

THE EXPECTATIONS, NEEDS, RISKS AND CONSTRAINTS FOR PROJECT PERFORMANCE

Ellen Lau¹ and Steve Rowlinson²

¹ *Division of Building Science and Technology, City University of Hong Kong, Kowloon, Hong Kong*

² *Dept of Real Estate and Construction, The University of Hong Kong, Pokfulam, Hong Kong*

Construction projects require client-contractor collaboration. Working in a collaborative manner means matching expectations and needs which would lead to satisfaction from both parties. Construction clients and contractors bear different expectations and needs and therefore satisfactory project outcomes should not just single out clients' satisfaction and negative project results should not deny satisfactory project performance. This study is to identify the expectations and needs of clients and contractors together with the barriers of risks and constraints that confine satisfaction and attempts to capture the gap expressed in qualitative data via a quantitative approach. The result indicates that perception matching is at a 44% level and the other 56% requires working out; while within that 44% there is also a difference in perception with either positive or negative values. It also shows that the client normally has higher expectation of contractors while contractors consider themselves fully meeting the clients' needs and require more involvement from the clients. As no single party is able to have 'complete' information to make 'perfect' or appropriate decisions, it concludes that mutual trust and empowerment are both important in client-contractor collaboration.

Keywords: collaboration, constraints, expectations, needs, risks, stakeholders.

INTRODUCTION

There are diversified expectations, needs, risks, interests and constraints which makes client-contractor collaboration difficult in a multi-party working situation. According to Tang's Report (2001) about committing to a partnering approach, fair and proper consideration should be given to the interests, needs, expectations, constraints and risks of every stakeholder. For this reason, mutual trust is indispensable among the stakeholders and a new form of contractual relationship based on co-operation, client focus and commitment to best practice for application to local construction projects is recommended (Tang, 2001). This emphasises a form of client-contractor collaboration in which needs, expectations, constraints and risks between clients and contractors vary, and would become more varied when taking considerations among stakeholder's organisations. It is not clear what constitutes in the four elements expectations, needs, risks and constraints, and these four elements are commonly studied separately and individually in the literature and have not been considered together in any study. The difficulty is that these four elements are distinctly different and an integrative look may create bias or questionable result. Yet, Bryde and Robinson (2005) suggest that there are two barriers to effective client-contractor working relationships: (1) a failure to agree the priority of measures of success; (2) a potential mismatch between the

¹ bsellenl@cityu.edu.hk

theoretical importance given to satisfying the needs of other stakeholders. So client-contractor collaboration constitutes many factors that require attention and detail investigation. In this study satisfaction is defined as the matching of expectations and needs in the stakeholder management framework to provide an explanation of the relationship management structure in the process of client-contractor collaboration; and to bring association in the four elements expectations, needs, risks and constraints which affect project performance. While satisfaction means matching clients' and contractors' expectations and needs, risks and constraints create a gap which prevents a full matching of these expectations and needs. The process performance in client-contractor collaboration would provide a different perception of project performance and an insight to the eventual level of satisfaction.

CLIENT-CONTRACTOR COLLABORATION

Bresnen and Marshall (2000) refer performance to construction projects as client-contractor collaboration and it is important to match each party's expectations and needs. The focus is to create a win-win situation through trust, openness, teamwork and shared goals. Bryde and Robinson (2005) point out that to maintain an effective client-contractor relationship, contractor organisations must be customer-focused in terms of understanding and fulfilling expectations of the clients, and the client organisations must focus on understanding and accommodating the expectations of all stakeholders in the supply chain including contractors, sub-contractors, suppliers, other team members and those who have vested interests in the project outcome.

