Policy Evaluation Using Stakeholder Analysis and Multi-Attribute Utility Technology Methods : A Case Study of Intellectual Property Protection Policy in Thailand

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ABSTRACT

Arguments over technology policy typically turn out to hinge on disagreement about dimensions of value, how to evaluate, and people who affect and are affected by such policies. Most of technology policies deal with specific decision involving with technology, legal, social, and economic factors which some of them are hardly to quantify. Meanwhile, all people involving in such policies may view differently depend on their interests and information they received. This paper presents an application of Stakeholder Analysis and Multi-Attribute Utility Technology methods for policy evaluation. Both methods help to identify a set of attributes which reflects indicators of policy performance and then evaluate the indicators base on each stakeholder group who has interests in the policy. A policy for protection of intellectual property of software industry in Thailand was selected as a case study.

A set of multi-attribute (policy evaluation indicator) was developed. It consisted of 68 criteria and separated into 12 attribute groups. These 12 attribute groups can use as evaluation criteria which indicate policy effectiveness, policy efficiency, policy resource adequacy, and policy responsiveness. Twenty-one experts were identified from 3 groups of stakeholders namely software developers/retailers, policy-makers, and software users. The experts made evaluation on the 12 attribute groups by firstly given levels of important or weight scores to each attribute group, then scored the satisfactory level of each attribute. Final scores for overall evaluation were computed from multi-attribute value function by simply multiply satisfactory score of each single criteria with its weighting score and then sum all scores together. Besides the overall evaluation scores, integration of both methods in policy evaluation can provide satisfied levels, policy strengths and weaknesses, existing situation and future scenario for every single attribute and each attribute group. The paper also discusses effects to policy stakeholders, advantages, disadvantages, and further applications in policy evaluation.

1. INTRODUCTION

Arguments over technology policy typically turn out to hinge on disagreement about dimensions of value, how to evaluate, and people who affect and are affected by such policies. Most of technology policies deal with specific decision involving with technology, legal, social, and economic factors which some of them are hardly to quantify. Meanwhile, all people involving in such policies may view differently depend on their interests and information they received.

Practically, evaluations of S&T policy formalize many technological and economic relationships in trying to present an accurate picture of the "total outcome" of the various aspects. The final evaluation report usually indicates the policy outputs and policy impacts indicator by indicator. The decision-makers must then somehow use their preferences to integrate all of these indicators in their minds and come up with an judgement to evaluate the overall performance of the policy whether it is good or bad, and it should be continued or terminated. This is very difficult especially for the policy evaluation which has lots of indicators.

This paper presents an application of Stakeholder Analysis and Multi-Attribute Utility Technology (MAUT) methods for policy evaluation. Both methods help to identify a set of attributes which reflects indicators of policy performance and then evaluate the indicators base on each stakeholder group who has interests in the policy. A policy for protection of intellectual property of software industry in Thailand was selected as a case study.

2. BACKGROUNDS

2.1 Stakeholder Analysis

Stakeholder concept is derived from general system theory that all living organisms (systems) interact with, and are affected from the environment. The major key for survival of the system is the ability to adapt to be responsive to the changing conditions in the environment. This concept seems to have emerged initially in the system analysis work on organization conducted by researchers at the Tavistock Institute in London (Mason and Mitroff,1981:p.43). It is widely used in management science, political science, and public administration. For an organism such as modern business corporation or government, system thinking provides a power tools to help managers appreciate the relationships between their companies and the rest of the world.

William N. Dunn (1994:p.85) clarifies that policy stakeholders are individual or group who have a stake in a policy because they affect or are affected by government decisions . Frederick and et.al. (1992:p.7-8) defines stakeholders in term of business management as a group or groups "affected by corporation's decisions, policies, and operations". The stakeholder group can be, for example, citizens' groups, labour unions, political parties, government agencies, elected leaders, and policy analysts often respond in markedly different ways to the same information about the policy environment and public policies and conversely. Moreover, for the stakeholder analysis, Dunn (1994:p.9) calls this method as Multiple Stakeholder Analysis.

"Stakeholders are all those claimants inside and outside the firm who have a vested interest in the problem and its solution" and "[they] are the concrete entities that affect and in turn are affected by a policy" (Mason and Mitroff,

1981:p.43, 95). Mason and Mitroff applies the concept of stakeholder in Strategic Assumption Surfacing and Testing (SAST) which is a planning process for business strategic and policy planning. They point out that it is very important and is the first task to identify as many of the stakeholders which involving in the problem. For example, Mitroff and Linstone (1993:p.136-150) use SAST with stakeholder concept in case study of drug company with ten groups of stakeholders involved in the company's business. Mason and Mitroff (1981:p.95-106) also introduces some stakeholder generation methods that help policy analysts to identify stakeholders in various dimensions. They say that there are several methods for generating a comprehensive list of stakeholders such as (1) imperative, (2) positional, (3) reputational, (4) social participation, (5) opinion-leadership, (6) demographic, and (7) organizational.

In policy analysis, stakeholder groups play major roles in policy process and stakeholder is one element of public policy system (Dunn,1994:p.70-71). The public policy elements are actions which made by governmental bodies and agencies. The policy stakeholder elements also include groups of individuals such as labour union or political parties which involve in policies because they affect or are affected by the government actions

2.2 Mutiattribute Utility Technology (MAUT)

Multiattribute Utility Technology (MAUT) is a set of procedures designed to elicit from multiple stakeholders subjective judgements about the probability of occurrence and value of policy outcomes. The steps in conducting a multiattribute utility analysis as suggested by Edwards and Newman (1998:p. 11-12) are as follows:

1) Identify objects of evaluation and functions that the evaluation is intended to perform.
2) Stakeholder identification. Define all stakeholder who affect and are affect by policy.
3) Extract attributes which reflect evaluation values in every dimension from the stakeholder groups and organize them into a value tree with hierarchical structure.
4) Weight the importance of all attribute groups from step 3 by stakeholder groups. These relative important values should be varied from one group to another.
5) Establish location measures which represent utilities of the attributes. The location measures will help to convert desired or undesired values of the attributes with different units into normal scores (e.g. scores rank from 0 to 50 or 0 to 100).
6) Aggregate location measures (step 5) with weight scores (step 4).
7) Perform sensitivity analysis by varying different numbers such as weights of importance or numbers of inputs.

