

A PLANNING MODEL FOR APARTMENT DEVELOPMENT PROJECT REFLECTING CLIENT REQUIREMENTS

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ABSTRACT : Client requirements is a concept with increasing interest in relation to several outcomes of companies, and in particular, in the event of apartment project that takes large share in the domestic construction industry, diverse angle of survey is performed to discover the client requirements and reflect them to the project to improve the quality. For this purpose, it is required to learn the client requirements and apply it in the apartment project, and the QFD (Quality Function Deployment) linked ROQ (Return On Quality) is a technique used in the manufacturing that surveys the client requirements to improve the customer satisfaction, and apply it to the quality improvement program to improve the profitability in this process. In this study, through the application of the ROQ process, the plan to improve the apartment quality management is presented. For this purpose, the consumer interview survey, FGI (focus group interview) survey and the client requirements are analyzed, and thereafter, through the interview with the specialist, the quality improvement program that enables the application to the product development of new apartment product is established. Through this process, the new apartment quality management improvement plan is presented.

Key words : Client, Requirement, Apartment, Quality

1. INTRODUCTION

1.1 Background and Purpose of Research

The client requirement is a desire and demand of consumers on the product or service as well as the basic element for customer satisfaction that it is related to several outcomes of the company that the interest on it has been recently increased(Myung-ho Park,1997). Therefore, for such an importance, the client requirement is learned and reflect it to the product development, and such flow is led to the construction industry that the construction academy and businesses also survey and reflect the client requirement, and through this output, the market competitiveness, a number of researches has been undertaken(J.M.Kamara, 1999).

In particular, the apartment in housing field of domestic construction market has a large share in domestic construction market with diverse customers that there is a demand for steady quality improvement. Therefore, through the diverse angle of survey, the client requirement is to be discovered and reflect such in the apartment project to satisfy the customers with the plan for apartment product.

This study surveys and analyzes the client requirement on apartment quality part, and when constructing apartment, this study presented the model of apartment development project to reflect it on the design and service quality.

1.2 Scope of Research and Method

This study on the product planning model that reflected the client requirement has progressed greatly in the manufacturing business, and many techniques have already developed and applied. These techniques develop and apply the model to apply in the apartment project, the similar product for manufacturing business and customer class, it may bring positive influence on the profitability in the apartment project. In this study, the quality improvement technique that reflected the client requirement is analyzed, and the study is limited to develop the planned model that is applied to the apartment development project.

This study is progressed as follows. First, the theoretical background related to research is contemplated and analyzed. Here, together with the contemplation of related researches, the important concept of this study, client requirement, and the surveying technique and the requirements surveyed on product quality and the technique to reflect the same on this quality is contemplated. On the basis of such concept, the client requirement is surveyed and applied in the planning stage of the apartment project by presenting the apartment project development model, and then, it shall be verified through the interview with the professionals.

2. THEORETICAL BACKGROUND

2.1 Trend of Related Research

To progress this study, the construction business undertakes the survey of client requirement, and implement the research for document contemplation related to the technique that is reflected on the product development.

Table 1. Related Research Bibliography

Classification	Title	Contents
Kyung-hwa Seo (2001)	A study on forecasting possibility of major district with post assessment utilizing visual value	Assessment after residing by applying QFD
Kamara, J. M. (1999)	CLIENT REQUIREMENTS PROCESSING IN CONSTRUCTION : A NEW APPROACH USING QFD	Introduce the QFD technique reflecting the customer demand in construction business
Low Sui Pheung (2001)	Quality Function Deployment in Design / Build Projects	Improving the quality by using QFD in design
Seay P. Cheong (2003)	Improving Construction Client Satisfaction Through Functional Briefing	Construction for client satisfaction reflecting the functional briefing

As shown on the document contemplation, construction business also reflect the client requirement with the QFD (Quality Function Deployment) and other quality improvement techniques studied. However, these study handles the contents on application through assessment after residing and possibility of application of QFD. Therefore, the domestic construction companies also develop the apartment products by QFD-applying product development system through the report of defect and assessment after residence, and the process is mostly surveyed after the apartment project for client requirement, as shown in the Figure 1.