Bryde and Robinson (2005) studied the differences between the client and contractor's focus, which is categorised by Tukul and Rom (2001) as customer-focus, stakeholder-focus, time-focus, cost focus, and technical focus, through a survey in the United Kingdom. Their result shows that clients put more emphasis on meeting other stakeholders' needs whereas contractors put more emphasis on minimising cost (to meet the project budget) and the duration of the project. Project stakeholders here refer not only to the project participants but also "people or organisations who have vested interest in the environment, performance and/or outcome of the project" (Bryde and Robinson, 2005). Client-contractor collaboration can be viewed in the stakeholder management model (see Figure 1) when expectations and needs are regarded as one project contextual factors in the relationship management structure requiring working out prior to empowering individual and teams for satisfactory outcomes. Satisfactory project outcomes refer not only the usual success factors of cost, time and quality, but also other factors such as customer satisfaction. One other factor referred by Bryde and Robinson (2005) is the level of agreement in project client-contractor relationship or client-contractor collaboration (Bresnen and Marshall, 2000). Customer satisfaction is regarded as a measure of how products and services supplied by a company meet or surpass customer expectation. Since satisfaction can be a psychological state, satisfaction of project performance has dual meanings. On one hand, satisfaction refers to whether the stakeholders are satisfied with a completed project. On the other, satisfaction means whether the project result is positive. On some occasions, the stakeholders would still feel satisfied even though the project outcome including cost, time and quality are not all satisfactory in a sense that there would be budget overruns, prolonged completion times and compromised quality. Many major projects carried out in the 20th century can be cited: the Sydney Opera House, the Channel Tunnel, Chak Lap Kok Airport. It follows that the perception of satisfaction has some impact on client-contractor collaboration.

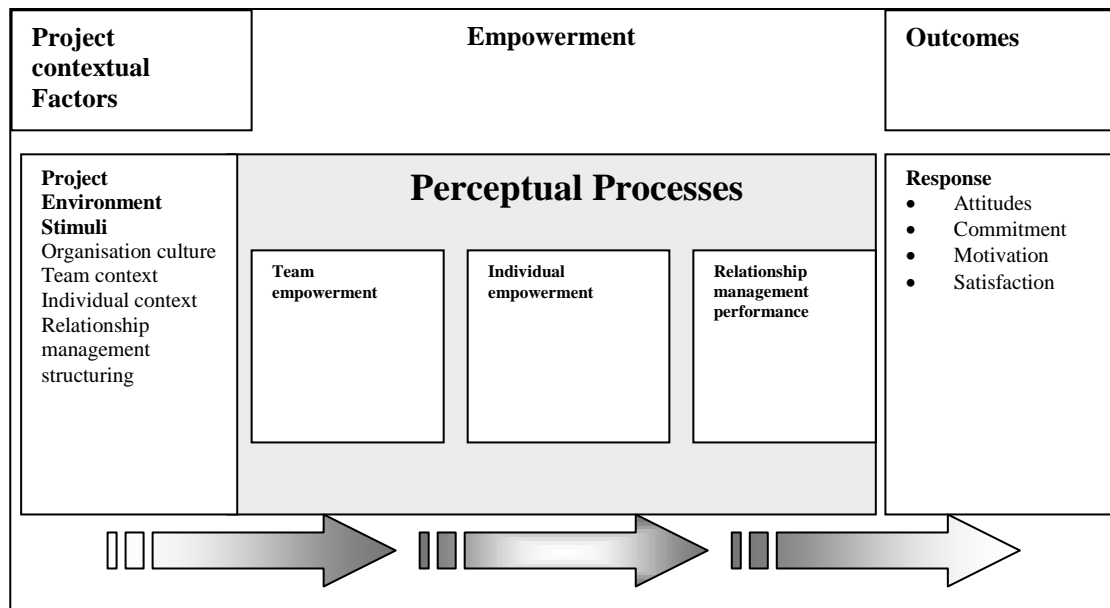


Figure 1: The Stakeholder Management Model (adapted from Ivancevich, Konopaske and Matteson 2005: p.111)

CLIENTS' EXPECTATION AND NEEDS

Satisfying customers' expectations and needs in construction projects are important (Chinyio, Olomoaiye and Corbett, 1998; Dulaimi, Ling and Ofori, 2001); Dikmen. Birgonul and Kiziltas, 2005; Egemen and Mohamed, 2006), and to achieve customers' satisfaction it requires understanding of the customers' expectations and needs. There is rich literature in marketing in which satisfaction of the service quality is measured by the extent of discrepancy between customers' expectations or desires and the perceptions of the product (Oliver, 1980; Teas, 1993; Cronin and Taylor, 1994; Rust *et al.*, 1999). Usually, the customers' expectations and needs together with quality standards are defined during the project requirement and feasibility stages. If these are not given sufficient attention, there will be problems in terms of buildability, delays due to incomplete designs, misunderstanding of customer expectations (Dikmen Birgonul and Kiziltas, 2005; Egemen and Mohamed, 2006).

