HKS

THE HONG KONG SURVEYOR

THE HONG KONG INSTITUTE OF SURVEYORS JOURNAL

Information

ISSN 1812 - 3953

Circulation: 6,700 copies to all members free of charge

To subscribe or unsubscribe, please email: linda@hkis.org.hk

THE HONG KONG INSTITUTE OF SURVEYORS
香港测量師學會
香港中环康乐广场 1 号怡和大厦 8 0 1 室
801 Jardine House, 1 Connaught Place, Central, Hong Kong SAR.

Telephone 电话：(852) 2526 3679 Fax 传真：(852) 2868 4612
Website 网址：www.hkis.org.hk Email 电邮：editor@hkis.org.hk

Editorial Board

Secretary

Linda Chan
The Hong Kong Institute of Surveyors
801 Jardine House
1 Connaught Place
Central, Hong Kong
Tel (852) 2526 3679
Fax (852) 2868 4612
Email: linda@hkis.org.hk

Journal Objectives

The HONG KONG SURVEYOR is an international peer reviewed journal which aims to develop, elucidate and explore the knowledge of surveying research; to keep practitioners and researchers informed on the current issues, best practices as well as serving as a platform for exchange of ideas, knowledge and opinions among surveyors and related disciplines.

The HONG KONG SURVEYOR publishes original contributions in either the English or Chinese language on all aspects of surveying and surveying related disciplines. Original articles, short communications and letters to the Editor are considered and accepted for publication on the condition that they have not been published, or submitted for publication elsewhere. The Editor reserves the right to edit manuscripts to fit articles within the space available and to ensure conciseness, clarity, and stylistic consistency.

All articles submitted for publication are subject to a double-blind reviewing procedure.

Topics

All branches of surveying, built environment and commercial management including but not limited to the following areas:

- Bidding and forecasting;
- Building control;
- Building renovation and maintenance;
- Commercial management;
- Construction and project management;
- Construction law;
- Claims and dispute resolution;
- Education and training;
- Facilities management and intelligent building;
- Geographical Information System (GIS);

- Health and safety;
- Heritage conservation;
- Information technology;
- International construction;
- Organization, scheduling and planning;
- Procurement and contracting;
- Project financing;
- Professional ethics;
- Space planning;
- Valuation;
- Value engineering, lean construction and concurrent engineering;
- Sustainability;
- Town planning and land use;
- Urban economics;
- Cadastral Survey;
- Engineering and Hydrographic Survey;
- Geodetic Survey;
- Photogrammetry and Remote Sensing.

For Instructions to Authors or enquiries, please contact the Secretary of the HKS Journal Editorial Board, Linda Chan at 801 Jardine House, 1 Connaught Place, Central, Hong Kong or phone (852) 2526 3679 or fax (852) 2868 4612 or email: linda@hkis.org.hk

HKS
THE HONG KONG SURVEYOR

From the Editor-in-chief

At the instigation of the previous Honorary Editor, Bernard Chan (Honorary Secretary of the Hong Kong Institute of Surveyors 2003-2004 Council Year), the HONG KONG SURVEYOR has become, in year 2004, a peer reviewed prime source journal publishing in both the English and Chinese languages.

The formation of the International Editorial Board in 2005 is a milestone for this charted growth. Members of this Board of academics come from both at home and abroad, each representing outstanding achievement in the surveying discipline.

Five peer reviewed papers are featured in this issue. Chen, Tang and Fellows presented their findings on an exploration of theory and practice relating to article 33 of China's tendering law. Tang, Chiang, Baldwin and Yeung reported on an institutional economics analysis on the integration of property and railway development. Leung described predicting normative commitment to construction value management. Ho, Chau, Yau, Cheung and Wong discussed the comparative study of building performance assessment schemes in Hong Kong. Zhang and Liu expounded on cultural traits of mainland China construction enterprises.

I would like to thank all members of the Board for their support and I can pledge that the Institute is committed to the development and furtherance of surveying knowledge at all times.

Professor
Chau Kwong-wing

Articles

Instructions to Authors

FORMAT AND GUIDELINES FOR SUBMISSION

ELECTRONIC SUBMISSION

Full Paper submission should consist of a file in Microsoft Word format attached to an e-mail message.

FORMAT OF FULL PAPER

Language

Both Chinese and English are acceptable.

Content

Full Paper should include title of paper, author details, ABSTRACT, KEYWORDS INTRODUCTION, TEXT, DISCUSSION, CONCLUSION and REFERENCES.

Paper length

Full Paper should not be more than 20 pages including all texts, graphs, tables, diagrams, maps, pictures, illustrations and appendices.

Paper size

Set paper size to A4. The lines of text (except the text under ABSTRACT) are indented left and right by 3cm from the paper margin.

Text font

Times New Roman.

Abbreviations

Generally no full stop is needed for titles, names, acronyms and measurement units: Eg, Mr, Dr, PRC, UK, HKSAR, Jan, Feb, Mar, 4m, 5ft,

Abstract

Drop 2 line spaces and type **ABSTRACT** in bold, full caps, 12 point size and centred. In next line, type the content of the Abstract in 10-point size, indent 3cm on both margins, left and right justified.

Abstract should be a single paragraph outlining the aims, scope and conclusion of the paper. It should be no more than 300 words in length.

Keywords

Drop 2 line spaces and type **KEYWORDS** in bold, full caps, 12-point size, left justified. Type the keywords in the next line and indent 3cm on both margins, left and right justified. Suggest approximately 5-10 keywords and spaced by commas.

Main Text

Drop 2 line spaces before typing each of the above topics. The text should be in single space, single column, 3cm indent on both margins, left and right justified, and 12-point size. Paragraphs are not to have any indents. Any abbreviations used should be defined.

Section headings are in bold and full caps. No blank line between the heading and the first line of text. Separate paragraphs in each Section with one blank line. There should be two blank lines before each Section.

Equations should be centred, with a space line above and below. Font size same as the text. Use only those mathematical symbols supported by the Microsoft Word.

All graphs, tables, diagrams, maps, pictures and other illustrations must be labelled. They should be as close as possible to their reference in the text.

References and headings of tables should appear above the table. Tables are to be centred on the page. Leave one blank line before the

table heading and one blank line after the table.

Illustrations are to be centred, with the reference and caption printed below the figure. Footnotes appear at the bottom of the page where they are cited, numbered and in 10 point size.

References

Drop 2 line spaces and type **REFERENCES** in bold, list all bibliographical references in alphabetical order with name of authors at the end of the paper. For clarity purpose, each reference should be in 12-point size, left and right justified, 3cm indent on both margins for the first line and 3cm indent on the left margin for the second and following lines. When referring to them in the text, type the corresponding reference number in square bracket, for example: [Stewart R. (2001)].

For cited journals

Surname and initials of Author(s), (year of publication), Paper title, Journal title, Journal volume: issue, pages. Example:

Stewart R. (2001), The Spatial Data Infrastructure: Concept, Prototype Development and Future Direction, GIS – Today and Tomorrow 28:2, 155-177.

For books

Surname and initials of Author(s), (year of publication), Book title, Publisher. Example :

Blachut C.D. (1979), Urban Surveying and Mapping, Springer-Verlag, New York

COPYRIGHT TRANSFER

Submission of an article for publication implies the transfer of the copyright from the authors to the HKIS upon acceptance and all authors are required to sign a Transfer of Copyright Form. The final decision of acceptance rests with the Editor. Authors are responsible for all statements made in their papers.

FINANCIAL DISCLOSURE AND DISCLAIMERS

Any affiliation with or involvement in any organization or entity with a direct financial interest in the subject matter or materials discussed in the manuscript should be disclosed in an attachment. Any financial or material support should be identified in the manuscript.

FOR ENQUIRIES

Please direct to linda@hkis.org.hk or call Linda Chan on (852) 2526 3679. Full papers are to be sent by email to the Editor at: linda@hkis.org.hk

Hong Kong Surveyor Vol 16(1), 11-22 June 2005 ISSN 1812-3953

Construction Project Tendering in China : An Exploration of Theory and Practice relating to Article 33 of China's Tendering Law

JG Chen[1], KW Tang[2] and R Fellows[3]

ABSTRACT

Recently (1999) China introduced legislation to control tendering for construction projects as an element of transition to a market economy. Article 33 'outlaws' tenders below cost but, unfortunately, cost remains undefined. This paper analyses what the term cost may mean and how costs are forecast and prices determined in the construction industry operating in competitive market economies. It is evident that interpretations are numerous and varied. Procedures commonly employed by the industry are based on heuristics and represent stochastic processes in, often misleading, deterministic terms. Usually, such simplifications go unrecognised and so, their consequences are ignored except when manifested as problems. On the basis that the tendering legislation in mainland China seeks to assist transition of the domestic industry from a command economy to a market economy, whilst ensuring competitiveness and assuring project performance, the paper concludes that a 'minimum price parameter' accompanied by bonding, could be employed, using currently available data, processes and expertise.

KEYWORDS

China, Cost, Economic Rationality, Tendering

INTRODUCTION

As China moves progressively to operating as a free market economy, there is increasing attention to effectiveness and efficiency. A critical element is to secure the advantages of competition, both price and non-price, whilst avoiding disadvantages and problems. In a world attaching ever more importance to visibility / transparency of procedures, devising appropriate systems is a sensitive and difficult task.

Commonly, communities endeavour to control market structures through enacting anti-monopoly, or anti-trust, legislation. Such statutory provisions may be reinforced by further legal measures to promote competition – most commonly, concerning price competitive bidding for public sector supplies. The underpinning assumption, really a politically-generated assertion, is that by ensuring competition, the 'best deal' is secured. Even if non-price factors are scrutinized in pre-bidding evaluations, with the objective of ensuring the only factor to significantly differentiate the bidders from the purchaser's perspective is bid prices, certain problems remain due to the price competition's being on bid price only whilst opportunities (n.b. variations, 'claims') exist for increasing the initial price to the final (outturn) price. Such opportunities can distort prices bid, depending upon the perceptions of the bidders and their preparedness to act upon them in determining the price to bid (Rooke, Seymour and Fellows, 2003).

[1], [2] *Department of Construction Management and Real Estate, Tongji University, Shanghai.*

[3] *Department of Real Estate and Construction, The University of Hong Kong.*

In an endeavour to engender stability and to avoid problems in changing from a command allocation system to a (bid) market price allocation system, China has passed laws relating to competitive tendering. In particular, Article 33 stipulates that "The tenderer shall not be allowed to offer a price less than cost". That law has prompted considerable discussion and is examined in this paper.

A particular problem remains the 'image' of how the authorities in China are attempting to ensure reliability, appropriateness and transparency in controls of the economic transitions. The issues are epitomised by the American Chamber of Commerce (2002), *"New tendering and bidding regulations have not been widely adopted and lack enforcement power. Many organizations resist implementation, and as a result, corruption remains a significant problem behind the continued lack of transparency of current tendering and bidding procedures."* Wang, Fang and Lin (2003), for example, provide support for the perception and note that,*" common means is offering a below-cost price to win the contract and then seeking unethical profits by modifying the design to change the unit price or work quantity in Xiamen, a bidder once won the contract by offering a price which was about 46% of the base price".* Corrupt price manipulations with subcontractors occur also, resulting in poor time performance and low quality. The usual practice of the designers' calculating an official 'base price' for a project (a prediction of the suitable low bid using official price data) is being amended in moves towards market orientation – since 1 July 2003, Beijing has employed an itemised valuation system instead of 'base price' (China Today, 2003).

THEORY BASES OF CONSTRUCTION PROJECT TENDERING

Economic Rationality

Much economic theory is founded upon the assumption of rational human behaviour – that individuals act to maximize personal satisfaction and firms act to maximize profits. A development to generalize the theory is that behaviour of economic agents has the primary objective of maximizing their utility.

Baumol (1959) examines the consequences of the separation of ownership and management as occurs in most larger companies. He notes that whilst the behaviour of owners is described well as being directed towards profit maximization, the behaviour of managers is characterized as revenue maximization. Hence, Baumol concludes that the behaviour of the modern company is described best as pursuit of revenue maximization subject to a minimum profit constraint.

Hutton (1996) documents the requirement common in Western stock markets for companies to produce, at least, non-decreasing streams of dividends, irrespective of prevailing economic conditions. A supplementary requirement is for the market value of the companies to be preserved in real terms. Hence, there remains major pressure on companies to pursue profit.

Neo-classical economic theory indicates that a firm must earn normal profit as a long period minimum requirement for survival. Normal profit is the minimum return required by the (average) owner of the firm to keep the investment in that firm and is assessed as compensation for risk-bearing etc. As market conditions, including financial markets, become increasingly turbulent (due to interactions, globalisation and so on), levels of normal profit fluctuate also. Further, corporate financing employs ever greater diversity of sources and 'financial products' and, taking taxation legislation into account as well, firms are concerned with (growth in) market share and profit; and thence, dependent upon their capital structuring, their return on capital employed (profitability).

In construction project tendering, the participants include clients, designers and main contractors, (plus suppliers and subcontractors). Normally, clients are drawn from a wide

variety of companies and government agencies whilst main contractors (tenderers) are usually companies. Therefore, behaviour of the array of parties to construction project tendering may be explained and analysed by the economic theory, discussed above. However, such behaviour is likely to be subject to satisficing / bounded rationality in making decisions (Simon, 1957) and opportunism (Williamson and Maston, 1999).

Values, Costs and Prices

Much theory of value is derived from the labour theory initiated by Smith (1970), developed by Ricardo (1971) and extended by Marx (1946) which asserts that only human labour (power) generates value.

Whatever basis of value accumulation and ownership is adopted, it is apparent that two elements are important in determination of market-based transactions: the utilities of the subject matter as perceived by the potential vendor and the potential purchaser, and those parties' conversions of such subjective use values into parametric (monetary) exchange values to determine whether a transaction is feasible. If a feasible region emerges, then the exchange value at which the transaction occurs (the monetary cost to the purchaser and the monetary revenue – price – to the vendor) will be determined by the negotiating powers and skills of the parties.

Clearly, the perspective is founded on the basis that, via subjective conversion, utilities are translated into money amounts, which, then, can be used as a common (universal) measure. However, a further, and critical, concept is that such valuations also represent resource embodiments so that money becomes a surrogate measure of real content (uses) in goods and services (hence, the widely-assumed model of trade-off between unit cost and quality, and / or time) and, thereby, is representative of opportunity cost.

Under market economic theory, whilst firms must earn normal profit as a minimum for survival in the long period, in the short period, a transaction is rational provided the exchange value covers the supplier's marginal costs at least. In a free market, firms will endeavour to maximize profit (subject to the considerations, noted above) whilst in a command economy, the governing authorities will allocate resources etc. and determine the parties to any transaction, its timing and the exchange value. In either (extreme) situation, the long period requirement is for total costs of the supplier to be reimbursed via exchange value to ensure sustainability – it is the short period situations in which notable differences occur, thereby calling the role of total cost into question as a necessary determinant of price.

Competition Theory

Commonly, competition analysis is founded on consideration of structures of markets as those are believed to determine behaviour of the actors and, thence, performance; the best known market structure is the (theoretical) perfect market. At the other extreme of the market structure spectrum lies monopoly and its demand side counterpart, monopsony. Although perfect markets do not exist in practice, but all other structures do, the perfect market forms a common, idealised basis on which much analysis, and politico-economic rhetoric, rests due to the perceived allocational and operational efficiency and effectiveness, notably, Pareto efficiency.

The structure-based analysis examines the market share of occupant firms, through % value of sales of each firm or group of firms. Concentration (ratio) concerns the aggregate market share of the four largest firms and so, denotes the degree of horizontal market power. Boundary analysis examines the barriers to entry / exit of firms – this concerns 'marginal firms', both actual and potential. Effective competition occurs where no firms have a market share which is large enough to give them strong influence over others, especially in respect of pricing, and barriers to entry are

small. Thus, many traditionally-oriented models relate to the notion of effective competition by analyzing the elements of market competition external to a firm (e.g. Porter, 1990) whilst 'contestable markets' (e.g. Baumol, Panzar and Willig, 1982; Button, 1985) concern sunk costs of entry as the barrier to expanded (numerical) competition through which the *shadow* of increased competition acts to suppress the profit-seeking behaviour of incumbent suppliers.

Under oligopoly, especially tight oligopoly and / or one where there is a dominant (usually price-leader) firm, it is easy for the firms to cooperate on pricing and market share allocations. Although, generally, the subject of anti-monopoly / anti-trust legislation, if formalized (as in cartels), there is much to suggest that instances of tacit agreements are common – indeed, are a natural consequence of rational organizational behaviour. The neo-classical economic analysis of equilibrium under oligopoly, employs the kinked demand curve being produced as a composite of the market share and particular demand curves, demonstrates its position as a static analysis in which moves from the equilibrium are considered. That may be examined, alternatively, in terms of Cournot and Bertrand equilibria in which the particular oligopolist determines its action, given the output quantities and prices of the other oligopolists.

Such analyses lead (e.g.) Lipsey (1989) to discuss the hypothesis of qualified joint profit maximization as the driver of the behaviour of oligopolists who are subject to two sets of economic forces – one advocating individual profit orientation, and the other profits of the group of firms. The underpinning tenet is that the oligopolists recognise their interdependence, especially in terms of pricing behaviour and, consequent, profits, given that such firms are likely to be of similar efficiencies, technical competence etc.

For analysis of construction project competition, the usual forms encountered comprise monopolistic competition (competition amongst the many) – as in open tendering – and oligopoly (competition amongst the few) – as in single stage selective tendering. The two market forms show differing levels of monopoly power and so, different bidding behavioural characteristics.

Construction Project Tendering – Models and Accuracies

Apart from development of codes of procedures for obtaining and producing tenders (e.g. NJCC, 1996), the other main stream of investigation has concerned the bid to be submitted to obtain a project and the consequent profit. The codes have been developed to protect clients / employers by endeavouring to provide procedures of constructor examination which should, if followed, yield a realistic, competitively low price as well as assured performance of the construction operations. Although of undoubted assistance in achieving the twin objectives, significant problematic aspects remain, some of which may be addressed only subjectively when potential constructors are being scrutinised (on their records of performance, financial security etc.). Thus, opportunistic behaviour, via front-end loading of bids etc. and revenue enhancement (scrutinising tendering documents for likely variations / change orders and for possible claims) remains extensive. The result is that final accounts (outturn prices) are usually above accepted tender sums by several percentage points, even on small, straight-forward, firm price projects; projects involving novel operations, innovations etc. may be subject to huge price escalation from initial to final contract sum.

Bidding models of projects began with Friedman (1956). The model concerned calculation of the probability of a contractor winning a bidding competition for a project by submitting a given bid against either a known number of known competitors or against a known number of unknown competitors. That model was criticised and amended by Gates (1967) who offered an alternative mathematical model. Willenbrock (1973) considered utility factors in bidding and adopted a decision tree approach. Carr (1982)

produced a complex model in endeavouring to obtain universal applicability which, as Willenbrock's, was based on the ratio of the particular contractor's bid: estimate, he concluded that "Expected value is not very sensitive to small changes in markup because each adjustment in markup is counter balanced … by a shift in probability of winning. This allows for adjustment in markup to level the workload, or to receive an adequate return on investment, without much change in expected value." Further discussion of bidding models is given in Skitmore (1989).

Those models focus on mathematical modelling regarding the level of bid (or markup) and the probability of winning the project at that bid. Fine (1975) provides a simple analysis to enable a contractor to examine its appropriateness of market judgements in bidding from its own (and public domain) data. Further Fine, and Harris and McCaffer (2001), calculate and chart percentage markups for contractors to apply to achieve break even (over a large number of projects) when competing against different numbers of competitors and having different levels of accuracy in their estimating.

A number of further studies, notably Ahmad and Minkarah (1988), Shash (1993), have sought to determine hierarchies of factors which influence contractors' bid – no-bid decisions as well as those which influence the level of markup to apply when bidding. Other studies investigate an array of factors likely to impact on bid levels and competitiveness (e.g. Drew and Skitmore, 1997).

Related investigations have sought to analyse the accuracy of tender price predictions made during the design period, usually by consultant quantity surveyors. Morrison's (1984) investigation went somewhat further than many others in quantifying not only the accuracy achieved but also the constituents of the overall prediction error. Bennett, (1982) found that the coefficient of variation (cv) of errors (forecast by QS during design: lowest acceptable bid) varied from 22.5% at early design stage to 6.5% at just prior to receipt of tenders; the improvement can be attributed to the greater detail of project-precise information and to the increased sophistication of the forecasting methods used in later design stages. Ashworth and Skitmore (1983) found the 6.5% cv to be applicable to different project types and sizes over a range of countries.

PRACTICES IN CONSTRUCTION PROJECT TENDERING

Work Allocation

Price competition is the most common work allocation mechanism, and so, price determination methods are the focii of procedures. That approach is questionable, due to the importance of time performance (especially of constructors) (NEDO, 1983; 1988) and quality performance considerations. Adopting the project performance criteria of cost, time and quality, the issue becomes what are the relative importances in making performance-impacting decisions? That, of course implies the traditional trade-off model of interaction of those criteria rather than the 'Toyota' model, as in 'lean production' and 'lean construction', continuous improvement firm (cif) etc. (see, for example, Womack, Jones and Roos, 1990).

For major construction projects, the usual allocation method is single stage selective tendering (as NJCC, 1996). However, industry practice is increasingly to introduce variants to supplement the standard procedures. Common variants involve:

(1) Submission of priced BQs with the tenders.

(2) Submission of CVs of key personnel whom the tenderer will employ on the project, if the work is allocated to that tenderer.

(3) Interviews of the low bidding tenderers' (2-3 organisations) key personnel on how the project will be managed, if the work is allocated to that tenderer.

(4) Submission of work execution programme

(in a prescribed format and level of detail) to become a contract document with an obligation on the successful tenderer to maintain the programme up-to-date during the project execution.

The purposes of varying the standard procedures are:

(1) To further reduce the potential for collusion / manipulation of pricing - and, hence, the award of the work after submission of tenders through obtaining knowledge of other tenders and amending the price component details as in the BQ.

(2) To enable initial judgement of the expertise to be employed in managing the project and, hence, the potential performance at a more exact level than judging the past performance of the tendering organizations.

(3) In extension of (2).

(4) To facilitate more control over time and to assist evaluations of time-performance consequences of decisions (and claims) as well as facilitating (discounted) cash flow evaluations of tenders.

By carrying out a more extensive evaluation of project execution intentions, the client, and consultants/advisors, are able to obtain not only a more holistic view of likely performance but should be encouraged to examine further the criteria for project performance and the relative importance of each. Additionally, by interrogating the relationships assumed to exist between those performance variables, they should make better (more accurate/informed) decisions over project contents (variations, programming etc.) and so, gain a more accurate set of expectations.

Price Determination Variables

The usual model for determining the price for construction of a project is:

Price = Cost + Mark-Up.

That model is a vast over-simplification. Even accepting the economic performance objective of profit maximisation as the sole (or dominant) objective of business units, just the perceived operation of (price) competitive tendering with work awarded to the lowest tenderer, leads to modification of the model. However, for long period analysis, and given that firms in the private sector have survival as an imperative, the minimum revenue they must earn in the long period must exceed their total costs by 'normal profit' at least - hence, the notion of 'normal profit' as a quasi cost. Whilst that consideration is vital, it is determined by realisations of financial flows; whereas pricing is a predictive activity, such that the model should be revised to be:

Price = Forecast Cost + Mark-Up.

