

**STUDY OF APPROACHES TO QUALITY IN THE
ARCHITECTURAL PROFESSION**

A Thesis

by

APARNA VARADHARAJAN

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

August 2002

Major Subject: Architecture

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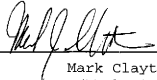
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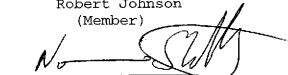
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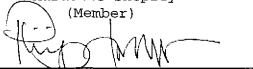
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ABSTRACT

Study of Approaches to Quality in the Architectural
Profession. (August 2002)

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Quality, as defined by the researcher, is a holistic concept of satisfaction of all the participants in architectural design: clients, users and professionals. This thesis analyzes what quality implies to architects. At the onset, it explores the various facets of design quality and the numerous quality models propounded by theorists. This compilation of information is classified based on their orientation towards each of the participant groups. The research then investigates the state of quality issues and processes in a section of the architectural profession, represented by five of the fifteen largest architectural firms in the world. The case studies consisted of interviews with members of the firm and documented evidence. These findings are correlated with the theoretical positions and analyzed for discrepancies. The study brings to light the disparity in the attitudes of the industry, theorists and the researcher on the basic definition of quality and the importance of quality issues in architectural design.

DEDICATION

To you Dad, for all that you represent
and
for what quality means to you.

ACKNOWLEDGEMENTS

Practicing architects say architecture is a collaborative effort, and I say, so is a thesis on architecture. Without the individuals mentioned below, this thesis would not have been written yet.

This study would have been impossible without Dr. Seidel who apart from being my Chair, was also a friendly ear in times of academic confusion and a source of encouragement in despondent, worrying times. Thank you, Dr. Seidel for your guidance, patience and for your frequently used, fearsome line, *"If you do not narrow it down, you will be an old woman when you graduate"*. I also thank all my Committee Members, Dr. Clayton, Dr. Johnson, Dr. Shepley and Dr. Stubbs and substitute Committee Member, Dr. Phil Tabb who not only guided me through this endeavor but also gave me the confidence to attempt it. I specially want to thank Dr. Johnson who facilitated the case studies by providing me the contacts in the firms and who quizzed me so thoroughly on the subject, making me more determined not to fail.

I will be remiss if I do not mention the firms who participated in this study. I would like to thank the members of RTKL, HKS, 3DI, NBBJ and Gensler for accommodating me despite their busy work schedules. Without them, this thesis would not hold the same academic and personal value.

The shoemaker had his elves and I had my dear friends, without whom deadlines would have never have been kept and peace of mind definitely lost. I thank Ruchi, Suma, Prama, Ashvin and Vasuki

for reading my proofs and bolstering my spirits in war times. Upali and Mukta, two invaluable friends, who I bored to tears with my discussion and debate, a big hug to you both. Upali, I owe you big time, but for your idea of thematic analysis, case study interpretation would have been a nightmare.

Lastly, I would like to thank my family, especially Dad who not only believed in my ability but also footed the bills.

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1. INTRODUCTION

1.1 INTRODUCTION

Architects have tried to legitimize the profession... through exclusivity and elitism. In their search for a credible professional identity, architects have systematically attempted to purify the aesthetic high ground by divesting the profession of various technical and menial roles now taken up by engineers, consultants, and builders. While serving to delineate the professional identity of the architect, the elitist relinquishment of industrial construction and middle-income housing has had the effect of diminishing and narrowing the client base available to the architect to little more than developers, large institutions, corporations, and the occasional wealthy individual. The result is that architects now find themselves in something of a self-imposed exile within design.

-Architect Stanley Mathews, from the paper, "Architecture, Science, and Aesthetics" as in Fisher's popular press article, "Can this profession be saved?" (Fisher, 1994, p.49)

Architecture, by all accounts, is facing an uphill task in maintaining its integrity as a profession and an applied art form (Fisher, 1994; Gutman, 1988; Kostof, 2000). This situation along with the ever-increasing danger of being sidelined by related fields, has architects and academics examining the direction in which architecture is going and re-evaluating positions. There has been a clear call for the profession to pull up its socks and deliver.

This thesis follows the style and format of the *Journal of Architectural and Planning Research*.

The profession is undergoing tremendous change in various directions and it seems that it is definitely more fragmentary now than in the past. Placing the profession under a magnifying glass, one sees various trends in the profession and Fisher (Fisher, 1994) has identified some of them in his article which is aptly titled, "Can this profession be saved?" In the article, he talks about the eroding client base with a shift in the supply-demand equation. He argues that there is an oversupply of architects and a parallel lowering of the public value of the architect's worth. He, like many others (Gutman, 1988; Kostof, 2000), talks about increasing competition and increasing pressure from outside the profession due to the growing complexity of projects. He adds that the profession's loss of a clear public purpose has definitely hurt it. Architects, he contends, are now only seen as promoting the interests of the large corporations and wealthy clients. Gutman (Gutman, 1988, p.97) identified ten trends in a practice amongst them were the rising consolidation and professionalism in the construction industry, greater rationality and sophistication of client organizations, the changing expectations of the public and the increasing and intense competition within and without the profession.

There are more people educated in technical and building matters and even people who are not professionals are more aware of architectural issues. A combination of these factors not only makes better clients but also raises the demand and standard of quality. Public sector clients like the Canadian Department of National Defense and Public Works along with a majority of the larger corporate clients are, increasingly, demanding ISO 9001

compliance and this is forcing some architectural firms to aspire for an ISO 9001¹ certification or adopt Total Quality Management (TQM) or other business models of quality.

Risk assessment and liability are big issues in practice today. Quality assurance is becoming popular due to the detailed documentation which helps assessing design risk more easily. Public clients now demand A/E firms have quality assurance or they are not eligible for participating in tender submission (Cornick, 1991, p.3).

The Continental Casualty Company compiled some statistics indicating that by 1983, the average liability claim payment rose from \$108,000 to \$148,000 per claim in five years (Streeter, 1988, p.4). The eighties saw a steady increase of 44 claims per 100 firms. Projecting these figures, one can assume that this number has increased drastically over the nineties and it continues to rise. Surveys conducted to understand causes of failure in buildings in Table 1 indicated² (Cornick, 1991, p.2):

Table 1: FAILURES IN BUILDINGS

	BRE Survey	Later ABCM Survey
Design faults	50%	33%
Product flaws	10%	26%
Construction flaws	40%	41%

¹ ISO 9001 is an international quality standard established by the International Standard Organization.

² The two surveys were conducted by the Property Services Agency (PSA) in the UK and were published in 1986, pertaining to causes of government building failures and forming the basis for the PSA's Design Standards.

The timing of Quality Assurance (QA) programs has a tremendous effect on cost and effectiveness as some errors can be eliminated at the design phase. Most building failures stem from information system failures arising out of unclear communication or incomplete research. Cornick (Cornick, 1991, pp.203-207) speaks of a workshop held for British firms where the primary quality assurance problem was found to be an improper allocation of time and resources.

Stasiowski and Burstein have summarized the need for quality when they identified the following trends in markets served by architects, indicating that there is a need to change business practices irrespective of how successful they have been in the past (Stasiowski and Burstein, 1994, pp.4-5), clients have higher standards and they are eager to sue if not satisfied. Simultaneously, they are insisting on shorter schedules and smaller budgets. Foreign firms are offering competition while nationally, there is an insufficient supply of qualified professionals. There are fewer apprentice programs, limiting training to fledgling architects. Capital requirements for CAD and other technical advances require firms to be more profitable while employees are demanding more while giving less.

To combat all these threats and problems, architects are beginning to adopt some of the technical systems in strategic planning: data processing, information and telecommunication. However, they are slower to adopt the "softer aspects" of strategic planning that call for development of the technical systems like decision theory, operation research, organizational theory and information theory (Hawk, 1984, p.178). These are now

being perceived as important as the architectural firms are getting larger and more competitive. Therefore, the way firms handle quality issues is an immediate concern.

Frankline, on his paper on Total Quality Management for the AIA, defines quality as, "*What it takes to bring total satisfaction - to clients, users and you*" (Frankline, 1992, p. 4). He elaborates that quality goes beyond what clients know they want. It is not just about complying with contractual and regulatory requirements. He states and, rightly so, that satisfaction is not even measured on the same scale as dissatisfaction. Satisfaction is about intangibles such as trust, communication, ready availability and perceived value while dissatisfaction measures tangible failure or obvious inadequacy.

To most firms, quality means lower repeat costs, profits, job satisfaction to all players and quality in terms of service and product. However, measurement of quality is difficult. Some designers believe that quality is a completely aesthetic attribute. An attempt to measure aesthetic quality only resulted in more design awards with predefined criteria in some cases. However, political machinations have rendered this method ineffective (Perkins, 1984, p.34). Legal quality can be measured by the number of lawsuits the firm has incurred, amounts paid in liability claims and the insurance company's risk categories. Functional quality can be measured using various tools. Till recently, design firms went in for quality control (inspection and action in retrospect) to catch design errors now quality assurance(preventive measures)is undertaken to prevent errors.

The current recession has also put quality in the spotlight as a possible strategy to boost productivity and hold onto clients. Quality strategies according to Davy (Davy, 1992, p. 2), are becoming the centerpiece of all competitive strategies. Although it cannot be a substitute for basic strategic positioning and structuring, it definitely can enhance working methods. Visions of design commitment and design excellence are not replaced by quality strategies. On the contrary, they are bettered by proper quality planning.

Perkins (1984), in the popular architectural press, states and highlights design quality as a central management issue. He argues persuasively that management and design cannot be separated in offices aspiring to consistent quality. He identifies the firm policies, top leadership and skill and talent of people as the primary forces behind a firm's success. Perkins specifically mentions the firm's definition of design goals in conjunction with other practice areas, type of projects sought and secured, client interfacing, organization and media influenced reputation as the other contributors to securing overall architectural quality. Overall, the firm's targets and goals directly or indirectly impact quality.

In general, when an architectural firm talks about process, it invariably means design process. The design process is all about allocation and control of resources. The firm's policies dictate scheduling, responsibility allocation, sequencing of tasks and processes, monitoring of progress, budgeting and deals with

consultants. Encouraging design talent and building good public image are also part of the design process.

A 'customer' can be redefined to mean any person who receives, service, product or information. So, the definition of customer broadens to fellow firm members, contractors, consultants and eventually, clients and building users. Perkins (1984) contends that client management makes all the difference between good and bad design and this is where the intangibles that constitute satisfaction are dealt with. Excellence in design is a multifaceted effort that needs to emanate from the leadership. Successful firms always have dynamic design processes. Most industry experts agree that the best way to understand processes and attitudes is to scrutinize individual firms as case studies and understand the organizational procedures (Lawson, 1994, p.3).

The case studies conducted quite clearly indicate that quality is an issue the firms want to tackle but maybe they are hesitant to introduce more formal methods into their processes. The primary reasons for their hesitant entry into quality methods are lack of awareness, time and resource crunches and the fact that they do not want to upset the apple cart. This is because of the choice of firms. They all are commercially and critically successful firms rated in the top twenty of the country's largest firms.

The whole notion of quality revolves around the client's satisfaction and so, some of the most important parts of the process are pre-design and kick-off meetings. There is also a

as integral to the organizational process and culture is very evident as is the fact that this is a very recent sphere of interest in the architectural circles.

1.2 AIM OF THE STUDY

"As a professional you have the obligation of learning your conduct in all relationships... in institutional relations, and in your relationships with men who entrust you with work. In this regard, you must know the distinction between science and technology. The rules of aesthetics also constitute professional knowledge."

Louis Kahn in Johnson (1994, p.154)

Nowadays, quality studies too become a part of professional knowledge. Quality, at some level, is also about relationships.

Therefore, the aim of this thesis is *'To study methods of achieving design quality in the architectural profession'*.

1.3 RESEARCH QUESTIONS

"What is so badly needed is for architects, and the developers who employ them, to be more sensitive to the deep-rooted feelings of 'ordinary' people and to find ways of integrating their opinions and their needs into the creative processes from which new buildings emerge."

Charles, Prince of Wales in Johnson (1994, p.127)

This thought and similar ones make me question:

1. Is quality is a worthwhile objective in architecture?
2. Does quality need to be explicitly stated in architecture?
3. Is it measurable and, to some degree, generalizable?
4. What are some of the quality measures that architectural firms are adopting?
5. Is quality a function of client, user and professional satisfaction?

1.4 OBJECTIVES

The research questions, when reorganized while keeping in mind the aim of the study, led to the framing of the following objectives:

1. To identify the parameters of quality as perceived by client, user and professional.
2. To identify the various models to achieve quality.
3. To identify a section of the profession's perceptions of quality.
4. To identify quality procedures adopted by some architectural firms.
5. To investigate quality as a measure of client, user and professional satisfaction.

1.5 SUMMARIZING THE CURRENT STATE OF LITERATURE

A comprehensive literature review shows a litany of publications on the nature of quality and quality management techniques.

These general methods have also been adapted to the specific practice of building construction. There is also some mention of this in the ongoing debate on the direction architectural practice is taking. In addition, there are a variety of quality models or "fine-tuning" techniques addressing building quality issues which are, by and large, fruits of research and still in the experimental stages. There has been a partial emphasis on identifying quality or comfort and satisfaction zones in terms of construction peripherals like thermal, acoustic, lighting and ventilation services. Building inspections to measure construction performance too have merited a great degree of attention. However, these are isolated practices looking only at specific issues and are, generally, known for treating symptoms rather than causes. They tend to deal with the project rather than the process.

Regarding the study of architectural practice, there have not been any studies devoted to specific cases in quality and quality processes in architectural firms. There have been broad outlines of firm management in monographs where the emphasis is more on project descriptions with attractive images. There has been a broad, general survey on what TQM means to the industry conducted by the AIA in 1992. As far as I know, there is almost no study on specific architectural firms' stands on quality and what they do to ensure it.

1.6 IMPORTANCE OF STUDY

I have already defined the need for studying quality issues in architecture. The benefits to the profession have also been

discussed. The study, apart from its broader implications, is important to the participant firms as they get a chance to examine their own practices as well as understand other possible methods of achieving quality and realize where they are in this very competitive field. So, it becomes a learning process for them too.

The College of Architecture at Texas A&M University along with the CRS Center is known for its interest in architectural practice and the design process. This study would, to some degree, contribute to both these areas of interest. On a more personal note, I hope to become a consultant to architectural firms, helping them to improve the quality of both the design process and product. This thesis would be a basis for what I see as an eventual lifetime's achievement.

1.7 THESIS STRUCTURE

This thesis is structured both horizontally and vertically as is seen in the graphical model (*See Figure 1*). It is a sequential progression towards the goal, which is to understand the various methods to achieve quality in architecture. The first row deals with quality perceptions as defined by the client, user and professional and establishes quality using both the value and strategic approaches to it. The second row represents various quality procedures and the final row assesses the quality achieved.

Quality perceptions are the stepping-stones to quality procedures: a sort of cause and effect, if you will. So, quality

perceptions become the goals and the standards for quality models. In the spirit of continuous improvement, which is the backbone of quality methods, assessment leads back and forth from procedure and so, quality models would involve both planning and assessment.

Vertically, each column represents each of three perspectives under study, namely, client, user and professional. Each standpoint is traced via the parameters of quality, the procedures and eventually, assessment. This thesis limits itself to the detailed study of the professional perspective. This is done by studying specific architectural firms as cases and understanding quality measures as applied to a certain project.

This thesis, in effect, establishes quality as a measure of satisfaction of the user, client and professional. It then identifies various positions on quality and the various models that architectural firms can adopt to achieve them. Thus, the methodology would involve establishing the main premise, a detailed literature review to identify various parameters and methods of quality, case studies to understand industry procedures and finally, an analysis based on the main premise of quality as a function of satisfaction.

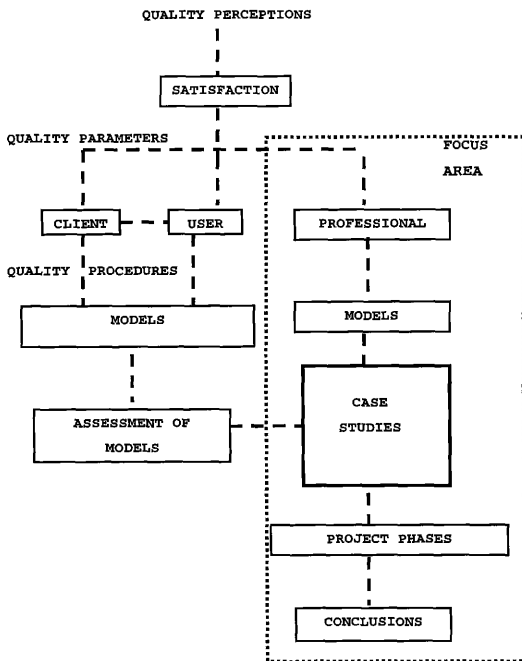


Figure 1: THESIS MODEL

2. METHODOLOGY

The thesis basically begins by addressing why quality is an issue in architecture and then explores the perspectives of client, user and professional on what makes a good building. So, the literature review then progresses from definitions and dimensions of quality to quality models and processes. The case studies were conducted as I chose to focus on the professional perspective of the issue. Eventually, one coalesces the theoretical and practical viewpoints on this issue. Although, the method seems to be linear, it really is a parallel process; going back and forth from a particular phase (*See Figure 2*).

The thesis methodology, typically, is simple. The complexity is in the details. The five steps in the method are:

1. Identification of the specific problem
2. Literature review
3. Theoretical analysis
4. Case studies
5. Conclusions

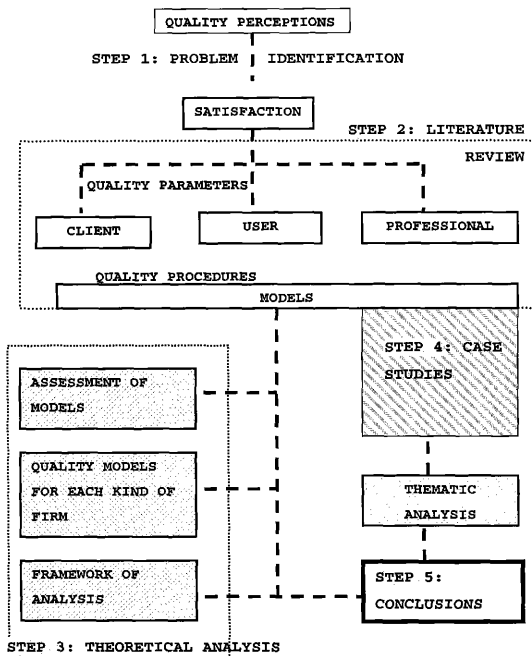


Figure 2: METHODOLOGY

2.1 IDENTIFICATION OF THE SPECIFIC PROBLEM

The route to defining the problem statement was fraught with confusion. The preliminary literature review brought forth the fact that the word "quality" lends itself to many dimensions, many definitions and many processes. The quest for good architecture has been seen and written about extensively through time. The danger was, that each time I read of a new quality model or a new theory, I was enthused and wanted to incorporate it in my thesis. Eventually, I had to ask myself the question of what I hoped to find in my study. I started by defining architecture as a service profession necessitating the intervention of users and clients. Using that logic, quality meant satisfaction. The problem statement metamorphosed several times. Finally, I classified the three stakeholder groups as client, user and professional and further narrowed the study down to research the profession's views on quality.

2.2 LITERATURE REVIEW

The literature review, in this study, attains special significance as this subject has no precedence but for theoretical expositions. The literature not only helped develop a framework of analysis for the various theoretical models but also formed the basis of the questionnaire for the case studies. The process of the literature review involved a detailed perusal of books and periodicals with some guidance from the World Wide Web in terms of annotated bibliographies. The search began with the broad outline of the topic. The subjects at that stage included:

- Architectural practice- status and process

- Quality
- Building inspection and evaluation procedures
- Architectural theorists on quality
- Architectural management practices

The simultaneous resolution of the problem statement led to a specific topic list that consisted of:

- State of architectural practice vis a' vis quality
- Notions of quality- general and architectural
- Models of quality- general and architectural

The notions of quality were indirectly divided into client, user and professional perspectives by utilizing Garvin's (Garvin, 1988, pp.40-45) five approaches to quality as a method of classification. The quality models are categorized as architectural product based, business based or architectural process oriented models aiming at the client, user and/or professional groups.

2.3 THEORETICAL ANALYSIS

The first step was a compilation of the parameters used by clients, users and professionals to define quality from the literature review. This list also contained each group's measure of quality derived from previous literature. A part of this list was used in the next step to develop a matrix to evaluate the quality models gleaned from literature. The variables in the matrix are organized into three sections, namely, basic descriptors, quality cost factors and efficacy factors. Each of them is then rated on a three-point or five-point scale. The last section in the analysis is derived partially from Coxe's

Superpositioning matrix (Coxe, et al., 1987) and partially from the previous step. The resulting analysis carries the Superpositioning matrix a step further and approximates as to what type of firm could use a particular quality model for best results.

2.4 CASE STUDIES

2.4.1 *In defense of the case study*

In any qualitative or quantitative research, one of the questions the researcher asks while framing the methodology is, "Breadth or Depth?" The subject under study is one where the breadth is relatively unimportant, as the question is not how many architectural firms pursue quality goals but one which asks how they do it. This research seeks to be a pilot study in a relatively new field. So, the profession's views are better represented by an in-depth study, the case method. With its inherent advantages of in-depth, multi-perspective analysis, it was the logical choice.