There are many variations of MAUT which are currently employed such as Dialectic Approach (Mitroff and Mason, 1981), Strategic Impact and Assumption-Identification Method (Abonyi, 1982), Analytic Hierarchy Process (Satty, 1980; Wind and Saaty, 1980), and Strategic Assumption Surfacing and Testing (Mason and Mitroff, 1981). These methods apply some common methods with different details such as system analysis, stakeholder analysis, tree diagram, weighting and scaling, normalised score , Z-score, qualitative judgement, and etc. The reviews of concepts, implement consideration, application areas, and suggested future research are discussed in Dyer and et.al. (1992:p.645-6 5 4) .

2.3 Intellectual Property Protection Policy in Thailand

Intellectual property protection policy in Thailand has been mainly exercised through Copyright Act, Patent Act, and Trademark Act. These laws have somewhat long history for their development back to 1892 and have reflected the government policies in each period of time. The intellectual property protection policy also portrayed a reality of

country's problems in economic, social, culture, and scientific development which government has to deal with both internal and external factors.

IPR protection in Thailand can be traced back to 1892 when the king declared the ownership of all articles in National Library newsletter. After that, in 1901, five years after the Berne Convention was completed at Paris in 1896. Thailand enacted the Ownership of Literary Works Act and was in force on August 12, 1901. On June 16, 1931 Literary and Artistic Work Protection Act was in force which extended its scope into international protection among Berne Convention's members. It should be observed that the act probably was enacted in order to preparing the domestic law to reach international standard before entering to the Berne Convention's membership (Hemaratchata, 1985:p.15). Moreover, On December 29,1980, Thailand decided to join the Paris Act of Berne Convention in Article 22-38 which concern about the administrative mechanism. The joining of the Convention was under a declaration provided for in Article 33(2) relating to the International Court of Justice (Bainbridge, 1996:p.525).

Like other developing countries, the current IPR protection policy in Thailand was enacted under trade pressures, particularly from the international influences (see Correa, 2000 and Anderson and Gallini, 1998). The pressures emerge from two sources: 1) foreign trade agreements and negotiations; and 2) copyright owner. In case of Thailand, the U.S. Trade Representative (USTR) has been using Generalized System Preferences (GSP) under section Special 301 as a penalty tool for Thailand. The U.S. has positioned its policy quite clear by agreed that stronger global IPRs are desirable and all effort should be made to minimize any loss (Callan, 1998:p.45). The U.S. has exercised its policy through international agreements and organizations such as World Trade Organization, GATTs, TRIPs, AFTA and etc. Also, another powerful policy tools of the U.S. is through bilateral negotiation by U.S. Trade Representative.

Loss in trade benefit to piracy was a main problem that made the U.S. forcing Thailand to revise the IPR protection policy and amend the copyright law. Each year, the U.S. intellectual property based products such as music, film, and computer software have been infringed in a large amount of money. For example, the software piracy alone costs the U.S. about 10,976.5 million U.S. dollars in 1998. For Thailand, the U.S. claimed that it lost 48.6 million U.S. dollars to Thailand's software piracy.

In April 1992, Thailand was named as a Priority Foreign Country under Special 301. On February 1, 1993, the U.S. sought immediate retaliation for Thailand's continuing unwillingness to take effective action: no prosecution against a pirate manufacturer or wholesaler had been completed, no major pirate had ever gone to jail, and claimed that the copyright industries had lost $560 million since 1984. During the spring, under the threat of trade retaliation, the Thai Government initiated strong enforcement actions and raids, primarily in the audio and video areas. The Thai Government also began drafting a revised copyright law.

After lengthy negotiations, the Thai government signed letters on August 24 and 25, 1993, reiterating its commitment to: continue aggressive raiding that had begun in earnest earlier that year; amend the copyright law to bring it up to Berne and TRIPS standards; create an IPR Court and authorize it to give improved remedies; and reduce its tariff rate on film prints. On the basis of these letters and continued enforcement, USTR removed Thailand from its status as a Priority Foreign Country and placed it on the Priority Watch List effective September 21, 1993. After Thailand enacted its new copyright law, the U.S. moved Thailand from the Priority Watch List to the Watch List on November 16, 1994, and kept it there in

April, 1995, citing "the need to ensure that deterrent penalties are imposed on convicted pirates" and other implementation issues under the new copyright law.

The IPR protection policy and Copyright Act issues raised a turmoil to the government in 1994 and before. In 1988, during government of Prime Minister General Prem Tinasulanondh, the intellectual property right protection policy issue partially caused to a dissolution of the Parliament. Even during the drafting of Copyright Act in 1993, opinions among the members of cabinet were separated between pro and con. The controversy focused mostly on negative and positive impacts from the policy on national social and economic systems and an economic power of the US over Thai economy (Hongjanya, 1994:p.69). Finally, the draft of Copyright act B.E. 2537 was approved by the cabinet on 20 July 1993 and was sent to the parliament.

On December 21, 1994, Thailand enacted a new revised copyright law as said in the letters signed with USTR on August 24 and 25, 1993. The Copyright Act B.E. 2537 (1994) extended scope of protected works to computer program, establish a copyright committee, protect the works of country members of Berne Convention, and increase penalties for copyright infringement. Moreover, the Act for the Establishment of and Procedure for Intellectual Property and International Trade Court came to effect on October 14, 1996.

Thai government provided the reasons for the proclamation of the Copyright Act B.E. 2537 (1994) as follows: 1) to improve the copyright protection measures in order to cope with the changing internal and external circumstances particularly the development and expansion of domestic and international economy , trade, and industry; 2) to promote the increasing creation of work in literary and artistic domain and other relevant field.