As noted, above, short period economic analysis asserts that the minimum rational price, from a predictive stance, is forecast marginal cost. In neither the short period nor the long period is there a maximum price; however, each tenderer is likely to assess a maximum applicable price which is dependent upon whether, and to what degree, the firm desires to be awarded the project and their evaluation of competitors' likely tenders. The maximum price to tender, for a firm which wants to be awarded the project, is below the (firm's forecast of the) lowest competing tender by the smallest possible ('safe') amount. Thus, provided the firm forecasts that such maximum price exceeds the marginal cost, it is that pricing consideration alone which determines its tender sum!

However, in exceptionally buoyant economic conditions for tenderers, they may endeavour to forecast the maximum price which the buyer would be willing to pay and so, bid up to that sum (as profit maximising behaviour). In such conditions, each tenderer will not be very anxious to win the project as workloads of firms are high (as are prices – which are likely to 'pull up' costs too); consideration of consequences of tendering behaviour on (longer period) relationships with

buyers and their agents remains a likely mitigant of such profit seeking / opportunism.

Understanding mark-up to be in respect of profit only, attention can turn to examination of cost forecasting aspects of price determination. Both design and construction are service activities and so, employ cost accounting approaches to price determination hence, the emphasis on estimating.

Consequences of adopting deterministic forecasting when, in reality, stochastic processes are operating – as for construction costs and prices – are epitomised by Reugg and Marshall (1990). They characterise construction project price forecasts as 'best-guess', conglomerate estimates of input variables but treated as certain estimates with results presented in single-figure, deterministic terms. That approach portrays the forecasts as being both precise and known (i.e. of zero inherent variability and absolutely accurate – zero error). Given the processes concerned, data measurement (recording), data selection, forecasting methods, and inclusion of human judgments in adjusting for different conditions etc., that usual practice is fundamentally flawed. An important consequence of such flaw is that the portrayed certainty, by its very nature, acts to disenfranchise decision makers by masking the variabilities and, hence, appreciation and investigation of what moves the forecasts, how, why, to what degree etc. Thus, in cost / price terms, there is likely to be less effectiveness and less efficiency – so, reduced 'value for money'.

Selection of items of data to use, adjustments etc. are human activities and so, are likely to be subject to errors – both systematic and non-systematic. [For a discussion of such errors, see Kahnemann, Slovic and Tversky, (1982) and, regarding construction, Al-Tabtabi and Diekmann, (1992); Fellows and Liu, (2000).] However, although errors for individual activities' costs may be quite large, provided the errors are not systematic and large, regression to the mean / central limit theorem effects will render the aggregate error to be relatively small.

In respect of estimating cost of materials – potentially, the most straight-forward resource to cost forecast – Skoyles (1978; 1981) found that the 'waste' factors employed in UK were, on average, only 50% of the waste factors experienced in practice. The consequence is likely to be that the estimate for a typical building project would under-forecast the cost by about 3% – a significant amount, given the level of profit mark-up applied by contractors, thus, errors in estimating are important but, often, unknown.

Gray (1983) investigated pricing of the preliminaries items ('site overheads') in UK bills of quantities (BQs) and found that about 6 items usually constituted 90% of the total price of the preliminaries section of a BQ. Costs of those items would be estimated in detail but prices allocated to many other preliminaries items would be lump sum 'guesstimates'. Research by Bennett (1982) noted that preliminaries usually constituted 15-18% of contract sum on large building projects; however, on small, repair projects they could total as much as 80% of a contract sum. [The equivalent costs can be deduced.] It is understandable that preliminaries items are used for 'last minute' bid price adjustments but with scant regard for consequences for delay cost reimbursement claims etc.

It is well-known that no BQ is a truly accurate measure of the project components, even in the absence of variations. Commonly, contractors add contingency sums to forecast costs and prices to allow for 'risks'. Although, statistically appropriate, those sums will be incurred on some projects, be exceeded on some and merely add to profit on others. Further, projects may be subject to uncertainties (as well as risks) which, by definition, can be assessed only subjectively. Hence, adopting an organisational, long period perspective, total costs (forecast to be or actually) incurred include such risk contingencies (assuming forecasting accuracy), the individual project / short period perspective yields a different result – dependent upon what occurs on the project / during that short period.

Additionally, prices, if not costs, may be

forecast taking opportunities for submission of 'claims' into account (see, e.g. Rooke, Seymour and Fellows, 2003) and for post contract downward negotiation of subcontractors' and suppliers' quotations which were used to assemble the bid. Those are clear manifestations of opportunistic, profit seeking behaviour (see, e.g., Williamson and Maston, 1999). Incentives for such behaviour are greater in a 'buyer's market' due to the downward pressure on bid prices.

The general overheads of firms are usually 'absorbed' into project cost forecasts. That process operates on a cost accounting basis in which prior periods' recorded overhead costs are used to predict the level of overhead costs for the forthcoming period, incorporating adjustments for envisaged changes. Bases for allocation of those overheads to outputs are determined and measured (e.g. direct costs of all projects over the accounting period used – usually, one year) and, subject to adjustments for historic variances.

Changes in structuring of the construction industry in many countries continues to witness the increasing incidence of subcontracting – in more extreme cases, main contractors carry out no construction activities but manage and service (provide attendances on) subcontractors. Such structural changes echo the general movement to 'core business' and the means of securing cost reduction through flatter structures of firms and, hence, reduced overheads (given approximately common technical efficiencies and costs amongst competitors). Pricing, then, focuses on assembling and adjustment of subcontractors', suppliers' and plant hire bids. Those bids constitute contractors' initial cost forecasts (potentially subject to later adjustments / manipulations) which the subcontractors may submit differentially to main contractors, thereby endeavouring to influence to which main contractor the project is awarded (see, e.g., Uher, 1990).

DISCUSSION OF ARTICLE 33 OF CHINA'S TENDERING LAW

Construction Project Tendering in Mainland China

Following declarations regarding economic reforms to move towards a market economy, mainland China (re-)introduced tendering in 1978. Previously, all construction projects were allocated to construction organisations by the government. The Ministry of Construction (MOC) issued Recommendations on Contracting Capital Construction Projects in 1979 – those were implemented first in Shenzhen and, later, in other cities.

Commonly, mainland China uses either open or single stage selective tendering for the competitive award of construction work with both local (increasingly privatised) and / or international contractors being the tenderers. Although open tendering is commonly advocated as a means by which integrity of bids may be assured, it remains subject to inefficiency problems, as noted by (e.g.) Banwell (1964).

For procurement by government in China, Article 17 of the Government Procurement Law of the PRC (effective 1 January, 2003) states, "...the procurement price be lower than the average market price, that procurement shall be more efficient, and that good quality goods and services are procured". That statement requires the 'best of all worlds' to be achieved – the reference to the average market price necessitates private sector prices to be above those in the public sector – likely to be a significant problem, especially if no comparable private sector demand exists (as for infrastructure projects)!

Objectives and Problems of Article 33

Article 33 of the Tendering and Bidding Law applies in conjunction with a variety of further provisions, notable among which are the following:

Article 26 – "A bidder shall have the capacity to undertake the project..."; required qualification may be specified in the tender documents.

Article 27 – "...a construction project, the contents of the bid documents shall contain the profiles and business performances of the persons-in-charge of the project and major technical personnel to be appointed as well as machinery and equipment to be employed...".

Article 28 – "*...If the number of bidders is less than three...issue the tender anew...*", as is common for public sector projects, universally.

The rationale behind the content of Article 33 is to endeavour to avoid problems which are notoriously consequent on "buying work" by constructors but, as noted above, that term may be interpreted in alternative ways. So, following the specific statement in Article 33, the question at issue is, 'What is the meaning of "*COST*"'?

Cost may be total, average, marginal; direct, indirect; prime; variable, semi-variable, fixed; sunk; incremental, etc. etc. Clearly, just to note "cost" is insufficient for certainty of meaning! A particular difficulty surrounds the use of the term 'cost price' in China; following explanation and discussion by Wang et al (2003), the 'cost price' refers to the total cost (direct plus indirect costs) of the item in question, evaluated against a market, or 'official', average. Hence, authoritative guidance is sought - analogous to case precedents for interpretation of common law (as in UK).

Anecdotally, a leading member of a Cost Engineers Association, has stated that, "...the cost here means the tenderer's own and individual cost...". That statement, albeit well intentioned, sheds little light on (the 'official') interpretation(s) of "cost". Zhu and Qian (2001) assert that, "Under the market system, the term 'cost' should be understood as the individual enterprise's cost however, as China is now in a transition period, the time has now come when the individual cost is used to evaluate the bids, because such cost is not available yet from most of the Chinese construction enterprises. Therefore, the best way is to take the 'cost' as the average cost of the industry for the time being." In countries with extensive and relatively reliable cost data that would be a monumental task of great duration - hardly feasible on a 'per project' basis; given the situation in a country as vast and diverse as mainland China, it would appear to be (practically) impossible!

It would be expected that, following usual competitive practice, even if firms could forecast their costs with complete accuracy, due to differences in structure, organisation and working methods, subcontractors, payment levels, incentive schemes and productivities, each firm's costs would be individual and, to maintain business advantage, confidential. If, however, cost disclosure were mandatory, that would be likely to result in 'business reaction' in such disclosures to attempt to maintain (some) cost secrecy; the accuracy of such disclosed costs is likely to be highly questionable!

Minimum Bid Parameter

To provide a sound, practical and equitable basis for the desired minimum bid parameter (cost or otherwise) an authoritative surrogate measure is appropriate. Although such a parameter would, advisedly, be determined by long term total costs for the 'average' tenderer, together with an addition for 'normal profit', problems could arise due to necessary inclusion of factors for economic conditions, efficiency changes etc. – the myriad of variables in 'cost planning' of construction projects (see, e.g., Seeley, 1996). On the basis that the objective is to afford 'performance assurance' for the client, then the minimum bid parameter might be set as a nominal minimum but with the proviso that if a tenderer bids below that parameter, the rationale must be established by the tenderer to the satisfaction of the client to ensure the viability of that bid and to give

adequate performance assurance (perhaps supported by insurance in the form of a default performance bond - at no additional cost to the client).

Wang et al (2003) discuss the method of applying the cost parameter for minimum bids in Xiamen. That method employs the establishment of average market prices for major items of cost in projects and operates through the following formula (applied to materials as an example):

$$C = \frac{\sum_{1}^{n} (b_i - l_i).m_i}{\sum_{1}^{n} b_i m_i} \times 100\%$$

where:

C = lowest price control (for material)
bi = average reference price (of a certain material) as announced by government
li = lowest wholesale price available in the market
n = number of (materials) expected to be used on the project
mi= quantity of the consumption (of a certain material)

Aggregation over a project contents and applied to the particular type of project (six types are used) facilitates a 'lowest control line' to be calculated – when a bid is below that control line, the tenderer must justify, with good evidence, that the low bid is reasonable.

Elsewhere in China, minimum cost levels to be applied for evaluation of bids are established by reference to price levels published by government agencies and, then, subjected to adjustment by representatives of the client (sometimes quantity surveyors) to endeavour to reflect the current level of market prices (anecdotally, up to minus 15% of 2001 published prices in Beijing, recently). Clearly, such subjective adjustments are very questionable concerning both their accuracy and intent, plus their potential consequences!

A further factor of, potentially, great significance on prices is location. In UK, location factors (as index numbers) for building tender prices are produced by the Department of Trade and Industry (of government) and by the Building Cost Information Service. What has been found in such factors is that they are very variable over small geographical distances and, further, that they are unstable both geographically and temporally. More globally, it is acknowledged in publications and by international quantity surveyors and cost engineers that similar variabilities occur both within individual countries and, often to a far greater degree, between countries Given the size and variability of China, producing reasonably reliable locational factors for building prices would be an immensely difficult task. The practical solution would seem to lie in local data collection and production of the factors, requiring constant scrutiny and monitoring to achieve sufficient accuracy and reliability.

The production of minimum tender parametric sums could, given data sources and access, be by authorities (e.g. Department of Standards and Norms; China Engineering Cost Association) who could be active in scrutiny of bids below the parametric level set for any project. Banks and insurance companies would need to develop appropriate standard form performance bonds / insurance policies as recourse mechanisms to further safeguard clients' financial interests on projects.

CONCLUSIONS

If one really desires a free market to operate, then that market should be permitted to dictate costs, prices and profits in constantly striving for (dynamic) equilibrium. It is when control of the 'hidden hands' is desired and implemented that (albeit for laudable reasons) problems, often grounded in human value-judgements, ensue.

'Buying work' through competitive tendering on construction projects, although, potentially, good

business rationally in the short period, is well-known to be fraught with problems, which, ultimately, all to often result in liquidations. In seeking to avoid such problems, mandatory tendering above cost has been incorporated in regulations in mainland China. However, the term cost has not been defined in Article 33 and so, is open to differing interpretations, notably, a tenderer's total cost or lowest (reasonable)bid price as predicted by / on behalf of the client (perhaps a government agency).

A further problem is that the legislation may lead to reduction in business incentives for cost reductions through productivity / efficiency gains as such may cause tendering problems due to potential disqualification of bids which are below expected levels, even if they could be substantiated as viable, the client (representatives), especially on public sector projects may be highly risk averse in this regard through compliance with legislation considerations. Due to the diversity of potential bidders - local, international and joint venture contractors, all with differing arrays of suppliers and subcontractors and, further, with varying spectra of finance sources and costs, the establishing of the viabilities of the possible arrays of bids is extremely difficult. At the domestic level, the consequences of the still emerging financial infrastructure is of relevance to such judgements by impacting on the costs and bids of local firms.

The difficulties are compounded by the realities of cost forecasting and competitive pricing. The numerous vagaries of cost forecasting and the common approach of portraying such stochastic processes in deterministic ways, mean that costs estimated for projects are somewhat unreliable, for individual projects especially – despite the demonstrated application of 'central limit theorem' in aggregate project cost predictions.

In order to secure the stability and performance assurance, stated to be the objectives of the legislators to assist the transition from command to market processes in the construction industry of mainland China (including its facing international competition), the setting of a 'minimum bid parameter' for each project by a reputable authority is recommended in lieu of the cost statement. Any tender below that parameter would require substantiation and, if accepted, (as could apply to all accepted bids) be supported by a performance bond (or other insurance) at no additional cost to the client. Such an approach would secure competitive incentives towards continuous improvements as well as facilitating stable development by preventing 'artificially' low bids from being submitted and accepted and accruing appropriate levels of project performance (with financial safeguard for the client).

REFERENCES

Ahmad, I., Minkarah, I. (1988) Questionnaire Survey on Bidding in Construction, *Journal of management in Engineering, ASCE*, 4 (3), 229-243.

Al-Tabtabi, H., Diekmann, J. E. (1992) Judgemental forecasting in construction projects, *Construction Management and Economics*, 10, 19-30.

American Chamber of Commerce - PRC (2002) *White Paper: American Business in China*, http://www.amcham-china.org.cn/publications/white/2002/en-15.htm, accessed 26 January, 2004.

Article 33, The Tendering Law of the People's Republic of China, Page 11, Law Press, 1999.

Ashworth, A., Skitmore, R. M. (1983) *Accuracy in Estimating*, Occasional Paper No. 27, Ascot: Chartered Institute of Building.

Banwell Report (1964) *The Placing and Management of Contracts for Building and Civil Engineering Work*, Ministry of Public Buildings and Works, London: HMSO.

Baumol, W. J. (1959) *Business Behaviour, Value and Growth*, New York: Macmillan.

Bennett, J. (1982) Cost Planning and Computers, In Brandon, P. S. (Ed.) Building Cost Techniques: New Directions, London: E&FN Spon, 17-26.

Button, K. J. (1985) New Approaches to the Regulation of Industry, *The Royal Bank of Scotland Review*, 148, Dec., 18-34.

Carr, R. I. (1982) General Bidding Model, *Journal of the Construction Division of the American Society of Civil Engineers (ASCE)*, CO4, Dec. 639-650.
China Today (2003) http://www.chinatoday.com.cn/English/e20036/b2.htm, accessed 26 Jan. 2004.
Drew, D. S., Skitmore, R. M. (1997) The Effect of Contract Type and Size on Competitiveness in Bidding, *Construction Management and Economics*, 15, 469-189.
Fellows, R. F., Liu, A. M. M. (2000), Human dimensions in modelling prices of building projects, Engineering , *Construction and Architectural Management*, 7 (4), 362-372.
Fine, B (1975) Tendering Strategy, In Turin, D. (Ed.), *Aspects of the Economics of Construction*, London: George Godwin, 202-221.
Friedman, L. (1956) A Competitive Bidding Strategy, *Operations Research*, 4, 104-112.
Gates, M. (1967) Bidding Strategies and Probabilities, *Journal of the Construction Division of the American Society of Civil Engineers (ASCE)*, 93, CO1, 74-107.
Gray, C. (1983) Estimating Preliminaries, *Building Technology and Management*, April, 5.
Harris, F., McCaffer, R. (2001) Modern *Construction Management (5 edn.)*, Oxford, Blackwell.
Hutton, W (1996), *The State We're In (2 edn.)*, London: Vintage.
Kahneman, D., Slovic, P., Tversky, A. (1982), *Judgement Under Uncertainty: Heuristics and Biases, Cambridge*: Cambridge University Press.
Lipsey, R. G. (1989), *An Introduction to Positive Economics (7 edn.)*, London: Weidenfeld & Nicolson.;
Morrison, N. (1984) Accuracy of Quantity Surveyor's Cost Estimates, *Construction Management and Economics*, 2, 57-75.
National Economic Development Office (1983), *Faster Building for Industry*, London: HMSO.
National Economic Development Office (1988), *Faster Building for Industry*, London: HMSO.
National Joint Consultative Committee (1996), *Code of Procedure for Single Stage Selective Tendering*, London: NJCC Publications.
Porter, M. E. (1990), *The Competitive Advantage of Nations*, New York: The Free Press.
Reugg, R. T. and Marshall, H. E. (1990) *Building Economics: Theory and Practice*, New York: Van Nostrand Reinhold.
Rooke, J., Seymour, D. E., Fellows, R. F., (2003) The Claims Culture; A Taxonomy of Attitudes in the Industry, *Construction Management and Economics*, 21 (2), 167-174.
Seeley, I. H. (1996) Building Economics: *Appraisal and Control of Building Design Cost and Efficiency (4 Edn.)*, Basingstoke: Macmillan.
Shash, A. A. (1993) Factors considered in Tendering Decisions by Top UK Contractors, *Construction Management and Economics*, 11, 111-118.
Simon, H. A. (1957) *Administrative behavior: a study of decision-making processes in administrative organization*, New York: The Free Press.
Skitmore, R. M. (1989) *Contract Bidding in Construction, Harlow*: Longman.
Skoyles, E. R. (1978) Site accounting for waste of building materials, *BRE Current Paper CP 5 / 78*, London: HMSO.
Skoyles, E. R. (1981) Waste of building materials, *BRE Digest Number 247*, London: HMSO.
Uher, T. E. (1990) The Variability of Subcontractors' Bids, Proceedings CIB 90 *Building Economics and Construction Management*, Vol. 6, University of Technology, Sydney, 576-586.
Wang, Q. M, Fang, Q., Lin, Z., Z. (2003) How to evaluate the Reasonable Price in the Process of Xiamen Construction Public Bidding for Project, *Proceedings 7th Pacific Association of Quantity Surveyors Congress*, Tokyo, 31 Oct. – 3 Nov. 92-94.
Willenbrock, J. H.(1973) Utility Function Determination for Bidding Models, *Journal of the Construction Division of the American Society of Civil Engineers (ASCE)*,CO1, July, 133-153.
Williamson, O. E., Maston, S. E. (Eds.) (1999) *The Economics of Transaction Costs*, Cheltenham: E. Elgar.
Womack, J. P., Jones, D.T., Roos, D. (1990), The *Machine that Changed the World*, New York: Rawson Associates.

Hong Kong Surveyor Vol 16(1), 23-40 June 2005 ISSN 1812-3953

Integration of Property and Railway Development: An Institutional Economics Analysis

BS Tang[1], YH Chiang[2], AN Baldwin[3] and CW Yeung[4]

ABSTRACT

This paper applies the theoretical insights of the new institutional economics in examining two alternative mechanisms of implementing the integration of property and railway development: the single-developer approach and the multiple-party approach. The relevance of these mechanisms is reflected in the recent debates concerning the KCRC Canton Road Station, the West Kowloon Cultural District Development and MTRC integrated development approach. This paper argues that a desirable development outcome can be generated when the incentive and constraint structure of the institutional framework is put in place such that the roles, interests and resources of the different parties are properly aligned.

KEYWORDS

Land Use Planning, Property, Railway, Institutional Economics, Transaction Costs

INTRODUCTION

Recently, two separate events have attracted a lot of discussions and debates from the property professionals in Hong Kong. The first event is about the axing of the Canton Road station. The Kowloon-Canton Railway Corporation (KCRC) announced its decision to drop the construction of a station of its new Kowloon Southern Link at Canton Road. The reasons provided by the KCRC and the government were that, firstly, such station was not viable on transport grounds[1]; and secondly, Wharf - the major property landlord of Harbour City accommodating the proposed station – refused to share the construction cost of the station and requested the government for an additional grant of permissible development floorspace[2].

The second event is about the development of the West Kowloon Cultural District (WKCD) on a prime waterfront site. One of the controversies is concerned with the government's proposal to award this 40-hectare site to a single private developer for 30 years. The intention was to ensure that the awardee would take an 'integrated approach' to 'plan, construct, operate, maintain and manage all the facilities in the project including both public and non-public facilities' within the District in a 'self-financing mode' without the need of government subsidy[3].

[1],[2],[3],[4]*Department of Building & Real Estate, The Hong Kong Polytechnic University*

[1] *According to the estimates of the KCRC, the station can only attract an incremental daily patronage of about 17,000.*

[2] *Legislative Council papers indicate that Wharf has refused to share HK$780 million of the station construction cost and has requested the government for a bonus plot ratio amounting to 600,000 sq. ft. of floorspace in connection with the redevelopment of the Harbour City. See ETWB (2005) and Liao (2005).*

[3] *Based upon a written reply by the Secretary for Housing, Planning and Lands, Mr Michael Suen, in the Legislative Council on 23 June 2004 [webpage: http://www.info.gov.hk/gia/general/200406/23/0623196.htm].*

These two events look entirely unrelated, but they aim at one practice in common. That is the use of property-related incomes to finance non-property activities and facilities in an integrated development project. Few land professionals will disagree that urban land development should be integrated in order to enhance efficiency, convenience and welfare of city life. There is however a lack of consensus about how this could be implemented. Take the integration of property and railway development as an example. Should these be implemented by separate parties or one single entity? In view of the Canton Road Station case, does it therefore lend support to 'a single-developer approach', as currently proposed in the situation of the West Kowloon Cultural Development District, so that such disputes could be avoided and a more efficient outcome be accomplished? Drawing upon the insights from the new institutional economics, this paper will discuss two different institutional mechanisms in implementing and organizing changes in the urban built environment, and examine the conditions under which a desirable outcome could be achieved.