Traditionally, management and organizational research have depended heavily on case studies to understand strategic planning and management and organizational structure (Yin, 1994, p.2). This is because every firm is a unique study and the information sought is both detailed and qualitative.

Yin (Yin, 1994, p.12) quotes Schramm (1971) defining the essence of the case study as trying to illuminate a decision or a set of decisions: why they were taken, how they were implemented, and

with what result. The advantages of knowledge gleaned from case studies (Feagin et al., 1991, p. 6) are:

- Observations and concepts about action and structure are grounded in their natural settings.
- Information of various sources occur over time and so, even complex networks and structures can be studied, indicating high validity.
- Accurate timelines are more easily constructed by following up various sources studying the same topic.
- It encourages and facilitates, in practice, theoretical innovation and generalization.
- It helps the researcher to understand the impact of decisions and interactions of people.

As they are multi-perspectival in nature, case studies not only provide factual evidence but also human perceptions of the issue at hand. A number of organizational issues are related to the intersection of human agents and organizational structures. Given this, problems arise if surveys are used in the study of organizations; the view of each member of the organization may not be independent or impartial (Feagin, et al., 1991, pp.54-56).

The drawbacks of the case study are its lack of representation and its lack of rigor in the collection due to researcher's bias (Hamel, 1993, p. 23). One can eliminate this by conducting pilot studies and having open questionnaires rather than formal, rigid questionnaires. Generalizability of case analysis is also circumspect. Only if the researcher can recognize patterns and

is familiar with other cases, she might be able to draw some general conclusions (Stake, 1995).

The method of triangulation is a recognized form of validation. Here, the interview, documented process and evaluation of the success of the project are all part of the triangulation. There are two possible ways to analyze case studies (Stake, 1995): categorical aggregation and direct interpretation. Categorical aggregation has the researcher selecting a collection of instances from the data, hoping that relevant issues will emerge. Direct interpretation has the researcher looking at a case and drawing meaning from it without looking for multiple instances. The former is over a time span and requires greater number of sources. A direct interpretation in this study is not only more feasible but also the subject lends itself to more factual and straightforward analysis. All this is based on the assumption that the framework of analysis developed has some correlation with case study findings (Stake, 1995).

2.4.2 Choice of firms

The choice of architecture firms was primarily governed by two factors. Firstly, the firms claimed to have quality systems in place and secondly, they have qualified critical and commercial success indicated by their massive turnovers and profits. The five firms chosen are very similar in terms of size. They also are multi-disciplinary with several offices. The five firms are large and they all qualify in the twenty largest firms in the country. The choice of firms was one thing, the choice of office quite another. Altogether, four places were visited and the choice of location was, in one case, governed by it being a

completely design-oriented office, three others were headquarters and the last was a matter of convenience to the researcher.

2.4.3 IRB approval

The Texas A&M University's Institutional Review Board, which is constituted to protect the rights and welfare of human subjects, approved this study. An exemption for a full review by the board was applied, and as was required, the clause for confidentiality was applied to all the subjects in the research to protect their identity.

2.4.4 Protocol

The case study protocol according to Yin (Yin, 1994, p. 64) should consist of:

- Overview of the project (project objectives and case study issues)
- Field procedures (credentials and access to sites)
- Questions (specific questions that the investigator must keep in mind during data collection)
- Guide for the report (outline, format for the narrative)
- Criteria for interpreting findings

The protocol of this research in the format prescribed by Yin, as detailed above, is:

2.4.4.1 Purpose of study-interview

To determine the quality assurance/quality control measures adopted by a firm's office to ensure architectural quality by using a specific project as an example.

2.4.4.2 Procedure

The six firms chosen were contacted by letter and e-mail. Once the first contact was made, I sent a protocol to the subjects and set up the interview. Primarily, there was an interview with one or more members (depending on the firm) involved in quality processes. The interviews lasted between 1/2-3 hours each, during which there was time spent on reviewing drawings and documents of the particular project under study.

2.4.4.3 Questions

The formulated questionnaire was basically open-ended (*See Appendix A*). The questions derived from the literature review, were classified into the following groups:

1. Definitions and perceptions of quality
2. Introduction to organization
3. Organization's relation to quality
4. General procedures to achieve quality
5. Specific procedures to achieve quality
6. Costs involved in setting up the models
7. Follow-up procedures and measure of effectiveness

The questionnaires were also customized according to the prior literature available on the firm.

2.4.4.4 Guide for the report and criteria for interpreting findings

The interviews were first transcribed and then analyzed thematically in the process presented in *Figure 3*. Thematic analysis according to Boyatzis (Boyatzis, 1998, pp. vi-vii) encodes qualitative data. A theme, as described by Boyatzis, is

a pattern found in the information which helps in organizing the data and at its most useful, helps interpret the phenomenon. He also recommends a descriptive use of a thematic analysis when the study requires greater clarity and ease of communication. Thematic analysis allows researchers to incorporate open-ended measures into their research designs. Boyatzis (Boyatzis, 1998, p.11) summarizes three phases in developing thematic analysis as:

- Sensing themes
- Reliability and consistency
- Interpreting thematic information in the theoretical or conceptual framework

According to Aronson (Aronson, 1994, p.1), after collecting data, one needs to identify all data relating to already classified patterns and then catalogue these patterns into sub-themes. The next step involves building a valid argument for choosing the themes. The themes allow clarity in the report. The main disadvantage of thematic analysis as seen by Boyatzis (Boyatzis, 1998, p.11), is projection or bias that can be overcome by establishing consistency of judgment and developing an explicit code.

In this study, the transcripts were printed out in double spacing with considerable margins. They were then studied in various layers which were color coded. The predetermined layers of analysis were:

- Factual triangulation
- Quality related issues/themes
- Firm process- issues/themes

- Conjecture- specific with questions
- Conjectural- general- comments

Another copy of the transcripts were examined for the themes and sub-themes generated in the above step. The themes forming the basis of the final case summary analysis are:

- Firm
- Quality concepts
- Quality procedures
- Quality relationships
- Firm process
- Specific project
- Future of procedures

These themes were further sub-divided into sub-themes given in **Appendix B**.

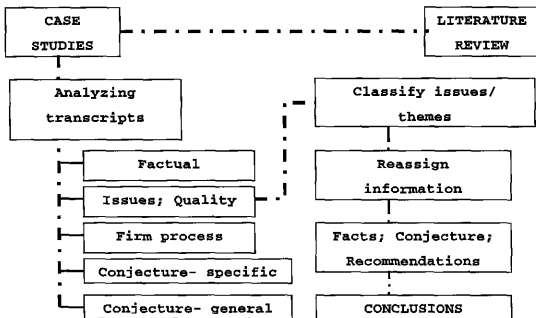


Figure 3: THEMATIC ANALYSIS

2.4.4.5 Scope of case studies

The chosen firms were representative of one section of the US architectural profession. As already mentioned, they are some of the largest firms in the country and they all have multiple offices, multi-specializations and commercial success. The cases heavily hinge on the attitudes and designations of people interviewed. There are also attitudinal differences between headquarters and allied offices. The conclusions are relevant to a specific office and are relevant to the entire firm only where specified by interviewees or documents. Partial triangulation is achieved due to restricted access to documents and filtered information and the fact that interviews were conducted only with primary, senior architects.

2.5 DISCUSSION AND CONCLUSIONS

The conclusions of the study were generated at six levels:

1. Scrutinizing what the industrial and theoretical definitions of quality are
2. Examining what processes exist and the reasons for the current state of quality processes in the industry
3. Contemplation on whether quality can be seen as satisfaction.
4. Deliberation on the research questions
5. Reflections on possible alternate methodologies
6. Future areas of study.

3. THEORY

3.1 ARCHITECTURAL PRACTICE AS RELATED TO QUALITY

3.1.1 State of the architectural profession

The architectural profession, according to Rose (1987), is unique in its history of professional culture and the norms attached to it. A shift in the 60's brought practices closer to corporate organization. Practice had to respond to increasing project sizes and complexity by changing organizational structure and methods of working. Decision-making and responsibility allocation became critical tasks. Specialization of roles within office structure was paralleled by specialization of practice to some degree (Gutman, 1988).

A New Jersey architect pointed out to Kostof (Kostof, 2000, p.317), "Instead of our successful architects, as a whole constituting a class of befogged dreamers, they are in reality fully as keen and of as large capacity in the business of money getting as any other constituency in American affairs." Architecture is a business that is immediately affected by the changes in the cost and availability of capital. There is not an easy balance of slumps and booms. This gap is heightened by the fact that the lack of strategic planning that is required (Sharp, 1991, p.1). Strategic planning involves intentionally setting goals and ideating on the best way to respond to the circumstances of the organization's environment, whether or not its circumstances are known in advance; nonprofits often must respond to dynamic and even hostile environments (Hawk, 1984). Being strategic, then, means being clear about the organization's objectives, being aware of the organization's

resources, and incorporating both into being consciously responsive to a dynamic environment. Strategic planning attitudes according to Hawk, (Hawk, 1984, pp.182-183) range from reactive to inactive to pre-active and interactive based on the past, present, future and knowledge.

The architectural firm, when it redefined itself as a business, destroyed the self-image of social idealism or utopianism represented by Pevsner (Kostof, 2000, p.345). The traditional architect's ideals were one with the society while imitating the similar professions of law and medicine substituting social ideals with professional ideals. Architecture when studied by sociologists and psychologists brought into focus not only the creative process but also client-user expectations and needs (Kostof, 2000, p. xii).

3.1.2 Need for quality in the architectural profession

As per the Building Design and Construction survey in 1980, Cuff (Cuff, 1991, p.55) notes that architects are hired for their ability to complete a work within budget and make it function; complete a building on time and ability to work with client staff in that order. Aesthetic quality and fee charged were ranked tenth as criteria for choice.

Lawsuits increased drastically in the 70's and 80's and as a result, separated design and the construction document phase (Gutman, 1988, p.97). Quality assurance is becoming popular due to the detailed documentation, which, helps assessing design risk more easily. Public clients now demand A/E firms have quality assurance else they are not eligible for participating

in tender submission (Cornick, 1991, p.3). The profession increasingly emphasizes on risk and liability as is seen in the importance these subjects are given in the AIA Handbook for Architectural Practice.

It is well established that better buildings go beyond pure form and they respond to social or technological change. The human cost of incompetent design management includes emotional discomfort or even pain (Morgan, 1998, pp.12-13). Liability for design work includes meeting project cost limitations and preparing drawings and specifications. Liability for job site activities includes certification and conformance to contractual limitations (Streeter, 1988, p.25). So, as Streeter (1988) says, an architect or engineer who commits a legal wrong in the course of professional practice, can expect to be called n to pay damages to persons suffering a loss as a consequence.

A proactive measure would be to manage quality in the briefing, designing and specification phases of the project. This approach leads to a cost-effective project. Reduced costs and increasing profits and market shares are also possible outcomes (Cornick, 1991, pp.5-6). Implementing quality management systems ensures:

- Requirements are clearly defined.
- Information supporting decisions are clarified.
- Responsibility of total quality are clearly defined.

3.1.3 Perspectives and state of quality

In the present state, "... we see architects having a reduced responsibility for the work they do, doing less work, and having greater liability for buildings done..." (Hawk, 1984, p.181)

To design or rebuild environments, one needs to define the stakeholders who will be able to clarify what is the desired end. A stubborn "ethic of independence" is borne out of the professionalism seen in architects (Kernohan et al., 1992. p. vii). This consists of the willingness to take the long view sometimes for the common good.

According to Symes et al. (Symes et al, 1995, p. 19), accountability for the quality of building design is now established having many facets, measures and methods of achievement. One of the paradoxes that emerges out of professional debate is that, although architecture is geared to offering services to the society, it resists allocation of a great proportion of its time to study society's needs (Gutman, 1988). There is a general disagreement of definition of good design although there is an agreement on the need for it. "In the main, architects have a simplistic idea of what community is, a very crude idea of how it works and an utterly idealized view of how they contribute to it. Architects are inclined to generalize community into some romantic idea of consensus without realizing that sheer size or generality is unworkable politically as a community concept." (Johnson, 1994, p. 147)

The Symes study (Symes et al, 1995, pp. 48-50) recognized that, perhaps, the realization of the client and the user being different groups is a relatively new phenomenon and as such, not

well incorporated into the design process. When the client is not the user and the architect is given only statistical data describing the users to work with, then, there is a doubt as to whose interests are represented and whose needs is top priority. The users are the true informants of building use and serviceability. However, the architects and construction professionals' knowledge and the users' experience are rarely integrated due to minimum contact between groups (Kernohan et al., 1992, p.xvii). According to Fitch as quoted by Cuff (Cuff, 1991, p. 55), the architect's isolation from the users breeds more 'formal, abstract and less humane design'.

The study and case studies conducted by Symes et al (Symes et al, 1995, pp. 48-50), found that the majority of the participant British firms felt that avoidance of conflict with the client, owner or contractor was important. They also felt that architectural law and liability and adherence to codes are important. The architects surveyed, to a large degree, felt that production of excellent projects was often inhibited by client's demands or expectations. Cuff also states that (Cuff, 1991, pp.68-69) design time and design freedom are constantly challenged by basic priorities of economy and function and the architect's business practices.

Cuff also conducted a study to understand the organizational characteristics of firms producing excellent buildings. The reasons discovered for excellent projects (Cuff, 1991, pp. 233-234) included quality clients who expected more while being more principled and flexible. The architects approached the work as a continuum of their past experience and future direction. The

architectural firm seemed to have strong leadership, flexible organizational structure, well-defined values, respect for creative genius and open communication. All the participants of the projects had a sense of ownership and free communication.

Quality management and business development are traditionally seen as beyond the architectural culture. With the broad changes increasing the importance of these functions in architectural firms, these quality models are becoming increasingly accepted as necessities. However, schools still seem to foster a culture bias with design management portrayed as anti-creativity and insensitive (Morgan ,1998, p.11).

Coxe (1980) wonders about the reasons or the negligence of quality assurance in the design management area. One reason, he claims, would be a traditional deference in the professionals, making reviews and constructive criticism demeaning. Another would be that both architectural education and registration process view the architect as a complete professional. The most important reason could be there is a genuine lack of understanding on how to sustain the creative process. Coxe (1980) avers that organizing the firm around a few key personnel (good designer, wise field specialist, top production technologist) ensures quality of performance.

Coxe observes that, to achieve quality, design firms need to concentrate on (Coxe, 1980, p. 43):

- Consistent standards for handling projects
- Consistent approach to dealing with clients
- Consistent quality reviews

- Clear responsibility and definition of final authority

3.2 QUALITY

Quality is derived from Latin "qualitas" which means: how constituted, nature or kind (Johnson, 1994, p.165).

Dictionary meaning³: The condition of being of such and such a sort as distinguished from others; nature or character relatively considered, as of goods; character; sort; rank.

Garvin in his work, *Managing Quality* (1988, pp.40-45), describes five approaches to define quality. They are:

Transcendent view: Quality is synonymous with 'innate excellence'. It is universally recognized and the assumption is that it is timeless and enduring without a precise definition.

Product-based view: Quality is a definite, measurable value. It is in terms of inherent product attributes rather than adjectives.

User-based view: Quality is subjective and depends on the beholder. It is equated, to some degree, with maximized satisfaction.

Manufacturing-based view: Quality as conformance to requirements suited to the manufacturing and engineering practices associated with the product.

Value-based view: Quality in terms of costs and prices, where a product provides performance and conformance at an acceptable price.

³ Webster's Revised Unabridged Dictionary, © 1996, 1998 MICRA, Inc.

Garvin derived this classification from studying various definitions of quality by people from varied disciplines. I am using these five views to categorize all the views on, generally, quality and specifically, architectural quality.

3.2.1 Transcendent view (innate excellence)

Quality when used as an adjective, as is most often the case, implies a degree of excellence (Johnson, 1994, p.165).

3.2.1.1 Architectural quality

Quality of professional performance, according to Coxe (1980, pp. 42-48), encompasses excellence of the technical, functional and creative solutions delivered.

Quality, according to Rose (1987, p. 60), is synonymous with excellence in the eyes of most design professionals. It is the last bit of extra design work that differentiates a good job from a great one and this maybe against the perspective of immediate project profitability.

Quality Without a Name (QWAN) (Schultz, 1994) derived from Christopher Alexander's Pattern Language defines quality encompasses universally recognizable aesthetic beauty and order, centers of symmetry and balance, life and wholeness, durability, resilience, adaptability, human comfort and satisfaction and emotional and cognitive resonance.

3.2.2 Product-based view (attributes)

Kaoru Ishikawa (Schultz, 1994, pp.118-126) lists the aspects of quality as performance purity, strength, dimensions, tolerances, appearance, reliability, lifetime defects, rework, non-

adjustment ratio and packing method. He also detailed out cost, delivery and service variables as related to quality variables. Ishikawa's cause and effect diagram, which is an effective process, explains the process using a Fishbone diagram with the five bones (causes) being people, method, environment, equipment, materials and the head (effect) being the quality characteristic.

The accreditation bodies and systems defined quality as:

- British, European and International Standards for quality systems: the totality of features required by a product or service to satisfy a given need
- ISO 8402:1994: The totality of characteristics of an entity that bear on its ability to satisfy stated and implied need.

3.2.2.1 Architectural quality

Smithies (1981) defines quality as spatial attributes. As architecture represents a complex problem where satisfaction of one group of objectives may conflict with another's requirements, the interrelationship between safety, unity, expressiveness, magnitude and function are all well defined by the intentions of the architect. Each of these parameters is further subdivided into various spatial qualities (Smithies, 1981, p.2). These spatial qualities are the basis for discourse and theories on architecture and architectural quality. There is a lot of literature on the aesthetic approaches to design depicting architecture as an art form and architectural quality as aesthetic pleasantness (e.g. Leupen, et al., 1997; Lawson, 1980; Powell, et al., 1984).

Powell describes the other dimensions of quality as the quality of workmanship of the project which is dependent on the skill and supervision of the workforce, quality of specification which is dependent on the performance of composites and materials and quality related to spatial arrangement, circulation, function and aesthetics which are dependent on the skill of the designer (Powell et al., 1984, pp.114-115). There is a possibility of having quality at the level of the component but this might detract from the quality of the whole as there might be a lack of cohesion.

3.2.3 User-based view (maximized satisfaction)

According to Juran (Schultz, 1994, pp.54-61), quality is client satisfaction measured as a frequency of deficiencies divided by the opportunity for deficiencies. He introduced the term ' Strategic Quality Management and tied them up with the quality trilogy:

- Quality planning which involves the activity of developing products and processes required to meet customers' needs- establishing quality goals; identifying customers and their needs; developing product and process features and establishing process controls and transferring to operations.
- Quality improvement which includes establishing infrastructure to secure annual quality improvement; identifying specific needs for improvement; clarify project team responsible and providing resources.
- Quality control which includes evaluating desired quality performance, measuring performance and acting on the difference.

3.2.3.1 Architectural quality

Bob Maguire as quoted by Lawson (Lawson, 1980, p.120) says that, " *the primary object of the creative architectural process is to achieve- to use Lethaby's phrase- 'nearness to need'.*" The difference in the quality of design lies in the treatment; whether it is the language of solutions especially in models or the language of problems that stem from the user.

Architects exist to satisfy both the user's short term and long term requirements. Coxe (Coxe, 1980, pp. 42-48) defines quality of professional service as getting the job done on schedule, on budget and in compliance with all the program requirements. Definitions of quality of professional service may vary and depend on the strengths of the firm. However, what is important is that the standard of professional performance be consistent from project to project of a firm. This is primarily the management's role; control of quality over projects.

Markus (Markus, et al. 1972) argues that if design is defined as a "*purposeful, goal oriented search*" with constraints of time, energy, skill and money then quality would be achieving a satisfactory solution keeping in mind the constraints.

3.2.4 Manufacturing-based view (conformance)

Edward Deming's definition of quality (Schultz, 1994, pp. 28-41) was that it is something free from error or flaw. It is a continuous variable needing continuous improvement. He modified the PDSA cycle (Plan-Do- Study-Act), which, was a method to achieve quality as was his 14 point theory of management, which, is the basis of most TQM models. The theory includes constancy

of purpose; adopting new philosophy for change; ceasing dependence on inspection; building quality into product; supplier selection; constant quality improvement; training; leadership of both management and workers; absence of fear; breaking down barriers between departments; absence of coercion; promoting leadership; promoting pride; education and self improvement and participation of everyone.

Philip Crosby (Schultz, 1994, pp. 92-96) declares that quality has to be defined as conformance to requirements not as goodness. It is about prevention not appraisal. Performance standards must be zero defects and not- *'that's close enough'*. Yoji Akao, (Schultz, 1994, pp. 140-143) developed the Quality Function Deployment method which helps focus employees on customer demands by using matrices and charts, develop a definition of quality and then deploy the definition to the development and production of the product/ service. Genichi Taguchi, another Japanese guru (Schultz, 1994, pp. 152-153), defined quality as a product's robustness (product performance when rapped, overloaded, dropped and splashed).

3.2.5 Value-based view (value for money)

Quality, to many, is defined as value for money. Armand Feigenbaum (Schultz, 1994, pp. 85-89) defined quality as total customer satisfaction with reasonable costs. These two serve as parameters for performance measurement of all segments of the company. He states that the two entry points to get better quality are to find out what the customer wants and then develop a design process to answer those wants.

3.2.5.1 Architectural quality

Pena (1977) contends that quality is a range of adjectives defining cost/sq.ft and Bartuska says that quality is a benefit/cost ratio with both qualitative and quantitative benefits and costs. Paradoxically, the public places high value on visual appeal even while the yardstick is cost-effectiveness (Bartuska, 1994).