Recently, on 20 November 1997, Prime Minister Chuan Leekpai delivered the government policy on intellectual property to the Thai Parliament. The statement declared an attempt to protect intellectual property right as a part of foreign policy. The policy affirms that to "[*p*]*romote economic relations and cooperation with important trading partners under a free trading system with fair competition, as well as actively participate in efforts to reduce international conflict resulting from disputes related to trade, investment, technology transfer and protection of intellectual property rights, by taking into primary account the country's preparedness*".

3. FRAMEWORK OF THE STUDY

The objectives of this paper are to 1) evaluate intellectual property protection policy with a case study of software industry in Thailand; and 2) to apply Stakeholder Analysis and Multi-Attribute Utility Technology methods in policy evaluation. The policy evaluation mainly focuses on goal-based evaluation and attempts to measure level of policy goal achievement.

Principally, the MOUT process is based on the works of Abonyi (1982), Edwards and Newman (1982), Mason and Mitroff (1981), and Keeney (1997). Some vantage points from all MAUT variants were drawn and adapted to make the method simple, straightforward, and be able to apply for the study properly. Furthermore, an identification of stakeholders, policy attributes (assumptions), attribute values, and aggregate measures of all attribute values were the main outputs of MAUT method.

The followings are the five steps of the study framework:

Step 1 : Identification of system stakeholders, stakeholder properties and relationship among stakeholders and system(s).

1) Identify the objects of evaluation and the functions that the evaluation is intended to perform (Edwards and Newman, 1982:p.18-32). All activities which were performed before and after policy-making process are identified. Depending on the context and purpose, the same objects or any policy activities may have many different values and results. A result from system analysis in software industry is used as information for this step.
2) Stakeholder and stakeholder characteristics are identified (Edwards and Newman, 1982:p.33-35). The stakeholder can be person or organization whose utilities affected or are affected by the policy.

This step will employ "inside-out system analysis" by define input-output of the system and draw system flowcharts using system dynamic concept (Richardson and Pugh, 1981:p.1-17). The output of step 1 provides system models (see Figure 1) which represent the whole system , a list of stakeholders and their related activities which are necessary information for identifying the attributes implicit in the policy, outcomes, and impacts (Abonyi, 1982:p.42-46).

Step 2 : Attributes generation

1) Draw value dimension or attributes out from stakeholders (Edwards and Newman, 1982:p.36-38). Formally, these attributes are outcomes of possible defined policy activities which affect to each group of stakeholders. The attributes base on the social, economic, political, and other environment dimensions.
2) Organize the attributes into hierarchical structure called a multiattribute hierarchy or a value attribute tree (Edwards and Newman, 1982:p.38-41).
3) Identify the measures of each attribute in descriptive format (Edwards and Newman, 1982:p.42-52). The attributive measures are used as indicators for policy evaluation.

Attribute generation step can link all stakeholders and policy together to describe system relationship. If there is no specific linkage [in system flowchart] can be defined for particular stakeholder, this stakeholder becomes a candidate for elimination from further consideration. The output of this step is a list of attribute linking specified dimensions (Abonyi, 1982:p.46-47).

Step 3 : Questionnaire design

The purpose of this step is to design a questionnaire which is able to gather all attribute values from stakeholders. Mainly, the questionnaire consists of two parts. The first part asks for general information about a stakeholder. The second part is a core policy evaluation. The stakeholders were asked to examine each group of criteria (which contains attributes) in order to weights for their importance and locates the scale of each single attribute

The design employed the Likert's scale or Likert's method of summated rating as a primary technique to draw weights and attribute values from stakeholders. The Likert's scale is generally considered to be simpler to construct, more homogenous scale, more reliable, and provides more precise information about the individual attitude on the issues (Thomas, 1978:p.16; Mason and Bramble,1989:p.300-301; and Youngman and et.al., 1978:p.44). The Likert's scale also allows to construct both positive and negative questions (Moser and Graham, 1992:p. 362) which is very valuable for analysis of a policy impact.

The steps in construction of Likert's scale questionnaire is suggested by Thomas (1978:p.14-16). The summary of these steps as follows:

1) Collect a large pool of statements or question which reflect to all attributes.
2) Each statement should be decide whether it indicates a favourable or unfavourable attitude toward the attribute in question. Ambiguous statements or those indicating a neutral attitude are discarded.
3) Design questionnaire with score 0-100 varies from unfavourable to favourable attitude (see Table 1). The different in score rank does not affect the final attribute value since all score will be normalized into standard form.
4) The scores then are tested in order to check for internal consistency with reliability analysis (de Vaus, 1996:p.255-256). The reliability analysis allows to study the properties of measurement scales and the items that make them up. The Reliability Analysis procedure calculates a number of commonly used measures of scale also provides information about the relationships between individual items in the scale. The test will correlate attitude score with probability of item endorsement. If the item correlates significantly (alpha more than 0.70), therefore, it meets the criteria of internal consistency. The pre-test also provides the feedback of improper questions such as ambiguous meanings or unsuitable questions.
5) The preliminary statements of attributes which have highest correlation will be selected to construct a questionnaire at the final step.

Step 4 : Data collection

The data collection was conducted by way of deep interview. The stakeholders were selected from experts in each stakeholder group to ensure correct represent in the samples. The experts included executives from Department of Intellectual Property, Ministry of University Affairs, universities, software companies, solicitors, judges, and etc. During the deep interview process, the questionnaire was used as guideline, and some information were provide to each stakeholder. This is very useful for the stakeholders to make their evaluations base on the same information.

All attributes were assessed relative weight and importance (Edwards and Newman, 1982:p.52-62) and grouped as identifies in step 2 according to selected criteria (Abonyi, 1982:p.47-48). To accomplish this step, each attribute was developed discrete scale to indicate the degree which each attribute meets the criteria (Falkner and Benhajla, 1990:p.106-107). The discrete scale technique bases on Likert's scale (Moser and Kalton, 1992:p.361-366; Thomas, 1978:p.13-16; Mason and Bramble, 1989:p.301-302; Youngman and et.al., 1978:p.43-44).