Drawn from the marketing literature, customer expectations are defined as beliefs or predictions about the attributes of product or service that they will receive from the delivery company (Olson and Dover 1979, Oliver 1980; Coye, 2004). These are claimed to have a link with the assessment of service or product quality and are related to how performance indicators are set. Customers have many sources of information that lead to expectations about upcoming service encounters with a particular company. These resources include prior exposure to the service, word of mouth, expert opinion, publicity, and communications controlled by the company (e.g. advertising, personal selling, and price), as well as prior exposure to competitive services (Boulding *et al.*, 1993; Zenithal, Berry and Parasuraman, 1991). Boulding *et al.* (1993) classified two classes of customer expectations: (1) the expectations about what will happen in the service, and (2) the expectations about what should happen in the service, that is, the customer feel they appropriately "deserve". It has been suggested that the expectations are influenced by one's prior experience of the product, the content of communications between the buyers and the sellers, and the perception developed in the process (Helson, 1959). In construction, clients' expectations are defined as the beliefs, predictions, desires and wants of stakeholders,

i.e. what they feel a service provider/contractor should offer (Ling and Chong, 2006). Stephenson (1996) stated that the expectations come from the sponsoring group, who are usually the top ultimate decision makers in the group. Early identification of customer expectations could however minimise uncertainty as the project phases develop (Dikmen, Birgonul and Kiziltas, 2005).

Construction clients have “needs” such as timeliness of completion, aesthetics and safety of production. These needs are part of project schemes and should be satisfied by building teams (Latham, 1994). Dikmen, Birgonul and Kiziltas (2005) stated that customer needs can be satisfied with cross functional communications. Chinyio, Olomolaiye and Corbett (1998) categorised eight dimensions of clients’ needs as aesthetics, economy, functionality, quality, working relationships, safety, surprises, and time; and found that functional buildings, contract duration and quality of buildings the clients’ most frequently desired needs.

CONTRACTORS’ EXPECTATIONS AND NEEDS

The literature seems to put more emphasis on the clients and customers’ expectations and needs while there is less claim and considerations from the contractors’ side. For contractors, the commercial benefit is important; they expect that “the continuity of work would enable better planning and allocation of resources, more predictable cash-flow, improved cost recovery and relatively secure margins” (Bresnen and Marshall, 2002). In addition, they also expect “the opportunity to develop further experience and expertise in partnering-type work with a major and highly prestigious client”.

It appears that the essence for construction project success is to observe clients’ needs whereas the contractors are there to fulfill clients’ needs with their technical expertise. Conflict takes place when the project goals are not compatible with the commercial or political goals of either organisation. It is therefore important to understand individual constraints and risks before practical implementation, as it is not uncommon to have diversified expectations, interests and needs in individuals, in groups and in organisations. Risks have been sufficiently studied and contain such details that only a risk expert in construction, like that of a risk expert in financial management, can adequately address the risk factors of a project of a substantial size and value. Constraints, unlike risks, are not related to uncertainty and they are not acts of God. Practically, in all cases the constraints’ limiting impact can be reduced or eliminated and hence increase the transparency of project management.