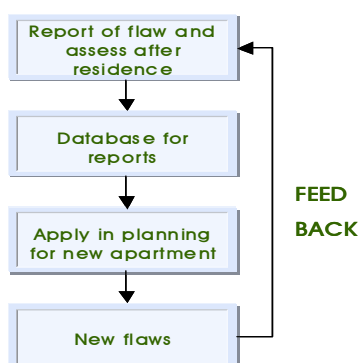


Figure 1. Requirements demanded by customer in existing domestic apartment business is reflected to process the product in this process

Perhaps it is attributable to the characteristics of apartment but such a technique is reflected on the new product development by surveying the demand of consumers who already purchased the product that there are many short-comings to fulfill the demand and desire of consumers who purchase the new product. Therefore, there is a need of consumer survey with the subject of expected purchasers at the planning stage of the apartment development project planning stage.

2.2 Customer Demand

2.2.1 Definition of Customer Demand

A client requirement is a desire and demand generated from a client when the product or service is acquired or consumed that the way of fulfilling it may have an immense impact on the corporate outcome (Park Myung-ho, 1997). In this regard, Philip Kotler said that, “the understanding of client requirement is the starting point of marketing and, without this, you are like a blinded person.” There are many cases of failure from focusing on qualitative data interpretation without reading the latent minds of clients that there is a need for survey in several techniques and actively utilize the qualitative technique for sentiment and experience of clients. In addition, in order to understand the ever complicated client requirements, there must be the introduction and facilitation of survey techniques used by the advanced companies that have applied the techniques in successful ways (Choi Soon-hwa, 2003).

2.2.2 Technique of Survey for Customer Demands

The advanced companies use various client survey techniques to find out the client requirement that has been more complex and diverse in recent days. In this study, the five techniques that are widely used recently are contemplated.

2.2.2.1 ZMET

This is the analysis method to learn and find out in metaphoric way through the non-linguistic and visual image for the needs in customer's sub-consciousness. This survey is done on 1:1 interview, and it has the participants to consider certain specific product or brand for about 2 weeks, then they collect the photo, picture and other images that express their feeling or thinking, then the researcher interprets the collected images gathered through the in-depth interview and analyze the frame of thinking of consumers. The technique is implemented for 12 ~ 20 persons of client to find the common themes, such as similarity, features and others, and the points describe the mental world of consumers by recreating the outcome in collage or mosaic. Through this method, the basic frame of concept to compose the thinking of clients can be described for mutual relationship, and for a tool of research method, it acquired the patent for the first time in the US (No. 5436830).

2.2.2.2 Laddering technique

This laddering technique is a method of survey to make the mental map by finding out the connection between the physical attribute of a product and the value of customers. In

order to find out the fundamental reasons that generate the consumption types, this technique approaches the internal value of individual through the perceptual process as if climbing of ladder to link to the concrete and realistic core elements with the abstract and existential value that attracts the purchase and use of a product. The laddering technique is a series of questions using the network to approach to the potential consciousness of consumers that it begins from the concrete attributes of product, including the color, taste, price and others, and it inquires the questions of "Why is it important?" to approach to the abstract and symbolic concept. In addition, it is made in the 1:1 in-depth interview method, and only a few and short questions would not bring out the internal value of consumers that the series of questions may be extended up to 20 stages.

2.2.2.3 FGI (Focus Group Interview)

This is a technique for a small number of participants to intensely discuss on certain theme with advertisement effect, brand recognition and degree of satisfaction and others. With the instruction of a moderator, 6~8 participants begin the discussion on a theme, and the participants may provide the valuable information if they had the experience of using the product or service, and the moderator shall have the skillful technique to lead the discussion in addition to have the professional knowledge and experience on products. This technique sometimes is facilitated for the purpose of advance or after the verification of the main marketing survey, rather than the independent use, but it may be risky to fully dependent on the survey outcome only by the top-of-mind without serious contemplation on the discussion themes. In addition, the method may be altered depending on the characteristics of product and consumer in a way of maximize the survey effect. In other word, The thinking of participants may be limited if the rigid interview space and method is used that there is a need for preparation, and for the product valuing on sentiment and experiment, the product is experiment directly in consumption environment and similar space to heighten the effect of interview.

2.3 Quality

2.3.1 Definition of Quality

The word, quality, has several meanings while developing from the existing traditional concept to the recent strategic concept. The traditional concept of quality has been objectively expressed for the physical properties of quality such as "prolonged use, sturdy and persistent" and others. However, together with the changes in modern industrial society, the executives of competitive society today gradually develop the concept of strategic quality in "satisfying the desire of clients" that the aspect of subjective features of quality has been emerged.