SYNERGY: RAILWAY & PROPERTY

It is nothing new to argue that urban land uses and transport facilities should be integrated. In theory, an integrated railway and property development is expected to generate the following key social and economic benefits (Fig.1):

(a) *Railway*

Urban rail transit will significantly improve the accessibility of the land around the stations and hence increase its values. By capturing these values through property development and other means, the railway operator can finance the construction of the urban railway which is always expensive to build.

(b) *Property*

Intensification of development density of the land around railway stations provides a large amount of floor space to support more residents and a higher intensity of urban activities, which will in turn improve the ridership of the transit railway and its operational viability.

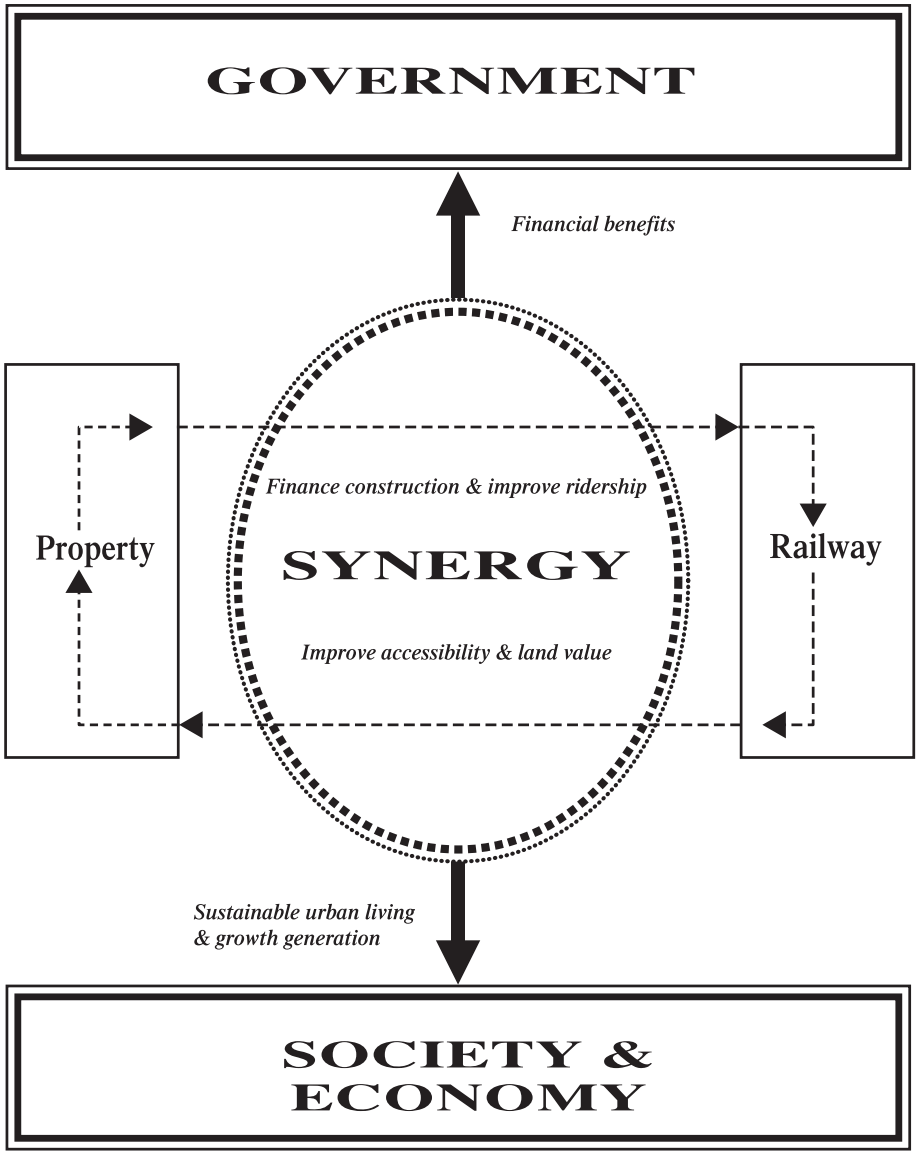
(c) *Government*

The government can receive financial gains in terms of the land premiums generated from property development of the station sites, a higher level of rates from private properties with improved accessibility and other monetary returns on railway operations (if owned by the government). Furthermore, the government may not be required to subsidize the operations of the railway, if the latter can be financially sustained by a large pool of transit riders within the catchment areas.

(d) *Society & Economy*

Society at large achieves a more sustainable form in terms of the compactness of urban development, more efficient use of scarce urban space, more open space, less urban sprawl, fewer roads, reduced air pollution from cars, and improved pedestrian-friendly environment. All these features can enhance the overall quality of urban life characterized by improved health, better convenience, greater diversity of life style and more time saving. The economy will equally be benefited as a result of the improved efficiency in transport and human activities.

Figure 1
Synergy of Integrated Railway and Property Development Model



Source: Authors

NEW INSTITUTIONAL ECONOMICS

If there are obvious mutual gains to the railway company and land developer in an integrated development project, why was there a deadlock in the case of the Canton Road Station? One interesting perspective is provided by the new institutional economics which refer to the use of neoclassical economic theories in explaining economic and social institutions such as government, markets, firms, and urban planning. This is often thought of as closely associated with the Chicago School, and also to the work of the economic giants like Ronald Coase, Armen Alchian, Oliver Williamson, Douglas North and others who focus on the analysis of 'transaction costs', 'property rights' paradigm and 'institutional changes' in the society (New School University, 2002).

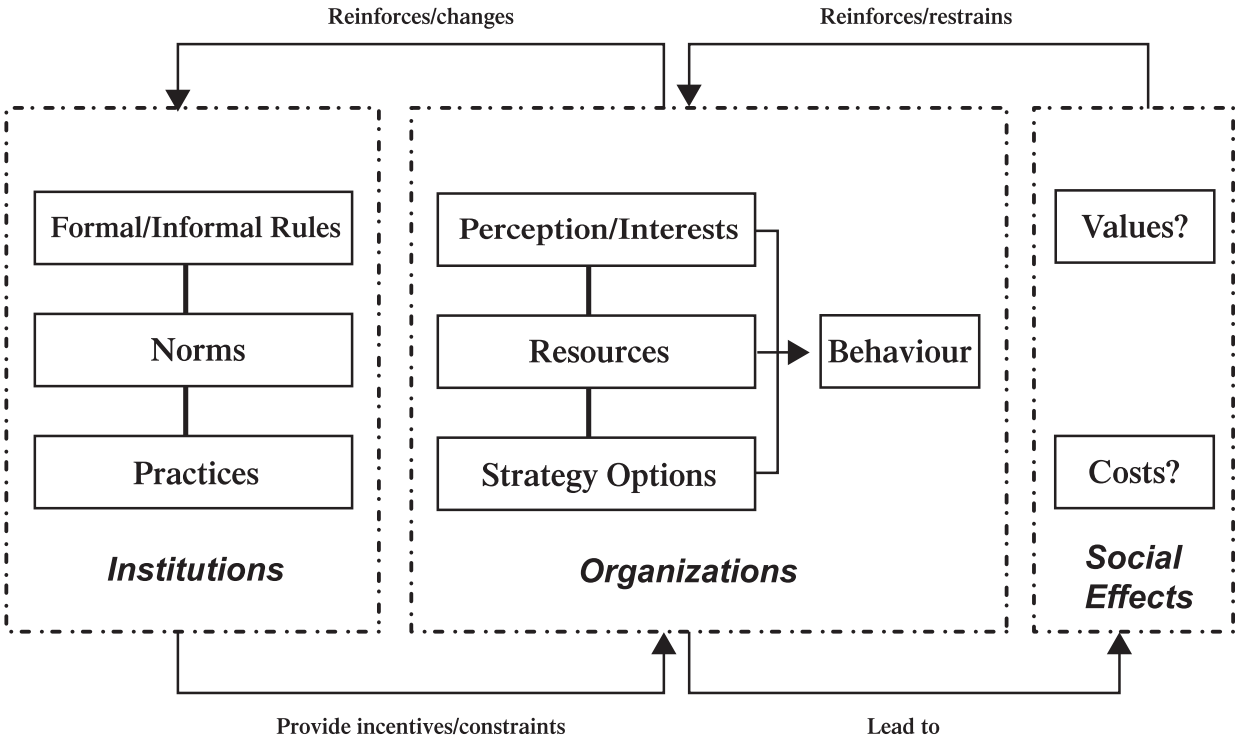
Under the new institutional economics, a transaction is the basic unit of its analysis and it is defined as an exchange of resources, assets of economic values, or reciprocal promises and action between the contracting parties in society (Dixit, 1996). Transactions can take place in the public or private sectors, and in the economic or political markets. When this concept is applied to land development, the issue of property rights becomes evident and pivotal. Land is an immobile asset. The subject matter of property transactions refers to the 'portable' bundles of property rights attached to the land assets (Seabrooke et al., 2004). Whether value can be created and captured through sensible use and development of the land asset is dependent on the property rights system, and in a broader framework, the institutions.

Institutions are constructed by the human society to govern our relations with each other. In a broad sense, institutions comprise both formal and informal rules, norms and practices that influence perception, knowledge, resources and interests of the actors and hence structure the patterns of their interactions in daily life (Fig. 2). Such arrangement governs the relationships between the stakeholders in the process of economic and social transactions. In essence, the institutions provide the systems of incentives and constraints which influence and frame the organizational behaviour.

In this respect, new institutional economics informs that the existence of private property rights is a pre-requisite to voluntary market transactions that seek to maximize economic efficiency and hence result in the best allocation and use of resources. A private property rights system refers to the conditions in which the owners are protected by law to have the exclusive rights to possess and use, to derive income from and to transfer the asset. In reality, the exclusive rights of private property are never complete. However, in a market economy, the above ownership rights are largely intact and the conditions under which the owners can exercise their rights are generally transparent. Given a clear, enforceable definition and delineation of property rights in land assets, individual owners will have an incentive to protect them, enhance their values through deliberate improvements and capture the benefits generated from their timely investment and transactions with others. Voluntary negotiations and exchanges between the individual parties will lead to an optimal use of the resources and ultimately maximize the welfare to the society as a whole[4].

[4] The famous 'Coase Theorem' has demonstrated, given a clear delineation of property rights, the power of market forces in reaching an amicable solution for conflicting use of resources. Put it simply, the Theorem argues that market negotiations and transactions between the parties can resolve any externality problems (such as pollution and/or misuse of land resources), irrespective of the initial property rights entitlements of the resources being traded. In other words, how the assignment of the property rights is initially assigned will not affect the efficiency of resource allocation. The results will be identical in which the private parties will 'internalize' the externalities in the transactions. However, this outcome depends on the condition of zero transaction costs. But the power of the Coase Theorem lies in its corollary: because of the presence of the transaction costs, the initial assignment of the property rights is critical in determining the outcomes (see Lai and Lorne, 2003).

Figure 2 Institutions & Organizations: Theoretical Perspectives



Source: Authors

Another reason why a private property rights system is a critical component in contributing to the protection, enhancement and possible capture of the asset values is because it will exert a constraint on the opportunistic action of others (Klein et al., 1997)[5]. This, of course, depends on the enforceability of the property rights system. As an example, common resources are quickly depleted because their values are 'dissipated' under competitive, free-riding opportunistic actions. While the new institutional economics suggests that privatization and market transactions of these common resources may help to resolve the problems, it also points out that the presence of high transaction costs (e.g. difficulty in enforcing the contracts) may prevent desirable market outcomes and / or market exchanges to happen.

[5] Klein et al. (1997: 2) give this example: 'Property rights tell you, not what you may or may not do with your property, but rather what others may or may not do with your property. What prevents you from filling in a swamp on your land is a regulation. What prevents others from trespassing to hunt ducks on your land is a property right.' (Italics original)

In other words, new institutional economics recognizes that voluntary market transactions between the contracting parties are not cost-free. This is particularly true in the case of land development, even in a free market economy which is generally open and transparent. High transaction costs are commonly represented in the following aspects (Alexander, 2001a; 2001b; Seabrooke et al., 2004; Hong, 1998):

(a) Asset specificity refers to the complex situations under which the assets, resources and decisions are interdependent. Integration of railway and property development is a lumpy investment and cannot be infinitely redeployed, easily divisible and substitutable.

(b) Imperfect knowledge about the conditions of the development sites and the contracting parties tends to increase the monitoring, enforcement and search costs.

(c) Uncertainty about the changing economic conditions will increase the development risks and the costs of delineating all the rights of the contracting parties to benefit from the land.

(d) A lengthy time period in completing the whole development will increase the uncertainty and the overall project risk.

(e) Negotiation, enforcement and administration costs will increase as a result of the need to constrain opportunistic behaviour, cheating and non-compliances of the involved parties.

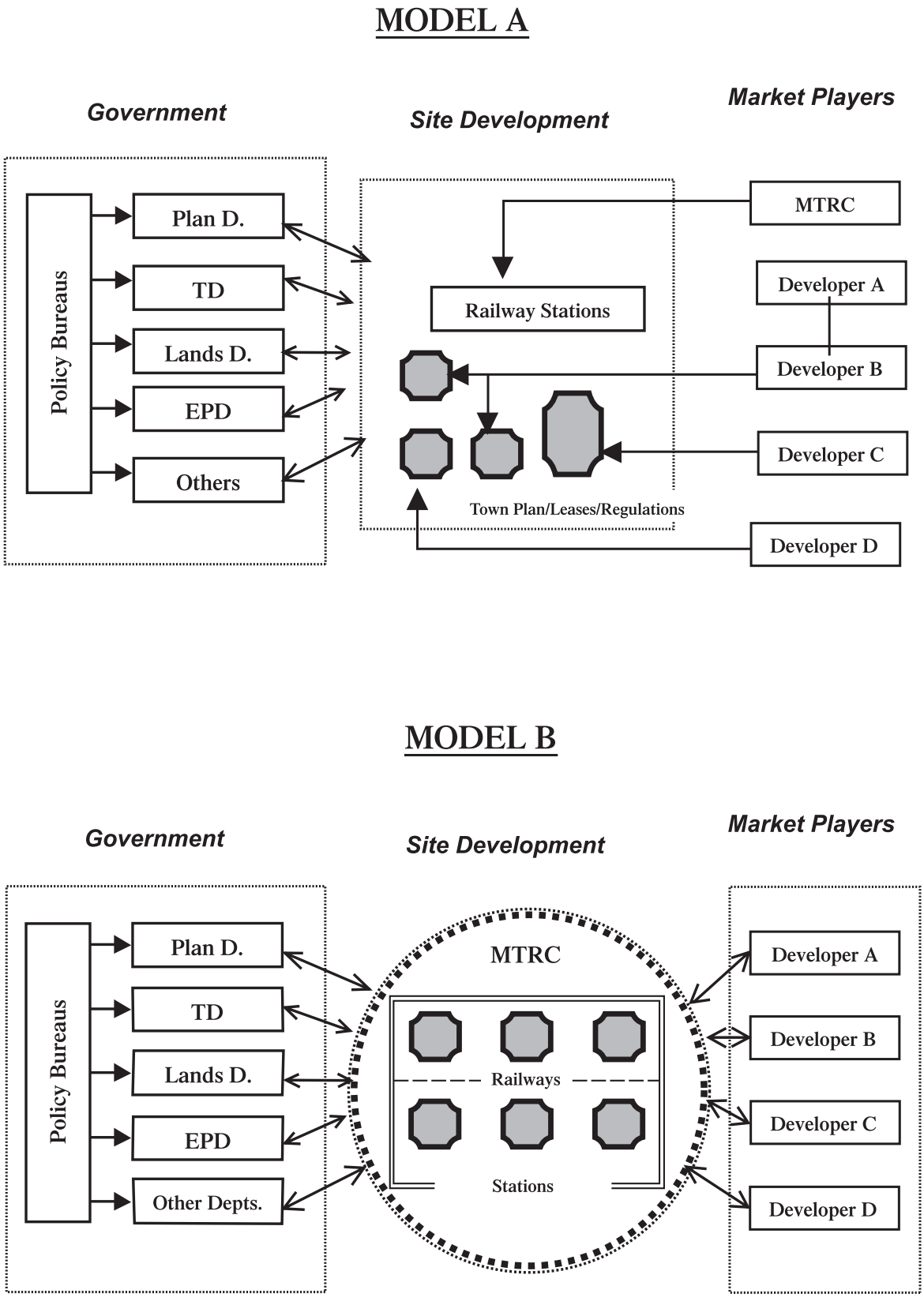
These high transaction costs in land development activities are 'frictions'. What the new institutional economics suggests that the logical move is to consider how to eliminate or reduce such 'frictions' in order to encourage cost-effective voluntary exchanges. Whether this necessarily justifies government intervention is an empirical question, and 'there is no a priori guarantee' of efficiency in such action (Lai and Lorne, 2003, p.8). In fact, direct state allocation of resources is only one possible means. Following Coase's (1937) ideas about the nature of firm, transaction cost theory suggests that there are other possible institutional forms of governing the production of urban built environment (Alexander, 1992a, 1992b, 1994, 2001a, 2001b). In other words, to be effective, urban planning and land development do not necessarily have to be carried out exclusively by the government. There are other feasible forms of land use governance which can also reduce transaction costs, depending on the attributes of the transactions in the land development process. Indicative planning, contract zoning, private-public partnership, voluntary contractual covenants are some examples of the bilateral type of governance structure.

TWO INSTITUTIONAL FORMS

The above theoretical discussions emphasize the importance of institutions in influencing and determining the outcomes of resource allocation. In many instances, it is simply impossible or very costly to choose among different institutions. For example, in the case of the Canton Road Station, it is unrealistic now to grant Wharf a priority right of having a KCRC station underneath the Harbour City. But imagine if that could be done. The KCRC would then have to consider whether it was worthwhile to compensate Wharf of not having a new station underneath its development. If this re-assignment of development rights were at all possible, the current scenario would have changed.

In some circumstances, however, an institutional choice in implementing an integrated land development project is possible. There are two alternative institutional forms in governing and

Figure 3
Government, MTRC and Developers: Two Institutional Models



Source: Authors

coordinating the transformation of urban space for railway and adjoining land properties (Fig. 3).

Model A represents government planning, assignment, attenuation, and restrictions of private individual rights over the use of land resources in and near railway stations. This institutional form of land use governance involves public-sector decision making, statutory framework and third-party regulation and enforcement by the government. Under this approach, the statutory town plans, land lease documents, the government land sale programmes, and the government policies and regulations provide the principal coordinating mechanisms in bringing together all the key players in developing the sites. The railway company is one of many developers and is primarily assigned with a limited role of constructing the railways and the stations only. Project implementation relies mainly on the interactions between these market players and the various government departments, their interpretations of the many government policy regulations and contracts, and their compliance with the conditions imposed upon them.

Model B is institutional approach now implemented by the MTR Corporation Ltd (MTRC). This model puts the MTRC at the central stage in planning and coordinating development of the station sites. This approach does not obviate the need for statutory town plans, land lease documents, government policies and regulations, but unlike the previous model, they only frame rather than dictate all the development particulars. The site development details are expected to be worked out by the MTRC in negotiation and consultation with the government departments and the developers. Exclusive development rights for the station sites are granted to the MTRC and this provides an incentive for the corporation to plan and develop the sites in such a way as to maximize the values of its entire development projects and 'internalize' all possible external benefits generated from railway and property development. The MTRC provides the platform for the resolution of conflicting interests of all the relevant parties in connection with the site development.

The central thesis of the new institutional economics is that the appropriate institutional form of governance for spatial transformation – whether through public sector planning and multiple-player approach like Model A, or through integrated private sector planning by the MTRC like Model B – is contingent upon the minimization of transaction costs[6]. The characteristics of the activity in question, the attributes of the type of transaction and the specific circumstances in history all play a role in determining the actual outcomes of the institutional form (Ball et al., 1998: 105-134).

EMPIRICAL CASES & APPLICATIONS

There seems ample evidence to demonstrate that Model B is capable of creating better development outcomes than Model A. The MTRC has the corporate mission to construct and operate the urban transit railways in Hong Kong. It is probably one of the few railway companies in the world that requires no operating subsidies from the government. This is attributed to its prudent management, but also its capture of land development opportunities at its stations. A major strength of the MTRC approach is that the institutional form does not only give the incentives for the corporation to maximize the returns from its land resources by means of good planning and design, but it also provides the appropriate means to implement

[6] Irrespective of either Models A or B, the government is always there influencing the land development process. The fundamental issues are in what ways and to what extent. Model A does not put the government at the centre because our emphasis is on the different means of implementing the project at the site level.

the development schemes[7].

Improving Public Planning Design

The alternative government land sale approach, more often than not, lacks both the incentives and the meticulous means to ensure successful implementation of the proposed projects. The government is not subject to the same degree of financial discipline as in the case of a private corporation like the MTRC. Although the government is also obliged to make the most appropriate use of land resources, this is only a general principle. The government has to address and balance it with the numerous competing social, economic and political objectives, other than the prudent commercial principle as in the case of the MTRC. Furthermore, different government departments have their separate missions and policy considerations. Their different policy instruments have varying strengths and weaknesses.

For instance, government town planning in Hong Kong is most effective in terms of regulating land use disposition, development intensity and certain elements of the built form including building height, number of storeys and site coverage. It is strong in development control but is notoriously weak in the areas of urban design, project initiation and scheme implementation. Furthermore, marketability of the development projects has never been the main concern of the government planners as a development regulator. This is often considered as a matter of the private sector. Indeed, it is perhaps not inaccurate to say that all government regulations are intended to be 'satisfying', i.e. setting the minimum acceptable standards and requirements, rather than 'maximizing', i.e. prescribing all the details and leaving minimal flexibility. This is certainly a prudent way of public administration in a small government-large market scenario.

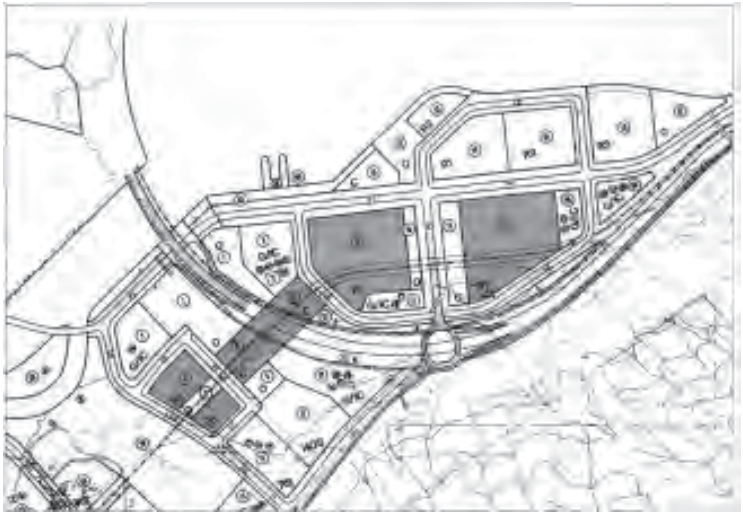
Tung Chung Station is a case in point. The initial government land use planning proposal for this station development was not considered satisfactory by the MTRC. The MTRC planners subsequently put forward their proposals in revising the urban design and land use planning of the Station area. What they did was to arrange the array of high-rise residential towers in a curvilinear pattern to take full advantage of the spectacular sea and mountain views. This creates a visually stunning identity to complement Hong Kong's landmark gateway. The commercial complex is strategically designed to bridge across the North Lantau Expressway and Airport Express Link and provides the first impressions of Hong Kong for in-bound visitors (Fig. 4). This example illustrates how the MTRC approach has not only maximized its returns by capitalizing on the full potential of its land resources, but it has also delivered a masterpiece that receives wide public applause.