Ascertain how well each object of evaluation serves each value at the lowest of the value tree. Such number, called single-attribute utility, ideally reports measurements or expert judgements. In stead of using location measures as suggested by Edwards and Newman (1982:p.65-73), each expert was ask to give a temporary scale for attribute evaluation directly based on type of attribute and policy evaluation score (Table 1).

Step 5 : Aggregate attribute measure for policy appropriateness and sensitivity analysis

Aggregate measures with measures of importance all attribute values (Edwards and Newman, 1982:p.74-80). This step normally produces the results of the MAUT evaluation or policy appropriateness in which all criteria are considered. By Using the following formula which adapted from Edwards and Newman (1982), the MAUT can be calculated value of each output as follow:

$$Ui = \sum_{i=1}^{n} WiwijUij$$

Where

U_i = the aggregate utility (value) of the i^{th} output

w_i = the standardized scale value assigned to the i^{th} value to weight the important of each policy objectives and goals (Level 1)

w_{ij} = the standardized scale value assigned to the i^{th} value to weight the policy influence to each j^{th} criteria (Level 2)

u_{ij} = probable value scale of the output indicator ith on j^{th} criteria (Level 3)

4. STAKEHOLDERS AND MULTIATTRIBUTES

A set of multi-attribute (policy evaluation indicator) was developed. It consisted of 68 criteria (single attribute) and separated into 12 attribute groups. These 12 attribute groups can use as evaluation criteria which indicate policy effectiveness, policy efficiency, policy resource adequacy, and policy responsiveness (see Figure 2). These criteria can be categorized into 3 groups prior to policy goal achievement:

1) Policy goal achievement in intensify development of marketing and economic : policy enforceability (PE), growth of software industry (GSI), and economic and social trade-off (EST).
2) Policy goal achievement in technology development to enhance knowledge based environment : level of creativity and innovation progress (CIP), level of technology diffusion and adaptability (TDA), and techno-legal impacts (TI).
3) Policy goal achievement in policy mechanism: Level of System Flexibility and Congruence (SFC); Efficiency in Policy Mechanism (EPM); Precision in Policy Mechanism (PPM); Policy Resource Allocation; Policy Visibility (PV); and Organization and Individual Impacts (OII).

Twenty-one experts were identified from 3 groups of stakeholders namely software developers/retailers, policy-makers, and software users. The experts made evaluation on the 12 attribute groups by firstly given levels of important or weight scores to each policy goal, attribute group, and then scored the satisfactory level of each attribute (see Table 1). With the capability of MAUT and simple spread sheet, the results of policy evaluation can be analyzed and presented in various dimension such as weighted score and non-weighted scored (for overall evaluation); existing evaluation and future prediction of the policy; policy evaluation by stakeholders, and policy goal achievement.

5. POLICY EVALUATION

Policy Overall Evaluation : Non-weighted Scores and Weighted Scores

Table 2 demonstrates summaries of policy evaluation (non-weighted or original scores) by Stakeholders and Table 3 shows summaries of policy evaluation (weighted scores) by stakeholders. The overall evaluation was placed between medium and high satisfied levels with scores 60.90 --based on the original scores without weighting. The policy-makers evaluated the policy with the performance scores higher than software developer/dealers/retailers and software users, but statistically insignificant. Meanwhile, Based on the weighted scores, the overall evaluation was placed between medium and high satisfied levels with scores 60.71 – very slight difference when compares with original scores (60.90).

The stakeholders valued existing performance of the policy at moderate level with the scores 52.29 points (from 100 points). The future performance was scored 70.09 points at the high level of satisfactory and differentiate from the exiting score significantly. The overall evaluation was placed between medium and high satisfied levels with scores 60.90.

The policy-makers evaluated the policy with the performance scores higher than software developer/dealers/retailers and software users, but statistically insignificant. The software developer/dealers/ retailers and software users evaluated the policy with the moderate satisfied level - - 59.26 points and 60.34 points respectively. It is only the policy-making group that rated the overall policy performance higher than other two stakeholder groups with scores 63.87 points. Most of attribute groups were ranked between scores about 50-60 points(medium satisfied level) and 61-70 points (high satisfied level). The total highest scores are techno-legal impacts (TI) and policy visibility (PV).

Based on the weighted scores, the overall evaluation was placed between medium and high satisfied levels with scores 60.71 – very slight difference when compares with original scores (60.90). The software developers/retailers, and software users were scores the policy performance with 58.54 points and 60.51 points respectively (medium satisfactory level). The policy-maker group viewed the policy performance a little higher than other two groups and gave the final scores at 64.12 points (high satisfactory level).

The stakeholders ranked the existing at the medium level (50.80 points). This is quite a low score. The future of the policy was scored 71.19 points – increased 20.39 points from the existing condition. There are 5 groups of attributes which distinctly differ between existing and future scores. These attribute groups are : policy enforceability (PE), growth of software industry (GSI), level of creativity and technology progress (CIP), level of technology diffusion and adaptability (TDA), and policy resource allocation (PRA).

Besides the overall evaluation, the MAUT can help to clarify strength and weakness of the policy by considering each single attribute and / or attribute groups. Figure 3 shows summary of policy evaluation by attribute groups. This is very useful when a policy-maker needs to bring the evaluation results as a policy feedback.

Policy Goal Achievement

Although the overall evaluation of the policy passed the criteria at a certain level, all the policy goals may or may not pass. The MAUT can apply to analyze the policy evaluation in various dimensions depends on evaluation design. Figure 4 presents the policy evaluation in time dimension (existing and future) which provides information about policy trends and policy impacts for the policy-maker, categorized by policy goal achievement. Figure 5 shows the summary of policy goal achievements in views of each stakeholder group. The followings are the summaries of policy goal achievement evaluation.