3.3 QUALITY MODELS

The AIA states that an obsessive commitment to quality is the key to successful firms. They go on to say that design excellence is 40% talent, 40% project process and 20% firm management (AIA, 1989, p. 14). An excellent firm constantly listens to clients and measures the results of the project. Client quality control involves monitoring a job so that a job is as good as it can be (Rose, 1987, p. 52).

A quality system or standard is procedural and is common sense (Sharp, 1991, p.113). Most firms would have some parts of a quality assurance (QA) plan in place. However, the totality is what determines quality. To implement a QA system, responsibility has to be delegated and the progress subjected to periodic scrutiny by inspectors. The initial costs of registration and assessment are offset by cost savings in efficiency and generation of new work from old work well done.

According to Schulz (www.integrated-aec.com), 'quality assurance' is a planned and systematic pattern of all the actions necessary to provide adequate confidence that a product

will conform to established requirements. 'Quality control' implements the quality plan by those actions necessary for conformance to established requirements. Generally, project managers are responsible for quality control.

An informal survey conducted by Markert (1992), showed that third party reviews, audits and checklists of various kinds were what A/E firms used to assure quality. Emphasis seemed to be on team development, leadership and project management. The survey also found that more accurate cost estimates, better coordination and verified field conditions resulted from quality assurance measures. However, the survey found that the narrow definition of quality lead to some miscommunication and delayed work.

Architects as artists, are tempted to create a different method for every new project (Pena, 1987. p. 9). Diversity is welcomed both in product and process. However, the dichotomy of architects also as scientists, forces discipline and a systematic pursuit of knowledge (e.g. programming). *"Good buildings don't just happen. They are planned to look good and come about when good architecture and good clients join in thoughtful, cooperative effort "* (Pena, 1987, p.12).

While discoursing on architectural collaboration and design participation, Cuff (Cuff, 199, p. 76) states that some architects find that more participatory the design, more time-consuming and thus, less profitable it is. Architects tend to treat other input as constraints. The issue is about design control and hierarchy. There is a mistaken notion that

collaboration involves relinquishing design control (Hawk, 1984, p.189). Collaboration, Cuff (1991) argues, results only in establishing the boundaries of the problem while the various alternative solutions are still the responsibility of the designer. The collaboration would involve mutual assessment, establishing rapport, setting limits, avoiding conflict and negotiating agreement (Cuff, 1991, p.191). There is also the issue of allowing users to making the building their own by modifying specified functions or adding to them. The flexibility of the finished product is deemed (Lawson, 1980, p.121), by some, as a part of satisfying the user.

The four main considerations of the process are function, form, economy and time. All these concepts are discussed in detail specific to certain quality models. They can be broadly classified into three categories depending on whether they are oriented towards the organization, architectural process or the building itself. The organizational models are business-based and consider the client and professional's needs. They can be proactive and reactive. The architecture process models involves all three groups of professional, client and user. They are both reactive and proactive. Lastly, building based models take into consideration clients and possibly, the users. These are generally reactive by nature.

3.4 ORGANIZATIONAL MODELS TO IMPROVE BUSINESS

These models are generic and can be applied to most businesses. Total Quality Project Management is the only one of these models that has been developed specifically for A/E firms.

3.4.1 Total Quality Management (TQM)

TQM is defined by the American Society for Quality Control as a 'management approach to long-term success through customer satisfaction based on the participation of all members of the organization in improving processes, products and services'. The objective of TQM is the continuous improvement of quality of project service, projects and the firm (Frankline, 1992, p.1). The fundamentals of TQM are: customer satisfaction, management by the use of data, respect for the dignity and value of people and continuous improvement (Miller, 1992).

A majority of the studies on TQM implementation are focused on Fortune 500 companies and manufacturing industries like the automobile industry. The top performance measures in TQM studies, some of which are also basis for the Malcolm Baldrige Quality Award (a prestigious quality practice award), are product time, inventory, costs of quality, errors/defects, reliability, complaints, market share and suggestions. These according to David Garvin (Hiam 1993, p. 22) are more in the nature of a checklist. The set of core TQM elements suggested by the TQM studies are training and learning, Baldrige criteria, customer focus, participation and empowerment, plan direction and teamwork.

In the architectural profession, there are firms like Glenn Garrison's Integrated Architectural Management (Morgan, 1998, p. 68) which offers a program called Quality Improvement Process Planning (QIP) to large and small design firms. It deals with TQM 101 (a basic course in TQM) to broaden the responsibility of design quality to everyone in the firm through quality

management. It focuses on participatory design within the firm. Garrison's version of TQM is geared towards the design firm incorporating 'top to bottom' cooperation. The whole practice is examined for quality, a sort of self-study (Morgan, 1998, p.101). The more open the firm's structure and the more the decision making structure is decentralized, the more a QIP process will be effective. Tickel of Compass Consulting Group, conscious of the apprehensions which exists, says that TQM only standardizes processes and not products and helps prioritize the tasks (Solomon, May, 1992, p. 105).

The underlying concept of quality management is measurement. This can be done by (Gordon and Nelson, 1998, p. 368):

- Utilization ratio: ratio of chargeable hours
- Rework hours: time spent redoing work due to errors and client's change of scope of work
- Project profitability
- Client satisfaction
- Repeat work
- Additional fees
- Publicity for the firm
- Marketing "hit rates"
- Response time of clients and vendors

3.4.2 ISO 9000 Standards

The ISO 9000 Quality Management and Quality Assurance Standards originate from the International Organization for Standardization which was founded in 1946. The ninety odd member

countries who are part of the body aim to establish an across the board notion of standardization and quality measures of various processes (Nee, 1996, pp.5-11). This is not used as much by USA as Canada or other countries in Europe and Asia. A major problem with ISO 9000 in the US is the delayed establishment of any standard national certification (Nee, 1996, p.6). Inspection at the final product level carries the costs of inspection; time spent doing a task incorrectly and the cost of correction. The incorrectness of documents largely contributes to these costs.

According to Nee, the standard is not prescriptive nor is it a product standard. The standard (Nee, 1996, p.11) is a guideline for a documented system with a formal method/process model. It addresses service organizations and is a company wide procedure. The focus is on customer and company needs.

ISO 9000 also ensures quality assurance from the main contractor, sub-contractors and consultants. This is because audits require that all related organizations have a formal quality system in place. The standards are not to be construed as a hierarchy of excellence but as a focus on deliverable output of an organization. In other words, it is customized for each organization as any quality policy must be relevant to organizational goals (Nee, 1996, pp.23-27). The ISO quality system is dependent on feedback and the management responsibility loop which are both reactive and proactive.

The ISO 9000 series has varying conforming standard systems of 9001, 9002 and 9003, catering to various organizational needs (Nee, 1996, p.24). The most comprehensive model is ISO 9001

which helps develop a detailed document quality system. The three phases in the process are planning, implementation and maintenance. The tasks at these phases are:

- Defining requirements: process specifications; product specifications
- Quality assurance plan: audit programs (ISO 9004-1 Clause 5.4)
- Quality Control plan: internal quality audits; documented quality system; design control; design review; reviewing the design stage documents before release; evaluations to include organizational structure (ISO 9004-1 Clause 5.4); audit report (ISO 9004-1 Clause 5.4)
- Sequencing the work process: detailed procedure with sequenced instructions; quality plan to ensure conformance including standards of workmanship
- Remediation: corrective action procedures (effective handling customer complaints and nonconformity reports); preventive action procedures (eliminating potential causes of nonconformity)
- Inspection: design qualification and validation; inspection prior to service delivery

Under ISO 9000, anything that impacts the quality of the final product or service must come under the consideration of a firm's Quality Assurance Program. ISO 9000 does not address the quality of the final product but addresses the management of the organization and its ability to deliver quality products with quality being defined by the needs of the customer (Nee, 1996, pp. 8-9).

3.4.3 British Standards

The British Standard BS 5750/ISO 9000/EN 29000 are derived from similar base principles and apply the standard as a measure of conformance. The standards view design as an integral part of production. One of the quality management models by Britain's Science and Engineering and Council (Cornick, 1991, p.31), is based on the six identified phases: briefing, designing, specifying, tendering, constructing and maintaining. The whole process works by detailing the sub-processes of these phases by describing them and identifying the desired output.

3.4.4 Total Quality Project Management (TQPM)

Total Quality Project Management is the concept of controlling quality by using measurement techniques, conforming to requirements and targeting zero defects (Stasiowski and Burstein, 1996, pp.4-5). TQPM is a planned program of continuous improvement of processes and management. The firms that will succeed are the ones that are externally focused, constantly refining and reforming processes while aiming for more efficient delivery and top quality design. Total Quality Project Management includes a list of procedures and checklists to assure quality.

The functional definitions of quality in architectural firms can be described, according to Stasiowski and Burstein (Stasiowski and Burstein, 1996, p.30) as:

- Easily understood drawings
- Few conflicts in drawings and specifications
- Economical to construct

- Easy to operate
- Easy to maintain
- Energy efficient

The various phases of TQPM (Stasiowski and Burstein, 1996) are:

- Defining requirements: pre-design questionnaire; list of questions to be asked by designer; checklist of typical services and documents required.
- Quality assurance plan: crisis prevention plan; quality control plan; design review requirements; audit report format
- Quality Control plan: conceptual review; intra and inter disciplinary review; drawing specifications cross-check; Redicheck method of spotting most consistently occurring errors in drawings and specifications; final review; safety checklists and issues; establishing a baseline of progress versus budget
- Sequencing the work process: work breakdown structure; decision matrix
- Measuring long term improvements in design quality (represented using graphs and charts): non-conformance as errors per drawing; efficiency of design in terms of total man hours required per sheet of drawings per discipline; variability in construction bids; budget overruns
- Client feedback: feedback questionnaire with performance appraisal; performance of design firm versus time; customer surveys; conformance with client communications plan
- Remediation: pareto analysis on errors and symptoms of errors; symptoms; propose remedies; action to institute remedy, control at new level.

3.5 PROCESS MODELS TO IMPROVE ARCHITECTURE

3.5.1 *Benchmarking*

Benchmarking is basically a set of self-determined parameters which firms use to measure project or firm performance. Each of these parameters would have a datum or an acceptable standard which new projects compare with or it could be a set of performance goals for every part of the process. The concept is to set a datum within an organization. This is achieved by aspiring to excellence as is seen in other projects or other firms (Davy, 1992). In architectural firms, firm-to-firm benchmarking was first conducted by Ross (2001). The survey focused on firms specializing in health care buildings and understood how their quality control measures worked. Team and organizational structure issues were brought up.

Benchmarking could also be external that entails identifying and studying other organizations which exhibit excellent performance. Kyle Davy (Davy, 1992) states that these organizations maybe within or outside the industry and the reference measures might be quantitative or qualitative. These benchmarks could be in terms of management, accounting, project management, CAD or design.

3.5.2 *Project Peer Reviews*

Project peer reviews are independent evaluations of design concepts and management procedures, performed only when the projects need greater quality assurance (ACEC, 1990, p.1). Private or public clients or designers who are external

evaluators perform these reviews that can be done at the early or conclusive phases of design. The advantage of using the project peer review is that it adds value and integrity to the design while increasing the life of the project.

The characteristics of the evaluation (ACEC, 1990, p.3) are: it is conducted by peers of the original managers or design professionals who are an independent third party. It is not a routine procedure in the design process with a specified purpose, scope, format and duration. It can be a single event or a series of sub- evaluations designed to obtain better results. The commissioning party who benefits from the evaluation pays for the review.

The project review (ACEC, 1990, p.4) is not a reflection on the ability or competence of the design team nor is it an application of normal checks and balances. The review is also not a normal review of documents by owner or a building code official. The project review is also not an exercise in value engineering study where there is a validation of the construction cost estimate.

The projects for peer review have to be carefully chosen. The process is designed to enhance quality of the constructed project by providing an external review of design assumptions, final design documents and project management. For this to be successful, design responsibility has to be clearly defined. In the case of a dispute, the designer and the client agree on external experts to mediate and their decision has to be accepted.

The typical steps of a project management peer review are (ACEC, 1990, p.11):

- Review of advance materials
- On-site review of documents
- Conduct of interviews
- Report and follow-up

The report includes list of documents, specific matters of review, interview procedures and guidelines for report formats. The checklist for project management peer review (ACEC, 1990) includes:

- Project descriptions
- Project management information system (MIS) and control
- Legal and regulatory aspects of the project
- Planning the design effort
- Project production procedures and control
- Authorization and quality control of project planning
- Quality control during construction

The checklist for project design peer review (ACEC, 1990) includes:

- Project information
- Review of final document
- Quality control during construction

3.5.3 User Participation

In today's scenario, there is a good likelihood that the ones who commission the building are not the users. Therefore, it follows that the 'users' must be considered to make the building successful. To do this, architects can use empirically based evidence, work with social scientists or use participatory design methods (Lawson, 1994, p.5).

Architect Richard Burton, when studied by Lawson (Lawson, 1994, p.12), was found to obtain feedback from users of his buildings so as to improve the quality of further designs. He also pioneered the use of social psychologists in the feedback process as is seen in Chavelton housing development where he collaborated with psychologist Peter Ellis. Most architects represented by Lawson were in favor of client and even user participation through out the building process. Participatory design involves a lot of client contact. This could be in the form of design of unit layouts by future occupants or ground breaking or active participation in construction.

3.5.4 Statistical Methods to Achieve Quality

3.5.4.1 Quality Function Deployment

QFD was first systematized in Japan in mid 1970s at Mitsubishi's Kobe shipyards. QFD provides specific methods for ensuring quality throughout each stage of the product development process, starting with design and it covers all areas of the company (Akao,1990, p.3). In other words, this is a method for developing design quality aimed at satisfying the consumer by translating the consumers' demands into design targets and major

quality assurance points to be used throughout the production stage.

Akao says that functions such as planning, design and service are all functions of quality (Akao, 1990, pp.4-5). Dr. Shigeru Mizuno defines the deployment of quality functions as the step-by-step deployment in greater detail of the functions or operations that form quality systematically and with objective rather than subjective procedures. A comprehensive quality function deployment system reflects technology, reliability, and cost considerations (Akao, 1990).

The QFD matrix is generated by assessing client's expectations and generating the units of analyses from them. Then they are split into operational measures and correlated with the operational measures obtained by professional knowledge. The scores so calculated help to prioritize tasks and generate decisions. This tool is effective as it breaks the whole process into sub-processes which are then detailed out and brought together again to form the whole.

QFD is a tool using a series of interconnected matrixes to document and translate the customer's requirements and expectations in design and production decisions. It is a system to record and order massive quantities of information on the project. The steps involved in QFD are:

- Developing the quality plan and quality design
- Detailed design and pre-production
- Process deployment

Akao (Akao, 1990, p. 10) argues that all departments of a firm should participate in QFD but in a gradual, incremental manner. He warns that an incomplete quality chart does more harm than good. He also cautions that allowing the creation of a huge deployment chart as the main objective is a mistake often made. The whole process of QFD is stepwise and might require a couple of iterations to tailor the model to a firm's specifications.

QFD includes SPC or Statistical Process Control. It is a quantitative way to quality where one of its sections is a process control chart. Walter A. Shewhart (Schultz, 1994, pp.3-11), first came up with Statistical Process Control (SPC) which consisted of graphical methods to indicate variations along with methods of measurement and sampling. This was an inspection-based procedure to ensure quality.

3.5.4.2 Statistical Process Control (SPC)

SPC is a statistical method to monitor performance of manufacturing and service approaches. It involves the use of statistical signals to determine whether to change a process or not. The important statistical parameters in SPC are mean, range, standard deviation and variance. The important principles (Brewer, 1996, p. 4) are:

- The process, product or service must be measured
- The data must be gathered as close to the source as possible
- The monitoring and adjustments must be done by the person who knows the most about them, preferably the operator or machine setter

- The data must be analyzed using statistical techniques such as control charts, probability plots, designed experiments and analysis of variances
- Action is taken before a bad product is made

The major applications of SPC include:

- Project selection and problem solving
- Data gathering
- Data analysis
- Evaluation
- Process improvement

3.5.4.3 Process Control Charts

One of the tools of SPC is a control chart, centering round the concept of control. This means that if the product or process characteristics are under control (within a specified range), the product would conform to the requirements (Murdoch, 1979). A control chart sets a process against time using a graphical record of data taken in time sequences. It allows for unanticipated or unintentional variations in the process. A control chart is a working document, and out of-control points need to be evaluated for cause, changes made and action taken.

The concept of a control chart evolved by Dr. Shewhart had the following goals (Murdoch, 1979, p. 36):

- To define the goal or standard for a process which management should strive to attain
- To be used as an aid to attaining the standard

- To serve as a basis for judging whether the standard has been achieved

The quality of an architectural project involves a great degree of qualitative data which makes process control difficult. As no two architectural projects are the same, control charts are limited in application. They would have to be in the form of process control charts. These would primarily monitor documentation and personnel and resource deployment which would speak of architectural quality and not design quality.

Applications of process control identified include:

1. Non-conformances as errors per drawing in past projects (Stasiowski and Burstein, 1994, p. 95)
 - Total errors
 - Non-conformance to
 - client/discipline design criteria
 - code
 - calculations
 - drafting standards
 - vendor data
 - Dimensional errors
 - Incorrect or missing callouts
 - CAD related problems
 - Incorrect notes
 - Additional views and details needed
 - Specification errors
 - Inter-disciplinary coordination problems
 - Operability/constructibility problems

- Record drawings in terms of non-conformance in different sets of drawings
2. Efficiency of design in terms of total man hours required per sheet of drawings per discipline (Stasiowski and Burstein, 1994, p. 97)- productivity chart for structural drawings- target productivity; weekly productivity; cumulative productivity
 3. Design cycle time expressed as calendar days requires to complete designs of various sizes
 4. Variability in construction bids, expressed in terms of statistical process control parameters (Stasiowski and Burstein, 1994, p. 98)
 5. Costs of construction change orders resulting from design defects, expressed as a percentage of construction costs
 - Number of drawings/project over time
 - Standard deviation (of mean) of bids over time
 - Percentage estimate above or below actual bid (generally 5% is the limit)- depicting the accuracy and precision of construction cost estimates
 - Rework hours
 - Repeat work
 - Client feedback
 6. Client feedback
 - Feedback questionnaire with performance appraisal
 - Charting performance of design firm versus time
 - Service quality evaluations by category
 - Client communications log
 - Conformance with client communications plan
 7. Tracking "inventories" in a design firm (Stasiowski and Burstein, 1994, p. 194)

- Labor utilization rate
 - Computer utilization rate
8. History of budget overruns (Stasiowski and Burstein, 1994, p. 305): percentage of budget overruns over project periods (limits at 5% generally)
9. Personnel
- Overtime
 - Sick days
 - In/out times
 - Schedule extensions
10. Organization
- Project profitability
 - Project hours
 - Team performance
 - Collection time
 - Goals achievement
 - Customer response time
 - Additional fees
 - Response time to customer
 - Schedule extensions
 - Shop drawing review time
 - Number of addenda

The ISO standards mention the use of process control charts to ensure quality. The ISO 9004-1 Clause 17 (Nee, 1996, p. 91) mentions the following are documents that are examples of documents requiring control:

- Drawings
- Specifications
- Inspection instructions (*for materials*)

- Test procedures (*for materials*)
- Operation sheets (*for labor and machines*)
- Operational procedures
- Calibration data (*for machines*)

3.6 BUILDING BASED MODELS TO IMPROVE USER AND CLIENT

SATISFACTION

Studies have been conducted consisting of follow-up procedures to test if the intentions of the designers have been borne out by the way people use the buildings. Discrepancies could arise due to misunderstanding of the real needs by the architect or a change in the assumed needs of the users or faulty construction and can be mitigated with the right knowledge. However, according to Michael Brawne (Brawne, 1992, p.34), there is no method which can study all aspects of architecture. He avers that this could be because of the difficulty in predicting human behavior. He claims that even detailed studies under controlled conditions fail to determine the efficacy of architecture.

3.6.1 Building Evaluation Techniques- CPBR Checklist

Building evaluation (Baird, et al., 1996, p. xxi) is a systematic assessment of a building based on a set of pre-defined objectives and requirements. The benefits of building evaluation include more even matching of demand and supply, improved productivity at workplace, minimized occupancy costs, increased user satisfaction, certainty of management and designer decision making and higher returns on investment in building and people.

The Center for Building Performance Research (CPBR) checklist compiled by Harry Bruhns (Baird, et al., 1996, pp. 141-159) helps in evaluation, planning a database and forms a basis for a comprehensive audit. The checklist, at a broad level, is divided into six categories with various variables comprising them:

- Corporate: serviceability, image, tenure, code compliance, time, initial cost, life cost, rent, operating cost, refurbishment, disposal and security.
- Site: access, built environment, microclimate, local services, site and conditions.
- Construction: structural safety, structural adaptability, overall dimensions, shell geometry, structural layout, cladding materials, security and access.
- Space: major zones, workspaces, other personal space requirements, maintainability, storage, circulation space, stairs, social space, way-finding, staff amenities, space use flexibility and quality, sub-lettable space, fit-up elements, finishes, furnishings, and fittings.
- Internal environment: air quality, ventilation, thermal comfort, noise, lighting, special area, and ambience.
- Building Services: all system capability and flexibility, maintenance, HVAC systems, electrical services, information technology, vertical transport, water services, fire protection and costs of services.

The checklist goes further and describes the impact of each of these factors on building quality and elaborates on the

individual items that they consist of and how these items can be measured and evaluated.