Responding to Imperfect Information & Uncertainty

Government institutions, by their very nature, are inept in reacting to swift market changes. The government bureaucracy is rightly not commercially-oriented. There is likely to be a

[7] The KCRC (a public body) appears to operate under a different incentive and constraint structure from that of the MTRC (a publicly listed company with government as a major shareholder). For instance, its recently completed West Rail has suffered tremendous losses. Part of the reasons is due to its lack of integration with the development of the West Rail property sites. The Chairman's Statement in KCRC (2004) suggests that under the project agreement with the government, 'the Corporation is acting as the agent for the Government in developing these sites. ... ... The Corporation has made the request that the Government give high priority to the development of these sites once property market conditions improve [but the agreement is that housing development of these sites will not be completed before 2008/2009].' This seems to imply that there is little incentive for the KCRC to develop properties in an integrated and timely manner so as to provide ridership to the West Rail, although this issue is beyond the scope of this paper.

Fig. 4
Tung Chung Development: Comparison of Master Plans



Government's Initial Master Plan

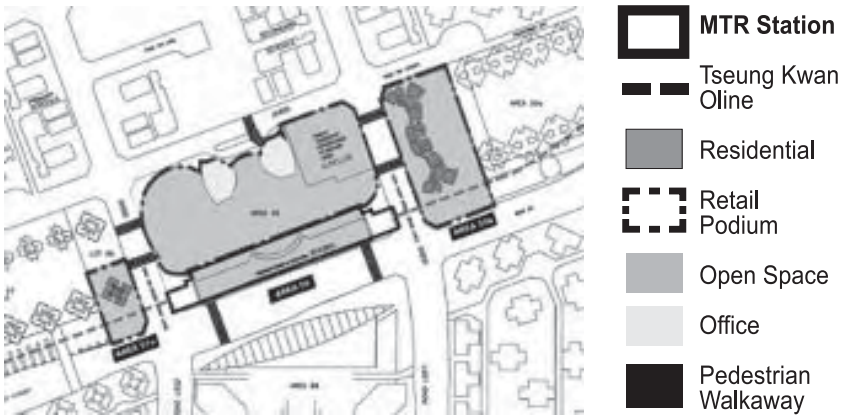
MTRC's Revised Master Plan

time lag in the government responses to the corresponding changes in market environment and the best timing is then lost. Alternatively, the MTRC model provides a sound institutional mechanism in addressing the possible problems of uncertainty and imperfect information associated with most real estate transactions. Property development is a lengthy process. Unforeseeable changes in economic and market conditions can happen that make the initial planning proposals obsolete.

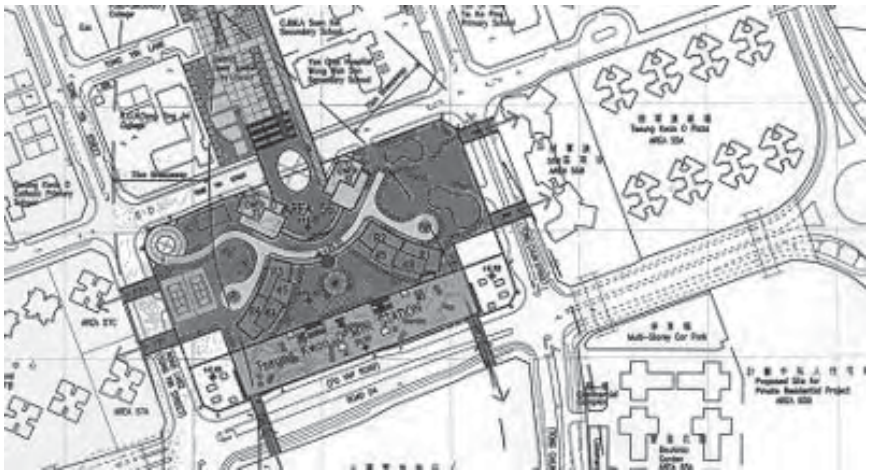
The MTRC has the organizational flexibility and capability to adjust to the market changes primarily because its performance is closely linked with the market conditions under the current institutional setup. Firstly, the MTRC is disciplined by the financial market to operate on prudent commercial principles. Its management performance will have an important bearing on its credit ratings, costs of borrowing and hence financial results. Secondly, the corporation is disciplined by the developers who choose to participate as its development partners in implementing the property projects. Developers agree to offer a sharing of their profits from the above-station development projects, when the MTRC invites them for tender. The MTRC is required to shoulder both development as well as financial risks in this process as the profit sharing is highly sensitive to the market conditions. Thirdly, the corporation is required to pay full market premiums to the government for the property development rights. The market premiums are levied on the property developers who are susceptible to the market environment.

The MTRC therefore has the incentives to make

Fig. 5 Tseung Kwan O Town Centre Development: Comparison of Master Plans



Initial Master Plan



Revised Master Plan

sure that planning and implementation of its property development packages will meet the market needs. The corporation has to closely monitor the market sentiments before offering its tender invitations to developers. All these enhance the practicability and marketability of the development projects so that they must fall within the acceptable risk levels of the corporation. Unlike other private developers, the MTRC is not prepared to take up highly risky and speculative development schemes on their stations.

The Tseung Kwan O (TKO) Station development is a case in point. Under the current government planning proposal prepared back in the 1990s, two office towers above four levels of retail uses were proposed at the station site, integrating with the partially underground TKO MTR station with a public transport interchange and carparks. The MTRC has found these planned uses obsolete and unsuitable for the town centre site. In 2003, the MTRC submitted a planning application to the Town Planning Board requesting for a change of land uses to residential, hotel and retail uses (Fig. 5). This example reflects the merit of the MTRC approach in reacting responsively and flexibly to the problems of imperfect information and market uncertainty associated with planning for property development.

Internalizing Externalities & Maximizing Synergy

Another key advantage of having a single entity like the MTRC to manage the joint development of railway and above-station property development is that it allows comprehensive planning and implementation of the projects. All possible development options can be evaluated at the planning stage before adopting and implementing a final, optimal option. This mechanism will help to enhance and maximize the synergistic effects between railway and property.

Maritime Square is a case in point. It is a shopping centre planned and managed by the MTRC at part of the development of Tsing Yi Station. It is not only the largest in Tsing Yi, (over 46,000 sq.m. of retail space), but it has also been carefully designed to ensure that its theme, quality and provision will become the focal point of the community for both the local residents and

Fig. 6 Maritime Square and its Weather-free Connection with Tsing Yi MTR Station

commuters. One special design consideration is to promote an apparently 'seamless' space integration between the railway station and the shopping centre so that a maximum degree of convenience is provided to the residents, passengers, visitors and shoppers. The shopping centre is also fully integrated with the above-station residential development alongside extensive landscaped open space and other recreational facilities. The residents can basically enjoy a 'weather-free' environment for their daily activities within the station development (Fig. 6).

All these benefits are made possible because the opportunities of land use integration were fully evaluated at the master planning stage by the MTRC. Furthermore, by means of 'Development Agreements', the MTRC will control, monitor and supervise implementation of the adopted master plan proposals of the station development by the developers which have won the subject tender. The Development Agreements stipulate, in great details, the conditions, responsibilities and duties to be fulfilled by the developers as the implementation agent of the MTRC. Most developers describe the conditions of Development Agreements as very 'harsh'. Nonetheless, the Development Agreements perform an important function in ensuring that good quality development product will come out in the end.

Question may arise as to whether the same extent of land use integration between railway station and property development could equally be achieved, not by a single-developer approach of the MTRC, but through separate private negotiations between the railway operator and the adjoining property owners. The answer is in the negative because:

(a) The connection between the railway station and the property development is likely to be a remedial action, which is often a second-best option. Examples include the new underground pedestrian links between Pacific Place and Admiralty MTR station and between Times Square and Causeway Bay MTR station. These two links have been constructed and opened for use long after the completion of the stations. An afterthought in land development is unlikely to have exploited the best opportunities, including timing, resources and design.

(b) Sometimes, it may not be entirely feasible from a physical perspective to establish the connections once all the committed development has been built.

(c) The costs of negotiation between the railway operator and the property developers are likely to be prohibitively high, resulting in project delays and/or failure. There is no guarantee that an agreement will be reached, as in the KCRC Canton Road case.

The single-developer approach of the MTRC is most suitable to achieve the benefits of land use integration with railway because it can delineate all the rights of the involved parties to benefit from the land. By 'internalizing' all the otherwise 'external' benefits to the separate parties, the MTRC can maximize the synergistic effects between railway and property. Real estate interests and transport considerations are *not* necessarily compatible. Likewise, property planner and transport planner have different objectives and they do not necessarily agree with each other. For instance, property planners want to retain the shoppers within a shopping mall. They would therefore favour the layout design of the public corridors so as to channel the pedestrian flows to go past as many shops as possible. Transport planners, however, want a direct access of the passengers to the station facility and an efficient pedestrian flow for the sake of safety and convenience purposes. If these two parties work for separate organizations, like in the case of the Canton Road Station, their own considerations become 'external' to the other. It becomes very costly, if not impossible, for them to resolve their conflicts through private negotiations in order to allow the synergy of property and transport to take full effect.

Sha Tin KCRC station is another example. The nearby privately developed New Town Plaza seeks to maximize the shopping space at the expense of the public circulation space. On the other hand, the railway operator needs to connect the station entrance area with the shopping mall in order to attract or disband train

Fig. 7 Congested Interface Area connecting New Town Plaza & Sha Tin KCR Station

passengers in an expedient manner. As a result, during the peak times, pedestrians and shoppers are often clogged at the interface areas between the KCRC station and the New Town Plaza shopping mall (Fig. 7). Such congestion causes discomfort to both the shoppers and the passengers. This is an example of how separate considerations are causing diseconomies and inefficiency to external parties.

Conflicting objectives can be more effectively resolved when the decisions are put under a company hierarchy. What this actually does, is to turn a possible 'zero-sum game' between two separate parties into a 'trade-offs' decision within one single firm. A single-developer approach of the MTRC can weigh the relative costs and benefits of these competing options, achieve a delicate balance of these apparently incompatible considerations, and come up with an optimal solution. The transaction costs in reaching a settlement within a firm are much lower than between separate companies. The decision so reached will maximize the full synergy between transport and property and minimize their harmful interface effects.

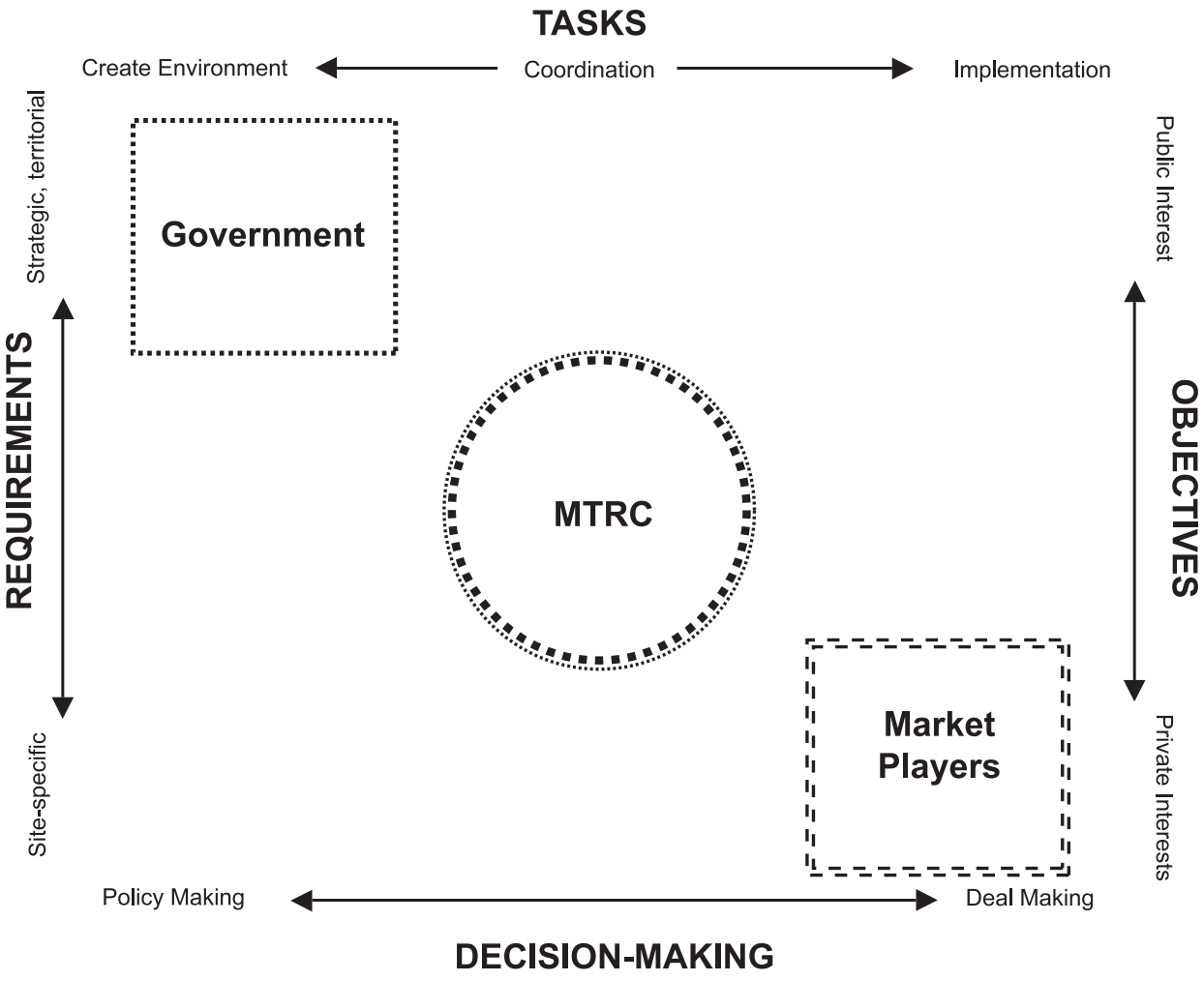
CONCLUSION

Based upon the new institutional economics and some empirical examples, this paper discusses why the single-party, integrated planning approach like the MTRC has provided a better institutional mechanism than the alternative government planning and land sale approach in

implementing integrated railway and property development project. Does this therefore mean that the West Kowloon Cultural District Development should best be implemented by a single-developer approach? What insights could we draw from the MTRC approach?

We consider that the success of the MTRC approach lies in the proper alignment of the institutional roles of all the involved parties with their objectives, tasks, requirements, expertise, interests, resources and decision-making environment. Fig. 8 highlights the respective role

Figure 8
Institutional Functions of Different Organizations: Four Dimensions



Source: Authors

of the MTRC vis-à-vis those of the other organizations.

Under this institutional setup, the government creates a favourable incentive and constraint environment, sets major policy objectives of strategic and territorial nature that take into account the public interest in connection with the joint development of the mass transit railway and station property. On the other hand, the market players such as property developers in pursuing their private interests, are responsible for implementing the projects subject to the site-specific requirements and the deals agreed in connection with the joint development projects. Finally, the MTRC acts as the intermediary between the government and market players for coordinating the implementation of these joint development projects, converting strategic objectives into site-specific requirements, transforming policies into deals and balancing possible conflicts between public and private interests.

Implementing integrated project over a long duration involves complex 'transactions' and hence high transaction costs. The intermediary, like the MTRC in the integrated railway-property projects, helps to reduce transaction costs. Eliminating this intermediary within the institutional setup implies either: (a) an expansion of the two remaining organizations into areas and functions which they are neither good nor proper at performing; or, (b) leaving a gap between strategic policy objectives and detailed implementation at the site level, between policies and deals, and between balancing public and private interests. This is probably the key problem we see in the proposal for a single-developer approach for the development of the West Kowloon Cultural District Development. Whether this development should best be coordinated by a 'development corporation' or other intermediaries depends on whether such institution is subject to an appropriate set of incentives and constraints so that it can make sensible trade-off decisions in a cost-efficient manner and implement the project in a truly integrated fashion.

ACKNOWLEDGEMENT

The authors are grateful for the support of the MTRC in this study. Some materials in this paper are drawn from the Study of the Integrated Rail-Property Development Model in Hong Kong recently completed by the authors. The usual disclaimers apply.

REFERENCES

Alexander, E. R. (1992a). A transaction cost theory of planning. *Journal of the American Planning* Association, 58(2), 190-200.

Alexander E R, (1992b) Why Planning Vs. Markets Is An Oxymoron: Asking The Right Question, *Planning and Markets*, 1999-2000.

Alexander, E. R. (1994). To plan or not to plan, that is the question: transaction cost theory and its implications for planning. *Environment and Planning B*: *Planning and Design*, 21, 341-352.

Alexander, E. R. (2001a). Governance and transaction costs in planning systems: a conceptual framework for institutional analysis of land-use planning and development control – the case of Israel. *Environment and Planning B: Planning and Design*, 28(5), *755-776*.

Alexander, E. R. (2001b). A transaction-cost theory of land use planning and development control: towards the institutional analysis of public planning. *Town Planning Review*, *72*(1), *45-75*.

Ball, M., Lizieri, C., & MacGregor, B. D. M. (1998). The *economics of commercial property market*. London: Routledge.

Coase, R. (1937). *The nature of the firm. Economica*, 4, 386-405.

Dixit, A. K. (1996). *The making of economic policy: a transaction-cost politics perspective*. Cambridge, MA: MIT Press.

Environment, Transport and Works Bureau (ETWB) (2005). *Kowloon Southern Link*. Paper Submission to Legislative Council Panel on Transport Subcommittee on matters relating to

railways, 5pp, January 2005, Hong Kong: Legislative Council Secretariat [File Ref: ETWB (T) CR 12/1016/99].
Harvey, J. (1996). *Urban land economics*. (4th ed.). Basingstoke: Macmillan.
Hong, Y.-h. (1998). Transaction costs of allocating the increased land value under public leasehold systems: Hong Kong. *Urban Studies*, 35(9), 1577-1595.
KCRC (2004). *Kowloon Canton Railway Corporation Annual Report 2003*. http://www.kcrc.com.
Klein, D. B., A. Moore and B. Reja. (1997). *Curb rights: a foundation for free enterprises in urban transit*. Washington D.C.: Brookings Institution Press.
Lai, L.W.C. and Lorne, F. T. (2003). (eds). *Understanding and implementing sustainable development*. New York: Nova Science.
Liao, S. (2005). *Is it worthy to invest $1.8 billion for an additional station on Canton Road?* Hong Kong: Legislative Council Secretariat, 7pp.
New School University, Graduate Faculty of Political and Social Science (2002). The History of Economic Thought (2002): http://cepa.newschool.edu/het/home.htm
O'Sullivan, A. (1996). *Urban economics*. (3rd ed.). Chicago: Irwin.
Seabrooke, W., P. Kent and H. How (eds.) (2004). *International real estate*, London: Blackwell.

Hong Kong Surveyor Vol 16(1), 41-46 June 2005 ISSN 1812-3953

Predicting Normative Commitment in Construction Value Management

MY Leung[1]

ABSTRACT

Projects' goals expressed as time, cost and quality requirements are seldom disputed. However, it is not easy to ensure that the defined goals will be implemented by all parties in the implementation process, whilst goal commitment is one of key variables towards project success and participant satisfaction in construction projects. Value Management is a tool to enhance / ensure the commitment to project goals amongst professionals in construction projects. However, it is still a debate whether construction participants implement the project goals, which are set through the systematic decision process, in the real world. In order to improve the implementation of complex construction projects in Hong Kong, it is critical to investigate goal commitment amongst temporary project team members. The paper aims at identifying the antecedents leading to goal commitment and predicting the normative commitment amongst construction professionals in the industry. A questionnaire survey was conducted in the study. The results indicate that five behavioral variables are the essential antecedents to predict the normative commitment in the construction projects.

KEYWORDS

Antecedent, Behavior, Construction Project, Normative Commitment, Value Management

INTRODUCTION

A few years ago, the Premier of the People's Republic of China, Mr. R.J. Chu, criticized Hong Kong people with "no Volition after the Discussion; no Action after the Decision" (SCMP 9/2001). A lack of goal commitment does not only exist in construction-related governmental departments, but also spreads to private companies in HK due to the uncertain economic environment. Although the overall economic situation has been improved in Hong Kong, the unemployment rate of construction workers in the industry is still over 15% in Hong Kong in 2004 (Census & Statistics Department 2004). In recent years, Hong Kong government formed an ad hoc group to review the current construction practices. The formal report in 2001 emphasized the need for commitment in construction projects amongst the various stakeholders such as clients, professionals and suppliers in ensuring that the construction works meet the clients' dynamic expectations (Tang 2001). Value Management (VM) technique was suggested as a useful tool for the teamwork to enhance the commitment amongst construction professionals. Construction professionals should work with client and other stakeholders together in the VM workshop for clarifying project objectives, comparing design options and setting project goals. However, it is still difficult to ensure project participants implementing the specific project goals in the real world, especially during this economic recession and uncertain environment in the industry. The study aims at identifying the antecedents of commitments amongst construction professionals in the industry in order to predict

[1]*Department of Building and Construction*
City University of Hong Kong,
Tat Chee Avenue, Kowloon Tong, Hong Kong
Tel: (852) 2788 7142
Fax: (852) 2788 7612
Email:bcmei@Cityu.edu.hk

the normative commitment of professionals in construction projects.

NORMATIVE COMMITMENT

Allen and Meyer (1990) suggested three distinguishable components of commitment in the psychological aspect namely, affective, normative and continuance commitments. Affective Commitment (AC) denotes identification with, emotional attachment to and involvement in the organization. Continuance Commitment (CC) denotes the perceived costs when staff leaves the organization. Normative Commitment (NC) reflects a perceived obligation to remain in the organization (Meyer et al. 2001). These three forms of commitment characterize an individual's relationship with the entity in question and have implication for the decision to remain involved with it.

Normative commitment (NC) reflects a perceived obligation to maintain membership in the organization. The underlying construct of NC is that commitment is the totality of internalized normative pressures to act in a way which meets organizational goals and interests (cf: Wiener, 1982). Such perceived feelings generally motivate individuals to behave appropriately and do what is right for the organization (Meyer and Allen 1991). Employees with a high level of NC remain in the organization because they feel that they 'ought to' do so (Allen and Meyer 1990, 1996).

ANTECEDENTS OF NORMATIVE COMMITMENT

Based on the extensive literature review, hundreds of studies examined the antecedents of commitment. The wide range of antecedents of commitment can be grouped into three categories: (i) personal characteristics, e.g., professional qualification, identification, acceptance, belongingness, internalization, etc.; (ii) Task-related characteristics, e.g., task nature, role difficulty and assessment; and (iii) organizational characteristics, e.g., senior supportiveness, centralization of authority and clarification (Mathieu and Zajac 1990). 26 hypothetical antecedents of commitment in the construction value management process are summarized in Table 1.