2.3.2 Quality Classification

The quality on entire life cycle is important, and it is largely classified into the purported quality to achieve the client's demand for quality and congruent quality to satisfy the quality specification, and the mutual relationship and formation is shown as below Figure 2.

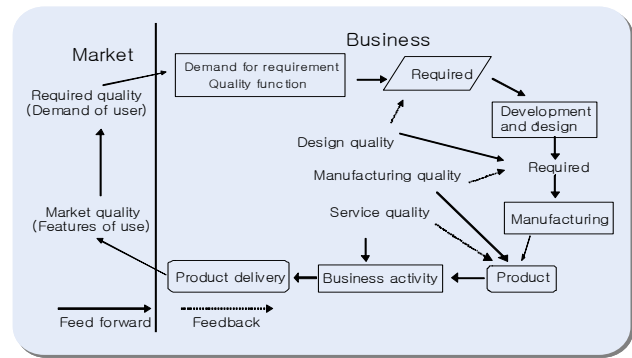


Figure 2. Relationship of Quality and Process of Formation

2.4 ROQ(Return On Quality)

2.4.1 Theory System of ROQ Analysis

2.4.1.1 Relationship of effect of quality and profit

The PIMS researchers announced that there is a strong relationship between the profit and quality orders, and between the quality and the market share rate from investment through a series of research.

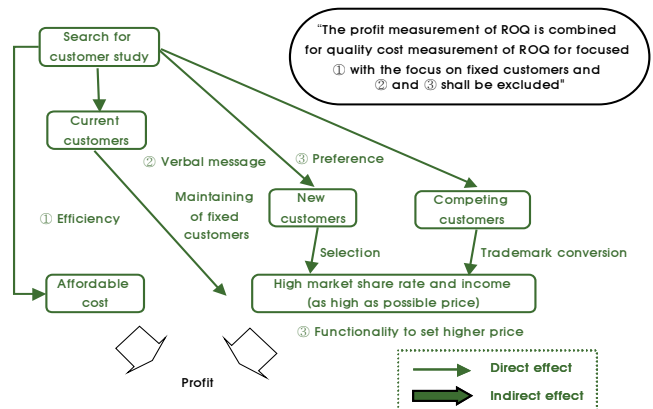


Figure 3. Effect of Quality and Profit

2.4.1.2 Expected effect of ROQ

1) Verification on appropriateness of management

Through the customer-oriented process analysis, it connects to the selection of detailed emphasized process, as well as the scientific connection with the client required /value and internal process and the quality improvement program. In addition, the intense investment with the limited resource and fund can be made in process improvement with significant profit effect can be made.

2) Measurement of financial effect

The verification on financial result that the measurement and quality through the calculation of quality improvement cost of ROI and net current value.

3) Simulation on investment decision

Through the mutually reacting computer model, it may forecast the market share rate with the fixed customer maintenance, impact and effect on process improvement profit, and the alternative for quality improvement can be assessed based on the profit effect.

2.4.2 ROQ Approach

2.4.2.1 Stage of ROQ measurement

The measurement stage of ROQ can be summarized in the following 4 stages, and the major contents for each stage is shown on Figure 4.

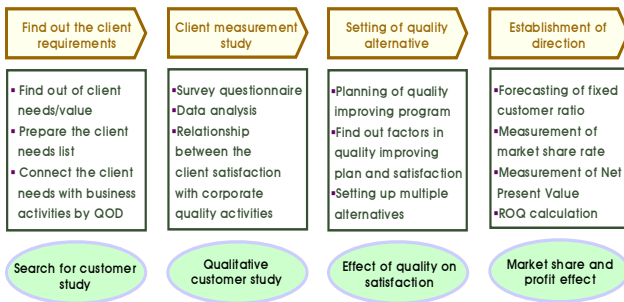


Figure 4. ROQ measurement stage

1) Learning of customer demands

In this stage, a company is considered as a service designed to satisfy the customer needs. Therefore, The customer needs list on service is prepared, and the customer needs using the Quality Function Deployment is connected to the corporate activities. The process that client needs are connected to the design characteristics with QFD technique.