RISKS AND CONSTRAINTS

Risk is a concept we all understand but is not easily defined (Coyle, 2002). It may be associated with the possibility that something harmful or damaging could occur if things go wrong, or it may relate to taking a chance or a gamble, where the outcome could be either favourable or adverse, or it may link to the fact that the actual outcome of an event could differ from what was expected or planned for. In brief, it is associated with uncertainty about the outcome of prospective actions. Risk factors identified in particular contractual arrangements such as in foreign investment of Sino-foreign Joint Ventures in construction projects in China (Shen, Wu and Ng, 2001) are categorised into six types: financial risk, legal risk, management risk, market risk, policy and political risk, technical risk. While risks can be a result of other means such as human factors, Jin and Ling (2005) studied “inherent risk” and attempted to use trust-foster tools to counter-balance these risks in construction via two case studies in China. They identified 14 risk factors that are human-related

including partner's incompetence, partner's exploitation, improper contractual agreement, unfairness in tendering, partner's project personnel lacking interpersonal skills, partner's dis-trust and mis-understanding, insufficient communication among partners, partner's short focus, partner's breach of contract, excessive demands and changes from partners, disputes with partners, over-interference from partner's company, problems related to social and cultural differences, and changes of personnel in partner's organisation. Yet, people have different perceptions of risk. The theories from psychology and strategic management indicate that risk perceptions are affected by heuristics and biases, problem framing, risk propensity and risk interpretation, and combining the risk ratings of different professionals to indicate the significance of particular risks is inadequate and misleading (Lau, Wong and Tse, 2009).

Constraints, on the other hand, affect mainly productivity in a construction process (Chua, Shen and Bok, 2003). A constraint is generally defined as "anything that limits a system from achieving higher performance versus its goal" in respect of continuous improvement in organisations (Goldratt, 1990). Constraint in construction is regarded as a constraining condition, agency, or force that limits the systems' performance in a given context or environment (Mayer, Painter and Lingineni, 1995; Whelton, Penneanen and Ballard, 2004). It describes the relationships between objects and processes (Whelton, Penneanen and Ballard 2004), and relates to whatever impedes progress toward an objective or a goal (McMullen, 1998). Constraints may cause undesirable consequences or are not supportive of the organisational goals. It is regarded by Stein (1997) as the environment and the limitations of the system which dictates the solutions. The impact of constraints can lead to core problems or root causes of failure (McMullen, 1998). Internal constraints are usually more under control than external constraints (Dettmer, 1998), and in project planning they are usually related to resource. Some of these are temporary and some others would last for the entire duration of the project (Schultmann and Rentz, 2002). There are also hidden constraints associated with non-value-adding activities (such as moving and waiting) which are sometimes unavoidable and should be reduced or eliminated in order to minimise waste and make the flow more efficient (Chua, Shen and Bok, 2003).

RESEARCH METHODOLOGY AND DEVELOPMENT OF SCALES TO MEASURE EXPECTATIONS AND NEEDS

This first stage of the study was to identify from the literature the variables to enable shortlisting and validating the clients' and contractors' expectations and needs. The second stage was to assess the gap between clients and contractors so as to answer the question whether the contractors' expectations meet clients' needs, and to find out whether their perceptions towards the same attributes were the same. The relevant literature and the official standard documents from construction organisations in Hong Kong, Mainland China and other countries were reviewed. Needs and expectations were studied in detail in order to validate the measurement scales to be used for the second stage of the study. The scales of measurement for client's expectations and needs are mainly adopted from Ling and Chong (2006) and Egemen and Mohamed (2006) whereas the scale adopted for use in the measurement of contractors' expectation is based on the survey of Dulaimi, Ling and Ofori (2001) for the Singapore construction industry. The first version of the questionnaires comprised 130 questions about expectations, needs and risks with an open-ended question on

constraints. The structured questions were later shortened to 65 for soliciting responses.