Due to the economic recession in Hong Kong, a lot of professionals stay in an organization with the CC rather than AC. In order to understand

Table 1 Hypothetical Antecedents of Commitment

Hypothetical Antecedents	
Factors	**Variables**
Personal	Relationship, Professional membership,Goal acceptance, Involvement, Belongingness, Goal specificity, Internalization, Resistant to change, Role specificity, and Participation
Task-related	Task nature, Task conflict, Task difficulty, and Assessment
Organisational	Authority, Senior supportiveness, Clarification, Equity, and Reward

the existing uncertain environment and improve the quality of construction projects, this study mainly investigated the antecedents of commitment in the construction projects, based on the identified behavioral variables.

A QUESTIONNAIRE SURVEY

A general questionnaire survey was conducted to the construction professionals in Hong Kong in 2002-03, including project managers, architects, civil / structural engineers, building services engineers, quantity surveyors, etc. Each set of questionnaire includes a four-page closed questionnaire. Out of 120 questionnaires, 75 were successfully returned in which 64 are valid for data analysis in the study. 11 respondents were returned with incomplete information and, thus, ignored in the data analysis stage.

Table 2 Pearson's Correlation of Normative Commitments and its Antecedents

Model	Variables	Unstandardized Coefficients (B)	t	Sig.	R^2	$\triangle R^2$
1	(Constant)	10.644	10.653	.000	.229	.229
	v10 : Reward	0.976	4.288	.000		
2	(Constant)	6.217	3.372	.001	.317	.088
	v10 : Reward	0.836	3.767	.000		
	v15 : Equity	1.228	2.800	.007		
3	(Constant)	9.032	4.520	.000	.399	.082
	v10 : Reward	0.979	4.542	.000		
	v15 : Equity	1.505	3.537	.001		
	v08 : Goal acceptance	-1.004	-2.878	.006		
4	(Constant)	7.548	3.975	.000	.496	.097
	v10 : Reward	0.761	3.637	.001		
	v15 : Equity	1.309	3.294	.002		
	v08 : Goal acceptance	-1.287	-3.862	.000		
	v04 : Role specificity	0.986	3.358	.001		
5	(Constant)	2.184	0.780	.439	.545	.049
	v10 : Reward	0.679	3.339	.001		
	v15 : Equity	1.369	3.591	.001		
	v08 : Goal acceptance	-1.090	-3.319	.002		
	v04 : Role specificity	1.003	3.563	.001		
	V25 : Internalization	1.116	2.518	.015		
6	(Constant)	4.971	1.697	.095	.587	.042
	v10 : Reward	0.815	4.008	.000		
	v15 : Equity	1.266	3.432	.001		
	v08 : Goal acceptance	-1.075	-3.404	.001		
	v04 : Role specificity	0.801	2.828	.006		
	V25 : + Internalization	1.544	3.346	.001		
	V24 : – Internalization	-0.960	-2.408	.019		

Ordinary least squares forward stepwise multiple regression analysis was used to predict the normative commitment caused by behavioural antecedents during the management process (cf: Pallant 2001). Table 2 summarises the results, showing that 'reward' (v12) was entered into the equation at first, followed by 'equity' (v17), 'goal acceptance' (v09), 'role specificity' (v05) and two 'internalization' variables (v27 and 28). The result provides support for the prediction that 'reward' (v12) is predominantly associated with the level of normative commitment, while the 'role specificity' (v05), 'equity' (v17) and 'goal acceptance' (v09) are also substantially related to the normative commitment incurred in construction management process (around 8-10% of variances).

Being a useful technique in exploring the predictive ability of a set of independent variables (e.g. antecedents) on a continuous dependent measure, the results of regression analysis indicate that only v12, v17, v09, v05, v28 and v27 are the antecedents influencing the normative commitment of construction professionals. Other possible related antecedents such as professional membership, relationship, clarification, authority, peer influence, belongingness, task difficulty and motive are excluded from the equation (refer to Table 1).

DISCUSSION

Out of the 26 hypothetical antecedents, 6 antecedents including two variables in personal factors and two variables in organisational factors and three variables in personal-related factor are significantly related to the AC of construction professionals. This suggests that the NC of professionals is related to different types of behavioural variables in the management process.

Role specificity has been positively correlated to NC. Construction projects are normally complicated and involve various professionals within a limited period. A specific professional role induces feelings of obligation to maintain the project among professionals. Construction professionals thus believe that it is the 'right and moral' thing to do (Meyer and Allen 1991; Wiener 1982) and, will to make an extra effort in the project to achieve the project goal, since they feel they 'ought to do' so.

In goal setting theory, personal value and motive are the origins to stimulate individual's behaviour (Locke and Latham 1990). Normally, they contribute a positive influence to the individual behaviour and job performance, because *internalization* aims at congruent personal value with the team member's value systems (Becker et al. 1996). However, the study reveals that either positive or negative internalization can induce the NC among construction professionals. Professionals in the construction team will to attach to the project and devote their job if they involve the NC in the project.

VM workshop provides an opportunity to the participants in the decision process to identify the best value (project goal), but it is meaningless if the team members do not accept the common

Table 3 Antecedents of Normative Commitment in the Value Management Study

	Value Engineering Phases (SAVE 2004)	**Antecedents of Normative Commitment**
1.	Information	Role specificity *
2.	Function analysis	→ Equity +
3.	Creative	→ Equity +
4.	Evaluation	→ Equity +, Internalization *
5.	Development	→ Internalization *, Reward *, Goal acceptance *
6.	Presentation	→ Internalization *, Reward *, Goal acceptance *

*Note: + – Organizational factors; * – Personal factors*

goal and implement it according to the schedule. Hence, goal acceptance has to be established in the teamwork in order to ensure that the defined goal will be implemented in the actual process.

Apart from the personal-related variables, the equation also indicates two organizational variables (*equity and reward*) to predict the NC of construction professionals. To ensure that the outcome decided in the construction value management study workshop is implemented in the real world successful, the assessment method should be fair and just in the analysis and the evaluation phases of VM, as well as during the post-VM study, while some reward system (e.g., overtime payment, bounds, promotion, etc.) can be discussed and developed in the VM study. Of course, the whole team must ensure that all members accept the project goal at the end of workshop, as it will subsequently enhance the working performance during the implementation process. Antecedents of Normative Commitment are allocated throughout the Value Management study from the information phase to the presentation phase (see Table 3).

It is interesting to note that NC can be not predicted by any task-related variable for construction professionals, though task difficulty was found as one of the predicted variables for the AC of construction professionals (Leung and Sham 2004). Value management has a beneficial to assist team members to understand, expose and solve the task difficulties among professionals in the workshop. Task difficult requires construction professionals work together for solving the problems well, but task-related variables (nature/conflict/difficult) has no effect to their obligation for the completion of task.

CONCLUSION

A comprehensive study on value management provides us with valuable information to enhance the goal commitment amongst project participants throughout the entire management process. Three forms of commitment have been identified in this paper based on literature in organizational behavior. NC concentrate the reason (ought) to do the project.

This paper indicates that, out of 26 hypothetical variables, 6 behavioral variables are found as antecedents of NC for construction professionals. It covers organization-related and personal-related variables in the value management workshop for construction projects. 'Reward', 'role specificity', 'equity', 'goal acceptance' and 'internalization' are critical antecedents to predict the NC of professionals. Hence, specific organizational system must be considered as a major problem in the VM workshop. Facilitators have to identify the role of professionals in the project in the beginning of VM workshop and set up an equity system among professionals in the analysis and evaluation processes. Since the professional will to devote their time and effort to finish the task in any situation, it is not necessary for facilitators to identify the personal and team values in the workshop. A fair and just analysis / evaluation approach and reward system should be adopted during and after the VM workshop, in order to ensure that the participants accepted the project goals normatively and will to implement it in the industry during the post-workshop stage.

ACKNOWLEDGEMENT

The work described in this paper was fully supported by a grant from CityU (Project No. 7001388).

REFERENCES

Allen N. J. and Meyer J. P., (1990) The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of Occupational Psychology*, 63, 1-18.

Allen N. J. and Meyer J. P., (1996) Affective, continuance, and normative commitment to the organization: an examination of construct

validity. *Journal of Vocational Behaviour*, 49, 252-276.
Becker T. E., Billings R. S., Eveleth D. M. and Gilbert N. L. (1996) Foci and bases of employee commitment: implications for job performance. *Academy of Management Journal*, 39(2), 464-482.
Census & Statistics Department, *Frequently Asked Statistics* (2004) HK: C&SD, http://www.info.gov.hk/censtatd/eng/hkstat/index1.html, viewed 24th May 2004.
Leung M.Y. and Sham F.C. (2004) Predicting affective commitment in construction value management, In *Proceeding of the 2nd International Conference on Value Engineering and Enterprise Technology Innovation*, 16th –18th October 2004, Value Engineering Committee of Chinese Technology -Economics Association, VE of Society of China and Zhejiang University, 69-73.
Locke E. A. & Latham G. P. (1990) *A Theory of Goal Setting and Task Performance*, Englewood Cliffs, NJ: Prentice Hall.
Mathieu J. E. and Zajac D. (1990) A review and meta-analysis of the antecedents, and consequences of organizational commitment. *Psychology Bulletin*, 108, 171-194.
Meyer J. P. and Allen N. J., (1991) A three-component conceptualization of organizational commitment. *Human Resources Management Review*, 1, 61-89.
Meyer J. P., Stanley D. J., Herscovitch L. and Topolnytsky L. (2001) Affective, continuance, and normative commitment to the organization: A meta-analysis of antecedents, correlates, and consequences. *Journal of Vocational Behaviour*, 61(1), 20-52.
Mottaz C. J. (1988) Determinants of organizational commitment. *Human Relations*, 41, 467-482.
Pallant J. (2001) SPSS Survival Manual: *a Step by Step Guide to Data Analysis Using SPSS for Windows (Version 10)*, Crows Nest.
SCMP (9/2001) Premier Zhu Rongji struck a positive note on HK's economy, *South China Morning Post*, 5th Sept.2001.
Tang H. (2001) Construction for Excellence: Report of the *Construction Review Committee, The Construction Review Committee*, HKSAR.
Wiener Y. (1982) Commitment in organizations: a normative view. *Academy of Management Review*, 7, 418-428.

Hong Kong Surveyor Vol 16(1), 47-58 June 2005 ISSN 1812-3953

Comparative Study of Building Performance Assessment Schemes in Hong Kong

DCW Ho[1], KW Chau[2], Y Yau[3], AKC Cheung[4] and SK Wong[5]

ABSTRACT

Having access to information is essential when one needs to make a decision to buy property or renovate a building. However, information concerning the health, safety, and environmental performance of buildings is not always readily available. This creates a need for building performance assessment tools. This paper aims to compare the building performance assessment schemes available for use in Hong Kong, namely The Hong Kong Building Environment Assessment Method (HK-BEAM), The Intelligent Building Index (IBI), The Building Quality Index (BQI), and The Comprehensive Environmental Performance Assessment Scheme for Buildings (CEPAS). Their similarities and differences are pinpointed and discussed in detail. The findings of this study will serve as a guide for practitioners to decide on the schemes that best suit their purposes.

KEYWORDS

Building performance, Building labelling, Green buildings, Health and safety, Hong Kong

INTRODUCTION

Information is essential for making consumption and investment decisions related to property. For example, people want a comfortable, safe, and hygienic place to live. However, these aspects are not always revealed during pre-transaction property inspections. Some of the information is technical in nature and homebuyers may not fully understand the implications of certain building design and management features. In some cases, the cost of obtaining the information for purposes of comparison is too high. The aim of building performance assessment is to provide a path to channel the information to all interested parties. These assessments would be helpful towards revealing the quality of a building and facilitating the screening process in the pre-transaction stage.

At present, there are several building performance assessment schemes that have been developed based on Hong Kong's unique situation, and are now available for use locally. However, these schemes are often portrayed as rival approaches, and the emphasis tends to be placed on their differences rather than similarities. Against this background, there is a continuing need for comparative research that seeks to clarify interrelationships between alternative methods, thus helping practitioners choose the most suitable assessment scheme for addressing specific aspects. Indeed, we believe that this comparative study contributes significantly to the important goal of improving decision making for users, investors, and property and facility managers.

[12345]*Department of Real Estate and Construction*
The University of Hong Kong,
Pokfulam Road, Hong Kong
Tel No.: 2859 2146
Fax No.: 2559 9457
E-mail: danielho@hku.hk

AN OVERVIEW OF BUILDING PERFORMANCE ASSESSMENT SCHEMES IN HONG KONG

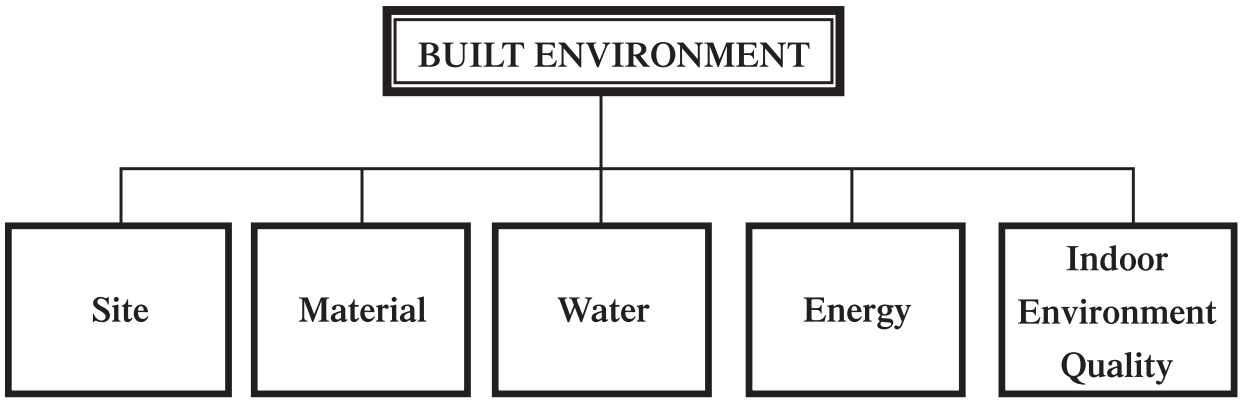
There have been several building performance assessment schemes developed or proposed for use in the local context. These schemes include the Hong Kong Building Environment Assessment Method (HK-BEAM), the Intelligent Building Index (IBI), the Building Quality Index (BQI), and the currently proposed Comprehensive Environmental Performance Assessment Scheme (CEPAS). An overview of these schemes is given below.

The Hong Kong Building Environment Assessment Method (HK-BEAM)

The HK-BEAM scheme was developed in 1996 by the Centre for Environmental Technology Limited (HK-BEAM Society, 2004a; 2004b), and is now owned and operated by the HK-BEAM Society. The approach and documentation in the HK-BEAM was initially an adaptation of the Building Research Establishment Environmental Assessment Method (BREEAM), which originated in the U.K.[1] The scheme was then updated and reviewed, the latest version of which was issued in December 2004.

The structure of the HK-BEAM is organized around 'inputs', as represented in Figure 1. The inputs are categorized into five performance aspects, namely *site, materials, energy, water*, and *indoor environment quality* (HK-BEAM Society, 2004a; 2004b). Under each category, there is a list of specified factors that would affect the quality of the respective input. For example, the efficient use of materials, sensible material selection, and waste minimization can contribute to better performance in the material input of the built environment.

Figure 1 The structure of the HK-BEAM



[1] *The BREEAM was developed by the Building Research Establishment in the U.K (Baldwin, et al., 1998). There are other building assessment schemes focusing on environmental issues available overseas, such as the Leadership in Energy and Environmental Design in the U.S. (US Green Building Council, 2001), Green Building Tool in Canada (Cole and Larsson, 2002), and the Comprehensive Assessment System for Building Environment Efficiency in Japan (Murakami, et al., 2004).*

The Intelligent Building Index (IBI)

The IBI was developed by the Asian Institute of Intelligent Buildings (AIIB) in 2001 to assess building intelligence (Asian Institute of Intelligent Buildings, 2005; Wong, *et al.*, 2001). At that time, it measured building performance in terms of nine quality environment modules, including *environmental friendliness, human comfort,* and *safety and security* measures (So and Wong, 2002). After the outbreak of Severe Acute Respiratory Syndrome (SARS) in 2003, an additional *health and sanitation* module was added to enhance the original framework. The IBI is essentially a design tool providing guidance to designers as to what constitutes an intelligent building, and acts as a platform for assessing an intelligent building objectively (So and Wong, 2002).

The Building Quality Index (BQI)

The outbreak of SARS in early 2003 and frequent fatal building-related accidents have highlighted concerns over the possible dire consequences of building neglect. In order to promote proper building maintenance and management of buildings through the use of market forces, the Faculty of Architecture of the University of Hong Kong developed a BQI to distinguish those poorly performed buildings from the good ones (Ho, *et al.*, 2004). At present, the BQI comprises two indices, namely the Building Health and Hygiene Index (BHHI) and the Building Safety and Conditions Index (BSCI). With assistance offered by local professional bodies and tertiary institutions, the Faculty developed the BHHI and BSCI assessment frameworks and carried out pilot schemes for a sample of multi-storey private residential buildings in Hong Kong during the summers of 2003 and 2004.

The hierarchy of the BHHI is presented in Figure 2. At the top is the objective (i.e., a healthy built environment). It is then divided into *Design* and *Management* on the second level. The *Design* aspect of a building represents the 'hardware' of a building, which is usually hard to change technically or economically once a building is put into use (Ho, *et al.*, 2004). On the other hand, the *Management* aspect of a building represents the 'software', which is dynamic and relatively easy to change even after a building is occupied. The classification of building factors into *Design* and *Management* has the advantage of dividing the factors into groups that are within and beyond the control of the owners. This helps owners identify the possible actions that could be taken to improve the health and hygiene standards of their buildings. The assessment scheme was designed after an intensive workshop was conducted with expert representatives from key professional bodies and other universities. The framework for the BSCI is very similar to that of the BHHI, except for its focus on building-associated risks and condition problems (Ho and Yau, 2004). The assessment framework of the BSCI is again classified into intrinsic *Design* and controllable *Management* aspects, as shown in Figure 3.

The Comprehensive Environmental Performance Assessment Scheme for Buildings (CEPAS)

In light of increasing public awareness of our deteriorating natural and built environment, the CEPAS was proposed as a standard yardstick for determining the environmental performance of buildings in Hong Kong (Hui, 2004). As a green building labelling scheme initiated under the 2001 Government Policy Objectives, the CEPAS endeavours to address both physical and human-related issues amongst the core aspects of sustainability. While placing much emphasis on traditional environmental performances, such as energy, indoor air quality, and the maintenance of building services installations, the CEPAS also considers other social-economic factors, such as impacts on surroundings,communal interactions, building economics, transportation, heritage conservation, etc.

Eight performance categories were identified for the CEPAS, which are *Indoor Environmental Quality (IEQ), Building Amenities, Resources Use,*

Hong Kong Surveyor Vol 16(1), 47-58 June 2005 ISSN 1812-3953

Figure 2 Hierarchy of the BHHI

Source: Ho, et al., 2004

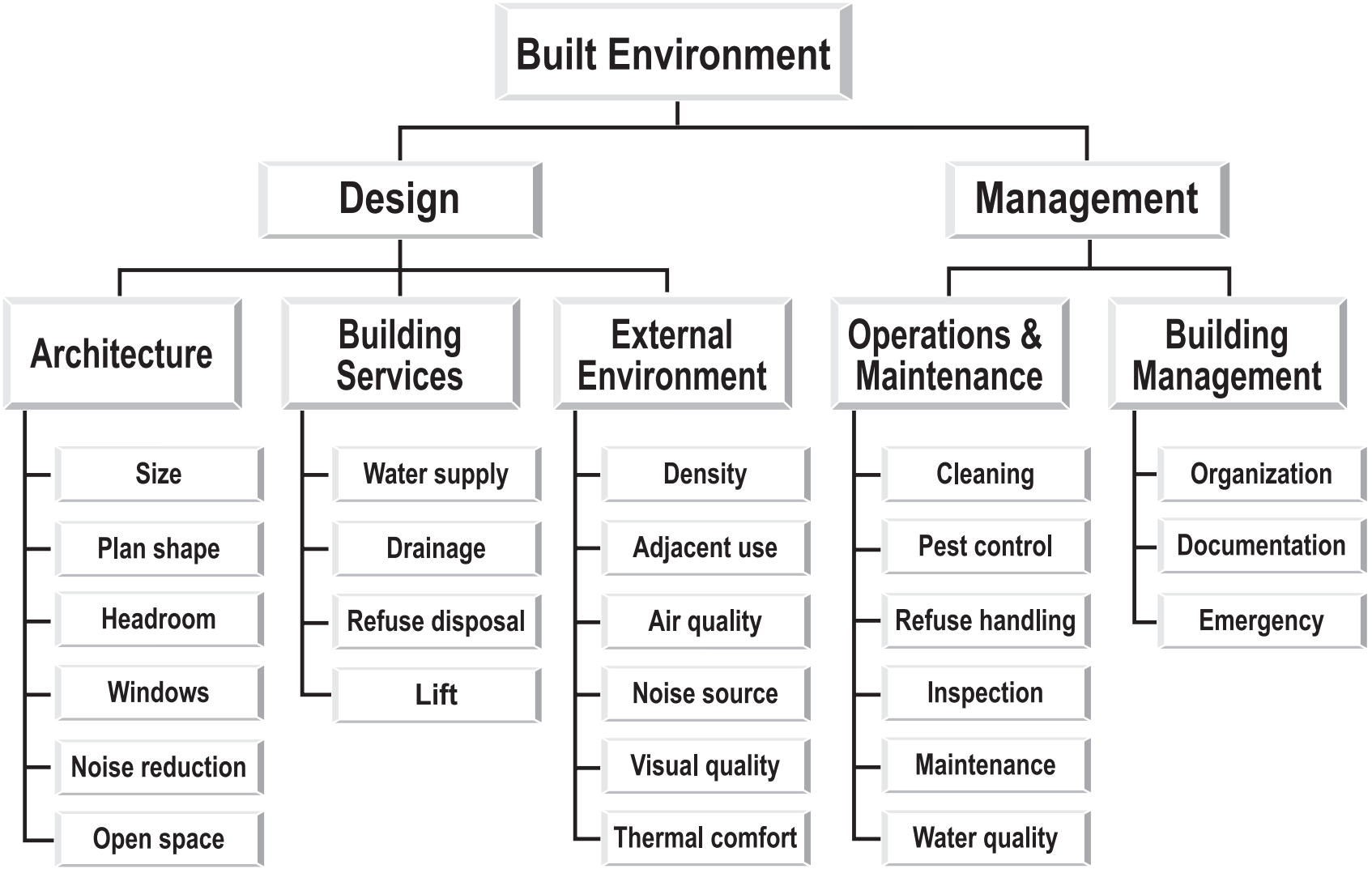
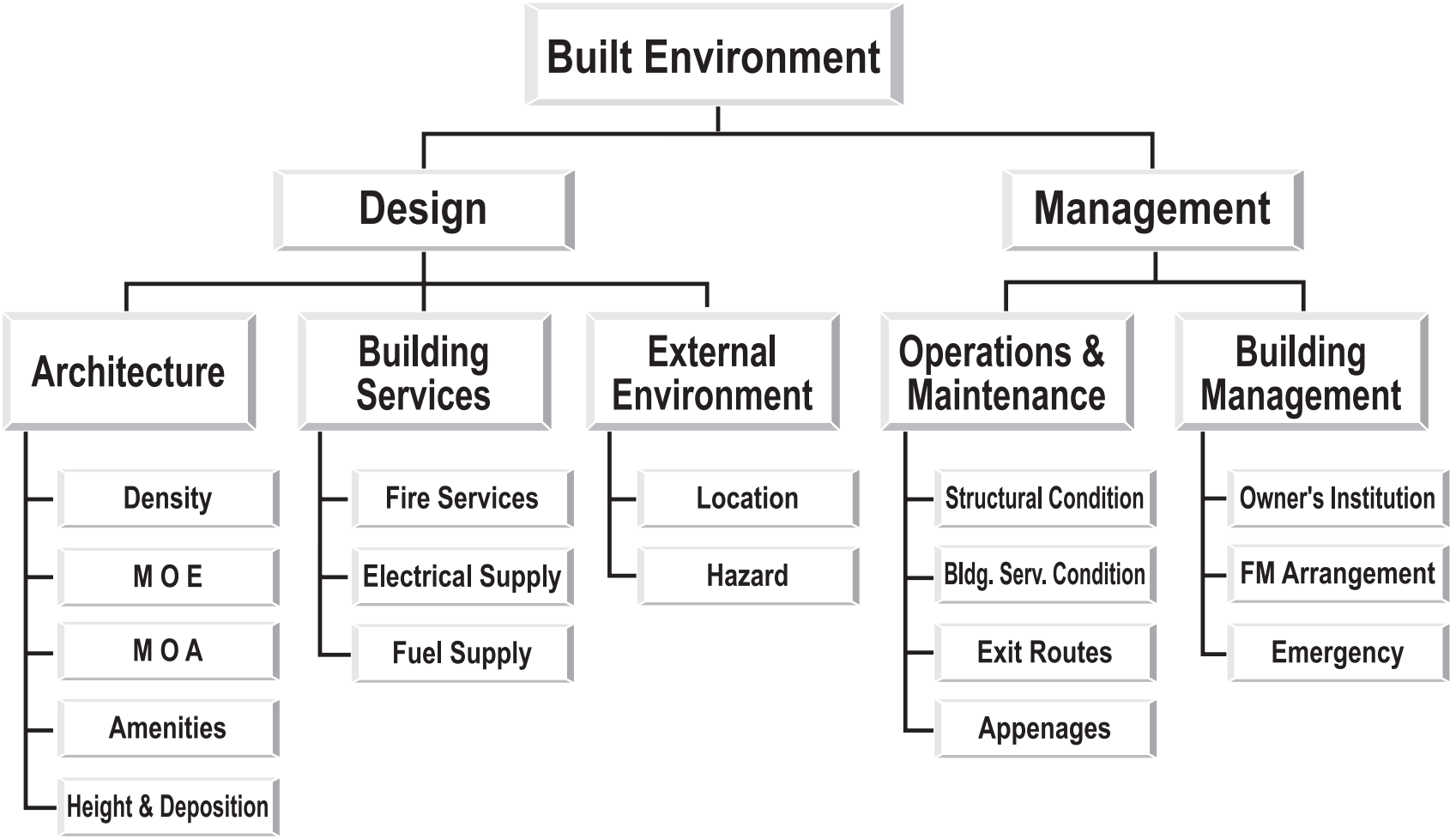