3.6.2 Fitness Test

The spatial organization and spatial comfort systems are a result of the human-environment relationship. Bartuska (Batuska, 1994, p.157) defines the successful fitness test as designing with people and the environment, both built and natural while understanding the interrelationship between the internal and the external.

Batuska defines quality (Batuska, 1994. pp.52-53) as maximizing benefits and minimizing costs in terms of energy, long and short term monetary measures and environmental impacts. Here, the benefits and costs are numbered in terms of units and the ratio obtained to judge effectiveness of design. However, measurement of quality is difficult due to the fact that benefits are generally described in verbal or quantitative terms, while costs are a more numerical entity.

Quality: Creativity :: $\frac{\text{Benefits}}{\text{Costs}} = \frac{\text{health/environmental fitness}}{\text{\$, energy and/or impacts}}$

3.6.3 Participatory Building Evaluation

The evaluation process developed by Kernohan *et al.* (1992), allows for different user and provider groups to determine physical and social issues in the building. Each group goes through a three step process- introductory meeting, touring interview and review meeting. The participants in the evaluation process include users (occupants, visitors, owners),

facilitators and managers. In the introductory meeting, the facilitator explains the process and the purpose of the touring interview and the meeting also iterates issues. The touring interview has each participant group tour the building reflecting on the issues raised in the introductory meeting. The review meeting is primarily negotiation between the various parties. This is where both outcomes and action are decided.

3.6.4 Building Utilization Studies

Space utilization is defined by Rawlinson (Powell et al., 1984, p.25) as the pattern of space usage over time. The aim of building utilization studies was to find and assess patterns of space utilization in order to identify improvements in existing buildings. This feedback could also be used for future guidance and in self-help techniques (Powell et al., 1984, pp. 19-20). The two variables used are frequency (percent of available time when a space is actually in use) and occupancy (percent of particular space which is occupied when that space is used).

Space utilization studies have the following effects (Powell et al., 1984, p.32):

- Understanding time profiles of activities
- Improving the completeness of briefing information with the inclusion of the time dimension
- Understanding the revenue costs of space provision
- Understanding what factors affect space utilization
- Exploring various space utilizations like shared space and multi-use space

Each building performance mandate has quality thresholds for various parameters which provide physical, psychological and social comforts (Powell et al., 1984, p.77-82). Peter Mill, who explains total building performance, first establishes the quality thresholds. Quality, here, is defined as a property or characteristic. He identifies the qualities as aural, visual, thermal, air, building enclosure, functional/use, building services and health and well-being. He goes further to detail methodologies and the qualitative units or operational measures.

Many firms are beginning to understand that space utilization is of utmost importance especially in commercial projects where value for space is vital. Space Analytics and Space Syntax laboratories amongst others are compiling databases and predict usage patterns using specialized software developed for this purpose.

3.6.5 Building Performance Studies

Markus, et al. (Markus, et al., 1972, p.v) feel that appraisal is a design activity and it is a continuous introspection by the designer who monitors his own performance. Appraisal has to be of both the design ideas and the building itself. Markus, et al., divide their conceptual model for appraisal into four systems (Markus, et al., 1972, pp.5-12):

- Building system: Construction, services, content
- Environment system: Spatial, physical
- Activity system: Identification, control, communication, informal activity, workflow
- Objective system: Production, adaptability, morale, stability

They contend that the interrelationships between these systems provide an ideal system (Markus, et al., 1972, pp.87-90). This system was primarily used to study educational institutions. The parameters under study included:

- Costs of various building elements
- Spatial elements and relative areas assigned to each

The physical performance of boundaries considered air, cost, durability, fire, flexibility, maintenance, optical, people, services, shape, sound, strength, surface, thermal conductance, water and weight factors. Each of these variables was broken into units of analysis and then into operational measures to aid appraisal. The procedure includes generation of matrixes for functional and psychological comfort parameters both during and after the design process.

3.6.6 Post Occupancy Evaluation (POE)

A POE or post occupancy evaluation, according to Preiser (Preiser, 1989, pp.1-6), is a subset of 'building diagnostics'. It has both diagnostic and prognostic capabilities with short and long term implications because of the feedback system generated for future projects. Performance evaluation and feedback relates client goals and performance criteria to the actual and measurable performance indicators.

According to Gutman and Westergaard (Gutman and Westergaard, 1973, pp.2-3), the difference between criticism and user-satisfaction evaluation is that, in the latter, the standards are more explicit. However, this does not mean that they are easy to measure.

Users either modify undesirable surroundings or they get attuned to them (Gutman and Westergaard, 1973). However, this is not to say that user satisfaction need not be gauged as, although people are tolerant towards a wide range of environmental conditions, extremes can cause adverse effects.

The short-term benefits of POEs include (Preiser, 1989):

- Identification and solutions to problems in facilities
- Improved space utilization and improved feedback
- Better understanding of design decision implications
- Performance implication by budgetary changes

The medium-term benefits of POEs include (Preiser, 1989):

- Built in capability for facility adaptation to organizational change
- Accountability for building performance of design professionals and owners

The long-term benefits of POEs include (Preiser, 1989):

- Long term improvements in building performance
- Improvement of design databases, standards, criteria and guidance literature

User-satisfaction studies have in-built limitations. These are in terms of user expectations, situations in life, personal variations and bias (Gutman and Westergaard, 1973, p.4). All these factors are innate in any behavioral study and have to be accounted for. Performance criteria have to consider current use of a building, intended use, state-of-the-art in the particular

typology and management of the client organization compared to the user groups (Gutman and Westergaard, 1973).

There have been many methodologies proposed to conduct POE. The processes, in some cases, consider the client's organizational goals and cultural contexts. The processes all have a few common characteristics of clarity of process definition and clarity of purpose and scope. Models for POE incorporate environmental and spatial attributes, building integrity, maintainability, serviceability, conservation issues and psychological comfort issues. The studies, generally, involve development of matrixes based on rating scales and eventually, generation of recommendations (Presier, 1989).

Research on POE (Preiser, 1989, p.296) is concentrating on increased user participation, more efficient data gathering and effective intervention in complex organizations. To ensure an effective user satisfaction study, one needs to define the operational measures and units of analysis at the outset. Gutman and Westergaard (Gutman and Westergaard, 1973) in their paper conclude that there is a definite need for collaborative effort from the behavioral sciences and environmental sciences to enhance POE.

3.7 SUMMARY

Amongst the numerous definitions of quality, one can highlight the three views of excellence, attribute and satisfaction. The others definitions are variations and derivatives of these three. The concepts of quality, on a more general note, are

observations made by experts in other fields especially management gurus. The specifics are dealt with architectural theorists and commentators while they define ideal architecture.

Some of the quality models are also derived from other industries while some are exclusive to architecture. These models have been divided into organizational and architectural models. Architectural models have been further divided into process and product oriented models.

The next chapter sifts through the assortment of quality definitions and models and establishes a position both theoretically and practically by analyzing the data based on a set of criteria.

4. THEORETICAL ANALYSIS

4.1 QUALITY AS SATISFACTION

To reiterate from the literature reviewed, quality is seen as excellence, as an attribute and as satisfaction. Garvin's approaches to quality (Garvin, 1988), as already stated in the previous section, include the transcendent view of quality as "innate excellence", timeless and universally recognized and the user-based view where quality is, subjectively, equated with maximized satisfaction. Quality when not perceived as "excellence" or satisfaction", is seen as an attribute (Smithies, 1981). According to Kernohan, et al. (1992), providers perceive quality in terms of formal and technical properties of the facility as an artifact e.g. how it looks or how assured the idea is while the users perceive it as the relation between facility and activity e.g. how it works in relation to intended activity and perceived needs.

Quality has a multitude of definitions where generally the transcendent and user-based views are strongly upheld as they are, perhaps, universal in application. Both definitions have their supporters. However, "quality as excellence" is seen as a more intangible definition and some consider this passé (Gordon & Nelson, 1998). By far, quality as satisfaction is probably a better argument to make than quality as excellence. Gordon and Nelson (1998) contended that nowadays, quality has become the means rather than the end. One of the reasons for this is that to be achieved, quality had to become a more scientific, tangible and measurable entity. So, quality as client satisfaction (a more tangible entity) was expounded as a

definition across industries. Armand Feigenbaum, a management guru (Schultz, 1994, pp. 85-89), then defined quality as total customer satisfaction with reasonable costs. In architecture, the client and the users maybe separate entities. So, when one talks about client satisfaction in architecture, one also needs to talk about user satisfaction.

Howard Robertson (Robertson, 1944, p. 95) states that quality stems from the client element, from intelligentsia and the critic class, from the architectural training side, from the building and construction side and from town and country planning authorities. "Quality is a thing of spirit, a universal currency...quality is in every way a satisfying thing. On the "subsistence level" it has a practical material value; but since quality is also something which is satisfying to the spirit, it is therefore a link a building which is completely utilitarian and that which can become- as in the case of a monument- a work in the category of what may be termed ' pure art'." (Robertson, 1944, p.68)

Cuff (Cuff, 1991, pp. 196-197) defines design quality as, "... a phenomenological entity perceived by individuals, not as inherent quality of the object or building." Thus, she feels that design quality is dependent upon those who make the judgment of quality. She claims that the three main evaluators of a building's quality are the customers and/or society, participants in the process including clients, designers and consultants and the architectural profession. The AIA handbook on design excellence (1989) also splits the players into three tracks. So, one can safely surmise that quality is satisfaction

and is to be gauged by various groups: client, user and professional.

People with differing interests in building have differing expectations on the returns of investment. Both users and providers (read architects) want a building to gain some return on their investment in having an interest in the building. So a building (Kernohan, et al., 1992, pp.11-12) would need to cater to various needs and satisfy various groups. This satisfaction could be preferential as the providers would be the primary decision makers and this is a primary concern of this thesis. According to the 1987 AIA Fact Book, an estimation of allocation by project type of total revenues to the profession shows that 10% of the projects emphasize on profession and designer satisfaction; 25% on user groups and societal satisfaction and 65% on client satisfaction.

According to Cuff (Cuff, 1991), the first group of users and society are the most ambiguous and evaluating their perceptions on the excellence could be done thoroughly using a post-occupancy evaluation or more cursorily by general press coverage, community reaction, number of visitors, leasability and reports from staff. Determining client and architect or consultant satisfaction is easier by self-stated reports. The other indicators include subsequent work done together and client recommendations. Professional satisfaction can be gauged by design awards won and publication in journals. Thus, one can definitely argue that quality is a measure of client, user and professional satisfaction; and to measure quality one needs to identify what satisfies these three groups.

4.2 QUALITY PARAMETERS

To determine what quality means, one must first understand the broader dimensions of it. These, according to Garvin (Garvin, 1988, pp. 49-59) are interrelated and might vary within a product.

Objective

1. Performance: the primary operating characteristics.
2. Features: the secondary traits that supplement the basics.
3. Reliability: the probability of a product not failing within a specified period of time.
4. Conformance: the degree to which the product's design and characteristics meet pre-established standards.
5. Durability: a measure of product life.
6. Serviceability: speed, competence and courtesy of repair.

Subjective

1. Aesthetics: how a product looks, feels, tastes and smells.
2. Perceived quality: an indirect measure to compare other products.

If we take the statement, "Quality is a measure of satisfaction of the client, user and professional" to be true, then, one has to first list what the particular expectations are from a building project. The AIA book on design excellence (AIA, 1989, pp. 18-25) describes the continuum of values as seen by three groups of people ranged from the designer's interests, to user (user and society) groups' needs and the client's values. The users and society are categorized together. This value system can also be seen as a quality system where each group describes its parameters to achieve satisfaction. Each group has some varying and some common expectations from the building. One way

to understand this would be to say that professional satisfaction is the universal set while client and user satisfaction are subsets. This is the ideal scenario. However, the diagram in reality, might change to all three sets intersecting and in the worst case, they are completely disjoint. I contend that a timeless building has all three-player groups satisfied thereby prescribing to the first scenario.

Therefore, if one defines quality holistically, one needs to iterate what quality means to client, user and professional (**See Table 2**). The various parameters listed by these three sets of people are random at first glance, but actually can be classified using the manifestations of quality architecture as perceived by each of these groups. For example, in the professional's case, he perceives quality as manifested as financial success, critical acclaim, peer recognition and pride in good work. So, these are the ends that professionals aspire for and the 'quality parameters' are the means to get there. The table below is derived by first listing the manifestations or indicators and then listing the corresponding parameters to achieve them. (**See Table 2**)

Design excellence (read quality) can be judged only over time. It is not an objective fact or asset of quantifiable characteristics although one might begin enumerating these characteristics so that quality becomes a more tangible objective.

Table 2: QUALITY PARAMETERS**Quality: Perceptions and Indicators**

Professional				
Indicators				
Financial success; pride in job well done; recognition by peers:awards, publication and emulation; growth; repeat clients				
Parameters				Sources
Positive environment	Limited legal liability	Flexibility in design-retaining design control	Strong personal expression	(AIA, 1989), (Cuff, 1991), (Frankline, 1992), (Davy, 1992), Symes, <i>et al.</i> , 1996), (Gutman, 1988), (Preiser, 1989), (Staskiowski& Burstein, 1996)
Client and user satisfaction	Conformance to clients' requirements	Clarity of concept	Aesthetic significance	
Strategic plans for growth and focus	Ease of communication	Advances in architecture	Defined responsibilities and procedures	
Within budget	Quality clients	Exploring new spatial relationships	Technically innovative	
Physical resources: equipment; workspace	Participation in decision making	Innovation-transcending style	Organizational satisfaction	
Client				
Indicators				
Pride;self-fulfillment; value for money				
Parameters				Sources
Political/social statement	Timely services	Within budget	Professionalism of consultant firm	(AIA, 1989), (Cuff, 1991), (Frankline, 1992), (Davy, 1992), (Symes, <i>et al.</i> , 1996), (Gutman, 1988)
Aesthetics	Perception minus expectation	User satisfaction	Maintainability	

Table 2 Continued				
Context	Perceived quality	Ease of communication	Conformance to needs: Function	More sources (Staskiowski& Burstein, 1996)
Strategic planning reflecting organizational / personal philosophy	Use of readily available materials efficiently	Value addition	Technical excellence	
User				
Indicators				Sources (AIA, 1989), (Cuff, 1991), (Frankline, 1992), (Davy, 1992), (Gutman, 1988), (Preiser, 1989)
Approval; enthusiastic use; support; physical and psychological well-being				
Parameters				
Aesthetics	Easy and self-evident circulation	Good life cycle costs	Safe	
Maintainability	Flexible	Ecologically considerate	Durable	
Conformance to needs: Function (space organization; space allocation)	User friendly	Recognizes context	Environmental quality: Physical (IAQ; lighting; acoustic) Psychological	

4.3 COMPARISON OF QUALITY MODELS

There are various quality models and techniques which an architectural firm can adopt as seen in the previous chapter (pp. 39-65). The question is how does one choose the right model. The choice is governed by the firm's ethos and aspirations as the destination determines the route more often than not.

I will now try to establish a common set of criteria to assess the various models. These criteria are derived from a comprehensive literature review. I wish to underline the fact that I do not advocate one model over the other, I merely undertake to help architects to decide which model is appropriate in a particular circumstance.

The evaluation criteria of the matrix are split into three sections:

Basic descriptors: They generally help in identifying the thrust of the quality model and help distinguish what the efficacy factors would be. The thrust could be in terms of process/product and client/user/professional orientation of the model. This is a 5-point scale ranging from very low to very high.

Quality cost factors: Quality cost is defined as the costs involved in implementing the quality models. They are in terms of a 3-point scale ranging from low to high. I have classified them as:

- Manpower: number of people required.
- Finances: amount of money required including man-hours, resources and overheads.
- Technology: need for special or high technology.
- Time: amount of time taken to complete implementation.
- Repeatability: in terms of projects and can be linked, to some degree, to generalizability.

Efficacy factors: They are used to see how effective the models are. The factors are chosen dependent on whether it is client, user or professional oriented. The parameters under each section are highly weighted factors in table 2. This is a 5-point scale ranging from very low to very high.

The quality models being reviewed are TQM, ISO 9000, Benchmarking, Peer review, QFD, Building Utilization Studies, CPBR checklist and POE. (*See Table 3*)

4.4 SUPERPOSITIONING MATRIX AND QUALITY

The architectural profession is constantly evolving and always looks to define itself so as to find more innovative business and practice models. Coxe *et al.* (1987) proposed a classification of architecture and engineering firms so as to understand not only the firm's functioning and policies, but also to determine strength and weaknesses for better strategic planning.

They define the three broad design technologies of A/E firms as (Coxe, *et al.*, 1987, p.33):

- Strong delivery: highly efficient service on routine assignments; clients view the buildings as products rather than a service.
- Strong service: reliably managed services especially on complex assignments.
- Strong idea: delivery of a single expertise; with emphasis on innovation and uniqueness.

They also stress that there is nothing judgmental about the quality of any of the design technologies. All three if successful, introduces a different vital component of design, service and delivery.

Table 3: QUALITY MODEL COMPARISON

	Organizational models		Process models			Building based models		
	TQM	ISO	Benchmarking	Peer review	QFD	Building Utilization	CPBR checklist	POE
Basic Descriptors (5-point scale)								
Necessity for all projects	very high	very high	very high	low	very high	low	very high	high
Process oriented	very high	very high	high	average	very high	low	average	low
Product oriented	average	low	high	very high	average	very high	very high	very high
Professional oriented	very high	very high	high	very high	high	low	average	low
User oriented	low	low	average	low	low	very high	very high	very high
Client oriented	high	high	high	very high	high	very high	very high	very high
Quality cost factors (3-point scale)								
Manpower	average	average	low	low	average	high	high	high
Finances	high	high	low	average	low	high	high	average
Technology	average	average	low	low	average	high	average	low
Time	High	high	average	average	average	high	average	average
Repeatability	High	high	high	low	high	high	low	low
Efficacy factors (5-point scale)								
Usability of data for future research- generalizability of findings	very high	very high	very high	average	high	high	high	low
Ease of generation of recommendations	low	low	high	very high	very high	high	high	average
If professional:								
Defined responsibilities and procedures	very high	very high	very high	high	high			
Legal liability	low	average	average	low	low			
Conformance to clients' requirements	high	very high	very high	high	high			
Innovation- transcending style	average	average	very high	high	low			

Table 3 : Quality Model Comparison (Continued)								
If client:								
	Organizational models		Process models			Building based models		
	TQM	ISO	Benchmarking	Peer review	QFD	Building Utilization	CPBR checklist	POE
Timely services			high	high		very high	low	average
Within budget			high	high		very high	low	average
Conformance to needs: Function			average	high		high	very high	very high
Aesthetics			very high	high		average	average	very high
Efficacy factors (5-point scale)								
If user:								
Aesthetics						average	average	very high
Maintainability						high	high	very high
Conformance to needs						high	very high	very high
Environmental quality						high	very high	high

The Superpositioning matrix developed by Coxe et.al (1987) has design technologies on the vertical axis while the horizontal axis is represented by:

- Practice-centered business: they have qualitative bottom lines with emphasis on the discipline serving others.
- Business- centered practice: they have quantitative bottom lines with emphasis on the tangible rewards for their efforts.

Either of the above value systems can produce a successful firm. The key is to have common goals and emphasis in any firm. Expression and consistency of values are necessary for a design firm's success. These values are qualitative rather than quantitative (Rose, 1987, pp. 96-97). They are definitions of quality aspired to in the mission statements. The Superpositioning matrix when analyzed for strategies for quality (Coxe, et al., 1987, p.38) showed that a strong delivery, business based practice used quality control as a key to client satisfaction while a strong service, business based practice had department heads and project managers responsible for quality control and strong service, practice based business had experienced, technical people providing quality control input while decisions were made by principals.

Based on the analysis of the quality models in table 3, I have tried to understand which quality models would be best suited to which type of firm seen in the table below (See Table 4). The assumption here is that the firm's ethos would influence choice of model.

Table 4: POSITIONING OF FIRMS**Superpositioning matrix- quality models**

Strong delivery	<ul style="list-style-type: none"> - Vertical structure headed by designer (Coxe, <i>et al.</i>, 1987, p.82) - Would prefer organizational and process models: ISO, TQM, QFD and Benchmarking 	<ul style="list-style-type: none"> - "Quality control is the key to client satisfaction: (Coxe, <i>et al.</i>, 1987, p.38); stress on standardization and reliability. - Would prefer organizational models: ISO and TQM
Strong service	<ul style="list-style-type: none"> - Quality control provided by experienced people (Coxe, <i>et al.</i>, 1987, p.38) - 'Client and user' oriented. - Would prefer process and building based models: Peer review, Benchmarking, Building Utilization, CPBR checklist and POE 	<ul style="list-style-type: none"> - Department head in charge of Quality Control (Coxe, <i>et al.</i>, 1987, p.38) - Stress on strong project management. - Would prefer process and building based models: Peer review, Benchmarking, QFD, Building Utilization and CPBR checklist
Strong idea	<ul style="list-style-type: none"> - Master designer's leadership (Coxe, <i>et al.</i>, 1987, p.38) - Clients with unique kind of architectural problems or patrons with egos to satisfy - Would prefer Process and building based models: Peer review, CPBR - Should prefer: POE 	<ul style="list-style-type: none"> - Management a coordinating and administration function - Would prefer process and building based models: CPBR, Building Utilization and Benchmarking - Should prefer: POE
	Practice centered business	Business centered practice

The authors of the Superpositioning matrix (Coxe, et al., 1987) are the first ones to state that none of the classifications are stringent and that any firm could fit into more than one category in the matrix and firms often move from one category to another. They mention that the higher organizational goals, generally, fall into one category and that the firm's functioning spills into other slots in the matrix.