1) Policy goal in intensify development of marketing and economic has been aimed to reduce increase the economic benefit of the software owners by mainly reducing piracy rate in intellectual property products. In case of software, it is an assumption that the intellectual property protection policy would help to reduce software piracy rate and increase the market and economic returns to all stakeholders, especially software developer/retailers and software users, at a certain satisfied level. After policy has been implemented for 5 years (1994-1998), the stakeholders evaluated the current policy's performance at medium level (45.26 points—see Figure 4). Software developers gave low score when compares with other two stakeholder groups and overall scores (see Figure 5). In contrast, the evaluators saw the future of the policy with quite high satisfaction. The overall evaluation for the future of the policy's goal achievement was scored 73.02 points (high satisfied level). Finally, an overall policy performance for the policy to protect intellectual property right of the software owners was evaluated with moderate level (58.78 points), very close to high level.

2) Policy goal achievement in technology development to enhance knowledge based environment This policy goal based on It is based on an assumption that the policy would encourage and then increase a level of R&D in software industry. So far, the policy (or IPR factor) did not affect neither the level of R&D in software industry nor promote the development of the software technology. From the study concludes that IPR factor had medium influence to both R&D and technology levels. The stakeholders scored the existing goal achievement at medium level (53.98 points). The stakeholders scored the future trend with high level (72.06 points). For the overall evaluation of this goal achievement is 63.02 points (high satisfied level - -see Figure 4). Meanwhile, Software developers seem to be enjoy the achievement in current technology development with scores 65.39 points (see Figure 5), higher than overall scores.
3) Policy goal achievement in policy mechanism. In overall, the policy mechanism was designed suitably to overcome the problems in protection of software IPR enforcement. However, due to the nature of policy and legal systems in Thailand which is based on written text so it is quite rigid. If the policy formulation body (such as government and parliament) is not active enough to deal with rapidly change in the world of technology, it is hardly to change the current IP laws to cope with newly change in software and related technology. The existing policy mechanism demonstrates well harmony, durability, and co-operation in policy anti-piracy enforcement and promote the intellectual works. The stakeholders foresaw a few improvement when compares with other two policy goals (see Figure 4). Stakeholders stated that policy mechanism in Thailand is rigid, lacking of flexibility in changing, and depends largely on government bureaucracy. For overall, the policy mechanism was evaluated with medium satisfied level (54.97 points), the highest scores among all three policy goals. Policy makers and software users were quite satisfied with the achievement in policy mechanism (see Figure 5).

From the case study of Thailand's intellectual property protection policy, it clearly describes some advantages that the Stakeholder Analysis and MAUT provides. There are:

- Stakeholder dimension. The aggregation of individual preference into a group collective opinion reflects the preferences and trade-off among stakeholders and would serve as an effective tool in group decision making when multiple objectives exist. By convert aggregate values to normal or standard scale, the policy maker can avoid some evaluation difficulties and is easily obtain a overall aggregated result.
- Evaluation indicator dimension. The MAUT allows a policy analyst or policy maker to integrate all indicators which indicate a success or failure of the policy altogether. This is very useful for any policy that has multi-objectives and has many indicators with different units of measures. The large uncertainties about the varieties of indicators which will affect to policy at a different scale as well as the multiple objectives policies can be normalized into the same level.
- Analysis dimension. Both methods, when combine together, give a policy analysts more alternatives to analyze and present the result of policy evaluation in different combination.

In case where there are lots of attributes and stakeholder groups that make the MAUT analysis be too complicated, a computer can assist to calculate the results, rank-order the weighting and attribute values, review attribute value to the stakeholders, change weighting and value for sensitivity analysis. Although a computer which was use in this study is a simple spreadsheet program and cannot be consider policy value for final assessment. However, it does point out that the MAUT could easily be programmed and perform by a computer by adding the interface for user to input all information for analysis. The computer can be extended to communicate among the stakeholders whom giving their preferences in the evaluation to view other stakeholders' values and review their own values to reach the consensus. When apply with computer software and computer network (such as web based program), MAUT can operate at "one time, difference places" or "difference places, different times" where decision makers don't need to gather in one meeting room to participate This will help to speed the process.

Since this study operated on one-round evaluation basis, therefore, the stakeholders did not have chance to review individual scores and compare with other stakeholders. The stakeholder must concentrate and pay more attention in provided information before making any judgement. There is a probability that the evaluation scores may not reach the consensus because of the highly difference in opinion among stakeholder groups. If the stakeholders were allowed to review, change their inputs, and see the results of these changes, the evaluate scores may move to be more consensus. Nonetheless, an advantage of one-round evaluation is that it consumes less time than multi-rounds evaluation.

Another point is that an implementation of Stakeholders Analysis and MAUT have been noted to require care and professional expertise in its application (Bose and et.al., 1997:p.697). There is an argument that utility measure is non-stationary (see Kersten, 1985). The changing in a set of stakeholders may affect to the evaluation result because it depends largely on knowledge, information, attitude, and interest of each stakeholder. When policy stakeholders are defined, some stakeholders may link with the policy very far because some policies does not affect to the stakeholders directly. So far there is no previous work focus on how to select the experts as stakeholders. Persons which have positions, roles, and their reputations involving the policy would be a good basis for expert selection. If stakeholders are selected appropriately and support with adequate information, evaluate results would be accurate and reliable.

For the future research of policy evaluation with Stakeholder Analysis and MAUT, conceptual and structure should be developed especially stakeholder and attribute identifying. The system dynamic concept should be applied more in order to facilitate stakeholder and attribute identifying process. Finally, to cope with complicated problem, information technology should be developed as easy-to-use decision support system for a policy maker.

5. CONCLUSIONS

There is no decision procedure, formal or informal, can get around the fact that the policy evaluator's preferences are essentially subjective and critical aspect in policy evaluation. Stakeholder Analysis and MAUT methods decompose the complex overall evaluation problems into smaller sub-problems that can be better managed in terms of scaling, weighting, and combining the given scores from each criteria. Both methods show the policy decision-maker or policy evaluator how to aggregate the value or satisfactory level derived from each of the various attributes into a single measure of the overall value. There appear to be a variety of ways that use of Stakeholder Analysis and MAUT could have supported the policy decision making and evaluation.