Figure 3 Hierarchy of the BSCI

Source: Ho and Yau, 2004



Hong Kong Surveyor Vol 16(1), 47-58 June 2005 ISSN 1812-3953

Loadings, Site Amenities, Neighbourhood Amenities, Site Impacts, and Neighbourhood Impacts. Also, the major sustainability considerations at the building level were incorporated (Hui, 2004). The *IEQ, Building Amenities, Site Amenities*, and *Neighborhood Amenities* are mainly human-related factors, while the remaining categories are mainly physical factors. The relationship among these categories is illustrated in Figure 4.

COMPARISON OF DIFFERENT SCHEMES

As the objectives of these building performance assessment schemes diverge, they have different features to suit their purposes. In the following section, the four schemes reviewed above are compared and their similarities and differences are discussed. The comparison carried out is based on the nature, purpose, and scope of assessment, targeted building groups, stages of building life-cycle involved, assessment objectivity, performance rating, factor weighting, and the presentation of a final rating. A summary of the comparison is given in Table 1.

Figure 4 Matrix of Performance Criteria for the CEPAS
Source: Hui, 2004

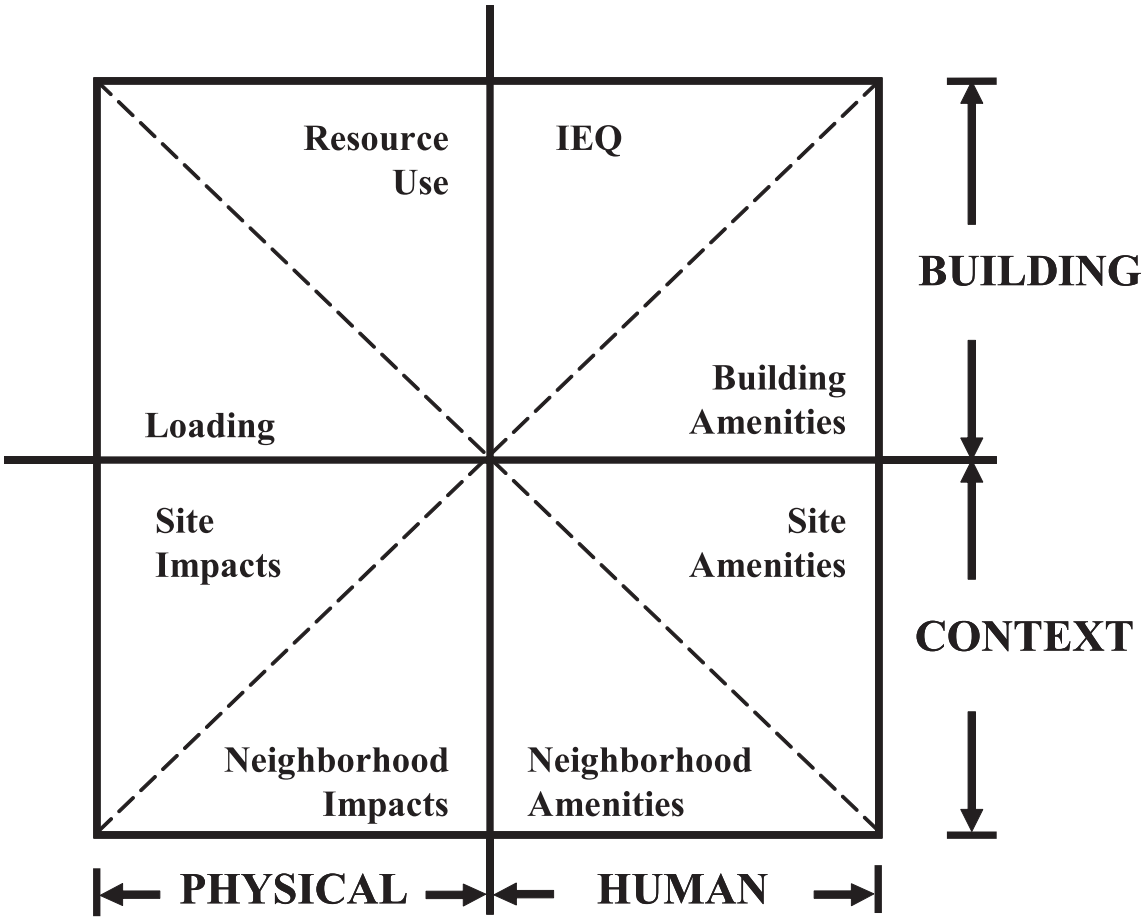


Table 1 Comparison of the features of different schemes

		HK-BEAM	IBI	BQI	CEPAS
Nature of Assessment	Voluntary	●	●	●	●
	Mandatory				
Purpose of Assessment	Building labelling	●			●
	Building rating		●	●	
Target Building Groups	Residential buildings	●	●	●	●
	Non-residential buildings	●	●		●
	New buildings	●	●	●	●
	Existing buildings	●		●	●
Scope of Assessment	Health and hygiene	⬤	●	●	⬤
	Safety	⬤	●	●	⬤
	Green issues	●	●		●
	Comfort	⬤	●		⬤
	Information technology	⬤	●		
Stages of Building Life-cycle Influenced	Planning	●			●
	Design	●	●	●	●
	Construction	●	●		●
	Operation	●		●	●
	Demolition	●			●
Assessment Objectivity	Objective judgement	●	●	●	●
	Subjective judgement	⬤	●	●	⬤
Nature of Factors	Prescriptive-based	●	●	●	●
	Performance-based	●	●	●	●
Rating Scale	Dichotomous scale	●	●	●	●
	Linear scale		●	●	
	Non-linear scale	●	●		●
Weighting of Factors	Equal weights	●			
	Preset different weights		●		
	Weighted by expert panel			●	●

Key: ⬤ = Applicable; ● = Marginally applicable

Nature and Purpose of Assessment

All four schemes are not mandatory in nature. While all of them are for benchmarking building performance in various aspects, they serve different purposes. The IBI and BQI are building rating systems, while the HK-BEAM and CEPAS are building labelling systems.[2] Moreover, unlike the other building performance assessment schemes, which aim for an in-depth assessment of building performance, the BQI aims to provide a low cost, objective, quick, and yet balanced assessment of building attributes on the health and safety of occupants. It is designed to cover as many buildings as possible with limited resources and within the shortest possible time.

Target Building Groups

The HK-BEAM and CEPAS cover all building types in Hong Kong, be they new or old. However, for both the HK-BEAM and CEPAS, only single-ownership buildings are eligible for assessment. Although the coverage of the IBI with respect to building types is as wide as that of the HK-BEAM and CEPAS, most of the parameters measured under the IBI cater to new developments only. It is noted that the objective of the IBI is to provide a design tool to give guidance to designers as to what constitutes an intelligent building. In contrast, the BQI is intended to classify the living environment of most people in Hong Kong regarding health and safety conditions. The BQI is tailored to multi-storey residential buildings with multiple dwelling units and co-owned common areas.

Scope of Assessment

Among the four schemes, the coverage of the IBI is the widest in terms of scope of assessment. It evenhandedly covers health and hygiene, safety, energy efficiency, comfort, and high-technology aspects. The HK-BEAM and CEPAS place their emphases on the first three and four aspects, respectively. The scope of the BQI is the most focused among others, assessing only health and safety issues.

Stages of the Building Life-cycle Assessed

As the HK-BEAM and CEPAS seek to measure and label the performance of buildings over the whole life cycle, the assessment spans from the planning stage, through the design, construction, commissioning, operation, maintenance, and management stages, and finally to deconstruction. In the BQI framework, assessment factors capture some important aspects affecting the design, as well as day-to-day maintenance and operations during the occupancy phase of a building. Thus, it has an influential impact on a project during its design and operation stages. As aforementioned, the IBI serves as a design tool, and its impact is confined to the design stage of a project. However, since there is a *Construction Process* and *Structure* module in the IBI assessment framework, the use of the scheme could be extended to the construction stage.

Objectivity of Assessment and the Nature of Assessment Factors

Objective criteria for assessment were emphasized in all the schemes under study. This provides a common platform on which assessment can be made easier and more straightforward, eliminating possible subjective judgement due to different assessors. For example, in the IBI, the ratio of life-cycle cost to rent is an objective judgement.

Objective criteria are commonly used in all schemes. Assessors' subjective judgement is also needed in both the IBI and BQI to rate the performance of certain aspects of a building during inspection. The major problem of incorporating subjective judgement is the inconsistency. In the BQI, inconsistency is reduced

[2] *According to the definitions provided by Larsson (2004), these two systems involve an assessment protocol for compiling an overall building performance score. The only difference lies in the fact that more elements, like the implementation of the protocol at the industry level by means of trained assessors, a training program for assessors, and a marketing program to publicize the system to the industry, are included in a building labelling system.*

by providing a "scoring manual" to assessors, in which scores could be assigned to a set of descriptions illustrated with photos. This helps an assessor rate the conditions of a building in a more consistent manner. As for the CEPAS and HK-BEAM, the use of subjective judgement is very limited. The only exception to the CEPAS and HK-BEAM is the assessment of innovative design, which can bring bonus points to certain assessment factor categories.

Another feature that distinguishes schemes from each other is the use of prescriptive, or performance-based, assessment factors. Factors that are prescriptive in nature dictate how and what should be assessed rather than only specifying the objective to be achieved. For instance, to minimize energy loss in a building, we can assess the overall thermal transfer value of the building (performance assessment) or check if a particular type of heat-insulated material has been used (prescriptive assessment). Both types of assessment factor are common to all the schemes studied.

Performance Rating

The purpose of a rating system is to convert the raw data into a score so that we know about the building performance for a particular area or how many credits should be given to the building factor being assessed. This is vital to all building assessment and labeling schemes. Dichotomous scale is common to all four schemes. In this scale, the building factors are rated basically in dichotomous yes-or-no answers. The benefit of such a rating scheme is a reduction of the time used for the assessment and a minimization of the degree of subjectivity in the assessment process.

In the IBI, HK-BEAM, and CEPAS, ratings for most factors are not scalar. A building either satisfies the requirement to receive credit or it fails to do so. The building will be awarded credit even if other criteria are substantially below par. The implication is that an *excellent* graded building can have several items that are substantially below average.

On the other hand, most factors in the BQI and a few factors in the IBI are rated on linear scales.[3] The use of linear scales can avoid the distortion of information during the scaling or transformation process. By and large, the use of linear scales allows for a finer differentiation of performance grading, and can provide a more complete picture of performance. In establishing the scales, industry norms or relevant statutory provisions are taken as reference points. In some circumstances, more than two discrete categories have to be allowed to give a finer differentiation to building performance. In the BQI, a five-point scale has been adopted – poor, below average, average, above average, and good. Such a scale helps ease subjective judgments on both quantitative and qualitative selection criteria, and it works well even for inexperienced assessors (Schniederjans, *et al.*, 1995 and Baird, *et al.*, 1996).

Weighting of Factors

Weightings represent the relative importance of a building factor towards the overall goal of the assessment. They affect the degree of influence by each building factor on the overall result. The factor weightings of the HK-BEAM are varied and inherent. Or put it another way, the weightings are determined by the maximum credits attainable for these factors (Todd, *et al.*, 2001). The weightings can be changed by adding or dropping factors under the assessment scheme or adjusting the credits allocated to the factor. Similarly, the relative importance of each factor with respect to the objective of each category is determined inherently in the IBI. In particular, however, different sets of predetermined weights for the ten quality environment modules are designated to buildings of different uses in the IBI. For instance, "life cycle costing" is weighted as 1 in residential buildings, but 5 in educational institutions; "image of high technology" is

[3] *In a linear scale, the score of the factor is calculated based on a linear projection from a predetermined reference point. For example, the raw rates, ranging from X_1 to X_{10}, can be transformed to a continuous linear scale ranging from 1 to 10, or mathematically, $[X_1 , X_{10}] \rightarrow (1,10)$.*

weighted as 3 in residential buildings, but 6.5 in commercial (office) buildings. Therefore, by changing the weightings, the IBI can be configured to assess different building types.

While both the HK-BEAM Society and Asian Institute of Intelligent Buildings have not mentioned how their factor weightings are determined, the BQI and CEPAS obtain the weightings from a group of external experts with different backgrounds. The experts' options are elicited because there is a general lack of objective empirical scientific evidence[4] for determining the relative importance of the effect of some aspects of a building on its occupants and the environment. In the CEPAS, each factor category is allocated with a predetermined weighting, which directly influences the cumulative performance scores. These weighting factors were developed from a consultation forum, held in July 2003, which solicited opinions from local building professionals, building user groups, and green groups on the relative importance of building performance issues.

In arriving at the final set of weightings in the CEPAS, the experts were asked to assign absolute weightings for each factor. Nonetheless, it was difficult, if not impossible, for the experts to provide a consistent weighting for each factor once the number of factors to be considered is large. Saaty (1980) stated that the intuitive and cognitive capacities of human beings restrict the maximum number of factors to be considered simultaneously in order to achieve a consistent result. In this regard, the weighting of each factor in the BQI is pre-determined by expert panels[5] using the Analytic Hierarchy Process (AHP), which was developed by Saaty (1980). The use of the AHP allows for more consistent and reliable results regarding the relative importance of the factors. This increases the public's acceptance of the results.

Assessment Procedures

The HK-BEAM requires building owners to assume the initiative to approach HK-BEAM assessors with their selected buildings for evaluation. Owners provide detailed information, at their own cost, for assessors to complete the checklist. Assessments rely on the accuracy of information supplied by owners. Assessors validate the data and appraise the project using HK-BEAM criteria. A Provisional Assessment Report is then produced listing those credits that have been achieved and potential performance areas that can be improved. Owners can take assessors' proposals and pursue further credits before submitting their buildings for final assessment. The validity of certification lasts for five years. The assessment and certification processes of the CEPAS are more or less the same as those of the HK-BEAM. The validity of assessment results for the operational stage of existing buildings in the CEPAS also lasts for five years.

As the aim of the BQI is to give a general appraisal of all residential buildings in Hong Kong, this cannot be achieved by solely relying on voluntary participation from building owners. Owners' input is viewed as necessary, but should not be the only input in the assessment procedure. Instead, most of the information is obtained from publicly available sources. For example, building design is assessed by gathering information from approved building plans kept by the Buildings Department.[6] In order to reveal actual conditions, a building survey will also be carried out. Inspection will be confined to common areas of the building so that it will not be necessary to seek consent from every individual owner. An appraisal of the performance of the building

[4] One example of obtaining weighting through scientific research is the calculation of the total energy embodied in the building material used.

[5] Several workshops were carried out between 2003 and 2005 to collect views from experts on the relative importance of different building factors to the health and safety performance of residential buildings.

[6] Acknowledgement has been made to the Buildings Department for facilitating the retrieval and copying of plans for the BQI Pilot Scheme conducted in 2003 and 2004.

management agent is also required, but it is limited to the information related to normal building operations such as incident records, as-built drawing, and post-occupancy surveys. Therefore, the costs to be borne by owners are trifling.

Applicants for a building performance assessment sometimes may disagree with the assessment results. Therefore, an appeal mechanism becomes essential to address the grievances of these applicants. Among the schemes, appeal processes are provided in the HK-BEAM, and have been proposed for the BQI and CEPAS. On the other hand, there are no explicit assessment, certification, and appeal procedures for the IBI.

APPLICATION OF THE SCHEMES

Every nation or city has its unique environmental, ecological, social, cultural, economical, and technological conditions. Given the importance of a building performance assessment scheme to a society, it is necessary to devise an assessment scheme that is pertinent to its specific purposes (e.g. sustainability and the health and safety of the built environment) and specifically adapted to deal with local conditions.

The IBI, HK-BEAM, and CEPAS consider a wide variety of factors, which are put into different categories. Yet, their comprehensiveness comes with high implementation costs. Therefore, it is more suitable as a design guide for developers and designers. The relatively low-cost and simple assessment procedures of the BQI make it the most advantageous for large-scale first 'screening' of building performance in health and safety aspects. The government or organizations managing a large portfolio of properties can make use of the BQI to classify multi-storey residential buildings according to their health and safety conditions. As for the HK-BEAM and CEPAS, they cover more or less the same factors with specific concentrations on green building issues, and their assessment methods are similar. They are apt for labelling buildings that excel in environmentally friendly performance. Unlike the other three schemes, the IBI takes a balanced view of different categories of building factors, and hence does not have a sharp focus. Therefore, the IBI best serves as a set of design guides for high-quality buildings in terms of various aspects.

The study revealed that the objectives, target groups, assessment procedures, and resources required differ among the four schemes. The comparison suggests that these schemes do not necessarily compete with, but rather complement, each other, with each scheme serving different purposes.

The authors wish to acknowledge the support of Small Project Funding of the University of Hong Kong and CERG HKU 7107/04E.

REFERENCES

Asian Institute of Intelligent Buildings (2005), I*ntelligent Building Index (IBI),* available at http://www.aiib.net/ibi-index.htm (accessed on 4 May 2005).

Baird G.; Gray J.; Isaacs N.; Kernohan D. and McIndoe G. (1996) *Building Evaluation Techniques,* McGraw-Hill, New York.

Baldwin R., Yates A., Howard N. and Rao S. (1998), *BREEAM 98* for *Offices: An Environmental Assessment Method for Office Buildings*, Building Research Establishment, Garston, Watford.

Cole R.J. and Larsson N. (2002), *GBTool (Green Building Tool) User Manual,* Green Building Challenge, Vancouver.

HK-BEAM Society (2004a), *Hong Kong Building Environmental Assessment Method - New Buildings,* HK-BEAM Society, Hong Kong.

HK-BEAM Society (2004b), *Hong Kong Building Environmental Assessment Method - Existing Buildings,* HK-BEAM Society, Hong Kong.

Ho D.C.W., Leung H.F., Wong S.K., Cheung A. K.C., Lau S.S.Y., Wong W.S., Lung D.P.Y. and Chau K.W. (2004), Assessing the Health and Hygiene Performance of Apartment Buildings, *Facilities*, 23:3/4, 58-69.

Ho D.C.W. and Yau Y. (2004), Building Safety

& Condition Index: Benchmarking Tool for Maintenance Managers, *Proceedings of the CIB W70 Facilities Management and Maintenance Symposium 2004* held on 7 & 8 December 2004 in Hong Kong, pp.149-155.

Hui M.F. (2004) Comprehensive, Environmental Performance Assessment Scheme, *Proceedings of Symposium on Green Building Labelling* held on 19 March 2004 in Hong Kong, pp.54-60.

Larsson N. (2004), An Overview of Green Building Rating and Labelling Systems, *Proceedings of Symposium on Green Building Labelling* held on 19 March 2004 in Hong Kong, pp.15-21.

Murakami S., Ikaga T. and Endo J. (2004), CASBEE: New Labelling System Based on Environmental Efficiency & Designed to Fit All Lifecycle Stages, *Proceedings of Symposium on Green Building Labelling* held on 19 March 2004 in Hong Kong, pp.24-33.

Saaty T.L. (1980), *The Analytic Hierarchy Process,* McGraw-Hill, New York, NY.

Schniederjans M.J., Hoffman J.J. and Sirmans G. S. (1995), Using Goal Programming and the Analytic Hierarchy Process in House Selection, *Journal of Real Estate Finance and Economics*, 11, 167-176.

So A.T.P. and Wong K.C. (2002), On the quantitative assessment of intelligent buildings, *Facilities*, 20:5/6, 208-216.

Todd J.A., Crawley D., Geissler S. and Lindsey G. (2001), Comparative assessment of environmental performance tools and the role of the Green Building Challenge, *Building Research & Information*, 29:5, 324-335.

US Green Building Council (2001), *Leadership in Energy and Environmental Design (LEED) Environmental Building Rating System, Version 2.0*, US Green Building Council, Washington, D.C.

Wong K.C., So A.T.P. and Leung A.Y.T. (2001), *The Intelligent Building Index: IBI manual, Version 2.0*, Asian Institute of Intelligent Buildings, Hong Kong.