Table 5: QUALITY AND THE SUPERPOSITIONING MATRIX

Firm position if quality is satisfaction		
Strong delivery		C
Strong service	A	
Strong Idea	B	
	Practice centered business	Business centered practice

If quality is a measure of satisfaction, then the definition of architecture is centered round service (*See Table 5*). Then, typically, the firm would fit into the 'Strong Service' category with a limited emphasis on 'strong idea' and 'strong delivery'. In the diagram above, leg A represents the main area of emphasis while legs B and C are subsidiary areas. Leg A represents professional, client and user satisfaction by defining service holistically. Leg B represents professional satisfaction by striving for critical acclaim and peer recognition. Leg C

represents client satisfaction and professional satisfaction in terms of financial success.

Perkins (Perkins, 1984) contends a firm's goals and policies directly impact design quality. The policies on a day-to-day basis, become the process having a multitude of complex relationships and factors. Therefore, to understand what quality means to a firm, one must begin with the organizational ethos, framework and process and then move to quality policies. Then one would be able to delve into quality procedures and eventually try to understand how the organizational goals are converted into reality by using a specific project as an example.

5. CASE STUDY: FIRM A

Firm A is an organization that establishes an environment of strong business principles to support the design function. The managerial and business framework has enabled the firm to grow and sustain itself without a signature style. The interview with the firm lasted for an hour and a half. Al was the Senior Vice President, Director of Quality Management. He was fairly forthcoming but admittedly, not completely prepared for the meeting. The response was friendly and to some degree, forthright.

5.1 DESCRIPTION

The basic tenet of firm A is the "business of architecture". The business philosophy emphasizes performance in achievement of client goals. It is a customer-focused firm that claims to recognize the importance of responsive design services.

Services: Architecture, structural engineering, interior design, master planning, graphic design, facility programming, facility evaluations, facility management, computer services, model services, equipment planning, and computer visualization.

Areas of specialization: Corporate, commercial, healthcare, justice, hospitality/leisure, sports/assembly, interiors/graphics, aviation, education.

Number of offices: 8

Number of people: over 500

Awards: Many design awards including an Honorable Mention in NAIOF's Building of the Year award and the Golden Brick Award

5.2 ABOUT THE FIRM

5.2.1 On organizational philosophy

The firm's literature says, "Our philosophy of purpose is to obtain and provide responsive professional and quality design services to our clients in a business orientation and within a nurturing setting of our staff". The literature on the firm also indicates that the focus is first on business, then on the customer and lastly, on the employees. By their own account theirs is also a proactive culture and attitude. Their report has them pegged as having "a conservative- but aggressive- attitude in every aspect of the building development/delivery process."

Firm A's business philosophy emphasizes performance as achievement of client goals. They claim that, "The deliberate application of this service philosophy has resulted in the consistent delivery of projects that are well designed, technically well executed, and completed within budget and on schedule." It has a strong production and project management reputation and serves 'signature' design firms as the 'architect-of-record'.

Al on the quality goals in the mission statement, says, "I think it is intrinsic in there- our mission statement- I don't know the exact words of it but it's very similar to the first thing I talked to you about- which is getting our clients, servicing our clients and making a profit- I mean that's pretty much it." He also said that their CEO believes that "those three things can be the goals and everything else is some subservient part of that but that's where it all goes". Their company presentation

states, "Our goal is to create a personal relationship with people within their organizations. Although our product is architectural services, our business is about people and the trust between those people."

5.2.2 On the organization

Firm A is organized into departments rather than studios, each managed by one principal. In their report they say that their organizational structure is non-bureaucratic and highly flexible. The firm is integrated into market sectors, services and locations. A three-man executive committee heads the firm. The primary operational unit of the firm is a project team formed for each project under the direction of a single project director or principal-in-charge who has responsibility for working with the client and directing the project. Each team specializes in a particular typology.

The Project Team is structured around a three-person nucleus known as triad- consisting of the principal-in-charge or project director, the design architect, and the project manager. Each of these three individuals are involved from start to finish. A project team consisting of architects, support staff and consultants support this triad. There are also in-house specialists in practice areas such as building codes, specifications writing and quality control.

5.2.3 On process

A2 who is a principal in the firm, in his article, advocates the development of a procedure manual where the nuances are

documented and shared. He also recommends that the outline be distributed to senior managers for detailing and this has to be published after the legal counsel has looked at it, as "risk etiquette cannot be overemphasized".

The construction administrator controls the delivery process with a 'project procedure manual' that discusses key milestone issues such as pre-construction conference, pre-installation conferences, state inspections and commissioning closeouts. When asked about the quality process, Al says that they do not have any documents, as the process would vary from project to project.

5.2.4 Analysis

To summarize, the firm works as a series of departments rather than a studio with each project being handled by a team specializing in a particular market sector. It proclaims that the three foci are business, client and employees, in that order. All the firm literature indicates that in the Superpositioning matrix, they would be positioned as a strong delivery, business centered practice with a tendency towards the strong service sector. It is interesting that they use the word "customer" and not client. Can one conclude that the firm's business philosophy views the practice as dispensing an architectural product rather than an architectural service?

5.3 QUALITY

5.3.1 On quality

Al mentions that getting and serving clients and making profits are integral to the quality goals mentioned in the mission

statement. Interestingly, he defines client satisfaction as a gauge for measuring quality, which I take to mean that quality is defined by the client's needs. He also mentions that quality can be seen as an established standard or minimum level in terms of product systems and material specifications. The established standards are not to be flouted irrespective of the client unless the client is willing to take the responsibility.

5.3.2 On clients

The firm is "customer-focused" with specialized staff for specific market sectors. A1 says the instructions of the client are foremost and so, while talking about the client, he says, "It's his money- he has a right to tell us what he wants, but there are some things we are not going to take the professional responsibility for." This philosophy along with the fact that they have good insurance makes the percentage of their repeat clients a high 70%.

5.3.3 On measurement and responsibility

A1 says that quantification of quality is very difficult and admits that he does not know of methods to measure it. The feedback process and tracking of persistent Requests For Information (RFIs) are possible methods. He does not know if they are measuring quality but states quite definitely that they "are being responsive to it." A1 also says that one of the responsibilities of his job is to see that there are no legal issues especially in the building material and product systems. He implied that fear of liability was one of the major

motivations behind the firm's quality management program in general.

5.3.4 Analysis

It seems to be that growth and liability are the two motivating factors in the firm's quality management program. The concept of quality is completely client driven. The quality of product seems to be synonymous with quality of finish- as in "high quality- high finish". The standards for quality are tangible in terms of materials and systems rather than the more intangible ones for design. This emphasis probably stems from the fear of liability suits, as in that case there is definite, quantifiable evidence.

5.4 QUALITY PROCEDURES

5.4.1 On client-user expectations and needs

There are specialists bringing in their expertise in specific market sectors- emphasizing the "customer focus". Al mentioned that the initial project meeting between team and client and said that client intervention is limited to the timely review meetings which are naturally part of the process. He dismissed pre-design as "airy" and unimportant and said that client expectations can be met only in the later stages where specifics are discussed. He felt that the pre-design meetings are too generic.

5.4.2 Quality procedure

The firm claims that their quality process is proactive with milestones that are project dependent. The quality management system primarily consists of a series of reviews by a quality management team. The primary responsibility for quality lies with the project manager. However, A1 along with one or two others, belong to the quality management team review projects. The other members specialize in specifications and code compliance. The reviews are conducted to preserve the company and the clients' interests. This is a fairly recent process.

The checklists are primarily detailed commentaries on materials and building systems as to usage, specifications and drawings. The check sets are standardized checking procedures especially dealing with referencing of documents. There is also a detailed list as to documentation process and document standards. They use the 'green-out' process to examine documents. This consists of underlining the documents in identified errors and once corrected, they are marked off in green. They do not have specific documentation on project process as A1 feels that it is obvious and implicit to everyone in the project.

The quality management group conducts reviews which are incremental and these get arduous at the construction document phase. A1 dismisses pre-design as too general and not requiring the quality group's intervention. He says they are brought in to review specifics. The reviews are very informal where they look at specific building elements, standard of care and budgets. The quality management team also has other responsibilities. A1, in fact, flies in and out of reviews. There is also a 'feedback

committee that comes in at the end of the project, reviewing it. They issue a 'head's up' which is a recommendation or change in previous material specifications or any other details and a document reference is filed.

5.4.3 Analysis

The whole quality management process seems to be very loose. The firm regards quality management as a set of reviews and this, at some level, is reactive rather than proactive as they claim it to be. The reviews are more arduous in the Construction Document phase indicating that the focus is on construction quality rather than design quality. The reviews are informal and have no specific structure. They emphasize building materials and systems pointing to possible previous trouble in that area or probably it is the phase they identified as needing improvement.

5.5 QUALITY RELATIONSHIPS

5.5.1 On costs

When asked about the percentage of hours billed for the quality procedures, A1 replied that totally 1-2% of the hours were billed as reviews and similar procedures but it depended on the project. He says that they do not have a way of defining the cost-benefit ratio. On prompting, he said that they do look at the change orders. They also look at RFIs and try to make sure that there no repetitive mistakes are made. However, he emphasizes that change orders and RFIs are very dependent on the contractor and what his perceptions and abilities are. RFIs, he concludes, might give some indication but it is not the best yardstick to measure quality.

5.5.2 On organizational culture

A1 says, quality is inbred in the culture of their office. He also contends that one of the hardest things to do as a company was to instill the organizational culture in the six allied offices. In most of allied offices, the employees come from the same city. So, they found that what worked best for them was to take people from the headquarters and plant them there so that the culture can spread. The importance of people in the organizational culture is seen in this quote from the company presentation, *"... final thought- and this is profound- is to select, hire, teach and retain great people. Great people create even greater architecture."*

5.5.3 Analysis

The firm does not have a definitive way to measure quality costs, as the benefits are not quantifiable. Seems like the firm has realized some difficulty in working with contractors who are upto standard. Most of the firm's take on quality seem to hinge on people and culture and so one wonders how flexible this culture is, in terms of local flavor and advantages.

5.6 SPECIFIC PROJECT

The project A1 describes is a 38 million\$ construction cost hospital that they are just about to finish. The local contractor was on board from the very beginning of the project. At the end of schematic design, they had an all day, informal meeting in their office. Towards the end of design development, they had a subsequent meeting in the contractor's office where they interfaced. At that time, they brought in sub-contractors

for the major areas of the project; to hear the dialogue and talk about the various parts and pieces where they would assist the contractor, making sure that the budget was appropriate. They had all the reviews at 40% and near the end of the design development phase; they followed up with a fairly exhaustive pre-construction conference. The selected sub-contractors met the team to discuss the project and related project history. Al remarks that it was interesting that a large number of the sub-contractors helped them with their pricing at the end of design development and that made a big difference. He feels that, that had a large impact on the success of the project. It was a great partnering effort, he claims. The firm's relationships with the other players have been outstanding. They tried to integrate quality assurance into the basic process and it had a positive impact on the project. This is what, he affirms, they would like to do with every project.

5.6.1 Analysis

The unique feature about this project is the concept of partnering and the structured reviews. This project seems to exemplify the importance of other players like sub-contractors and consultants in influencing the architectural quality of a project. The definition of quality could broaden to good, repeatable experiences in project control.

5.7 CONCLUSIONS

This firm is "customer" focused and has a business based philosophy seen in the focus of the reviews (building systems) and their marketing approach. They appear to be concentrating on

construction quality rather than design quality in their quality program due to their fear of liability.

Their whole quality management program does not have a rigorous agenda. It is a loose knit concept which centers round a team that reviews projects especially in the Construction Document phase. They are not looking to examine whether the design matches upto client expectation, instead they inspect building details and materials systems in terms of durability, safety and constructibility.

The two parts to this quality method are reviews and feedback conducted by separate teams. They are informal and at best, semi-structured. Process definition does not seem to be a priority with them. The firm does not seem to be looking at more formal procedure to ensure quality. They are content with the current system which, they claim, is reinforced by their culture.

6. CASE STUDY: FIRM B

Firm B is one of the largest firms in the world that has been consistently recognized for its management style and business practices. The interview went awry as the person to be met, B2, a Vice President of the firm was busy and did not show up. Instead B1, another Vice President was interviewed. The interview lasted forty minutes. It was followed up with a questionnaire response from B2 sent a week later. However, it was evident at the onset that B1 was not prepared. They were also not forthcoming about information and documents. B2 gave generic and politically correct answers and they were very generic which was probably due to the methodology pursued.

6.1 DESCRIPTION

Firm B tries to organize its services to support its clients along the complete real estate and facilities cycle from planning to implementation. They also are strategic consultants and look into how real estate policies can affect a client's business. It is a firm that prides itself on its ability to deliver.

Services: Architectural design, master planning, interior architectural design, programming and space planning, design standards development, tenant planning, graphic design and branding, 3D visualization, renovation, restoration and adaptive reuse, building design consultation, feasibility studies, facilities management

Areas of specialization: Airports, offices, education, entertainment, hospitality, retail, workplace

Number of offices: 24

Number of people: 2300

Awards: Many awards including awards for best business practices and AIA firm of the year award

6.2 ABOUT THE FIRM

6.2.1 On organizational philosophy

The firm's complete organizational philosophy concentrates on the client. Their mission statement revolves around the concept of providing great places that enrich people's lives and how they intend to make places that contribute to their clients' success. Their vision statement reflects their dedication to the client by delivering quality design. Their goal is to add substantial value to their client's enterprises i.e. the client's success is the best measure of the firm's success. The total focus is on client across the entire strategic cycle and this works as the competitive advantage. There is no definitive style or look as they consider it important to reflect image of client.

6.2.2 On the organization

Firm B has a "corporate office", which is the site of most of the firm's support services (legal, accounting, human resources, etc.), as well as the location of the firm's Chairman and President/CEO. A board of directors, consisting of the firm's founders and top leaders, establishes policies and measures results.

The firm's organization is not hierarchical; instead it is very flat. The offices are autonomous in function, including design,

management, operations and marketing with an overlay of company-wide policies, operational procedures and systems and shared communications. The studios are the basic building blocks and these are organized around practice areas. Firm-wide "Practice Areas" are formed around market sectors (i.e. airports, hospitality) and practice disciplines (i.e.: master planning, workplace). These practice areas meet annually and include members from various offices and regions. Their purpose is to advance the practice and provide communication within the firm about the activities of each group. It has only one profit center, in the belief that this fosters cooperation and communication across the firm.

6.2.3 On process

According to B1, the accent is on communication and free availability of information. So, there is a physical proximity amongst team members. He thinks that as the client moves with his decision making process, things change and the more information everybody in the team has on a day-to-day basis, the better the chances are in preventing somebody spending a lot of time wasted on something that is ultimately going to be changed. At another level, the project architect has frequent communication with the consultants.

6.2.4 Analysis

The whole firm seems to be focused on serving the clients. They are a strong business-centered practice. The studios are organized around market sectors. The process described, seems to be fairly typical of a large architectural firm with no special

characteristics. The process hinges on clear and extensive communication amongst team members. There are mentions of effective client participation but no details are divulged. So, once again, one might assume that there is nothing out of the ordinary by way of process.

6.3 QUALITY

6.3.1 On quality

B1 when talking about the firm's definition of quality says, "We fail if we do not create a work environment that enhances that person's experiences in the work environment. That doesn't necessarily mean fancy, it doesn't necessarily mean expensive- it means to support what they do. And it needs to be pleasing and creative." In other words, quality is client satisfaction. He goes on to mention that clients recommending them to others are the most vocal input they have to measure success. B2, when asked about quality talked about how quality was embedded in the vision statement.

B1 says that one must recognize that architecture is a business and a profit making business. Therefore, the indicators of success and quality are growth, good financial returns and satisfied clients. When asked about critical acclaim, he replied, "That is very important too but if you miss any of the first three the fourth doesn't do you much good. You have to live to design another day. And if you are not keeping clients happy and you are not making money then you won't be around long. So, design awards are important but on that list they are number three or number four".

6.3.2 On clients

The firm's attitude is that it is a client's building and one has to listen to them and focus on making certain that the client's desires and needs are on a much higher priority than the firm's specific desire to give a client a building that makes the firm happy. The firm contends that to understand the client, one must necessarily understand the client's business at the onset of the project. There is limited client intervention in their projects but again this is dependent on the client. They do not mandate any overall procedure for client intervention. However, they say they do recognize the risk they run if they do not have sufficient client participation. By and large, they have clients who are satisfied and give them more work as a result.

As to user participation, B1 says it is streamlined as too much of user input is counterproductive. So, they collate data from various user departments through surveys and questionnaires and then ask the client which set of demands and needs are to be complied with. After which, they compile the programming document.

6.3.3 On measurement and responsibility

B1, as already stated, says that financial success is the primary gauge of quality. He feels that all other indicators are secondary. B2 mentions that quality measures include such things as: reduced construction costs, shortened construction schedule, reduced operating costs, lower or higher population density or improved recruitment and retention that are

attributable to the design. B2 declares that they believe it is their public and professional responsibility to deliver quality.

6.3.4 Analysis

To firm B, quality is primarily client satisfaction. While talking to B1, one wonders if quality and success are synonymous. The reason is that all his replies and statements explicitly mention either success or failure. B1, speaking on behalf of the firm B, categorically states that the first goal is to make a profit so as to design another day. He clearly prioritizes goals and client satisfaction is a close third. This can be interpreted in another way: satisfied clients lead to growth and financial success.

Therefore, to them client satisfaction is all-important and they strategize for the client in terms of built spaces. They primarily deal with corporate organizations and so go to some lengths to understand the clients' businesses. This technique has helped them to specialize in office buildings amongst other types.

Their sense of professional responsibility seems to stem from business pressures or maybe even the fear of liability, as the latter would definitely affect their professional reputation. As there are no special methods of gauging quality, they do not do anything in particular except monitor costs and schedules. Their choice of metrics confirms their wanting to be a successful business. Other monitoring measures have not been divulged and so there remains ambiguity as to what they are.

6.4 QUALITY PROCEDURES

6.4.1 On client-user expectations and needs

B1 stresses that listening and understanding client's expectations and desires is paramount. So, the firm 'benchmarks' its clients in the context of assessing the caliber or quality of a project is expected. It is a system they use to understand the client's expectations especially in terms of materials and finishes. They allow the clients to witness images rather than words by taking them around similar projects. This tour is followed up by narrative (if the projects are their own) on the process and expectations of the case study buildings. The project outcomes are matched up with budgetary and time constraints in past projects. The choice of case study is based on the building type and accessibility. As to user intervention, conflicting programming requirements from different user groups are dealt with by asking the client to sift through the information and the programming document is devised. B1 said that they preferred that the clients use a few people like the project manager, to funnel information, so that there are no discordant notes in the project.

6.4.2 Quality Procedure

B1 quite categorically stated that they did not have any specific quality processes. B2 refutes B1 and says that they have a Technical Steering Committee that looks into technical quality and it conducts project reviews across typologies and offices. The committee has design leaders within each practice area. He says that the responsibility for quality rests at the office, studio and practice levels. B1 agrees that it is at a more process, day-to-day level.

At the beginning of the process, they have a visioning session where the values of the client and firm are put down along with project goals, deliverables and philosophy. The client and the firm define what success means to them. The resulting notes and charts are used as a road map to the rest of the project. This is what they use at the end of the project, to gauge whether it was a success or not.

There are major reviews at the end of every phase. They have people from other teams coming in and reviewing work but that is very schedule dependent. B1 was forthright and said that the intense competition and tight schedules made end-of-project reviews difficult to conduct on every project. The quality measures are in-house and reviews with consultants at all levels handle basically cost and constructibility.

The firm relies heavily on it being a communicative process where they prefer continuous monitoring to a SWAT team coming in at the end. Repeat clients come with their own feedback and so, B1 admits that is all they have in terms of feedback. He feels that they should do more in terms of feedback systems.

6.4.3 Learning

B1 states that they do not have an experienced designer or architect handing out sketches. Instead, they have a mentoring system which offers general learning opportunities. It helps junior architects apply past lessons in a particular project and understand why they do certain things, educating them on the process rather than focus on the end result. The education, B1

says ensures that everyone in the firm understands very clearly that they are there to serve the clients. B2 also mentions that they have 'lunch and learn' sessions in order to improve work. Training which is a part of this improvement process, handles localized issues like code compliance.

6.4.4 Analysis

There are no formal quality reviews or processes in the firm. They rely on communication and timely intervention of design and technical leaders to ensure quality. One wonders about the outcome of the visioning session where the project goals are documented, how they are translated into reality and how the project is kept on the straight and narrow course.

The focus is on understanding and listening to the client. Their system of benchmarking projects is unique. The effectiveness of this would lie solely on the choice of projects. The one concern here is that this process might typecast the project as design clichés might become the norm. User participation is preferred at a restricted, secondary level to streamline information.

Although, they expressed a need for feedback, there are also no specific procedures in place. B1 seems to be under the misapprehension that quality programs are only quality control or inspection based. B2 openly admits that he feels specific quality proposals are counterproductive. As he did not elaborate, I might conclude that quality does not seem to be a pressing issue in the firm.

6.5 QUALITY RELATIONSHIPS

6.5.1 On costs

Costs are not defined as the processes are not specifically identified as quality proposals as B2 thinks that such a move might be counterproductive. He however, mentions that as quality is integral to the process and that the closest they have to a quality procedure is value engineering which is a process wherein various substitutions are considered to reduce cost or time.