RESEARCH RESULTS

60 responses were collected of which 34 are from clients (including consultants) and 26 from contractors (including subcontractors). The mean values and t-values of each of the variables were worked out. The mean values of client's expectation/needs are 0.1 higher than the mean values of contractors' expectation/needs. The variables are then distinguished between clients and contractors to run a gap analysis with ranking order adapted from the t-value. Both positive values and negative values are resulted in this gap analysis and only those exceeding the maximum overall values are considered as gap in this study. The results are based on a quantitative approach to express the qualitative data of perception. For the 65 items under investigation, 29 items are found to have a mean value above +3.25 in the gap analysis. The gap results indicated that there were 11 (negative) + 18 (positive) = 29 items (44% of the total items) in clients' and contractors' perception of expectations and needs. This means that among these 18 matching items, the contractors considered that they have met with half of the clients' expectation items such as "respond promptly to client's requests and problems", "high quality references from previous clients and consultants", "proposed construction method", "a motivated and united workforce" whereas contractors are expected to be "flexible to accommodate variations", "possess the capability to cover subcontractor's works if it fails", and "make client feel secure in leaving the project in their hands". For the negative items, different perceptions exist and there will not be matching unless these are changes. It is reckoned that these are the areas in which risks and constraints exist, and this requires further investigation. Generally, clients are expected to be more interested and involved during the design and construction stages of the project and have closer cooperation among all stakeholders.

For the risk events, there is a significant difference between clients' and contractors' perception on "bad performance by contractors is overlooked" and "project delay"; whereas there is no correlation between their perceptions on "disputes over variations" and "lack of effective management control of sub-contractors". Even though "accident event leading to environmental damage" and "inadequate contractor capability in terms of management, labour, skills, plant etc" are negatively correlated, there is no evidence that these risk events are significant in this context.

The sub-scales for constraints are based on the five types of constraints, namely, economic, legal, environmental, technical and cultural constraints identified in the author's early study (Lau and Kong, 2006), and are used in the form of open-ended questions to collect qualitative responses. 19 results were collected via questionnaires and follow-up telephone interviews. The results indicate that clients' most significant economic constraint is finance or shortage of funds in running projects, whereas the contractor's most significant economic constraint is the fluctuation of material prices which they find difficulty in predicting them and have them accommodated in the tender price. The fixed price contract although favoured by the client has its drawback for the contractor. Quite often the cost constraints determine the contractors' working quality and the quality of the materials used. For public clients, the media and the Audit Department will impose restrictions on how the public money is used and produce barriers for bringing in new technology, new design, and innovations as to how the work is done. The legal constraints are about compliance with legislation

about changing law and current legislation and balancing of working methods with environmental requirements, whereas technical constraints are generally about the site conditions, site limitations and the changes of working methods. Regarding cultural constraints, the major concern is about the way disputes are handled.

Correlation analysis was further carried out between clients' and contractors' expectations and needs. The result indicated that when the contractors expected that the clients chose them because of their skills was highly correlated to the clients' expectation that the service provided by contractors would not ruin their reputation. When the contractors expected the clients to set buildability as one of the criteria to select consultant, it was highly correlated to clients' expectation that the contractor would exercise appropriate project control, monitoring process and cost control. Moreover, when the contractors' expectation is about the clients' interest to get involved in the project, it is highly correlated to the clients' expectation for contractors to maintain good reputation. This shows that clients are concerned about reputations, both his and others.

DISCUSSION OF THE RESEARCH STUDY

The results indicate that the perception matching is at a 44% level, and the other 56% requires working out; while within that 44% there is also a difference in perception. Clients normally have higher expectation on contractors while contractors consider themselves fully meeting clients' needs and require more involvement from the clients. However, satisfactory performance is different from clients' satisfaction. In view of the similarities and differences of expectations and needs of construction clients and contractors, measurement of their expectations and needs together with the barriers of risks and constraints will help understand what confines satisfaction. Mutual understanding therefore constitutes a threshold for trust and when this state is reached, trust is en-route. Since the context of this research has captured the gap between expectations and needs and revealed the associated strengths of risks and constraints in the process, it also helps understanding better how to bridge up the gap to sustain mutual trust in the construction working environment. The study further led to a finding that expectations and needs were quite imbalanced in themselves and between client and contractors. This shows agreement with the findings of Bryde and Robinson (2005) that the difference in priority of measures of success between clients' and contractors is an effective barrier for collaboration in addition to the limitations shown in many formal mechanism as suggested by Bresnen and Marshall (2000). The result indicates that reputation is of some importance to the clients and the contractors whereas reputation by itself is a form of inter-firm trust. It appears that when 'reputation' becomes a formal mechanism incurring trust, then the 'informal' part of the process of client-contractor collaboration would come more readily.