Hong Kong Surveyor Vol 16(1), 59-70 June 2005 ISSN 1812-3953

中国国有建筑企业的文化特徵

张水波[1] 廖美薇[2]

摘要

过去十年中，中国经济的飞速增长给中国建筑业带来巨大的发展机遇，然而与此同时，建筑业在迅速发展变化的经济环境中也面临著诸多挑战和不确定性。中国建筑业发展至今，因其行业整体表现欠佳以及在质量和收益率上的低效而被广泛批评。研究表明企业文化和工作表现之间存在紧密联系，本文在此基础上提出了一个企业文化－企业绩效模型，用于研究中国国有建筑企业。企业文化与企业绩效的关系 (即 C-E 关系，Culture-Effectiveness) 研究已经在组织研究领域中引起了广泛关注，但是在这种关系的存在性以及关系强度的研究上仍然存在较多未解决问题 。本文提出了一个用于研究中国建筑承包公司 C-E (Culture-Effectiveness) 关系的模型，并给出对中国建筑业企业文化特徵进行聚类分析的结果。

关键字

企业文化、企业绩效、中国承包商、国有企业

概述

过去十年中中国经济得到了高速增长，并给中国建筑业带来了巨大的发展机遇。1999 年全国固定资产投资达到 29880 亿元人民币，而在 1980 年这个数位仅为 910 亿元人民币 (国家统计局，2002a, b) 。然而与此同时，建筑业因为其行业表现欠佳以及在质量和收益率上的低效而受到广泛批评 (Yao, 1998 ， Sha & Lin, 2001)。因此研究如何提高中国承包商企业的企业绩效就成为一个十分重要的研究课题，而在这个课题中关于企业文化和企业绩效关系的研究更是研究的重点。

一些研究者认为，现实中存在大量承包商企业无法直接控制的影响承包商企业绩效的外部环境因素和专案因素。但是，只有那些企业自身能够控制并体现企业如何应对外部环境变化的特性才是决定企业绩效稳定性和企业最终生存的关键因素 (Adas, 1996)。一些学者指出，企业管理自身的能力和企业应对外部环境变化的能力都来自于企业文化。相关研究中的一些早期研究认为企业文化是无形的，而现在则认为它能够直接影响企业的竞争力、发展和最终生存 (Hu, 2001)。

企业文化与企业绩效：研究回顾

在过去二十年里学术界已经逐渐认识到：虽然表面上企业就其组织结构来说互相类似，但在企业表现和企业绩效方面差异很大。这种现象说明在企业中存在一种无形力量，这种力量能够渗透到企业生活中，并影响企业运作的方方

[1] 中国天津大学管理学院
[2]Dr. Anita M M Liu,
Dept. of Real Estate and Construction,
The University of Hong Kong,
Pokfulam,
Hong Kong.
Tel: (852) 25492319
Fax: (852) 25599457
Email: ammliu@hkucc.hku.hk

面面。对企业文化的研究最初就来源于相关研究领域学者和企业管理者的这种认识。他们认为：如果我们能够更好的理解企业的模糊性和不确定性，那么我们就能通过调整企业的组织结构来极大的提高企业的表现和绩效 (Brown, 1998)。正如 Schein (1985：1）所指出的："企业文化这个概念也许能为组织研究这一复杂研究领域带来希望"。因此自从 20 世纪 80 年代早期起，对企业文化的研究在管理和组织相关研究领域中占据了突出地位。

研究企业文化的目的是多方面的，其主要目的则是研究企业文化通过作用于企业工作过程以影响企业绩效 (企业绩效是在讨论企业全局层次时最重要的变数之一) 的机制。这种企业文化－企业绩效的关系研究，大致可以分为以下几个阶段 (Vesson, 1993, Wilderom, Glunk & Maslowski, 2000)。

萌芽阶段

在组织研究领域中，企业文化－企业绩效的关系研究是随著上个世纪前半叶人际关系学派的建立而发展起来的，其中 Hawthorne 研究 (霍桑实验) 是该领域研究的先锋。虽然没有明确将企业文化作为研究课题，该研究却隐性指出了团队文化影响生产过程的机制。Jaques (1951, 1965) 将人们习惯和传统的思维、做事方法与员工的工作行为联系在一起。虽然他并没有对这种"人们思维、做事的方法"的影响效果进行直接研究，但是他的发现却表明：如果企业文化与其企业结构、外部环境不一致，那么企业文化将成为企业生产效率的严重阻碍。Pfiffner & Sherwood (1960) 曾经提出企业文化与企业绩效之间存在某种关系，但是他们没有对这种关系的性质进行进一步研究。Silverzweig & Allen (1976) 是最早明确研究企业文化对企业绩效影响的学者。他们的 8 个案例研究包括了不同的企业，这些企业在不同程度上都有亏损，并有提高工作绩效的意愿。研究发现其中六个企业在对企业文化进行调整后从根本上提高了工作绩效。根据这项研究结果，他们提出企业文化与企业绩效之间存在密切的实质联系。

发展阶段

上世纪 70 年代末，相关研究发展到对企业文化－企业绩效关系进行明确研究的阶段，其目的是通过这种研究来解释这一时期日本企业取得巨大成功的奥秘。Ouchi 是这一研究领域的杰出学者之一，他 (Ouchi & Jaeger, 1978，Ouchi & Johnson, 1978) 通过论证强调：企业的人文价值观对企业的经济表现有所贡献。这个发现使人们开始关注员工承诺和员工价值观一致性对企业成功的重要性；这些人文价值观包括对员工的关心、求同决策等，而这些价值观通常是日本企业的特徵。基于对超过 30 家日本公司与美国公司的调查，Pascale & Athos (1981) 通过论证"关注员工技能、行为风格和员工目标将带来高效的工作表现"而提出了一个近似的观点：日本企业的高效生产率归因于他们对人际关系的重视。Peters & Waterman (1982) 指出企业文化的强大与否是成功企业与不尽成功企业之间差异的根源，他通过论证研究指出：企业管理者只有从采用机械和理性的管理方法转变成为采用灵活和人性化的管理方法才能够实现企业的卓越表现。同年，Deal & Kennedy (1982) 也提出一个相似的观点：强大的企业文化既能够很好的与环境相适应，也能够适应环境的改变，从而提高企业表现。相关研究在这一时期的特点是："企业文化与企业绩效之间存在关系"这一观点获得了较为普遍的认同，但缺乏实质性的实证分析证据。

实证检验阶段

由于有关"企业文化－企业绩效存在关系"的观点被一些学者质疑 (Carroll, 1983, Hitt & Ireland, 1987)，甚至举出相矛盾的研究发现，所以从上世纪 80 年代开始至今，一些学者进行了大规模的实证研究以检验上述观点的正确性，进而探索和揭示企业中的文化现象。

其中主要相关研究者有：Barley，Meyer & Gash (1988)，Cooke & Rousseau (1988)，Dennison (1990)，Rousseau (1990)，Calori & Sarnin (1991)，Gordon & DiTamaso (1992)，Kotter & Heskett (1992)，Marcoulides & Heck (1993)，Petty et al (1995)，Dennison & Mishra (1995)，Wilderom & Van den Berg (1998)，以及 Sawner (2000)。这些研究的研究结果之间虽然在某种程度上存在差异，但都表明企业文化与企业绩效之间存在关系。但是，由于这些研究大部分都仅仅使用了检验相关关系的统计方法，因此这些研究并不能够确定关系的方向。尽管如此，这些研究所证实的企业文化和企业绩效之间的显著相关关系表明它们之间可能存在著一般因果关系，而这种因果关系需要进一步分析研究 (Wilderom, Glunk & Maslowski, 2000)。

在广义管理研究领域对企业文化研究越来越重视的同时，建设管理研究中关于企业文化的研究也越来越多。Maloney & Federle (1991, 1993) 引入了一个“竞争价值理论框架”(Competing Value Framework)，以作为他们分析研究美国建筑业企业文化的理论基础。Gale (1992) 认为文化是减少建设专案冲突的手段。Seymour & Rooke (1995) 提出了他们对建筑业文化以及相关学术研究文化的观点。Rowlinson & Root (1992) 提出文化对建设专案管理能够产生影响。Hall & Jaggar (1997) 肴意到国际工程项目中文化差异对专案进度能产生重要影响。Liu & Fellows (1999a,b) 特别提出了专案采购中的文化问题以及研究了文化对工程项目目标的影响。Liu (1999) 研究了文化变数的维度、强度与房地产业专业人员工作满意度之间的关系。

目前，关于企业文化研究的研究成果之间并不是十分一致，甚至有的彼此矛盾。出现这种现象是因为“企业文化”与“企业绩效”这两个概念本身十分复杂，并且内涵和外延十分广泛，同时在研究 C–E (Culture-Effectiveness，文化－绩效) 关系问题上也没有一个综合全面的理论框架作为基础。

文化 - 绩效 (C-E, CULTURE-EFFECTIVENESS) 关系理论框架

行为学派

企业文化研究多数强调处于企业生活中心地位的企业价值观和理念的重要性。但是，研究企业文化和企业绩效关系的一个重要问题是如何才能建立能够解释该假设关系的理论基础 (Wilderom, Glunk & Maslowski，2000)。在企业文化和企业绩效关系的研究中，多数理论都将企业的成功归因于企业价值、理念和实践。这些观点暗示了企业绩效是企业文化的应变数(即企业文化是引数，企业绩效是因变数)这样一个理论框架。

虽然这一理论框架说明了企业全局层次的两个变数——企业文化和企业绩效之间存在联系，但这一框架仍然比较肤浅，因为它并没有揭示企业文化影响企业绩效的过程机制，忽视了这个“能动过程”，而这个过程就如同“黑盒子”一般未被研究清楚。为了证实企业文化和企业绩效之间的假定关系，就需要深入探讨企业文化对组织行为的影响机制。

组织行为学的传统理论之一是 S-O-R (Stimulus-Organism-Response) 理论 (Naylor, Prichard, and Ilgen, 1980)，Liu & Walker (1998) 采用该理论对工程项目采购过程进行建模，提出了该过程的 B-P-O (Behavior-Performance-Outcome) 回圈理论。若将企业文化视为被企业成员共用的“思想软体”(Hofstede, 1991)，则企业文化会影响企业成员的认知、感知过程，引导他们的行为，整合企业内部流程以保证企业的生存和对环境的适应 (Parsons, 1951, Schein, 1985, Cooke & Rousseau, 1988, Denision, 1990, Denision and Mishra, 1995, Cameron and Quinn, 1999)。因此，我们可以将企业文化认为是企业员工行为的“原动力”。

认知图示理论

在对认知理论相关研究进行详细总结的基础上，Markus & Zajonc (1985) 提出认知图示理论是对认知机制进行解释的最适用且最深入的理论。对于认知图示，Marshall (1995：39) 给出的定义可能是最全面的：“认知图式是一种记忆工具，这种记忆工具使得个体能够以系统的方式综合整理个体经验：即个体能认知与已获经验相类似的新经验；能区分不同的经验；能形成对相类似经验共性关键因素框架的判断和评估 (这些关键因素包括口头和非口头两种类型)；能做出推论和估计，建立目标，并能按照上述框架制定计划；当遇到与该框架相关的问题时，能采用所需的技能、流程及规则”。上述定义中，认知图示就像一种“心理地图”，它不仅使得个体能驾驭其自有的经验对过去和现在进行合理解释，而且能够对将来进行合理期望 (Harris, 1996)。Taylor & Crocker (1981) 对认知图示的功能进行了最全面的总结，如下：

- 提供认知经验的基础；
- 对记忆资讯的编码和处理进行指导；
- 影响资讯处理的效率和速度；
- 指导填补现有资讯的缺陷；
- 提供解决问题的模式和范例；
- 协助对经验进行评价；
- 协助预测未来、建立目标、制定计划和执行目标。

认知图示是动态的，当它包含的资讯越来越多时，认知图式会趋向复杂 (Lord & Foit, 1986, Bartunek & Moch, 1987, Fiske & Taylar 1991, Harris, 1996)。通过研究认知图示理论，我们就能深入理解企业文化对个体组织体验的影响机制。Rumelhart (1984) 认为任何外在因素的相关经验都可以通过认知图式表示，因此每个人可以拥有多个认知图式。Harris (1996) 认为个体的社群知识体验通常与一定的环境背景相关，因此与特定企业环境相关的认知图示对于理解企业文化最为重要。通常，研究文化的学者多从文化的视角来强调人的动力。但是，简单假定个体拥有众多需要并认为社会组织仅仅是为了满足不同个体需要，这样的观点是犯了抽象个人主义的错误；而假定企业文化绝对内在化则是“过分社会化”个体并且过分简化了个体积极利用群体共识的过程 (Kashima, 1997)。Strauss (1992) 认为，人的动力在广义上是“社会领域中的事件和物体与人类精神世界对于该事件和物体进行解释的相互作用为物”。

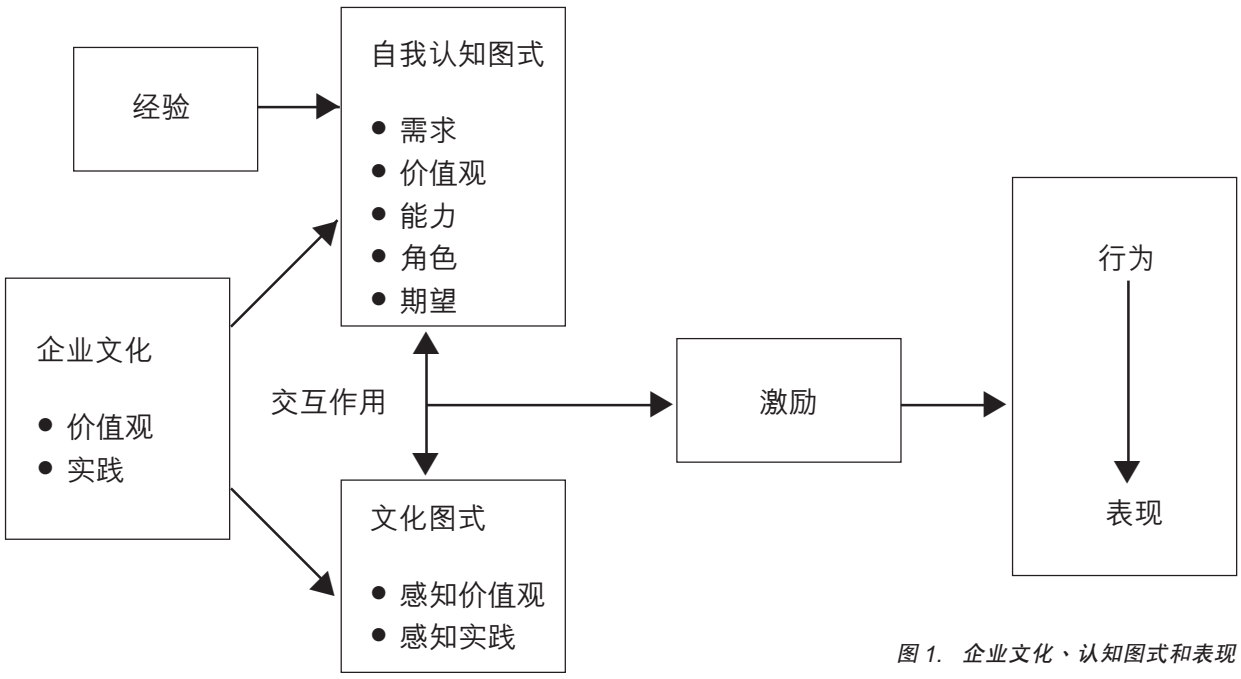


图 1. 企业文化、认知图式和表现

激励理论表明人的行为是为了满足自身的需求。假定人所有的意识行为都是由于为了满足需求和达到目标 (Newstorm & Davis)，则个体会按照目标的达到程度来评价自身的表现，而个体的需求满足感则由其自身对行为结果的评估来决定。这种评估是通过比较从企业获得的奖励 (由企业根据其行为和表现水平决定) 与其自身的期望来完成。在企业中，奖励分为两类：外在奖励和内在奖励 (Robbins, 1996)。与此同时，员工的满足感并不仅仅来源于目标达成和需要满足，按照公平理论 (Adams, 1965, Goodman, 1974)，满足感还来自奖励的公平性。所以，员工的满足感也受到员工的“横向”比较的结果，特别是与其同级同事的比较。

上述分析是个体层面 (微观层面) 的企业绩效分析。因为企业的整体表现很大程度上取决于个体表现的集合 (同时也受到外在环境的影响) ，企业成员的表现很大程度决定了企业的整体绩效。在企业文化的研究中，企业整体层次的绩效概念是多维度的，通常包括：客户服务质量、市场占有率、资本回报率、对市场环境的适应性和最终生存。图 2 表明了企业表现和企业绩效的关系。

研究目标

在讨论了企业文化和企业绩效关系的基础上，本文的研究目标如下：

检验企业文化和企业绩效之间是否存在相互关系；研究确定将企业文化视为“资产”或者“负债”(取决于企业文化对企业绩效的正面影响或者负面影响)。

研究计划

本研究包括三个阶段：

(1) 第一阶段的工作包括对选定的几家中国建筑企业进行案例研究，目的是检验学术界提出的两种企业文化度量工具的适用性，即 OCI (Organization Culture Inventory) －企业文化清单 (Cooke & Szumal, 1993, 2000) 和 OCAI (Organization Culture Assessment Instrument) – 企业文化评测工具 (Cameron & Quinn, 1999)。它们在学术界都得到了广泛使用，都能可靠的度量企业文化。我们从中国建设部出版的《中国建筑企业名录》(中国建设部，1989) 中选取了 5 家建筑企业作为研究样本，他们分别来自中国的北方 (如北京和天津) 和南方 (如广东省汕头市)。此阶段的研究结果

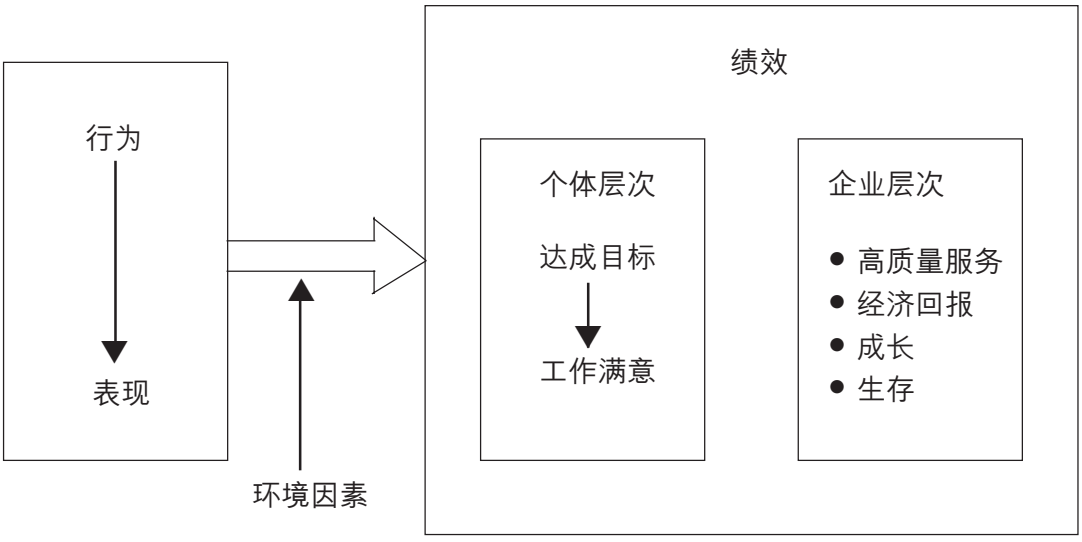


图 2. 表现和绩效

在本文研究结果部分给出。我们对这五家公司的反馈资讯进行了分析，并计算克隆巴赫α系数 (Cronbach Alpha coefficient)，结果表明，对于度量中国建筑企业的企业文化 OCAI 在有效性和可靠性上表现更好，因此更适合在本研究中使用。

(2) (a) 第二阶段的工作包括使用 OCAI 对中国国有建筑企业进行企业文化抽样调查，对抽样结果进行聚类分析，用于将研究样本归类。

(2) (b) 同时，我们设计了一个用于度量企业绩效的问卷，对 2(a) 阶段所选取的样本建筑企业进行这项调查。我们将企业文化和企业绩效调查的结果进行了相关分析，以便分析企业文化是否是影响企业绩效的变数。

(3) 第三阶段的研究使用案例研究方法，在第二阶段的研究样本中选出一部分企业进行定性分析，以便确定特定环境下影响企业绩效的主要文化因素，为将来进行企业文化变化研究指明方向。

实证分析结果

本节将给出研究阶段 1 和 2a 的资料分析结果：即对 5 家选定的中国建筑企业进行案例研究以确定适用的企业文化度量工具；以及对中国建筑企业进行企业文化调查的结果，在 2a 阶段使用了聚类分析方法以反映中国建筑企业的文化特徵。

两种企业文化度量工具－ OCA I和 OCI 都能度量企业文化的不同层次，如惯例、组织成员认同的规范和规则、文化现象等等。在这些方面，中国建筑企业之间很可能存在差异。研究发现，OCI 被认为过于冗馀 (120 个问题)；对于中国特定的文化背景来说，OCI 问卷的问题显得不甚明确，对 OCI 的反馈率仅有 8.2%，而对OCAI的反馈率则有 40% 左右。资料分析结果显示，OCI 文化类型的克隆巴赫α系数很低 (12种文化类型中有 8 个的克隆巴赫α系数小于 0.79 ，最低的仅有 0.22)，而 OCAI 文化种类的最低克隆巴赫α系数为 0.79 。因此我们认为，采用 OCAI 进行第二阶段的研究更为合适。

企业文化量度工具－ OCAI

OCAI 和它的理论基础——竞争价值理论，以及对其所归纳的四种文化类型 (和谐文化 clan culture、创新文化 adhocracy culture、秩序文化 hierarchy culture 和竞争文化 market culture) 的解释，在 Cameron & Quinn (1999) 以及 Quinn & Rohrbaugh (1983) 的相关研究中有非常详尽的阐述。每种文化类型用 6 个问题来进行描述，所以在 OCAI 中一共有 24 个问题，用于度量企业的不同侧面：包括企业主要特徵、企业领导、企业员工管理、企业纽带、企业战略重点和企业成功标准。在对这六个不同侧面进行度量的基础上，可以将企业文化分为四类，即和谐文化、创新文化、秩序文化和竞争文化。这四类文化并存于每个企业中，只是程度有所不同。通过对这六类问题反馈资讯的分析研究，可以分析被研究企业自身企业文化和所归纳的这四种文化类型的相对相似性。和谐文化指这类型的企业文化更注重维持内部灵活性、关注“人”、对客户需求敏感；创新文化指这类型企业文化注重外在定位，强调灵活性和个性；秩序文化指这类型企业文化注重内部稳定性和控制；竞争文化指这类型企业文化强调外在的稳定和控制 (Cameron & Quinn, 1999：123)。

资料收集

我们基于下面的考虑选择了5家建筑企业作为研究物件：(a) 它们属于建设部认可的一级资质建筑企业 1；(b) 主要从事房屋建筑工程，企业大小相当；(c) 研究物件为企业中具有较高职位者。各家企业的研究反馈资讯如表1。

第 2a 阶段，对所有 552 家一级资质国有建筑企业中进行分层取样以进行调查。根据 1996 年建设部未正式发行的《中国一级资质建筑企业名录》2，总共有 2127 家批准认可