B2 says that during the design process, they work with the client, contractor and consultants to review the costs and benefits of various aspects of the design. Later, they assemble benchmarking data on most projects and seek out quantifiable measures regarding the effectiveness of various design proposals. B1 states that 6% of the project hours are allocated to a project with a critical mass for pre-design and visioning.

6.5.2 On organizational culture

B1 says that Firm B focuses a lot on recruiting the right creative people, specific to the project type experience. He feels that the better the people, the less energy is needed to teach and elevate someone's capabilities. B2 says that continuous quality cost monitoring and working closely with other players produces more satisfactory results rather than waiting until the end of design.

6.5.3 Analysis

The continuous monitoring they seem to have is in terms of cost and schedules. They do not really speak of costs of quality, as there are no specific costs due to lack of specific procedures. The emphasis is on culture and communication which are intangible and difficult to assess through this research.

6.6 SPECIFIC PROJECT

When asked about specific projects, B1 discussed general visioning sessions. B2 mentioned a downtown high-rise building, where they convened a peer group of top design leaders of the firm to consult with the local design team and to make recommendations to improve the project. This process was initiated and supported by the firm's top leadership. The client was invited to participate in the process and he helped the team move toward a resolution. The recommendations were incorporated and the building was successfully pre-leased. It is currently under construction. B2 specifically mentions that this project had more intensive reviews but gave no details. From this project he says, they learnt that client, design team, consultants and contractor need to participate proactively in a successful project.

6.6.1 Analysis

There was a paucity of details, preventing an analysis.

6.7 FUTURE

B1 says that they are not really contemplating quality processes as they already have procedures that they follow as much as

possible. B1 says that one shoe does not fit all and a single checklist is not a viable option. They are not looking at a stand-alone team for quality but both B1 and B2 agreed that they are always on the look out for methods to improve quality.

6.7.1 Analysis

Both people interviewed seemed content with what they have although what that is, is unclear. They also murmured the politically correct answers saying that they were always on the look out for new procedures. However, the answers did not seem convincing.

6.8 CONCLUSIONS

The firm was represented by two individuals who portrayed it as a profit oriented, professional organization. It is clearly a business-centered practice with a focus on strong delivery and service. Their unprofessional treatment of the researcher makes one conclude that they did not have anything to talk about and so they indulged in a degree of belated disinterest.

The quality procedures are non-existent as independent, identifiable entities and the principles were too implicit to be gathered in a semi-structured interview. Principles of quality seem to exist at the cultural level and are not explicitly documented or formalized in anyway. The focus is on understanding clients and they use benchmarking and visioning sessions to achieve this. They won a prestigious best practice award and so, their processes must be highly refined. Theirs is necessarily a corporate setup dealing best with corporate

clients. So, the best way to study this firm would have been to study their process.

The case study had some surprising answers as the two individuals were accorded varying amounts of reaction time. Their answers were not always in accordance. They also seemed to be withholding information, and I do not know whether this is company policy or reticence on their part. The lack of details in this study point to one of two conclusions: they genuinely have very little information to share or they are being cagey. In either case, this could be deemed as an unsatisfactory study.

7. CASE STUDY: FIRM C

Firm C is a very versatile firm with a range of services offered. They aim to be an enduring organization with a reputation for professionalism and corporate morality. The interview was well planned and lasted three hours. The participants were C1, a project architect who, in future, takes a on a Quality Control manager role, C2, a Vice President and C3, a senior associate. The atmosphere was very friendly and they were very forthcoming about documents and records. The interview was structured as each of the three people contributed in different spheres.

7.1 DESCRIPTION

The firm's enterprising spirit has made them deviate from a purely design firm to a firm related to architecture and construction more holistically. Design, currently, is not their mainstay. The office I visited is completely a design office.

Services: Architecture, interior design, construction management, design-build, engineering, environmental consulting, facility assessment, IT implementation, project or program management

Areas of specialization: education, offices, public, entertainment, healthcare, residential, sports, industrial, justice, hospitality

Number of offices: 12

Number of people: more than 500

Awards: many awards

7.2 ABOUT THE FIRM

7.2.1 On organizational philosophy

Overall, the firm is very entrepreneurial and they are constantly in search for new markets in the construction industry. C1 feels that philosophically, the work is not approached differently at that particular office although they are a primarily design office rather than the other offices which deal primarily with project management and construction management. He also mentions that in some ways, they are dissimilar in culture and are considered the mavericks of the firm. In a strategic planning exercise in 1997, they came up with a set of values that formed their motto, incorporating integrity, collaboration and excellence.

7.2.2 On the organization

C2 feels that the whole system hinges on collaboration. The firm is organized around a troika, with a group leader heading strategic planning, a development officer who gets the work and the operations officer who manages the group's contracts and administration. Each of these groups reaches out to other departments and other offices for support. In terms of design, C2 mentions that the functional diagram they came up with has three circles who were the specialists representing art, science and function and the intersection of these sectors comprised the generalists.

7.2.3 On process

C2 feels that to achieve quality in design and construction documents, there has to be some sort of process that has to be established on paper that is at least a guideline or a framework

within which one is practicing. On smaller projects, a good bit of this process may not be applicable but it works as a reference point. He contends that having a process is important; as is having people understand it and be aware of it. They are currently working on the design development process and the construction documents process as they have finished with the pre-design and schematic design development phases.

7.2.4 Analysis

This office does not really represent the rest of the firm in many ways because of the very singular nature of the work as this is a completely design office. It has a very different organizational method which is more transparent. An obvious conclusion is that the philosophy is intrinsic to the process and vice versa. The design office is trying to reach the levels of its PM/CM counterparts in terms of process definition and methods.

7.3 QUALITY

7.3.1 On quality

When asked about quality, C2, the principal says, *"On one level, quality is defined by your clients and how well you serve them- after all it is a service profession"*. He goes on to elaborate that that client satisfaction is very important measure of quality. C1, while defining quality says that, *"We are all oriented towards quality as our clients would define it first of all and that means they are getting what they expect to get for their money and it will last them the time they expect it to last, which varies. So quality is meeting the client's*

expectations- that we have a product that is quality design and functionally and aesthetically it's the best there can be and given all these parameters of time and money and form, again, our standpoint and the client's standpoint, we want to know that what we have done will last, be safe and not cause problems to us, or our client". C3 defines quality for the company in terms of growth.

At a more personal level, C3 says that quality is seen as personal advancement opportunities and enjoyment of the work. Meanwhile, C1 reveals that quality to him is a chance to work on dream projects, knowing that he has made a difference in a project and in the larger sense, the city. He also sees this satisfaction increasing as he takes on the role of quality control manager.

7.3.2 On clients

The final meeting and presentation of the pre-design phase sets the tempo for the project. Its participants include the clients, staff and the pre-design team. The agenda is to establish a set of values for the project. Ideally, the clients are involved in that meeting because then they have the same framework for decision-making set in their mind.

When asked about the degree of client participation, C2 replied that it depends widely on the client: "1. Do they want to? 2. Are they capable? Some of them don't want to- they come and say- look I want a building like this and I want you to come and show me what it should be- that is not my favorite kind of client." He feels those clients are the difficult ones. He spoke of a

hotel client of theirs who is as passionate about the project as the team and it makes the whole process invigorating, fun and much better.

C2 frankly states that dissatisfied clients result from unrealistic or erroneous expectations. His take on it is that as long as everyone understands what is going on and what is a realistic, client will allow the firm to do the job well. He stresses that people and managing relationships with people are more important than buildings.

C1 mentioned that that the percentage of repeat clients was between 50-70%. To some extent, this is also due to the repetitive nature of some of their projects. C1 says that it is easier to keep a relationship that is already established than to go and establish new ones.

7.3.3 On measurement and responsibility

C2 while talking about awareness of architectural standards of a place, says that they are reference points and he says that it is their professional obligation to know what the standards are to challenge them. C1 says that the degree of challenging it is, at times, dependent on the amount of time of time they have remaining. C2 says that this awareness is dependent on project circumstances but the clients need to be made aware of it as part of the pre-design process and even if there is no specific pre-design contract, the clients needs to be made aware of implications of neglecting standards. He feels that research is important to protect them and the firm.

7.3.4 Analysis

Client satisfaction seems to be the most important measure of quality. The firm seems to have instilled a strong sense of professional responsibility in its members. There are evidences of quality defined both in terms of client and professional satisfaction. The office recognizes the importance of research especially in the pre-design phase; they feel this is a more holistic method of approaching the project. They, like others, prefer enthusiastic, demanding clients, bringing out the best in them.

7.4 QUALITY PROCEDURES

7.4.1 On client-user expectations and needs

All their sophisticated military and institutional clients are going to have the extreme requirements and high standards soon and this level of expectation would be fairly consistent. Even in-house where they have private projects, they are likely to follow a specific regimen rather than give in to the client's lesser expectations.

7.4.2 Quality procedure

They initiated their quality procedures by writing detailed process statements. The idea was conceived by C2 who is preparing elaborate definitions. He is working on the design development phase, having finished the schematic design and pre-design phases.

Pre-design became formalized in the office's functioning only after the process was written. The pre-design phase is,

generally, a separately negotiated contract. It has the whole team go through a series of investigations as to code, site, historical and cultural resources and it culminates in a presentation. This presentation is an open review with the remaining staff, architects and the client sitting in on a completely informal even messy session which is moderated. The pre-design phase ends with the generation of project goals, philosophies and design ideas. C2 then talks about how communication and clarity of project goals lead to more reasonable expectations from the client and these are all clarified and consolidated at the end of the PD phase.

The whole process is collaborative with reviews that include people from various disciplines and levels of experience. C2 says, *"There isn't anything written into the process statement that prescribes who participates in what, when and where."* The process statement only has indicators as to what issues need to be covered during the course of the project. He feels that, *"Our practice in America, the biggest problem is has is, it is too highly an aesthetic exercise."* He goes on to say that aesthetics are important but so are other more practical and contextual issue. He feels that by the whole process starts by being a very intense decision making process and ends by being an intense documentation process. He feels that architects are not aware of the process and issues involved in architecture and need to be educated on it to make it effective.

Each process statement has in-built quality control mechanisms. In the Schematic Design phase, there is a required peer review before the client's approval is sought. The whole process

begins to get formalized only after the process statement is formalized. There are detailed document standards that include CAD standards, document referencing, code compliance and graphic standards. They also talk about how code compliance are also standardized and reviewed.

7.4.3 Learning

The whole process statement is taught for three reasons. Firstly, new people need to be made aware of it. Secondly, people need to be reminded about what the office does and how it does it and lastly, the teaching sessions are also feedback sessions which makes the process dynamic and is a self-improvement process in itself. These process statements along with fundamentals of other departments like finance have been taught for the past year and a half and these are now going to permeate to other offices of the firm as well. The firm, on a larger scale has its own university with a continuing education program.

7.4.4 Analysis

There is a definite link here between process definition, education and process implementation. C2 rightly sees that there has to be education and awareness for successful implementation. The process definition is in terms of issues that need to be looked into, like a qualitative checklist. Comparatively, the reviews are in the background because one needs to first define the context of reviews and that is what they are doing now. All the concerns seem to stem from a genuine concern as to where the profession is headed.

7.5 QUALITY RELATIONSHIPS

7.5.1 On costs

The foremost intent is to make money and so Firm C resorts to making projections of resources and costs. This process has been in effect for the past year and it is too early to gauge if it is successful. According to C1, on the larger projects, where they had a project manager and architectural staff involved that always happened. However, project architects or managers unlike their PM and CM counterparts did not know how to do this. They now realize that they need to be more sophisticated about it. C1 also candidly states that if the specific project, detailed later, was their job they probably would not break it up these many times formally although in-house these reviews were still going to happen.

C1 says, "*Getting things right the first time is really important*". C1 mentions that code summary is essential. He feels that if the firm does not do its pre-design homework upfront, they lose a lot of work because they have to backtrack. C1 makes an ironical observation that big projects have more reviews than smaller projects but the latter can least afford rework as they have a shorter burn.

7.5.2 Analysis

The firm is well aware of the costs of rework and they also realize that something actively needs to be done to keep these costs to a minimum. The projection system they use seems to be fundamental, relying on experience. They need to employ more advanced systems to achieve more accuracy.

7.6 SPECIFIC PROJECT

The project Firm C highlighted is a three section infill project for an educational institution. C3 said that the scope and the size of the project are large enough and intricate enough to have a lot of architects involved. The project has multiple layers of client structure and a complex interface. The clients also had detailed review requirements of their own.

To gauge what the end users needed, they first had a questionnaire where they asked them what they wanted, followed up by a face-to-face interview. The information was then quantified in terms of what kind of finishes and costs were expected. A program book was created with costs, needs and wants and the firm to get a clear picture as to what the project entailed. These proved problematic in terms of the original budget and structural volumes. The new design went through a series of approvals. The project is eight months underway. The first phase of construction will begin later this year.

At the onset, the firm recognized that there would be a lot of research involved in the earlier stages to avoid major problems later on and they brought in C1 in the capacity of technical architect. There was also a lot of code summary checks as the project needed International Building Code which the firm was unfamiliar with. There were both internal and external reviews. Internally, they reviewed documents before they go out and C3 cross-references and compiles them for three days during the course of the review.

When they issued 50% Schematic Design (SD) drawings, C3 also reviewed the consultant's drawings along with all the consultants. There was more than one consultant coordination meeting; they let them work and come up with some design concepts and realize them at the end of SD. The clients had their own review. They looked at the drawings and made comments based on pre-set guidelines set by the clients.

In order for them to come up with Guaranteed Maximum Price, the submissions were at 50, 85 and 100 % of each phase and after each, there was a review by the client. C3 also said that at the 85% Construction Document (CD) phase which was to come in two months, he was planning to send the drawings to a third party outside the office. They would be an impartial third party cross-referencing and reviewing documents for clarity and errors. C3 said he was looking for someone to pursue the Redicheck method. He also says quite earnestly that, "*But there are still going to be errors- nothing's perfect*". At the time of the interview he was 'bleeding' all over the sheets at the 50% CD phase. The reason for the redlining is because the design had evolved but some of the drawings had still to be brought upto date. Both C1 and C3 agreed that generally only one review in SD and one in DD are the norm but three reviews at 50, 85, 100 is not untypical in CDs, but to have all three in all stages is rare. There is a project mark-up book where all notes and comments are ideally recorded, serving as a reference point.

Of the project, C3 says, "*The work is also a good learning tool*".

7.6.1 Analysis

The project demanded arduous reviewing and so, this is a classic case of a well-informed client with high expectations making sure that they get value for their money. C1 himself admits that the review process would not be so comprehensive and formal had the clients not expected it. The reviews here are multi-layered: internal, external and both. This is partially due to the client's complicated organizational structure and partially due to the complexity of the project. It should be a very good project because the rigorous process has been thorough. It remains to be seen if they have lost the bigger picture while in pursuit of the smaller ones.

7.7 FUTURE

C1 is slated to become the quality control manager in the near future. His role would be to monitor projects from the initial phase and to assure that the office is maintaining standards of design and documents. He would be the external participant in the reviews of all projects handled by the office.

7.8 CONCLUSIONS

The firm as a whole, can be placed in the Superpositioning matrix as a strong delivery, business centered practice. However, this particular office seems to be a deviant. It would probably fall into the strong service, practice centered business. That is probably because it is a completely design office and full of enthusiastic, idealistic designers.

The quality method they refer to consist of clarity of process. They are defining the client's needs as quality. Their emphasis on pre-design (PD) and the importance of research exhibits a proactive approach to quality. Their reactive approach is seen in their future plans to have C1 in charge of quality control responsible for reviews. His intervention would include SWOT analyses for each project.

They are an office in flux, in terms of quality procedures. In fact, their enthusiasm in participating in this study is mainly due to their keenness in initiating new methods into their way of working. Theirs is still a nascent quality system. They have not addressed more advanced issues of client and user intervention and have not completely thought of external or formalized feedback systems. However, it is a start and their fervor is infectious.

8. CASE STUDY: FIRM D

Firm D has achieved the delicate balance between quality architecture and quality management. It is consistently ranked amongst the top few firms in terms of billings and growth. In retrospect, this firm seems to be way ahead in the quest for quality. The interview lasted two and a half hours. D1 is a Vice president in the firm. He is also the primary author of the quality policy of the firm. The whole interview was planned for and structured as the presentation was ready and in-use.

8.1 DESCRIPTION

This is a firm with multidisciplinary interests and has been a very successful design firm both nationally and internationally. It has a reputation for consistent quality in terms of project delivery and service. It is collaborative and places a lot of stress on innovation, specializing in large mixed-use projects.

Services: Architecture, planning and urban design, interior architecture, landscape architecture, engineering, environmental graphic design

Areas of specialization: Corporate, healthcare, hospitality, public, residential, retail and entertainment

Number of offices: 6

Number of people: 500

Awards: Many awards including AIA Architectural Firm of the Year.

8.2 ABOUT THE FIRM

8.2.1 On organizational philosophy

Philosophically, they see themselves as a collaborative firm that is both idea and client oriented. D1 claims that they already have a reputation for their design abilities and now they are looking to be a well-balanced firm by enhancing their production and technical capabilities as well. This, he said, led to some restructuring and redefinition of roles in the firm. In 1990, they adopted a philosophy that emphasizes design first, clients next, its people and its management. They believe that the quality of work depends on the quality of people. They are in it for both good design and good profits but they contend that size does not equal success or quality.

8.2.2 On the organization

After the restructuring five years ago, the firm was organized to focus on market sectors. The offices are divided between geographical locations and market sectors. D1 claims that the intention is to have experts involved in those particular market sectors' client context to be amongst the top five firms in those sectors. The particular office I visited, for example, has healthcare, hospitality, retail, entertainment, urban housing, urban planning- and environmental graphics. The quality programs have not been instilled into the urban planning group or the environmental graphics groups, as they are smaller.

There is an emphasis on providing distinct career paths for project managers, project designers and project architects. The mentoring and training programs are flexible and allow a person

to sample all three different types of responsibilities before choosing one stream.

8.2.3 On process

Firm D firmly believes that process planning leads to better architecture. The quality process development began three years ago with a chart of decisions and quality measurement points along the path of a project. D1 describes it as almost a 3 dimensional checklist.

The first step in process definition was to redefine the organizational structure and roles they had in office. They felt that project design, project management and project architecture were the three key elements and those job responsibilities had to be defined clearly as they deal with large, complex, mixed use projects. The first notion that they came up with was called the "Road". It literally was a road map that described most of their projects and they realized that although the decision-making is radial, the path of projects is fairly linear. In due course, they discussed project culture in terms of increased accountability, providing systems for quality assurance and monitoring and providing resources for quality project delivery.

During this amplification of process, they also reexamined the AIA staffing and billing plans, resulting in the project architect getting involved a lot earlier in the process and the project designer is involved a little less because they have already made the quality decisions. *"The whole point is making quality decisions earlier- make quality decisions earlier- draw*

less later", D1 says. They staff up projects earlier in the design to make sure they have all the decisions made in the project before the document phase.

The most important meeting at the beginning of the project is called 'design generation' or 'big idea' generation has the lead designer or the partner in charge who ideate on the design. They require that the big idea of each be documented so that the idea permeates over all the phases. Another way, according to D1, is to have a brainstorming room with pin-ups that forms a backdrop for the crit sessions, to incorporate design ideas.

8.2.4 Analysis

The overall process is elaborately defined with allocation of responsibility, planning of phases and reviews, continuing education and intermingling of experts. The process definition has rightly preceded any quality strategy. It is also considered the first step to any TQM model.

The flexible career paths and mentoring are the hallmarks of any good organization. The quality process outlining was a period of learning and is a hit and trial method and so, I would say it is still evolving and proving itself. The emphasis on project ideas and idea documentation show that it is trying to live upto its "strong idea" image.

8.3 QUALITY

8.3.1 On quality

D1 avers that in the last five years the market was rather full and they naturally had to ask individuals with less experience to step up and do things that were above their experience level and as a direct reaction they decided to get their collective experience working on all the projects. He elucidated that this was due to understaffing resulting due to pressures of economy. To quote him, *"I guess what I'm saying is, because of the necessity of the economic situation and the lack of staff- drove us to a situation which we probably shouldn't have been in anyway."* He says that the industry thought that computer technology would solve all quality issues and only now it is waking up to reality.

D1 forcefully contends that quality equals passion. He says that individuals who are not worried about quality are not the most passionate architects that he has working on the project. He agrees that he maybe oversimplifying the issue but he has found that with some projects and some people you do not have to but in others, it needs to be taken care of.

Firm D considers growth, profitability and size as the major indicators of quality. Additionally they also mention, publication especially in the more popular press for higher visibility, design awards and higher retention of architects are the other pointers to quality. He feels that their higher retention rate is because of their benefit packages (ranked amongst the top five in the country) that are focused and staff driven. However, in more tangible terms, Firm D uses RFIS and

change orders, especially the latter, as it is easiest to track money and fulfill the client's expectations of value for money.

8.3.2 On clients

D1 on questioning, wishes there was more client intervention in projects. He says that they have sent out marketing surveys to clients at the end of projects and that apart from the kick-off and post mortem meetings and intermittent 3-4 informal reviews, they do not have much client participation. He says that this varies from project to project and client to client. A charged client makes a charged project team and this gives good results. He feels that clients who are experts on the business, have higher expectations and keep the firm on its toes all the way through.