If a reasonable profit margin is not properly recognised by the clients and the contractors, it would be a breeding ground for dis-trust and suspicion, whereas cheating and taking advantages over others may become a norm in making up the deficiency. In addition, there may be documentation and procedural matters not realised in the outset and these take up time and resources which would subsequently affect productivity. This is because contractors do not usually consider these problems at the tendering stage as there is no certainty of winning the bid.

CONCLUSION

Construction projects comprise of activities requiring client-contractor collaboration, and within these activities it often involves uncertainty, inherent risks and various constraints that hinder satisfactory project outcomes. Construction clients and contractors bear different expectations and needs, and therefore complete matching can hardly be found. Closing the expectation gap should count also the risks and constraints in a project working environment. In view of the size and value of the construction projects of today, no individual, group or organisation is able to have 'complete' information to make 'perfect' or appropriate decisions. It is a multi-party job in which diversified expectations, needs, interests, risks and constraints are inevitable; and it requires flexibility in the frontline to make quick and effective decisions during operation. The formal mechanisms should be considered together with the informal systems to enable not only satisfactory performance, but also stakeholders' satisfactions. This requires mutual trust and concerns empowerment. Sometimes such empowerment may have to pass onto young and inexperienced personnel, and this can further form a constraining or a risk factor for project performance, not to mention the possibility of one taking advantage of the other in the process that someone in the chain cannot be trusted. The risks and constraints in such a stance are obvious barriers for successful project performance. Only when the relationships between expectations and needs can be assessed with a view to closing the expectation gap then a better collaboration between clients and contractors can be sustained.

ACKNOWLEDGEMENT

The work described in this paper was supported by a grant from the Research Grants Council of the Hong Kong Special Administrative Region, China [Project No. CityU 115805 and HKU 71122/04E]

REFERENCES

- Boulding, W. Kalra, A., Staelin, R. and Xeithaml, V. A. (1993) A Dynamic Process Model of Service Quality: From Expectation to Behavioral Intentions. *Journal of Marketing Research*, 1993. **30**(1), 7-27.
- Bresnen, M. and Marshall, N. (2000) Building partnerships: case studies of client-contractor collaboration in the UK construction industry, *Construction Management and Economics*, **18**, 819-832.
- Bresnen, M. and Marshall, N. (2002) The engineering or evolution of co-operation? A tale of two partnering projects, *International Journal of Project Management*, **20**, 497-505.
- Bryde, D. J. and Robinson, L. (2005) Client versus contractor perspective on project success criteria, *International Journal of Project Management*, **23**, 622-629.
- Chinyio, E. A., Olomolaiye, P. O. and Corbett, P. (1998) An evaluation of the project needs of UK building clients, *International Journal of Project Management*, **16**(6), 385-391.
- Chua, D. K. H., Shen, L. J. and Bok, S. H. (2003) Constraint-based planning with integrated production schedule over internet, *Journal of Construction Engineering and Management*, **129**(3), 293-301.
- Coyle, B. (2002) Risk Awareness and Corporate Governance, Financial World Publishing
- Coye, R.W. (2004) Managing customer expectations in the service encounter, *International Journal of Service Industry Management*, **15**(1), 54-71.