企业 文化类型	北京	廊坊	天津	葛洲坝	汕头	平均值	样本数	克隆巴赫 α 系数
和谐	2.8326	2.9717	3.0240	3.2614	2.3952	2.9391	182	0.79
创新	2.0088	1.8468	1.7070	1.7100	2.8590	1.9462	185	0.86
竞争	3.2280	3.0319	2.1667	2.2105	3.4102	2.7084	171	0.88
秩序	3.5746	3.4667	3.5323	3.0738	2.3513	3.3441	178	0.84
样本数 (N)	38	35	56	38	26			
反馈率 %	37.6	39.3	47.5	37.2	48.1			

表 1. 阶段 1 研究样本文化类型分析结果

的建筑企业，其中 725 家中建筑工程企业。在这 725 家中，14 家具有军队性质，属于军队系统管理；159 家属于集体所有或个人所有；其他 552 家属于国有建筑企业 (非军队系统管辖)。因此本研究对这 552 家国有建筑企业进行分层随机抽样，以 5 作为基数，抽取能够整除5的企业作为研究的样本，这样样本大小为 110 —— 这个样本大小对于企业层次的研究属于正常范围。我们要求每一家企业提供 20 份调查问卷反馈 (资料收集于2003年早期完成)。本研究的样本大小与之前其他学者所做的相关研究的研究样本相当或者更大，如 Denison(1990)，Hofstede, Neuijen，Ohayv & Sanders(1990) 及 Adas (1996) 的研究。

资料分析

第一阶段的资料结果在表 1 中给出。对所取得的资料进行了方差分析 (ANOVA)，结果表明所有的 5 家企业在与四种文化类别相关的 OCAI 问题上存在显著的统计差异性。表1中的粗体数位表示这 5 家企业的主导文化类型。总体来说秩序文化是主导文化 (均值为 3.3441)，然而汕头这家企业是例外，它的主导文化是竞争文化。

第二阶段，从 98 家一级国有建筑工程企业中收回了 407 份调查问卷，反馈率是 21%。有效问卷为 66 家企业的 363 份问卷，结果表明，秩序文化的均值为 3.9364 从而成为主导文化 (见图 3)。

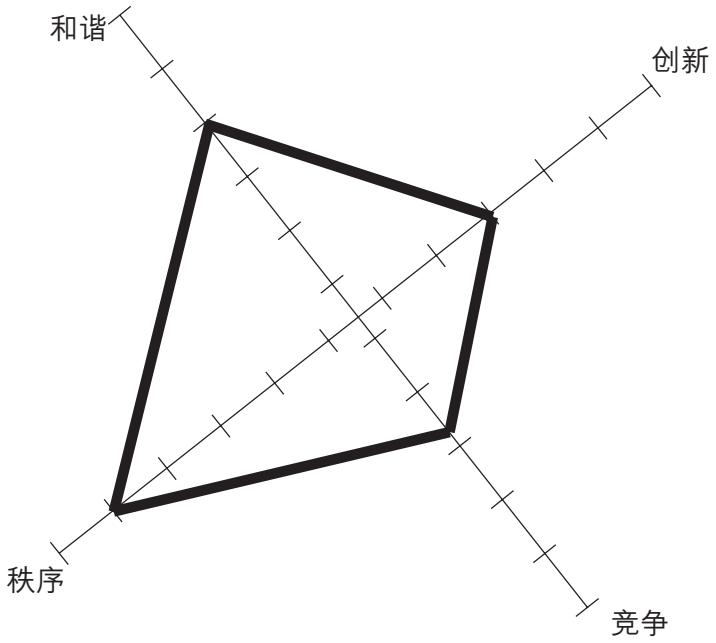


图 3.中国建筑企业典型的企业文化特徵

在进行聚类分析 (即按照样本企业文化特徵类型的相似性对样本企业进行归类) 之前还必须完成一项工作，即必须将个体的问卷打分数值进行汇总以得到企业层次的相关数值。许多组织研究领域的学者 (如 Howe, 1986, Cooke & Rousseau, 1988, Zammuto & Krakower, 1991 等) 都指出，使用个体资料汇毂以用于组织整体层面分析的前提条件是：变数的组内方差 (within-group variation) 比较小，即个体对于变数的打分基本一致。所以在将个体资料汇毂以进行企业层面分析之前，必须提供这样的实证分析支援。因此，我们对资料进行了统计分析，计算了 η 2 统计量 (见表2)，这个统计量能够量度组内资料的一致性。结果表明，在本研究的样本建筑企业内部，个体员工对于文化变数的看法基本一致。

对于本研究来说，我们采用非层次聚类方法 (non hierarchical clustering procedure) 进行分析，首先从 2 类开始分析，最终分析 6 类的可能性。对每次指定类别大小的分析，我们都进行了多轮次的分析，以达到比较稳定的结果。对于最后的类别选择标准，我们遵循以下考虑：组内方差较小 (即同类别的企业的企业文化特徵模式比较相似)，而组间方差尽可能大。F 值，即组内方差和组间方差的比率，可以作为选取最优类别数目的标准，同时所计算的显著性水平必须符合要求 ($p<0.05$)。

在进行聚类分析的过程中，我们发现 3 类，4 类，5 类，6 类的显著性水平都符合要求 ($p<0.05$)，但 5 类是最优结果，因为在 5 类时所计算的F值最优。所以我们选择 5 类作为进行聚类分析的最优结果。表 3 列出了在 5 类和 6 类情况下的统计分析结果，分别列出了这两种情况下每一类企业的数量。

文化类型	平均值	克隆巴赫 α 系数	η 2	F 值	显著性水平
和谐	2.9974	0.88	0.791	17.312	0.000
创新	1.9062	0.80	0.761	14.564	0.000
竞争	2.4448	0.89	0.849	25.696	0.000
秩序	3.9364	0.87	0.629	7.734	0.000
个体 N = 363; 企业 N = 66					

表 2. 阶段 2 资料统计结果

类别 文化类型	1 N=18	2 N=5	3 N=22	4 N=8	5 N=13		类平均值	自由度	标准误差	自由度	F 值	显著性水平
和谐	3.8037	4.0643	2.9768	2.3239	1.9435		8.867	4	.038	61	232.476	.000
创新	1.5153	3.2968	2.1224	2.2267	1.4488		4.241	4	.044	61	97.383	.000
竞争	1.9387	4.1056	2.7011	3.8214	1.6607		10.629	4	.029	61	370.397	.000
秩序	4.1412	4.1821	3.6983	2.9339	4.4321		3.371	4	.044	61	76.652	.000
	6 类											
	1	2	3	4	5	6						
和谐	3.0374	2.9040	4.0643	2.3239	1.9435	3.8037	7.113	5	.037	60	191.424	.000
创新	1.9934	2.2772	3.2968	2.2267	1.4488	1.5153	3.481	5	.037	60	94.183	.000
竞争	2.7253	2.6720	4.1056	3.8214	1.6607	1.9387	8.506	5	.029	60	294.165	.000
秩序	3.8802	3.4801	4.1821	2.9339	4.4321	4.1412	2.871	5	.030	60	95.208	.000

表 3. 方差分析结果（5 类情况和 6 类情况）

讨论

将个体企业的企业文化认为是决然不同的四种类型，这样的观点是错误的。Cameron & Quinn (1999) 提出的四种文化类型给我们提供了一个在企业层面系统研究企业文化变数的基础，但他们提出的四种文化类型模型并不能涵盖所有文化现象－特别是在国家民族文化层次。四种文化类型的理论框架提供了一个平台，在这个平台上我们能够进一步去解释那些能够促使企业变化和改善的关键企业文化元素，即一个能够提供“直观上有说服力而且易于解释和实施的改善企业文化”的框架。

第一阶段的研究发现表明：

- 企业文化差异确实存在于中国建筑企业的企业整体层面上；
- 在四种企业文化类型中，秩序文化类型与和谐文化类型相比竞争性文化类型和创新文化类型更具有主导性。

这说明企业文化虽然在企业整体层次上存在差异，但是仍然在很大程度上受到了中国传统文化的影响，其特徵是千年累积的儒家思想；而近几十年高度统一的政治意识形态和计划经济体制加深这种影响。然而与此同时，中国近年来的改革开放政策已经对当前的企业文化产生了影响，这种影响在本研究第 5 家企业的一些文化特徵中得到了反映 (第 5 家企业位于中国南部的汕头，而中国的南部地区比北部地区受到更多西方市场经济影响)。本研究的结果反映了中国目前整体社会的一般状况，即在政治上、社会上和经济上都具有混合性，而且都在不断变化之中。

通过 2 (a) 阶段的研究和进行聚类分析发现，按照不同的文化特徵组合，可以将中国的建筑企业中分为 5 类。在表3所示的所有的 66 家企业中，33% (22 家) 属于第 3 类，这类型企业秩序文化占主导；27% (18 家) 属于第1类，这类型企业秩序文化和和谐文化占主导，而竞争文化和创新文化处在弱势地位；20%（13家）属于第 5 类，这类型企业秩序文化占绝对主导，其他三类文化都处于弱势；12% (8 家) 属于第 4 类，这类型企业竞争文化占主导，其他三类文化处于中等状态；8% (5 家) 属于第 2 类，这类型企业各种类型文化都比较强大且处于平衡状态，即这类企业的文化类型均值从创新文化的 3.2968 到秩序文化的 4.1821。

结论

本文给出了一个用于研究中国建筑企业文化和企业绩效的理论框架。同时，本文从相关的研究出发，提出了研究假设，并给出了从中国建筑企业收集实证资料进行假设验证的研究方法。案例研究结果表明，OCAI 工具能够用来度量中国企业的文化特徵，而且不同地区企业之间存在企业文化差异 (特别是那些开放得较早，西方市场经济影响较大的地区)，但秩序文化和和谐文化仍然占主导地位。

企业文化研究领域学者在影响企业文化的重要因素上取得了三点共识，归纳如下 (Brown, 1998)：

- 企业所处国家或地区的社会文化和国家文化；
- 企业创始人或其他有重大影响力的领导的的远见卓识、管理风格和人格；
- 企业所从事的行业以及行业环境。

考虑到传统中国文化和中国建筑业的情况，本研究所得出的中国建筑业企业的文化特徵与中国的整体环境是一致的。秩序文化仍然处于主导地位，反映了 40 年计划经济的影响，在中国过去的计划经济中，所有企业都具有归属于某个行业系统，而且计划经济强调的是“秩序”，而这最终导致了被广泛批评的官僚作风和各种不必要的呆板程式。第二位的主导文化是和谐文化，这反映了传统的中国文化，即强调“和谐和关系”以及“以人为本”。随著近 20 年的经济改革，中国建筑业的竞争开始加剧，进而形成了一些企业的竞争文化。在整个研究中，创新文化始终得分很低，反映了在整体上，中国建筑企业的创新和承担风险的精神仍然十分缺乏。

致谢

本研究由香港 RGC (Research Grant Council) CERG (Competitive Earmarked Research Grant; project no. HKU7122/03E) 及香港大学 CRCG (Committee on Research and Conference Grants) 研究基金支援。

注释

1. 根据《建筑企业资质管理规定》(建设部，1989)，建筑业企业分为四级：一级、二级、三级、四级。在一级企业中又分为29 类，如房屋建筑工程 (工业民用建筑)、化工石油工程、水利水电工程、交通工程等，其中房屋建筑工程是最大类别。
2. 新颁布的《建筑企业资质管理规定》(建设部，2001) 对建筑企业资质进行了重新分级。新分级中，“特级”与前一版本规定中“一级”大致相当。因为新的规定刚刚实施 (本研究于 2001 年开始)，故为了取得更可靠的资料，本研究的调查仍然按照旧的分级方法。

参考文献

Adams, J. S. (1965), “Inequity in Social Exchanges” in Berkowitz L. (ed.), Advances in Experimental Social Psychology, New York; Academic Press, 1965, 267-300

Adas, A. (1996). The Level of Organizational Effectiveness of the Construction Firm: A Multivariate Model-Based Prediction Methodology, Unpublished PhD Thesis. The University of Waterloo, Canada

Barley, S. R., Meyer, G.W. , Gash, D. C. (1988), “Cultures of Culture: Academics, Practitioners and the Pragmatics of Normative Control” Administrative Science Quarterly, 33, 24-60

Bartunek, J.M., Moch, M. K. (1987), “First-Order, Second-order, and Third-order Change and Organizational Development Interventions: A Cognitive Approach” Journal of Applied Behavioural Science, 23, 483-500.

Brown, A. (1998). Organizational Culture, Second Edition. London: Financial Times Pitman Publishing.

Calori, R., Sarnin, R. (1991). Corporate Culture and Economic Performance: A French Study. Organization Studies, 12, 49-67.

Cameron, K. S., Quinn, R. E. (1999). Diagnosing and Changing Organizational Culture-Based on the Competing Values Framework. Addison-Wesley

Carroll, D.T. (1983). A Disappointing Search for Excellent. Harvard Business Review, 61(6), 78-88

China National Bureau of Statistics, Department of Investment and Construction Statistics, (2002a). China Statistical Year Book on Construction, Beijing: China Statistics Press. 国家统计局固定资产投资统计司 (2002a) 中国建筑业统计年鉴. 北京：中国统计出版社

China National Bureau of Statistics, Department of Investment and Construction Statistics, (2002b). The Chinese Major Construction Enterprises. Beijing: China Statistics Press. 国家统计局固定资产投资统计司 (2002b) 中国大型建筑企业. 北京：中国统计出版社

Cooke, R. A., Rousseau, D. M. (1988), Behaviour Norms and Expectation, Group and Organizational Studies, Vol. 13, No. 3, 245-273

Cooke, R.A., Szumal, J. (1993). Measuring Normative Beliefs and Shared Behavioural Expectations in Organizations: The Reliability and Validity of the Organizational Culture Inventory. Psychological Reports, 72, 1299-1330

Cooke, R.A., Szumal, J. (2000). Using the Organizational Culture Inventory to Understand the Operating Cultures of Organizations. In Ashkanasy. et. al (eds.) Handbook of Organizational Culture and Climate. Thousand Oaks: Sage Publications, Inc.

D`Andrade, R. G. (1992), “Schemas and Motivation” in D`Andrade R. G. and Strauss, C. (Eds) Human Motives and Cultural Models, Cambridge: Cambridge University Press.

Deal, T.E., Kennedy, A.A. (1982). Corporate Cultures: the Rites and Rituals of Corporate Life. Reading, MA: Addison-Wesley.

Denison, D. R., Mishra, A.K. (1995), Toward a Theory of Organizational Culture and Effectiveness, Organizational Science, Vol.6 No. 2, 204-223.

Denison, D. R. (1990). Corporate Culture and Organizational Effectiveness. John Wiley and Sons.

Fiske, S. T., Taylor, S. E. (1991), Social Cognition,

(2nd ed), Reading, MA: Addison-Wesley.
Gale, A. W. (1992), "The Construction Industry's Male Culture must feminize if conflict is to be reduced: The role of Education as A Gatekeeper to Male Construction Industry" In Fenn, P. and Gamerson, R. (eds) Construction Conflict Management and Resolution. London: E. & F. N. Spon...
Goodman, P. S. (1974), "An Examination of Referents Used in the Evaluation of Pay, " Organizational Behaviour and Human Performance, 170-195
Gordon, G. G., DiTomaso, N. (1992). Predicting Corporate Performance from Organizational Culture. Journal of Management Studies, 29, 783-798.
Hall, M. A., Jaggar, D. M. (1997), "Should Construction Enterprises, Working Internationally, Take Account of Cultural Differences in Culture? In Proceedings of the 13th ARCOM Conference, Cambridge, 1997 pp1-10"
Harris, S. G. (1996), "Organizational Culture and Individual Sense-making" in Meindle J. R. Stubbart C. and Porac, J. F (Eds), Cognition within and between Organizations, Thousand Oaks: SAGE Publications.
Hitt, M.A., Ireland, R.D. (1987). Peter and Waterman Revisited: the Unended Quest for Excellence. Academy of Management Executive, 1(2), 91-98
Hofstede, G. (1991), Cultures and Organizations: Software of the Mind, London: Mcgraw-Hill.
Hofstede, G., Neuijen, B., Ohayv, D. D., and Sanders, G. (1990). Measuring Organizational Cultures: A Qualitative and Quantitative Study across Twenty Cases. Administrative Science Quarterly, 35: 286-316
Howe, J.G. (1986). Group Climate: An exploratory analysis of construct validity. Organizational Behaviour and Human Performance, 19, 106-125
Hu, Dali (2001). On the Competitiveness of Enterprises. Beijing: Economic and Management Press. p243 (in Chinese) 胡大力 (2001) 论企业竞争力. 北京：经济管理出版社 第 243 页
Jaques, E. (1951). The Changing Culture of a Factory. London: the Tavistorck Publications.
Jaques, E. (1965). The Changing Culture of a Factory. London: the Tavistock Publications.
Kashima, Y. (1997), "Culture, Narrative, and Human Motivation" In Munro, D and Schumaker, J.F. and Carr, S.C.(eds) Motivation and Culture, New York: Routledge
Kotter, J.P., Heskett, J.L. (1992). Corporate Culture and Performance. New York: Free Press.
Liu, A.M.M (1999). Culture in the Hong Kong Real-Estate Profession: A Trait Approach, HABITAT INTL. Vol. 23, No. 3, pp 413-425.
Liu, A.M.M., Fellows, R.F. (1999a). Culture Issues. In Rowlinson, S. and McDermott, P (eds.) Procurement Systems: A guide to best practice in construction. London: E & FN Spon.
Liu, A.M.M., Fellows, R.F. (1999b). The Impact of Culture on Project Goals. In Ogunlana (ed) Profitable Partnering in Construction Procurement, London: E & FN SPON
Liu, A.M.M., Walker, A. (1998). Evaluation of Project Outcomes. Construction Management and Economics, 16, 209-219
Lord, R. G., Foti R. J (1986). "Schema Theories, Information Processing, and Organization Behaviour," in Sims, H. P, and Gioia, D. A. (Eds), The Thinking Organization: Dynamics of Organizational Social Cognition, San Francisco: Jossey-Bass, 20-48
Malhotra N.K. (1999), Marketing research: an applied orientation. 3rd edition., NJ: Prentice Hall.
Maloney, W. F., Federle, M. O. (1991). Organizational Culture and Management, Journal of Management in 5Engineering Vol. 7, No. 1
Maloney, W. F., Federle, M. O. (1993). Practical Models for Organizational Assessment, Journal of Management in Engineering Vol. 9, No. 1
Marcoulides, G. A., and Heck, R.H. (1993). Organizational Culture and Performance: Proposing and Testing a Model. Organizational Science, 4, 209-225.
Markus, H. , Zajonc, R. B.(1985), "The Cognitive Perspective in Social Psychology" in G. Lindzey and E. Aronson (Eds), The Handbook of Social Psychology (3rd ed., v. 1), New York: Random House, 137-230
Marshall, S.P. (1995), Schemas in Problem Solving, Cambridge: Cambridge University Press.
Ministry of Construction (1989), Regulations on Construction Enterprises Qualifications Management. Beijing, China (in Chinese) 建设部 (2001) 建筑企业资质管理条例. 北京
Ministry of Construction (2001), Regulations on Construction Enterprises Qualifications Management. Beijing, China (in Chinese) 建设

部 (2001) 建筑企业资质管理条例. 北京
Naylor, J. C., Prichard, R. D., Ilgen, D. R. (1980), A Theory of Behaviour in Organizations, New York: Academic Press.
Newstorm, J. W., Davis, K. (1993), Organizational Behaviour-Human Behaviour at Work, New York: McGraw-Hill.
Ouchi, W.G., Jaeger, A.M (1978). Type Y Organization: Stability in the Midst of Mobility. Academy of Management Review, 3, 305-314
Ouchi, W.G., Johnson, J.B. (1978). Types of Organizational Control and Their Relationship to Emotional Well-being. Administrative Science Quarterly, 23, 293-317.
Parsons, T. (1951), The Social System, Glencoe, IL: Free Press.
Pascale, R., Athos, A. (1981). The Art of Japanese Management. New York: Simon & Schuster.
Peters, T., Wateman, R.H. (1982). In Search of Excellence. New York: Harper and Row.
Petty, M.M., Beadles, N.A. II, Lowery, C.M., Chapman, D. F., Connell, D. W. (1995). Relationship between Organizational Culture and Organizational Performance. Psychological Reports, 76, 483-492.
Pfiffner, J.M., Sherwood, F.P. (1960). Administrative Organization. Englewood Cliffs, NJ: Prentice hall.
Quinn R.E., Rohrbaugh J. (1983), A spacial model of effectiveness criteria: towards a competing values approach to organisational analysis. Management Science, 29, 363-377.
Robbins, S. P. (1996) Organizational Behaviour Seventh Edition Prentice-Hall International, Inc.
Rousseau, D. M. (1990). Normative Belief in Fund-Raising Organizations: Linking Culture to Organizational Performance and Individual Response. Group and Organizational Studies, 15, 448-460
Rowlinson, S., Root, D. (1996), The Impact of Culture on Project Management: A Final Report, Unpublished working report.
Rumelhart, D. E. (1984), "Schemas and the Cognitive System," in Wyer R. S. and Srull T. K. (Eds), Handbook of Social Cognitions (Vol 1.), Hillsdale, NJ: Lawrence Erlbaum, 161-188
Sawner, T. E.(2000), An Empirical Investigation of the Relationship between Organizational Culture and Organizational Performance in a large Public Sector Organization, Unpublished Doctoral Dissertation, The George Washington University.
Schein, E.E. (1985). Organizational Culture and Leadership: A Dynamic View. San Francisco: Jossey-Bass Inc., Publishers.
Seymour, D., Rooke, J. (1995), "The Culture of the Industry and the Culture of Research", Construction Management and Economics, 13, pp 511-523
Sha, K., Lin, S. (2001), Reforming China's Construction State-Owned Enterprises" Building Research and Information, 29(4), 270-276.
Silverzweig, S., Allen, R.F (1976). Changing the Corporate Culture. Sloan Management Review, 17 (3), 33-49
Strauss, C. (1992) "Models and Motives", In D`Andrade R. G., Strauss, C. (Eds) Human Motives and Cultural Models, Cambridge: Cambridge University Press.
Taylor, S.E. , Crocker, J.(1981), "Schematic Bases of Social Information Processing" in Higgins, E. T., Herman, C. P. and Zana, M.P(Eds) Social Cognition: The Ontario Symposium, Vol. 1 Hillsdale, NJ: Erlbaum.
Vesson, M. A. (1993). Cultural Perspectives on Organizations, Cambridge: Press Syndicate of the University of Cambridge.
Wilderom, C.P.M., Van den Berg, P.T. (1998): A Test of the Leadership-Culture-Performance Model within a Large Dutch Financial Organization. In S. Havlovic.Ed. Best Paper Proceedings, of the Annual Meeting of the Academy of Management, San Diego, CA
Wilderom, C.P.M., Glunk, U., Maslowski, R. (2000). Organizational Culture as a predictor of Organizational Performance. In Ashkanasy N.M., Wilderom, C.P.M., and Peterson M.F.(eds.) Handbook of Organizational Culture & Climate, 2000, Thousand Oaks: Sage Publications, Inc.
Yao, B. (1998), Construction Management, Beijing: China Construction Industry Press.
Zammuto, R.F. (1984). A comparison of multiple constituency models of organizational effectiveness. Academy of Management Review 9: 606-616