Firm D has been known to handle politically charged projects where various stakeholders have to be brought together to reach a consensus on the project. One of the methods they use is a design charette involving all parties. This, D1 feels, leads to everyone's egos being mollified and the solution is beneficial to all.

8.3.3 On measurement and responsibility

D1 in the interview said, " ... what's important for a quality program is finding how to quantify it; how to justify it; how to measure it." He says that after tracking Requests for Information (RFIs) and change orders from a documentation standpoint, they have seen a gradual decrease in them. There has been a gradual ramping up of the tracking program in the last

three years and hence, the gradual reduction in errors in documentation. The quality reviews have been undertaken for the last year and a half and so their success will be seen in some time.

D1 mentions the fact that it is due to some success on this count that they had a contractor refer them to a client for their good business practices. He feels that this is definitely an acceptable level of quality as somebody from the other side of the fence recommended them. He then reiterated that quality is beyond growth, profitability and size.

8.3.4 Analysis

Interestingly, quality is seen as an outcome of collective experience and knowledge sharing. So recruiting and retention of people become important. Their lessons have been learnt well as they have tried to deal with the basic issue rather than expect the advent of computer technology to solve the problems.

Their ambitions seem to be in terms of higher public visibility in the popular press. D1 agreed that popular design awards are what the profession needs to stay rooted in society. As of now, they are content to track quality by tracking money until better metrics come along. The whole quality program is its adolescence and so is completely driven by client expectations. Quality as can be seen here becomes the agenda of a few impassioned individuals who have to enthrone the others; such it is with every quality team.

8.4 QUALITY PROCEDURES

8.4.1 Quality procedure

D1 and others initiated the quality process which was inspired by Deming, Redicheck and similar literature. It was developed completely in-house. They began by demarcating job responsibilities and laying out the process. They went through a rationale to find out what they needed and they started playing around with a quality assurance scorecard to indicate when to have reviews, of what kind and who needs to be involved with those. The reviews are planned differently in different work sessions and some of them are structured, while some are loose and they range from design reviews to technical reviews depending on the project phase. The concern was to assure participants that it was not policing but a necessary part of the process. The current program is active only in one office and has been so for the last three years. The other offices have evinced some interest but are not completely active on this count yet. All the offices are ideating on it. Firm D has not reached a point where they will make this an edict but D1 thinks they are close to it.

The firm has a strong technical resource center situated in another office that other offices draw from and this was the main tool before the quality program started. The monster website deals with the myriad details which are born out of a massive firm. As a part of the quality program, there are checklists at each phase. The standardized resources include typical contracts, proposal letters, schedules and overviews for other tasks.

Internally, the reviews are conducted by the Quality Management Group (QMG). This group consists of practice leaders who specialize in particular market sectors. The firm felt that someone needed to be looking after each of the different areas of practice like design development, project management and construction administration and then found individuals within each of the offices individuals who really had a knack for that area of work or excelled at leadership and they became practice leaders. The QMG's responsibilities are well defined with each role being thoroughly clarified. It evaluates the projects by conducting specific reviews at specified intervals. The scorecard is a mechanism developed to track the progress of a project vis a' vis the reviews.

The QMG continually evaluates and reviewing what theories work by observing projects and evaluating them. There are also the people who write specifications who are involved in the reviews. Sometimes, on a more complex project, there are others who are involved in the reviews. There are no external reviews unless specified by clients. The firm feels that when a client who is that paranoid about the quality of drawings, they understand it is a pretty sophisticated client. While discussing reviews and the difficulties attending them, D1 says that the hardest and the most important thing to evaluate is whether they have accomplished the deliverables, the contractual obligations and whether the project has evolved to the appropriate point in all spheres. The other side is to evaluate what the future of the project is. He contends that the review should contain both hindsight and foresight.

The post-mortem review at the end of the project has each of the practice leaders putting together a list of what they could have done better, particularly the construction administration practice leader. The clients and the consultants also give their input and feedback on the project. The resulting document is aptly called "next-times".

D1, on the quality process chart, says that, *"I have to be honest with you- that's tough. That's tough to even get that- that is- what I have shown in the diagram is kind of the best-case scenario- if that happened it will be wonderful on every project. It probably does happen on every project but not so formalized. .. perhaps, it's a lot more informal like you said. Having something at the beginning of each phase is really the best we have been able to achieve."*

8.4.2 On learning

D1 observed that the usage of the quality manuals and program was very closely correlated to the level of experience; the more experienced the individuals, the more the usage because they understand what the manual is and why they need to use it. He says the less experienced individuals are extremely intimidated by it because they have no idea what it is and it is very hard for them. So, the firm decided to break it down to smaller, more handleable portions with their continuing education program. They recently hired a former Dean of a state university to examine the program and he is manipulating the courses to suit individuals with varying degrees of experience.

While talking about learning from previous project histories, D1 expresses the difficulty in obtaining detailed project histories especially in a large firm like his. The firm does have a database of projects but it is not very comprehensive.

8.4.3 Analysis

The quality management procedure emerged from Deming and others. The process is homegrown with constant revision and tweaking. The proof of the pudding is in the eating and although implementation of this system has begun, it seems to be early days yet to say whether it is effective or not.

The quality procedure is a structured, sequential progression of checks and balances. The process for review is detailed out in terms of review phases, structure, agenda and checklists. The concept of practice leaders is specialized in itself and within them they have market sector specializations. So, the Quality Management Group comprises of experts who are overseeing projects.

The buzzwords generated go to show how quality is being sold to the other individuals in the firm. They are geared towards motivating firm members. These buzzwords are being used clear the air and show that quality is not about policing.

8.5 QUALITY RELATIONSHIPS

8.5.1 On costs

Quoting D1 discoursing on quality costs, "I can tell you this emphatically though- quality- the money spent on quality

programs is really a good bargain- it's cheap, it's not expensive." He goes onto elaborate that spending even upto 8000\$ to save 4-5 million\$ on a project is definitely worthwhile. He contends that billing even senior people reviewing documents for a week is perfectly justified.

8.5.2 On organizational culture

"Quality delivery of ideas" is their motto and they take great pains in ensuring that they identify the right individuals and team to ensure that their motto is translated into reality.

8.5.3 Analysis

Although quality is considered an important goal, there does not seem to be any distinct way to measure it and so, Firm D decides to bill quality costs as overheads. Tracking change orders bring a sense of fighting money with money and I think, that helps justify the existence of quality programs.

8.6 SPECIFIC PROJECT

The project that D1 referred to was a convention center hotel that had a lot of public funding, a really politically charged project. At the time of the interview, they were finishing design development. They were at 3/4th Design Development. They had a design charette team comprised of different community leaders although the community really had nothing to do with the project. Although, the community was not financing it but the firm thought this process would decrease the opposition to the

project. They also had out-of-house peer reviews, as the client required them.

8.6.1 Analysis

The concept of all stakeholders participating in the design process is an interesting one. However, moderation needs to be exercised especially when the participants are not all stakeholders. One has to wonder if the social intervention in this case is a political sop or has it actually been a tool to get stakeholders to express their need and concerns. This is an ideal situation where there is participatory design backed up with good management practices.

8.7 FUTURE

D1 mentioned Deming's cycle of PDSA: Plan-Do-Study-Act and states that they have planned and done some things and now they need feedback. This, I suspect, is one of the reasons for participating in the study.

8.7.1 Analysis

Firm D is in the beginning of the implementation cycle of their quality plan. Feedback, by their own admission, is what they need to work on. They are also eager to learn other and newer ways of assuring quality. However, these have to be applied with caution as they may if not judiciously applied, clash with existing processes.

8.8 CONCLUSIONS

Firm D seems to be a professional organization talking of quality in corporate terms borrowed from other professions. They claim to have reached a stage of where financial success and growth are not strong enough indicators of quality. Their focus now is more inward in terms of process and design quality. They are aiming for more recognition in design circles. This is consistent with Maslow's theory of hierarchy of needs which states that only when man's basic needs are met, will he aim at self-actualization.

The firm's approach to quality is management oriented. They have tailored a TQM model to include quality reviews, planning, agendas with a QMG overseeing all quality processes. There are detailed checklists for reviews and documentation standards. After reviewing the documents provided, I feel that the process development and redefining the AIA phasing and staffing plans, show a lot of foresight. However, the literature which seems to be the starting point for this process might have been limiting, as the books are generic and management oriented. More innovative approaches to design quality can be seen as fruits of laborious research in centers and laboratories.

The firm seems to be way ahead of the other firms in terms of TQM. The in-house efforts are really to be appreciated. However, the weak links in the process seem to be a tad too much emphasis on reviewing and less emphasis on client and user participation. This also has to do with, to some degree, the kind of clients. However, feedback and active client and user participation is the backbone of continuous improvement of quality.

There is a big difference between the cup and the lip and implementation of such a system across various offices and varying leadership might be the real test of endurance of this system. The chances are this system would not fail radically as the authors of the policy are intimately acquainted with the organization's culture, ethos, policies and processes. Their main lookout would be to apply the system consistently across all projects in all offices.

9. CASE STUDY: FIRM E

Firm E is one of the world's largest design firms achieving exemplary design by focusing on clients, users, context and environment. The interview lasted for two hours. The interview panel consisted of three people with varying functions; E1 was a project architect, E2 a technical architect and E3 a principal designer. The interview panel was very friendly, forthcoming and well prepared for the meeting, as they had coordinated their schedules to appear together.

9.1 DESCRIPTION

Firm E is a collaborative practice organized around studios. It claims that it derives inspiration from context. The marketing literature states that they identify design by research, investigation, experience, reflection and analysis while their overall design philosophy is, "*Design that defines*".

Services: Architecture, planning and urban design, interior design and spatial planning, graphic and environmental design, economic and financial feasibility.

Areas of specialization: Healthcare, education, corporate design, science and technology, office/mixed-use, retail renovation/adaptive reuse, sports and entertainment, public assembly, justice, airport/transportation, retirement and assisted living, interior design, hospitality/resort/recreation

Number of offices: 10

Number of people: 800

Awards: Many awards including ones for innovation and Office Building of the Year.

9.2 ABOUT THE FIRM

9.2.1 On organizational philosophy

The firm, in its literature, states, *"The approach rests on the assumptions that serving clients, society, the environment, and the art of architecture calls for full and open-minded participation in the client's goals, sensitive and thorough definition of issues and the development of alternatives not bound by existing paradigm"*.

The firm, across all offices, shares the common value system mentioned above that E3 says is non-negotiable. He feels that the firm stresses a lot on spatial experience, dovetailing client culture and specific project goals. He feels that they handle most projects along these lines. The firm takes care of its people, ensuring that they reach their professional goals, while making sure that that the best team is presented to the client keeping with company ethos.

9.2.2 On the organization

They are not a departmentalized firm. Instead, they work as project teams. Each office is considered a studio which is largely autonomous, although there is some interdependence and interaction amongst studios.

Regionalism with "merge and grow" is the norm of the firm. The studios are complete entities with the partners ensuring constancy in ethos in terms of practice, operations, marketing, special initiatives and strategy. It is a collegial system where consensus is the main decision making process.

They are four advocacies in each studio. They are design, technical design, process and communication. These anchoring components are present at every stage although one might supercede others at certain points. All these advocacies, ideally, reflect a full understanding of the project philosophy and process.

9.2.3 On process

In the project kick-off meeting, they design the design process depending on client and user input and project requirement. According to the firm, clients dislike a predetermined process as much as a predesigned building. This constitutes the conditional part of the process. The unconditional part focuses on the type of drawings to be issued and kind of tasks inherent in any design process.

The Process Design League devises the procedure for a project in accordance with client's needs. This league is not a formal team; it is a responsibility of specified project members representing all four advocacies. They ensure that the project goals are adhered to.

E3 while speculating on the origin of process design said that a decade ago the firm was well versed in fully programmed buildings and came up with a mechanism to deal with complex healthcare projects with different layers of decision making. The success of that operation became a driving principle of the firm.

9.2.4 Analysis

The firm focuses on offering the best service to clients. They tailor the design process to attain this end. The studios in the organizational framework reinforce the importance of design in the firm's priorities, stressing on the quality of ideas to achieve noteworthy architecture.

The process is divided into the conditional and unconditional parts. This approach is unconventional, as a generic process would only have the latter. The latter would be typical of the framework provided by the AIA. The conditional part is defined by specific project needs.

9.3 QUALITY

9.3.1 On quality

According to E1, quality is a matrix of things including personal and public acclaim, client satisfaction, project theme and context, financial performance of the firm (listed as very important) and the ability to get more work based on that. E2 is more specific and states that quality is definite value addition to the client. E3, a designer, describes the facets of architectural quality as quality of material, quality of idea, quality of process and quality of product. He also mentions the quality of understanding linked to the quality of listening to the client and the users. Here, quality is seen as excellence.

Personally, E1 defines quality as materiality or the idea of permanence to what one does, standing through time.

9.3.2 On measurement and responsibility

Every project has its own standards of quality, relative to the metrics that clients have and so, they are absolute for each client but relative between projects. There is a project wide definition of quality derived from project goals and these are shared with the team so as to serve as a final evaluation of the project. Another metric the firm uses is the measurement of client and user satisfaction through post-occupancy interviews. One more indicator is the financial success of the client based on the business goals set in terms of the architectural project.

E3 says that materiality is important in architecture as professional liability is invariably in the sphere of material selection and can be handled by stating client expectations as goals. He also contends that the main responsibility of the architects is detailing of material systems.

9.3.3 Analysis

Primarily, to the firm, quality of architecture is satisfaction of the clients and users through excellent design. The metrics of quality are dependent on the client and the client's goals. The shared project goals are established in order to define professional responsibility and reducing liability.

9.4 QUALITY PROCEDURES

9.4.1 On client-user expectations and needs

The client and user intervention begins at the initial stages and intensifies in the interim stages until the construction

documents phase where the decisions have already been made. There is a weekly dialogue with the clients. User input is generally obtained at every stage regarding spatial organization, equipment and areas required. The firm also considers parameters like 'image', space utilization, sequencing of tasks, cleanability and maintainability apart from program requirements. The various user need categories are fit in with budgetary constraints and presented to the users for further feedback.

9.4.2 Quality procedure

The project kick-off meeting is a two-three day session planned by the Process Design League that includes the key stakeholders of the project. The session ensures that all the players ideate on client and community issues, reaching a common ground on project goals and expectations. The clients also expand on their own process so that the team gets a better idea of client needs.

While discussing the significance of the initial meeting especially in completely new projects, E3 says, "*In a way, it helps them (client and users) to realize they are a new entity*". Therefore, the session helps establish both project and user identity. The other items on the agenda are establishing measurable devices that keep a project on track and eliciting detailed information from the client as to who is responsible from their side. The goals ascertained in this session are almost immutable although they might be modified during the course of the project.

The firm has a multi-layered feedback system that also doubles as a review system. Firstly, there is a process calendar that charts the whole project. It sequences tasks and registers significant milestones by logging expected completion dates. E1 emphatically states that feedback systems are necessary to understand what research is needed to achieve clarity and identify pre-tasks in design. These are all listed in the calendar. Physically, the calendar is a huge chart that has each discipline marked in a different color and deadlines mentioned on the various post-its along with milestones. The shared project goals as well as internal goals are also put up on the side. This list is informally worded and is a reminder of the philosophy and values of the project and the firm.

Secondly, the firm documents all its projects in project monographs. These may be as informal as scrapbooks or formal with project details. The monographs are shared with the rest of the firm on the intranet. Thirdly, to ensure good feedback, the firm tries to make sure that as many members of the team as possible stay with the project from conception to completion; they then reinvest this strategic experience in other projects.

They have periodic design reviews. The daily ones discuss project progress on a day-to-day basis through mentorship. The weekly reviews consist of design dialogues over a project pin-up. These presentations are short and intense with the whole office participating. E3 contends that these "organic" crit sessions hone both presentation and critical skills. The monthly reviews have design leaders from other studios examining projects. The quarterly reviews have principals meeting and

critiquing the advocacies and the firm's strategic direction. Additionally, there are basic checklists for documents and deliverables but these have to be viewed against the specific delivery process in use in a particular project.

The firm tries to conduct annual post-occupancy interviews in all their projects. The interviews center around the satisfaction of the users and clients in terms of the shared goals listed at the onset of the project and later documented in project monographs. This procedure is also conducted to remind the clients that this was what they had asked for.

9.4.3 Learning

The firm feels that a big part of quality is training and mentoring with an active, hands-on approach. Elucidating E3 says, *"Quality begets quality through training"*.

They also have firm sponsored, worldwide travel programs. These invariably have a theme; they could be country or region specific or a particular set of successful buildings. The travelers, at the end, make a presentation to the whole office, communicating what they saw and learnt.

Research and investigation are important to the firm especially in the specific technical typologies that the office handles. Generally, this research is in terms of new ideas in design, new technologies and innovative processes. The calendar technique is a constant learning process allowing for better project understanding.

9.4.4 Analysis

There is no formal quality process in place. The firm concentrates on the basic design process to achieve project goals. The only implicit quality program it seems to have is continuous improvement, seen in its stratified review systems, training sessions and active client/user intervention.

The 'calendar' process deals with the status of a project, its goals and its deadlines. This forms a backdrop for reviews and crit sessions. The calendar takes into account shared project goals established in the kick-off meeting and monitored by the Process Design League. It promotes clarity of process and eventually, quality.

Interestingly, the review systems are not seen as policing but as feedback systems. They are periodic rather than dependent on project phases. The reviews are hierarchical ranging from internal project team reviews to studio wide reviews to cross-studio reviews and the firm-wide principal reviews.

The other feedback systems include post-occupancy interviews with clients. This is a unique feature of the firm and it exhibits a genuine concern for clients and users.

9.5 QUALITY RELATIONSHIPS

9.5.1 On costs

E3, while talking about quality costs, says, "There is a tremendous amount of reinvestment in the firm". When asked to

quantify this amount, he said that it was very hard because a part of every budgetary allocation goes into communication, research and training.

9.5.2 On organizational culture

E2 comments that the process is very open and expectations are clearly listed since they spend a lot of time on communication and interaction. Communication is one of the four advocacies or focus areas in the team.

The firm stresses on communication at three levels: internally, externally (clients, potential clients and the community) and professionally (other architectural firms). They use both traditional and digital media to share information and knowledge.

9.5.3 Analysis

The firm's culture is centered round communication, openness and continuous improvement. These are three factors that come under the purview of all the advocacies and so are hard to quantify in terms of budgets and benefits which are reflected in the overall success of the project and the firm.

9.6 SPECIFIC PROJECT

The project monograph (summary of project of the year) of a corporate headquarters described the project, the process, the concept and the philosophy in some detail. This was a very

successful project, focusing a lot of professional attention on the firm.

The 'big idea' linked project ethos to form while the project goals were linked to the client's challenge, "Who are we?" bringing up issues of establishing client presence and identity. The goals also included achieving flexibility of work environment and delivering project on budget. Image creation was also a high priority.

The monograph mentions definitions of design and technical quality. On the former, it says, "*The design quality is manifest through an unyielding commitment to reflect the culture and purpose of our client's enterprise in every detail*". Technical quality was about the usage of an innovative building system.

In the narrative, the project is then tied philosophically and financially to the client's business. Then the spatial planning, formal and compositional elements and the general layout of the project are described. There is also a mention of the response to site conditions and greening strategies utilized.

9.6.1 Analysis

The process itself seems straightforward but one is impaired by the lack of details on client/user intervention. This hugely successful project exemplifies the process detailed by the firm. It appears to be the rule rather than the exception, from what they claim.

9.7 FUTURE

The firm is currently undergoing organizational changes initiating better alliances between offices, broadening and deepening the firm culture in an attempt to make it the best architectural practice in the world.

9.7.1 Analysis

This is an operational and strategic move rather than the launch of an active quality procedure.

9.8 CONCLUSIONS

The firm with its emphasis on design and service to clients, can be placed as a practice centered business focusing on strong service in the Superpositioning Matrix. One can also see it leaning towards the strong idea section of the matrix. Thus, the firm could be seen as following the 'quality as satisfaction' model in the matrix developed by Coxé, et al (1987) and extrapolated by the researcher.

However, the firm does not have any quality process in place. Their dedication to quality (defined as client satisfaction), can be seen in the unique approach to design, namely, process design. The firm also is the only one that is actively pursuing post-occupancy evaluations of the clients based on goals established at the beginning of the process.

The firm process also allows for active user intervention during design. This again, is unusual for a firm this size. They do not

seem to have a post-occupancy evaluation of the users. So although they have made headway in user participatory design, they have not incorporated user feedback into their process.

Their main approach to quality lies in the concept of continuous improvement. They do not call it that, but their feedback and review mechanisms and training programs point that way. So I ask, "*What's in a name anyway?*"

10. CONCLUSIONS

A professional, as far as I can make out, is somebody who acts pro bono publico- in other words, who has social responsibility and is not a business man.

-Serge Chermayeff in Johnson (1994, p.154)

Primarily, this thesis found that architecture is increasingly becoming a client-centered business due to pressures of competition and fear of litigation. Quality strategy is seen as a positive market differential but the firms, by and large, are only just beginning to adopt client satisfaction models. Some of the firms do not even have a formalized quality process. The profit motive in the quest for quality has led the firms to implement management models that fine-tune organizational process rather than cater to architectural design quality. These findings could be influenced by the type of firm interviewed: large and corporate ones. However, one result is for certain, there is a definite lack of benchmarks or metrics to define and measure architectural quality.