2) Stage of customer measurement research

In this stage, the questionnaire for measuring the customer satisfaction is drafted and the questionnaire survey is implemented. In addition, the data is analyzed to find out the various corporate activities, relationship with the customer satisfaction and the matter of fixed customer is found out.

3) Stage to set quality alternative

This is the stage to find out client satisfaction factors on corporate activities that the factors that influence on the general client satisfaction is learned from quality improvement program. Also, the major management level and categories are defined and the improvement process that considered major management level of structure is selected.

4) Stage of establishing promotion direction

In this stage, the relationship between the satisfaction and fixed customer rate is learned through the data analysis. In addition, by using this relationship, the newly added fixed client ratio from the quality improvement program is estimated, and measure the market share rate that responds to the new fixed client rate, and find out the efficient method for cost savings from the quality improvement program. Lastly, the changed market share rate is added with the saved cost from quality improvement program and subtract cost of the program to make the net prevent value.

3. ROQ APPLICATION IN PLANNING FOR NEW APARTMENT PRODUCT

3.1 Research Process

The purpose of this study is to develop the entire planning model that reflected the client requirement. From the theoretic background of Chapter 2, from the quality improvement technique for customer satisfaction, there is

the QFD-linked ROQ process, and this is to survey the client requirement first, and establish the quality improvement program thereto. For this purpose, various customer surveys have to be made, and it is important to analyze it with reliability. As shown on the document observation and the client survey methods of domestic construction companies, QFD technique currently applied in domestic construction business mostly applied by the client requirements surveyed after the projects. And the reliability of data is less assured since the subjects of client survey is aimed at people who already made the purchase and not to make a purchase for a long time rather than the demand of customers who is about to purchase the apartment product. Therefore, the marketing survey that is made for the expected person to move in at the product planning stage of the apartment project, and as shown in earlier 2.2.3, it has to be actively made by active utilization of qualitative method as well as the quantitative method as well. Therefore, this study applies the ROQ process used in manufacturing to the apartment for construction business to survey the quality category through customer survey of quantitative and qualitative techniques, and this outcome is reflected on the quality improvement program and verify through the specialist monitoring for the result, then, it is to show that the above process is systematically established to show as the model before the apartment project when undertaking the apartment project.

In order to undertake this study, the Suwon and Yongin areas are presumed as the new apartment project district and implemented two surveys for the subjects of the area clients. The survey of client requirement was done by quantitative technique(questionnaire for visitors of apartment model house) and qualitative technique, through the outcome analysis and specialist monitoring, the quality improvement program is established to apply to the new project, and through this process, the planned model for the apartment development project by reflecting the client requirement through this process.

3.2 Quantitative Technique

3.2.1 Consumer interview survey (questionnaire survey)

For the interview survey of client residing in the Suwon area, several categories on quality field from the current residential area was measured with subjects of model house visitors in Maetan district of Korea Housing Corporation.

3.2.2 Assessment method

On the response to each question, good points and complaints of variables are assessed for the rank of 1, 2, and 3 and this is comprehensively converted into a percentage.

3.2.3 Question category

The questions are composed of the categories under the Figure 5 of Checklist for each field of decision making and apartment quality and price at the time of purchasing the housing and residential situation.

3.3 Quantitative Technique

3.3.1 Survey of customer FGI (Focus Group Interview)

The FGI survey was implemented for the survey of

requirement on customers of the apartment with the subject of interviewees selected through the application from the persons of Suwon, Yongin and Seongnam apartment.

Respondent	Name Resident (City/county, gu/myeon) Housing types Housing size (Based on the area for sales)
Major decision making factors when subscribing for subdivision sales	
Intent to purchase	
Assessment on pricing	
Quality of apartment	Assessment of quality level (compared to other company) Assessment on quality change
Each size of apartment	Good Complaints
Desirable housing concept	
Importance for each subject consumer	Children's room VS family living Open space VS Privacy of housewives
Space composition (Front assignment of children's room)	Inside of apartment Outside of apartment
Priority sequence for quality class	Installation of swimming pool within the complex (Increase of 1 million won for subdivision sales) Assessment on location feature (image) Appropriate price in apartment business district

