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Guaranteed Maximum Price (GMP) Contracts in Practice – A Case Study of a Private Office Development Project in Hong Kong

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Abstract

Purpose – This paper aims to investigate the operational mechanism, project performance, motives behind, benefits, difficulties and success factors of adopting the GMP scheme based on a real-life case study of "Chater House", an international Grade A private office project in Hong Kong.

Design/methodology/approach – The case project was analysed by means of the related project documentation and a series of face-to-face interviews with the relevant senior project representatives.

Findings – All the interviewed key project stakeholders perceived that the GMP contract helped achieve competitive price, value for money and superior quality of products as well as provided stronger incentives to innovation and cost saving. The case study revealed that the overall success of this GMP project was underpinned by the following key attributes including: (1) implementation of partnering concepts; (2) reasonable share of cost savings; (3) early involvement of contractor in design development; (4) right selection of qualified subcontractors; (5) establishment of adjudication committee; and (6) open-book accounting arrangement.

Practical implications – The lessons learned from this successful GMP project could help the industrial practitioners to minimise the detriments brought about by potential difficulties, and maximise the benefits gained from implementing GMP philosophy. Such an improved understanding could well generate essential strategies to eradicate the root causes of adverse project performance, win-lose consequence and confrontational working relationship amongst various project stakeholders.

Originality/Value – The research study has provided solid groundwork for client bodies and contracting organisations to develop a best practice framework for implementing successful GMP schemes in future construction.

Keywords: Guaranteed maximum price; Procurement strategies; Case study; Incentive arrangement; Hong Kong.

Paper type: Case study

Introduction

The construction industry has long been fraught with high risks, limited trust amongst contracting parties, a lack of incentives and misalignment of objectives, which might eventually be conducive to unfavourable project performance (Moore *et al.*, 1992; Chan *et al.*, 2004). Particularly in Hong Kong, office development projects have been delivered primarily in a traditional manner where consultants and contractors have little motivations to devote efforts more than just meeting the minimum contractual requirements. The increasing complexity of buildings and the need for improving the overall quality of constructed facilities have triggered the application of new alternative procurement approaches to deliver construction projects (Construction Industry Review Committee, 2001; Wong, 2006).

Consequently, the guaranteed maximum price (GMP) scheme has been introduced to be an alternative integrated form of procurement for clients to minimise risks and integrate the diverse interests of a complex construction project (Trench, 1991). GMP is an incentive-based procurement strategy which rewards the contractor for any savings made against the guaranteed maximum price and penalises him when this sum is exceeded as a result of his own mismanagement or negligence according to a pre-agreed share ratio (Masterman, 2002).

The GMP type of contractual arrangement has been gaining popularity in Hong Kong since the completion of the first project introducing GMP in August of 1999 (i.e. 1063 King's Road). The project was delivered on time and the final out-turn cost was over 10% less than similar buildings adopting the traditional procurement system (Ho, 2000). On the other hand, Nicolini et al. (2000) explored whether target cost contracting can be applied in the United Kingdom construction industry via evidence from two new pilot building projects. Nicolini et al. (2001) further found that both of the two pilot demonstration projects obtained a cost reduction of 8-14%, faster programme by 5-20% and rework down by 90-95% when compared with a similar project under the traditional contracting approach, with no reportable accidents recorded during construction.

Target cost contracting has since then received considerable attention within the United Kingdom over recent years with some problematic results as well. For example, Harris (2002) claimed that while the New Wembley National Stadium located in London procured under a GMP form of contract was finally open in March of 2007, it cost more than £757 million (over original estimated budget of £200 million back in 1996), opened almost two years behind schedule with its troubles widely reported, e.g. two high profile court cases between the main contractor and steel contractor. So it is worthwhile examining the underlying reasons for the unfavourable project performance even though a GMP contract was in place using the case study methodology.