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Table 1 Policy Evaluation Scores

Value/Criteria/Indicator Scale					
Score	Level of Attribute Value	Level of Important/ Influence	Level of Impact	Level of Opinior	Level of Adequacy/ Certainty/ Potential/ and etc.
0	No answer, Do not know, cannot justify	Unimportant No influence	No answer, Do not know	No answer, Do not know	No answer, Do not know
1 - 20	Strongly Unsatisfied Very low level value and tend to be decreased if the policy is not improved	Slightly Important/ Influence	Very High Negative Impact	Strongly Disagree	Very low
21 - 40	Unsatisfied Low level value and to be decrease in value if the policy is not improved	Some Important/ Influence	High Negative Impact	Disagree	Low
41 - 60	Moderate Satisfied Medium level value and value tend to stay the same if the policy is not improved	Moderate Important/ Influence	Equal impact No impact	Undecided	Medium
61 - 80	More Satisfied High level value and value tend to be increased with a low or medium rate	More Important/ Influence	High Positive Impact	Agree	High
81 - 100	Strongly Satisfied Very high level value and value tend to be increased with a high rate	Strongly Important/ Influence	Very High Positive Impact	Strongly Agree	Very high

Table 2 Summary of Policy Evaluation (Non-weighted or Original Scores) by Stakeholders

ATTRIBUTE GROUPS	STAKEHOLDER GROUP			TOTAL (non-weight)
	Developer	Policy	Users	
Policy Enforceability	46.94	68.85	65.52	58.51
Growth of Software Industry	63.33	66.67	59.92	63.31
Level of Creativity and Technology Progress	65.72	63.50	62.92	64.29
Level of Technology Diffusion and Adaptability	57.15	55.42	48.54	54.20
System Flexibility and Congruence	57.36	71.88	63.96	63.39
Efficiency in Policy Mechanism	55.28	54.38	62.92	57.20
Precision in Policy Mechanism	55.79	71.60	58.96	61.21
Policy Resource Allocation	55.46	65.56	62.08	60.24
Policy Visibility	70.00	72.29	67.00	69.94
Economic and Social Trade-off	57.05	52.40	52.79	54.51
Tech-legal Impacts	73.30	68.75	68.28	70.57
Organization and Individual Impacts	53.78	55.17	51.21	53.44
TOTAL (by Stakeholder Group)	59.26	63.87	60.34	60.90

Table 3 Summary of Policy Evaluation (Weighted scores) by Stakeholders

ATTRIBUTE GROUPS	STAKEHOLDER GROUP			TOTAL (Weighted)
	Developer	Policy	Users	
Policy Enforceability	7.22	10.59	10.08	9.00
Growth of Software Industry	7.31	7.69	6.91	7.30
Level of Creativity and Technology Progress	9.27	8.96	8.87	9.07
Level of Technology Diffusion and Adaptability	7.33	7.1	6.22	6.95
System Flexibility and Congruence	5.88	7.37	6.56	6.50
Efficiency in Policy Mechanism	2.83	2.79	3.23	2.93
Precision in Policy Mechanism	2.15	2.75	2.27	2.35
Policy Resource Allocation	4.98	5.88	5.57	5.41
Policy Visibility	0.90	0.93	0.86	0.90
Economic and Social Trade-off	3.66	3.36	3.38	3.49
Tech-legal Impacts	5.64	5.29	5.25	5.43
Organization and Individual Impacts	1.38	1.41	1.31	1.37
TOTAL (by Stakeholder Group)	58.55	64.12	60.51	60.71