Figure 5. Checklist for questionnaires for survey

Stage 1	Self introduction, purpose and description of instruction
Stage 2	An act related to apartment purchase ① Previous residence, time of move, reason ② Point of consideration when subdivision sales or purchase
Stage 3	Opinion on general complex concept ① Good point of apartment currently residing ② Not satisfied from the apartment of current resident ③ Impressive point from the recently sold apartment ④ What is the complex that has higher price or popular in nearby area of your residence? What is the reason for higher price ⑤ Opinion related to parking facilities ⑥ Mixed arrangement of apartment for lease and sales ⑦ Opinion on location of apartment business district ⑧ What do you wish in a new apartment? ⑨ Appropriate sales price for each size of apartment business area ⑩ Recognition and feeling on the apartment brand ⑪ Appropriateness when the apartment brand is used for subject business district
	Assessment and opinion on plane ① Point you like when you visited other apartment ② Opinion on penthouse on highest floor ③ Reaction on single housing on the highest floor ④ Preference on first floor exclusive garden ⑤ Balcony preference for each size (ABCD) ⑥ Installation of balcony sash
	Assessment of construction company and product image ① Thinking of apartment as a product ② Improvement of the apartment

Figure 6. Checklist for questionnaires for FGI survey

3.3.2 Caution

The response shown on consumer FGI is purported on finding the issue not thought of by the surveyor or finding the content to be known in detail in the final questionnaire. Another word, rather than gaining a conclusion but to formulate an image, and the result may differ depending on the interviewer. Therefore, a note shall be made not to expand the following response to the opinion of entire subject.

3.3.3 Outcome indication method

This is the method that writes down each reaction on question. For example, when the reaction was made by two persons, the mark was made for the two opinion, and in the event of multiple persons consent, it is marked with 'multiple', and no response was not marketed, and it was not to be interpreted as no response. In other word, the marked showing may not be all of the reactions that was shown.

Under the survey purpose, the arrangement is made mainly for the survey purpose, and the sequence of cleared opinion is sometimes in presentation sequence, but it is not related to importance, and the number before the opinion is for the identification of the attending person.

4. ANALYSIS OF SURVEY RESULT AND IMPROVEMENT PLAN

4.1 Analysis of Customer Measurement Result

4.1.1 Questionnaire Survey

As the result of analyzing the data after the questionnaire survey, the advantages in the current resident living was the structure of lining the living room and kitchen and expansion of the balcony for convenience with 24% and 30%, respectively. In addition, for complaints, there is no built-in furniture and no complaints for 15% and 32%, respectively that there is a gap between the clients for the questionnaire of dissatisfaction for current residential living. Therefore, to supplement this point, the thinking of potential clients is surveyed through the normal customer survey technique, and this point is reflected to contribute in the quality of apartment.

4.1.2 FGI Survey

As a result of comprehensive analysis for FGI survey data, there are needs of convenience facilities within the complex (post box, bank, commercial premises, sports center and others), park facilities (sports and bicycle road, hiking path and others), high level landscaping and security facilities, well ventilated parking space on outdoor. In the aspect of plane, structure and facilities, there is a need of various storage space, use of high class finish material, dress room, useful veranda, expandability of rooms and high ceiling, and there are other needs of planning for seniors, development of system that can make prompt action for affordable price that these points have to be reflected when planning for the new product of the apartment.

4.2 Selection of Quality Management Area

In order to establish the quality improvement plan for product and service of apartment, the quality improvement area has to be classified and selected. Considering the comments on quality classification on 2.2.3, the design and service items are divided for each column. The design quality is classified into five fields of outdoor space, arrangement plan, plane and structure, facilities, and finish while the service quality is classified into two fields in management and repairing and maintenance.

4.3 Establishment of Quality Improvement Plan

4.3.1 Interview with Specialists

The ideal plan for customer satisfaction is to reflect all client requirements, however, the requirement for each is all different and unable to accept all requirements in terms of budget that there is a need of formulating the improvement plan that can be selected with priority through the interview of specialists.

This study selected 6 construction companies of Korea, and the categories to apply in categories surveyed through the interview with the person in charge who plans and develops the products.

4.3.2 Quality Improvement Plan

In order to gather the data earlier surveyed and formulate the quality improvement plan, interviews with specialists in

3 companies were conducted. As the result, with the exception of a few categories that are impossible to apply realistically, and go through the priority sequence for second review to formulate the quality improvement categories as shown below.