- Cronin, J. J. and Taylor, S. A. (1994) SERVPERF Versus SERVQUAL: Reconciling performance-based and perceptions-minus-expectations measurement of service quality, *Journal of Marketing*, **58**, 125-131.
- Dettmer, H.W. (1998) *Breaking the Constraints to World Class Performance*, ASQ Quality Press
- Dikmen, I., Birgonul, M. T., and Kiziltas, S. (2005) Strategic use of quality function deployment (QFD) in the construction industry. *Building and Environment*, **40**(2), 245-255.
- Dulaimi, M F, Ling F Y Y and Ofori, G. (2001) Building a World Class Construction Industry: Motivators and Enablers, Department of Building, National University of Singapore.
- Egemen, M. and Mohamed., A. N. (2006), Clients' needs, wants and expectations from contractors and approach to the concept of repetitive works in the Northern Cyprus construction market, *Building and Environment*, **41**, 602-614.
- Goldratt, E. M. (1990) *Theory of Constraints*, Croton-On-Hudson, NY: North River Press.
- Helson, H. (1959) *Adaptation Level Theory* in Psychology: A Study of a Science, 1, Sigmund Koch, ed. New York: McGraw-Hill.
- Ivancevich, J.M., Konopaske, R. and Matteson M.T. (2005) *Organisational Behaviour and Management*, McGraw-Hill/Irwin
- Jin, X H and Ling F YY (2005) Constructing a Framework for Building Relationships and Trust in Project Organisations: Two Case Studies of Building Projects in China, *Construction Management and Economics*, **23**, 685-696
- Latham, M. (1994) *Constructing the Team*, Final Report of the Government/Industry Review of Procurement and Contractual Arrangements in the UK Construction Industry, HMSO Department of the Environment (1994)
- Lau, E and Kong, J. (2006) Identification of constraints in construction projects to improve performance, *Proceedings of the International Conference on Construction Culture, Innovation, and Management (CCIM 2006)*, Dubai, United Arab Emirates, Nov. 2006 (CD-ROM)
- Lau, E, Wong, R. and Tse, G. (2009) Evaluation of Risk perception in Construction, paper accepted for the *Fifth international Conference on Construction in the 21st Century*, May 2009, Istanbul, Turkey.
- Ling, F. Y. Y. and Chong C.L.K. (2006) Design-and-build contractors' service quality in public projects in Singapore, *Building and Environment*, **40**, 815-823.
- Mayer, R. J., Painter, M. K., and Lingineni, M. (1995) Information integration for concurrent engineering (IICE) towards a method for business constraint discovery (IDEF9), Knowledge Based Systems, Inc. Texas: Human Resources Directorate Logistics Research Division.
- McMullen, T. B. (1995) *Introduction to the theory of constraints (TOC) management system*, St. Lucie Press/ APICS Series on Constraints Management.
- Oliver, R. L. (1980) A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions, *Journal of Marketing Research*, **17**(4), 460-469.
- Olson, J. C and Dover, P. A. (1979) Disconfirmation of Consumer Expectations Through Product Trial, *Journal of Applied Psychology*, **64**(1), 179-189.
- Rust, R. T., Inman, J. J., Jia, J. and Zahorik, A. (1999) What you don't know about customer-perceived quality: The role of customer expectation distribution, *Marketing Science*, **18**(1), 77-92.

- Schultmann, F. and Rentz, O. (2002) Scheduling of deconstruction under resource constraints, *Construction Management and Economics*, **20**(5), 391-401.
- Shen, L.Y. and Wu, G.W.C. and Ng, C.S.K. (2001) Risk Assessment for Construction Joint Ventures in China, *Journal of Construction Engineering and Management*, **27**, 76-81.
- Stein, R. E. (1997) *The theory of constraints: applications in quality and manufacturing*, 2nd edition, Rochester, New York.
- Stephenson, R. J. (1996) *Project partnering for the design and construction industry*, New York: Wiley.
- Teas, R. K. (1993) Expectations, performance evaluation, and consumers' perceptions of quality, *Journal of Marketing*, **57**(4), 18-34.
- Tukel, O. I. and Rom, W. O. (2001), An empirical investigation of project evaluation criteria, *International Journal of Operation Product Management*, **21**(3), 400-416.
- Whelton, M., Penneanen, A. and Ballard G. (2004) Knowledge Emergence and Adaptive Management: An Exploration on the Co-Production of Project Needs and Requirements by Client-Specialist Groups in Kazi, A. S. ed. *Knowledge Management in the Construction Industry: A Socio-Technical Perspective*. Hershey, PA, USA: Idea Group Publishing, 2004. pp.251-275.
- Zeithaml, V. A., Berry, L. L. and Parasuraman, A. (1991) *The nature and determinants of customer expectations of service*, Marketing Science Institute, working paper 91-113. Marketing Science Institute, Cambridge, MA.