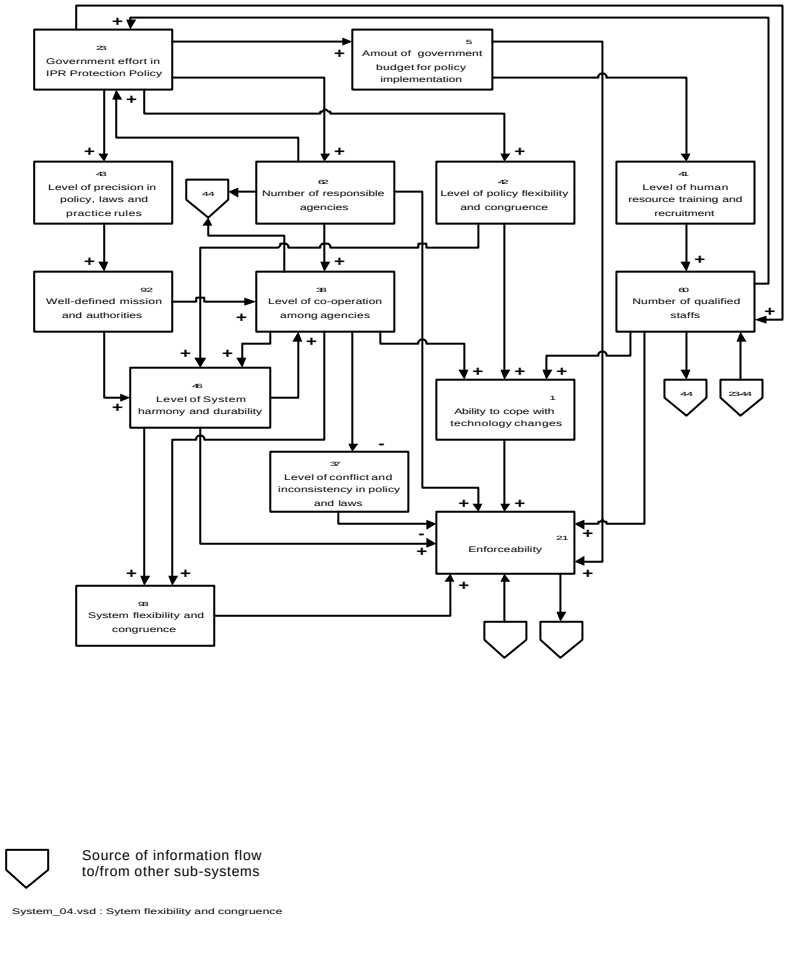


Figure 1 Example of System Analysis to Identify Attributes and Stakeholders

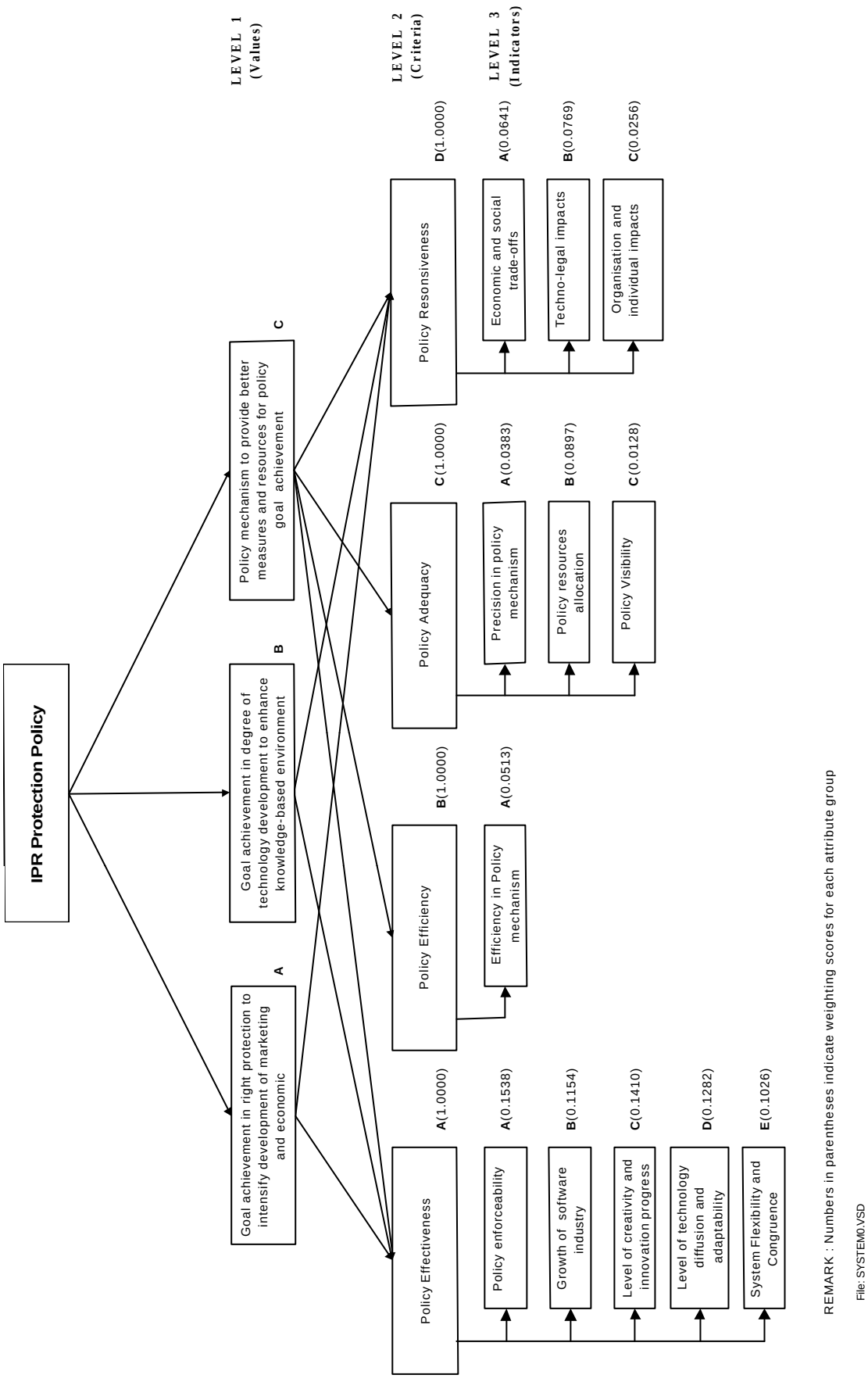
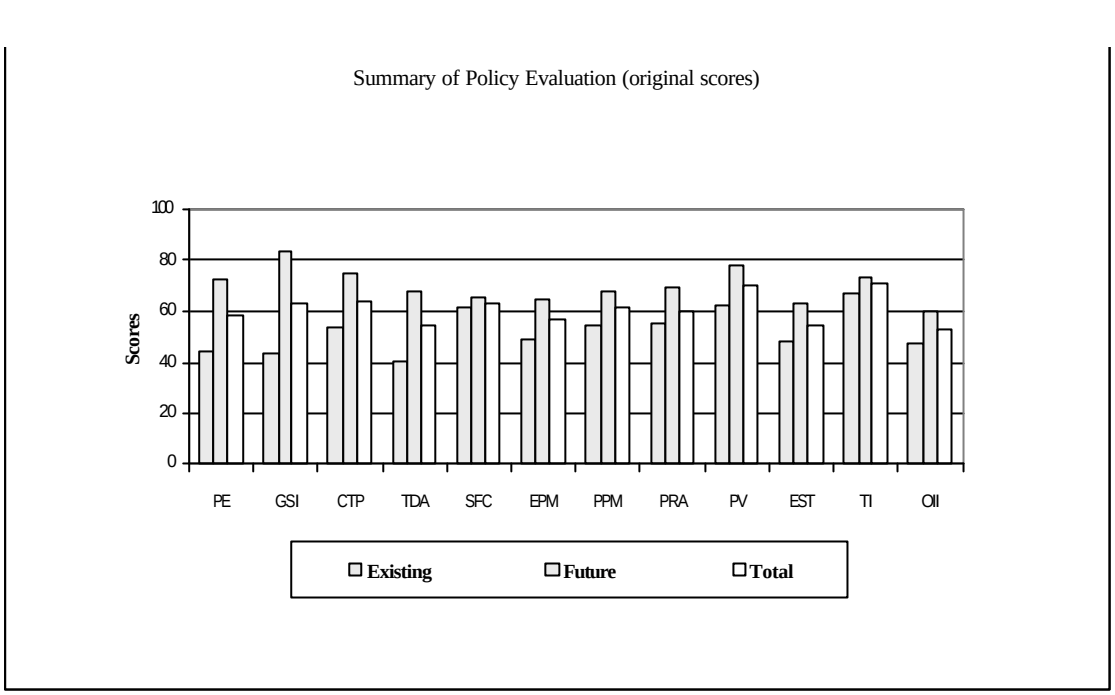