Classification	Design quality				Service quality	
	Outdoor space	Arrangement plan	Plane and structure	Furniture and facilities	Management and service	Defect repairing
Improvement plan	-Resting space extension -Resident public facilities -Vending machine for civil petitions -Green land/landscaping -Hiking/bicycle path	-Arrangement to southern direction -Securing the right to view -Underground parking	-Bay number: 4 bays -Front porch in all unit -Dress room/Powder room -Expansion type balcony -Multi-purpose use/Auxiliary kitchen installation	-Numerous storage space -Built-in furniture & electronics -Living room art wall -Home automation system -Over 100Mbps network environment	-Education program for resident report/ -Pre-tenancy site visit -Apartment management office employee training	-Prompt defect repairing -Process system -Affordable defect repairing

Figure 7. Quality Improvement Plan

When the quality categories on each of the above categories are intensely improved and applied in the apartment projects in the Suwon and Yongin area, it is expected to have the positive result in improving the apartment recognition and profitability through the customer satisfaction.

5. CONCLUSION

5.1 Outcome of Research

This study was to present the improvement plan with the reflection of client requirement and management for the quality improvement of apartment that has a large share of domestic construction market as a part of customer satisfaction management. For the existing survey method for client requirement and its reflecting process, the most of opinions of customers were surveyed after the apartment project. Therefore, in the apartment business where the re-purchase is not available, the existing methods of client requirement had some difficulties to reflect the client requirement who purchased apartment. Therefore, this study proposed the process that can improve the quality by surveying and reflecting in detail for the client requirement for the expected purchasers of the apartment.

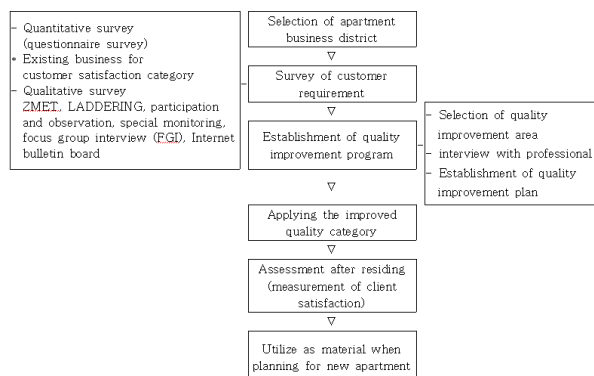


Figure 8. Planned model before apartment business reflecting the customer requirement

Such a model has the value as the tool for planning at the time of planning the apartment development project under the reality of domestic apartment product development without much client requirement survey for expected clients.

5.2 Future Direction of Research

The client satisfaction is measured by the subject of actually commercialized apartment with the application of quality improvement plan and feedback on the client requirement, the study for survey and assessment on the influence on profitability can be made through the quality improvement on customer satisfaction by using ROQ.

In addition, in addition to select appropriate subscription group, reliable questionnaire survey and FGI, the early mentioned ZMET, laddering and other techniques shall be applied to the development of the apartment development in a way to reflect the client requirement for more in-depth.

REFERENCES

- [1] Myung-Ho Park, "Establishment of the Renewed Client Requirement Concept", *Journal of the Marketing Institute of Korea*, Vol. 1, No.4, 1999.
- [2] Soon-Hwa Choi, *Make the product to be able to sell during depression*, CEO Information No 405, SERI, 2003
- [3] Kyung-Hwa Seo, "A study on forecasting possibility of major district with post assessment utilizing visual value", *Journal of the Architectural Institute of Korea*, Vol 17, No 7, 2001
- [4] Roland T. Rust, *Return On Quality*, Times Mirror International Publishers, 1995
- [5] J.M. Kamara, "Client Requirements Processing in Construction : A New Approach Using QFD", *Journal of Architectural Engineering*, ASCE, Vol. 5 No. 1, March 1999, pp. 8-14
- [6] Seay `P. Cheong, "Improving Construction Client Satisfaction Through Functional Briefing", *Construction Research Congress : Winds of Change Integration and Innovation In Construction*, ASCE, 2003
- [7] Low Sui Pheng, "Quality Function Deployment in Design/Build Projects", *Journal of Architectural Engineering*, ASCE, Vol. 7, No. 2, June 2001, pp. 30-39