All these findings are probably inherent in the kind of large firms chosen. All the firms fall into the business centered practice, strong service/delivery categories of the Superpositioning matrix which can be seen as a limitation of this study. These findings may vary to some degree if smaller, more design firms are studied. However, these firms being as large as they are, contribute to a high percentage of

architectural billings in the US. So, this study, does give a fairly realistic view of what is out there.

The initial intention of this thesis was to prove that satisfaction led to quality and that all the players: client, user and professional had to be satisfied to make good architecture. However, the case studies underlined client satisfaction as the most important facet of the success of the project. There was, and still is, a naive sense that *"architecture has to be for the greater good"*. However, user satisfaction did not largely figure in the discussions. In fact, it hardly figured at all which only goes to show that quality either needs to be redefined to include users or we need to conclude that the definition of quality precludes them and so, users are an unimportant group in the architectural project.

10.1 QUALITY

This thesis began by defining quality as a universal entity. The search for a viable definition began with defining quality as excellence but this proved to be too elusive. So, I define quality as the degree of satisfaction afforded to all the participants of the building process, from conception to occupation. Ergo, high quality indicates that there is an integration and balance of professional ideals, business philosophies and socialistic goals.

While one is on the subject of architectural quality, one still needs to clarify whether one is addressing quality of professional service, professional performance or the building

itself. This thesis definitely deals with quality of professional performance, which at some level, deals with professional service.

Coxe (Coxe, 1980, pp. 42-48) succinctly specifies that quality of professional performance encompass excellence of the technical, functional and creative solutions delivered. Maister, while discoursing on quality of service, aptly uses the lyrics of an old song, "It ain't what you do it's the way that you do it "(Maister, 1993, p.77). Professional service is very dependent on the organization's environment and ethos. This study did not delve into the details of organizational culture. However, it did to some degree, investigate attitudes.

While exploring quality, one repeatedly comes up against the terms 'product' and 'process'. Typically, the building is the final product in the architectural process but in this study, the product refers to the documents and services provided by the firm.

Juran and Feigenbaum, both management gurus (Schultz, 1994), viewed quality as client satisfaction. All the firms interviewed upheld this position. This is a very business oriented definition of quality, as one certainly needs clients to retain one's practice.

Architecture, to the firms interviewed, is a business and quality is seen as a corporate strategy to make it successful: "It's a business, you need the money..." Thus, they primarily define quality as client satisfaction. The case studies had

firms gauging quality by financial success and critical acclaim, while, at a personal level, they saw quality as excellence and passion estimated by personal growth and acclaim as well as pride in a job well done.

Symes, *et al.* in their study (Symes, *et al.*, 1996, pp.48-49), find that a high percentage of British architects derive personal satisfaction from educating the client and public while promoting architectural thinking. The case study findings were consistent with the British study which found that almost all the architects surveyed, rated client satisfaction as number one priority. Architectural quality, in theory, ranges from being defined as spatial attributes to satisfaction and aesthetic appeal (Kernohan, *et al.*, 1992; Smithies, 1981; Garvin, 1988). On the contrary, visual and aesthetic statements are overemphasized and are often the number one priority in a young architect's education.

There are two trends that need to be examined here. Firstly, why is client satisfaction almost the only concern of the firms? Secondly, why is there a difference between quality definitions and priorities in practice and theory and academic institutions?

The Symes study (Symes, *et al.*, 1996. p.50) found that more than half of the British architects agreed that architecture is now more a business enterprise than a profession. It also found that architects were exploring new approaches in architectural practice to overcome intense competition. This is substantiated by Gutman's conclusions (Gutman, 1988) on the nature of the growing competition from within and without the profession. In

this scenario, the role of the client has become increasingly important. According to Maister (Maister, 1993, p.74) there is a definitive shift in power from the professional to the client. He says that the professional firm has to be more responsive and adaptable to win over the clients nowadays. So, client satisfaction is an issue, which naturally comes to the forefront, and firms define all their policies aiming at this.

To answer the second question, one must understand that at the academic level, architecture is taught as a problem solving and image creating exercise. This, along with the fact that most schools encourage students to take the path of high-design, emphasizing visual appeal, makes design control an imperative. At this juncture, the client becomes a facilitator in the process and not a participator. So, the client is literally seen as a member of the other team. Practice, on the other hand, focuses on the client. Ideally, there should be a middle path between these two extremes. The profession really has to reorient itself to incorporate its artistic, ideological visions into a more practical framework.

10.2 QUALITY PROCESSES

From the case studies, one can conclude the subject under examination is client satisfaction systems rather than quality systems. Even these are new to the architectural profession. The section of the profession that was studied is the vast, successful business that has extended its practice beyond American soil. According to the World Architecture survey (2001), all the firms barring one rank amongst the top twenty

firms in the world. The rankings were based on fee earnings and growth of the firm. None of the firms interviewed exhibited any extraneous quality process. In other words, they had no separate quality methods because they invariably undertook organizational quality approaches that advocate a generic method of functioning.

There were no formal quality procedures and in the main, all the firms started with document standards (the architect's output, at one level) and reviews especially in the construction document phase. After documents, the next priority seems to be clarity of process. Three of the firms (A, B and E) have informal quality processes that are not explicit although there is a mention of it in their policy manuals. Firm E expressed that they were looking to formalize it in the future while firms A and B are content with a semi-formal set-up. Specifically, the procedures that seem to be most in vogue are:

- Audits and reviews at predetermined stages that get increasingly demanding as the process gets to the Construction Document phase;
- 'Kick-off' meetings where client goals and project goals and philosophy are established;
- Process definition which is like a written manual as to process sequence and tasks like 'road maps';
- Checklists on document presentations, CAD standards and material specifications; and
- Feedback or 'post-mortem' meetings where there is an internal assessment at the end of the project.

The focal points in the process determining quality are the kick-off meetings at the beginning and the post-mortem reviews at the end. Otherwise, there is intermittent client feedback and negligible user input. These findings are consistent with the results of the Symes study (Symes, et al., 1996, pp. 32-33) on the importance of client interfacing.

Organizational ethos and environment has probably as much to do with quality as quality procedures if not more. So, overall the emphasis is on process, a sort of generic framework. This is a very significant finding as this was an unexpected outcome. The firms without exception talked about how their culture emphasizes quality and this study mentions this in a hope that somebody delves into the concept of organizational culture as affecting quality.

The role of people and people management has also been accentuated in this study. Architects, especially at the entry level, have lower job security with the personnel policy being 'hire and fire'. However, all these firms exhibit high retention of people whom they have carefully recruited, by offering good benefit packages and empowering the individuals by opportunities for growth.

Theoretically, we have seen various approaches to better architecture. They can be broadly classified into generic, business models (TQM, ISO 9000), design process models (benchmarking, peer review) and building based models (POE, CPBR checklists). Each of these methods can boost productivity, client satisfaction, user satisfaction and/or profits.

Eventually, the choice of model should be consistent with organizational ethos.

10.3 WHY IS IT SO?

As seen, the profession follows theory in as much as it makes business sense, aiming for financial growth. Quality is important as an adjective to describe the firm any marketing literature. Every firm, without exception, claims that quality is the very essence of their work. This is inconsistent with the fact that quality issues are not necessarily in the forefront of their business strategies. Their disinclination to even experiment with other quality methods could stem from the following reasons:

- The intangible nature of architectural design makes quality itself hard to define and determine. The profession finds the lack of metrics to measure quality quite a challenge. Quality costs and schedules which, although accounted for at the onset of the project, are the first to be axed in the wake of budgetary and time constraints. The firms themselves recognize this. They also mention that unexacting and undemanding clients are only worried about costs and schedules and so the firm has to concur.
- The lack of awareness on quality has led to the misconception that quality procedures stifle design creativity and leave a paper trail. On the contrary, quality procedures are generally designed to clarify and provide insights into the basic process. For example, Ishikawa's fishbone diagram which ensures quality by depicting cause and effect, is similar to

architectural tools like bubble diagrams and adjacency matrices (Davy, 1992, p.3). A quality procedure provides consistency in process rather than product. There is also a notion that quality control is inherently policing. In a very small way, it is but everybody is subject to the rules and it ensures that there is consistency in method and quality of product. Quality control has to be applied top-down to alleviate these concerns and quality training will mitigate the fear of, "Big Brother is watching you!"

- Large architectural firms of the twentieth century work more as private corporations (Kostof, 2000, p.330) with structures of power, striving to further their own ends through production. The firms interviewed were large and had sufficient manpower to host separate quality functions to further their business. The smaller firms, on the other hand, may not have the critical mass to support independent quality processes. If they have to produce sensitive architecture, the quality methods need to be in-built into the process and they should not be labor intensive.

- I think that architectural education does not lay enough emphasis on professional responsibility and social implications of being an architect. Schools almost inculcate students with the notion that clients are the enemy and ironically, in the field, clients are all important. Schools also tend to over-emphasize design control while underplaying more practical skills like design and client management. This is synchronous with Gutman (1988) and Fisher (1994) who also highlight the gap between education and the field.

- There is a lack of economic models in the profession that deal with issues of decreased profitability and low pay scales (Gutman, 1988). This makes it more difficult for architectural practices to incorporate quality programs into their styles of functioning especially because cost-benefit ratios of quality programs cannot be calculated.

10.4 SATISFACTION AND QUALITY

This thesis resulted in highlighting the client's role in an architectural project. This finding has only brought into focus the profession's blinkered view on this issue.

A recurrent theme of management writing in the professional service sector is client service and management. Professionals, according to Maister (1993), have a tendency to become fascinated with the intellectual and artistic challenges rather than client expectations. He contends that clients are mocked for their lack of professional knowledge and are resented as they exercise design control by restricting budgets. This worldview is reinforced by these case studies where the client is seen as the most significant player in the project. The Symes study (Symes, et al., 1996) only supports this as they found that 99.7% of the respondents considered client satisfaction important while 80.8% claimed that the desire to produce excellent projects is overshadowed by client demands.

"We are whores and want to be paid as highly as possible for doing what we do best. Therefore we do skyscrapers best- they're the most profitable."

-Philip Johnson in Johnson (1994, p.127)

If quality is client satisfaction, it follows that the quality of clients influences the quality of work. Extrapolating on this, a good client ensures a good project and so a bad client reaps a bad project. This is a contradiction as the client could be satisfied but have a bad project. If design style is a completely negotiated product with the client, how important is professional expertise and creativity of the architects?

I contend that quality is more holistic and involves more than appeasing clients and to achieve it, an architect must utilize all her professional expertise. Good architecture is about satisfaction of all the people concerned as after all, it is a people's profession.

10.5 RESEARCH QUESTIONS

We have traveled full circle and now return to the research questions that spawned this study. The questions, to varying degrees, have been addressed in the case analysis and in the above section. However, to put the issues into perspective, I will now attempt to answer them forearmed with theoretical positions and practical viewpoints.

10.5.1 Quality as a worthwhile objective in architecture

The obvious answer is in the affirmative. The case studies reinforce this as the firms studied, well understand that quality (defined by them as client satisfaction) is something they have to deliver to be successful. The interviews brought out that since quality is client satisfaction and satisfied clients mean more business, they have to deal with quality as an issue. As the success of quality measures can be gauged only over time if at all, it makes firms wonder if quality should be an agenda or not. They all agree with the principle of the thing, however, only two of the firms, namely, firms C and D have a definitive quality strategy. With the others, the question is moot, as they seem to prefer a more informal route to quality.

As I have already mentioned, quality did seem to be a concern of all the firms interviewed and rightly so. The reasons for this concern are all rooted in the evolving profession. The American society is highly litigious and the building industry is especially susceptible to litigation as is seen in the exponentially increasing construction disputes (Streeter, 1988). This very real fear drives firms to cover all bases with quality strategies and inspections. Clients too are demanding definitive standards of design and service. They also expect their consultants to have a consistent process to avoid miscommunication. They are more aware today than ever before and are sticklers for very high quality. This along with the growing competition and increasing complexity and size of projects, have made architectural firms scrutinize their team

coordination, communication and quality processes under a microscope.

10.5.2 Quality to be explicitly stated in architecture

All the firms interviewed unanimously stated that, "Quality is client satisfaction". They were also clear as to why this was so, a question of bread and butter, they said. The questions they are grappling with are, how do they know what the client's expectations are and what should they do to satisfy their clients. However, the definition of quality lends itself to ambiguity, as client satisfaction is a random variable with no established benchmark or datum. The definition of quality needs to be expanded and quality metrics and expectations need to be explicitly stated to save the industry from falling standards, apathy and complacency.

10.5.3 Measurability and generalizability of quality

In the interviews, all five firms conceded that growth and financial success were the indicators of quality. Some added that publications and design awards are equally important indicators. However, growth and financial success are also a result of other, perhaps, more weighty factors like markets, political maneuvering and strategic planning. All the firms appreciate the difficulty in establishing viable metrics of quality per se. This is partially due to the intangible nature of design and partially the lack of constant definitions of quality and the lack of effort to do so.

Literature also suggests that emulation is another indicator of quality. This is circumspect as the five firms, without exception, make it a point not to have a signature style and so emulation is almost impossible. Secondly, emulation has a lot to do with publicity and visibility both of which are, to some degree, results of media bias and marketing strategy.

They use Requests For Information (RFIs) and change orders to track some of the effectiveness of a certain quality method. These are the most quantitative ways of doing it and it seems to work to a limited degree. As for the rest, how are they to measure 'a client's satisfied smile' or what worth do they put on the fact that a contractor, by verbal recommendation, got them another big project because they are good to work with? There are others and this is just the tip of the iceberg.

As to generalizability, client expectations vary from project to project and client to client so one can only say that till a more holistic study is done to measure quality, one cannot establish parameters to have an across the board notion of quality.

10.5.4 Quality measures that architectural firms are adopting

Despite the substantial literature available to explain various methods to better architecture, in the five firms studied, the methods are primarily home-grown versions of quality management with the emphasis on document inspection and review. The document standards are primarily CAD standards, formats, requirements and details. Specifications and code compliance are the other two areas which have received a lot of attention.

Document standards are the easiest places to start as not only are they the easiest to identify but also the easiest to enforce.

In terms of quality management, only one firm (Firm D) has detailed management policies for quality. Two other firms (A and C) are making some in-roads into defining a quality policy for themselves. Overall, the emphasis is on process with firms still defining and standardizing it.

The first step to quality management is documentation of process which some firms are coming to grips with. The next step is implementation which Firm D has started recently. Firms A, B and E did not mention it and so I assume that the process definition, if it exists, is not implemented or it is still in the nascent stages.

The last step to quality is feedback which admittedly is the weakest link. It is almost non-existent barring the case of Firm E which has made it a policy to have systematic post occupancy evaluation. The others agree that it is important but with the resource crunch, they relegate it to the back burner.

10.5.5 Quality a function of client, user and professional satisfaction

Overwhelmingly, the case studies proved that client satisfaction is number one priority. D1, an architect from firm D equated quality with passion and another firm C put pride in doing good work and personal acclaim as quality. These statements make me conclude that client and professional satisfaction, in that

conclude that client and professional satisfaction, in that order, constitute quality at the professional and personal levels.

So, there is a chasm between the persuasive arguments of Cuff (1991), Robertson (1944) and AIA (1989) establishing quality as satisfaction of client, users and society and the professional community and the industry's single-track perspective. I have already questioned the judiciousness of this approach as I feel that architecture, as a profession, is social by nature. There have been definite instances where the social sensitivity of the profession can be called into question and this is probably because of the narrow definition of quality or acceptable standard of deliverables.

10.6 AT THE END OF IT ALL

In retrospect, I find myself asking new questions about quality in architecture:

- Are quality procedures not stand-alone processes? How does one address quality in relation to company ethos and process?
- Client based systems are inconsistent as, logically, there can be no benchmarking or minimum standards. These systems would also imply that the profession exercises no control over design and the quality of architecture. So, could we not say that this client centric view is circumspect, as it seems to forego professional accountability?

to change or do not consider quality an important issue or is it simply too new a field?

- Are formal quality procedures really needed or is there a need for more care and sensitivity?

10.7 ON REFLECTION

This thesis acts almost like a pilot study. There are alternative methodologies and in terms of issues which need to be studied; it is almost like opening the Pandora's box.

10.7.1 Alternative methodologies

This field requires a greater depth of understanding and so single case studies where a particular project is scrutinized in terms of expectations and perspectives of the client, the users and all the other players from consultants to contractors. This would help to study quality more holistically and definitely more meaningfully. If a multiple case study method or a survey is used, then a true random sample should be obtained by varying firm size, location and specialization.

10.7.2 Possible areas for study

The need of the hour in this field is to establish some universal metrics of architectural design quality. Then one needs to use them to study projects (a detailed project evaluation) in greater depth to understand what makes good projects and what separates good from bad architecture.

The other burning need is to find ways and means to allow for workable client-user interventions in the process. Specifically, I mention participatory design. Also, as a part of client/user participation, feedback and evaluation need to be studied. There has been some research on post-occupancy evaluations but like in all research, the most important part is to interface research findings with real-time application. These areas need to be studied by professional organizations.

Lastly, after dealing with the symptoms, one addresses the cause. Architectural education needs to be reexamined for its overemphasis on aesthetic goals and its near negligence of the importance of pre-design research, design management and inculcation of a sense of social and professional responsibility.

Architecture is for everybody, hence the ideal architect is Everyman.

- Mario Salvadori in Johnson (1994, p.117)

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APPENDIX A**QUESTIONNAIRE****1. Definitions/ perceptions of quality**

Quality is perceived in various ways-some see it as conformance, some as client satisfaction, some as degree of excellence and some see it as definitive physical attributes. These definitions are inspired by management gurus who expounded on both the manufacturing and service industries.

- a. Given this, how does your firm define quality?
- b. From where was this definition inspired?

2. Introduction to organization

- a. What is the firm's mission statement?
- b. What is the organizational structure/management approach?

3. Organization's relation to quality

- a. Why is quality considered important?
- b. Are quality goals a part of the firm's business strategy?
- c. When did quality as a concept become formalized and quality improvement become a part of the firm's functioning?
- d. How has the organizational structure been modified to incorporate quality goals and/or quality?

4. Procedures to achieve quality- general

- a. What are the measures taken to achieve quality?
- b. Are they process or product oriented?
- c. Are they in-house measures or were external consultants involved?
- d. Was there certification involved?
- e. When was the firm certified? What was the procedure?
- f. How far is user/ client participation endorsed and is there any specific procedure for user-participatory design?

5. Procedures to achieve quality- specific

- a. What are the measures taken to achieve quality in a particular project executed in the last three years?

- b. If these are in-house measures, what was the procedure? Did it involve one person responsible for quality or was there a team or was it integrated into the design process?
- c. If there are external consultants, who are they? What were the criteria for choice? How are they integrated into the firm's functioning? At what levels and stages do they intervene?
- d. Are these measures client specific or integral part of the architectural services offered?
- e. What were the results of this procedure in this particular case?
- f. How did it affect other projects?
- g. What were the lessons learnt?

6. Costs involved in setting up the models

- a. Are costs of quality defined and accounted for separately?
- b. If yes, how do they change project costs?
- c. Is there a cost-benefit analysis conducted to vouch for effectiveness of the measures used?

7. Follow- up procedures/measures of effectiveness

- a. Alternatively, does the firm have any assessment procedures to find out the "quality" or effectiveness of a design?
- b. Has there been a significant change in the performance of the firm after the measures have been introduced? If yes, in what way?
- c. Are there any other quality measures on the drawing board?

APPENDIX B

THEMES DERIVED FROM CASE STUDIES

Theme	Sub-theme	Parameter	
Firm	Philosophy	1. Firm philosophy- mission	
		2. Essence of mission statement	
		3. Firm's definition of architecture	
		4. Firm orientation	
	Organization	5. Team composition/ coordination	
		6. Studio based/ hierarchy	
		7. Level of quality intervention- designation	
		8. Team or individual related to quality	
	Process	9. Process definition	
		10. Clarity of process definition/ medium of definition	
		11. How one recipe doesn't work for them	
		12. Points of uniqueness	
		13. Quality definition	
Quality concepts	Quality	14. Quality philosophy	
		15. Quality indicators	
		16. Quality parameters	
		17. Personal take on quality	
		Client	18. Importance of client
			19. Client expectations
			20. Percentage of repeat clients
	21. Firm ethos as to signature		
	Measurement; responsibility	22. Issue of professional responsibility	
		23. Quantification of quality	
		24. Quality measurement	
25. Points of uniqueness			
Quality procedures	Client user expectations/ needs	26. Strategic direction	
		27. Understanding client's expectations (if quality is defined as client satisfaction)	

Theme	Sub-theme	Parameter
		28. Degree of client participation
		29. User participation
		30. Importance of pre-design or kick-off meeting
		31. Presence of checklists
	Quality procedure	32. Quality procedures
		33. Reviews- stages/ procedures
		34. Checklist for each review
		35. Review procedures with members of other teams joining
		36. External audits
		37. Feedback
	Learning	38. Training
		39. Continuing education
		40. Databases of previous projects
		41. Points of uniqueness
Quality relationships	Costs	42. Quality costs- are they considered worthwhile?
		43. Quality costs measurement
	Organizational culture	44. Quality and culture
		45. Incorporating culture
		46. Communication related to quality
		47. The relationship between quality, pre-design and programming
		48. Quality and sharing knowledge
		49. Quality as or affected by interpersonal relationships
		50. Quality of people- recruiting
Specific project		51. Stage /description of project
		52. Client demands/ expectations
		53. Special procedures/ needs
		54. Specific project procedures
		55. Point of departure from other projects
		56. Success or lessons learnt
Future-feedback		57. Feedback databases
		58. Quality as a future program

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