Figure 2 Multi-Attribute Hierarchy



REMARK :

Policy Enforceability (PE)
Growth of Software Industry (GSI)
Level of Creativity and Innovation Progress (CTP)
Level of Technology Diffusion and Adaptability (TDA)
System Flexibility and Congruence (SFC)
Efficiency in Policy Mechanism (EPM)
Precision in Policy Mechanism (PPM)
Policy Resource Allocation (PRA)
Policy Visibility (PV)
Economic and Social Trade-off (EST)
Techno-legal Impacts (TI)
Organization and Individual Impacts (OII)

Figure 3 Policy Evaluation with MAUT Separated by Attribute Group

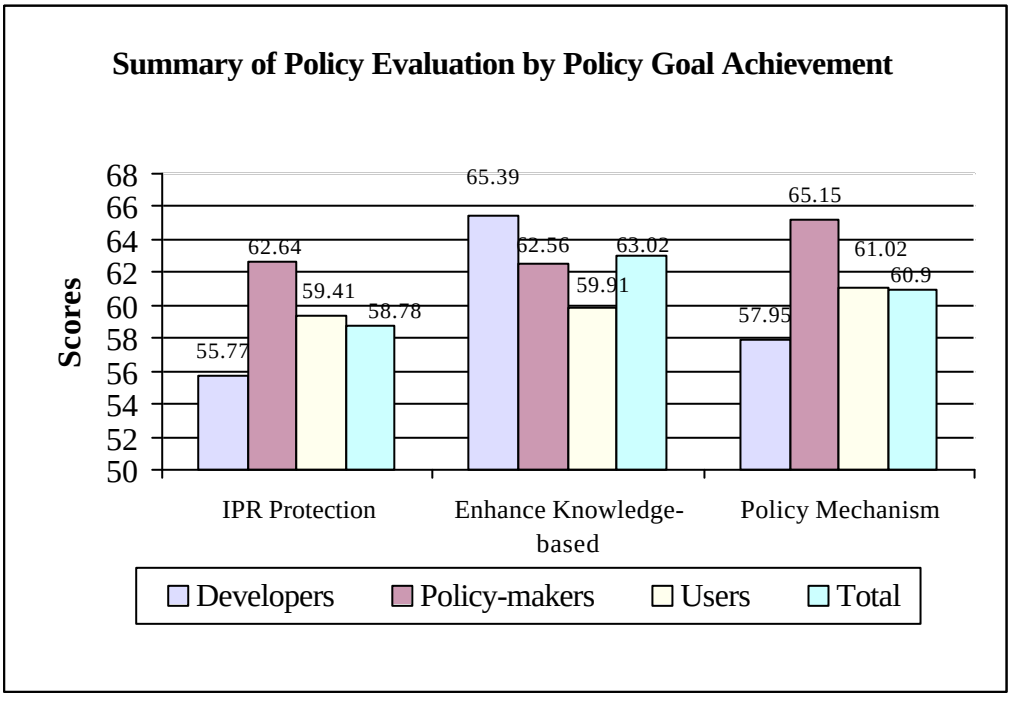


Figure 4 Policy Evaluation with MAUT Separated by Existing and Future Evaluation

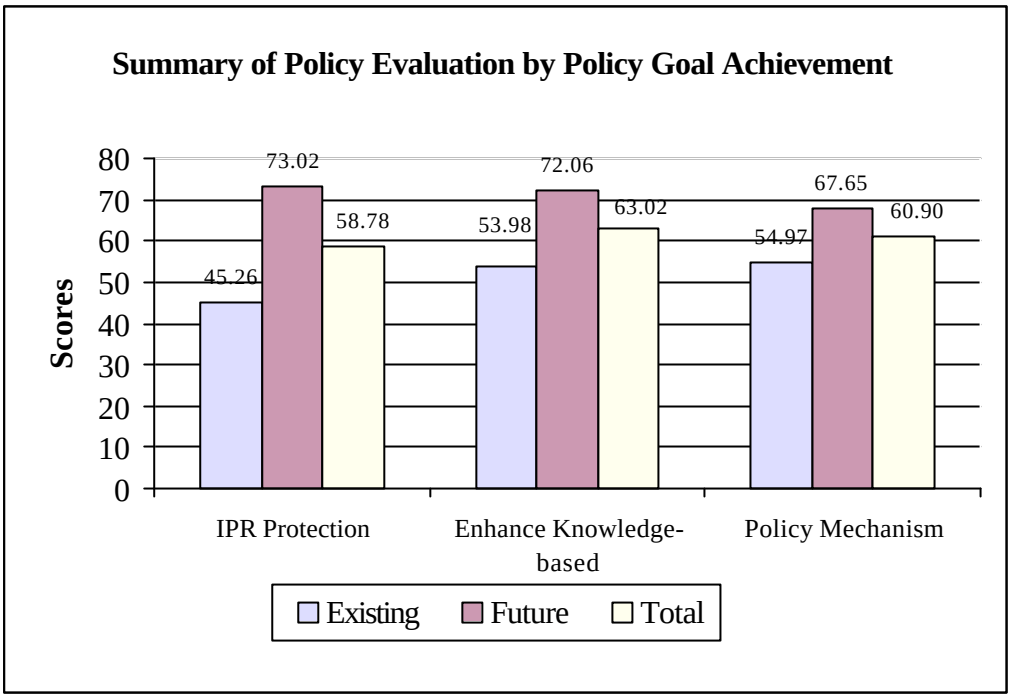


Figure 5 Policy Evaluation with MAUT Separated by Stakeholder Group