Moreover, there is a lack of research evidence to evaluate the overall project delivery process, the levels of success and lessons learned from previous GMP projects. Since the GMP form of procurement is still at a germinating stage of development in Hong Kong, a comprehensive investigation of its application is essential and timely. Hence, the objective of this paper is to report on a real-life case study of "Chater House" in Hong Kong which adopted the GMP contract. Senior industrial practitioners representing different organisational interests were interviewed and relevant documentation of the case study project were reviewed to examine the operational mechanism of GMP, and to solicit their opinions on the motives behind introducing GMP, the benefits, difficulties and success factors of implementing the GMP scheme in comparison with other procurement options. Most importantly, various lessons

learned from this successful case study project in relation to overall project performance are presented and discussed herein.

Concepts and Features of Guaranteed Maximum Price (GMP) Contracts

Kerzner (1995) defined GMP as:

> *"… the contractor is paid a fixed fee for his profit and reimbursed for the actual cost of engineering, materials, construction labour, but only up to the ceiling figure established as the 'maximum guaranteed'. Savings below the maximum guaranteed are shared between owner and contractor, whereas the contractor assumes the responsibility for any overrun beyond the guaranteed maximum price."*

Walker and Hampson (2003) regarded GMP to be:

> *"In the GMP arrangement, the client will agree to reimburse the contractor only up to a negotiated guaranteed maximum amount. After that, the contractor bears the risk. This method provides the knowledge and expertise of the client to influence the budget-making process to provide a reimbursable amount for the work but potential mismanagement on the part of the contractor is guarded against through a guaranteed maximum limit."*

Hence, under the operational mechanism of GMP, an agreed ceiling price and a gain-share arrangement are thus established in the construction contract under this agreement (Clough and Sears, 1994). GMP can be discerned as one of the forms of Target Cost Contracting (TCC) with the sharing arrangement limited only to the gain (Perry and Thompson, 1982). In case of any savings from a difference between the actual cost at completion and the final GMP, there is a sharing function to split the gain between the client and the contractor (Trench, 1991). If the actual cost at completion exceeds the final GMP without any changes to the defined scope, the contractor must solely bear the additional cost (Carty, 1995). This arrangement provides incentive for saving project cost by incorporating contractor's innovative ideas in both design and construction.

Boukendour and Bah (2001) considered GMP to be a hybrid arrangement consisting of a cost reimbursement contract and a call option for a fixed price contract. In practice, since the project information and data provided at the tender stage are not sufficient for construction and completion of the works, the contractor usually includes a sum for future design development in the form of GMP allowance and for any unforeseeable risks associated with the project (Gander and Hemsley, 1997). Apart from the ceiling price and gain-share mechanism, GMP offers clients the possibility of retaining greater control over the design process and project cost, at the same time bringing in expertise in building designs and innovations in construction methods or materials from the contractor (Chan *et al.*, 2006).

In a typical GMP construction project, two types of variations are often pre-defined in the conditions of contract: (1) design development variations; and (2) GMP variations (Gander and Hemsley, 1997). The design development variations do not trigger a re-calculation of the GMP because they are deemed to be included in the fixed lump sum of main contractor's direct works finalized at the contract award stage. GMP variations arise only due to the changes in scope of work. GMP variations can allow for the re-calculation of the GMP (Fan and Greenwood, 2004). The net cost adjustment of such GMP variations will be added to or subcontracted from the contract GMP. Besides, since the arrangements of variations under the

GMP/TCC approach are pre-agreed between the client and the contractor, the occurrence of claims / disputes might be reduced, and the preparation and agreement of the final project account tend to be finalised earlier than for the conventionally priced contract (Gander and Hemsley, 1997).

The contractor should notify the architect in writing, advising the value, extension of time (if any) if the contractor wishes to make a claim arising out of a GMP variation; or he disagrees with the architect's decision as to whether or not the architect's instruction is a GMP variation, all in accordance with the agreed GMP methodology (Hong Kong Housing Authority, 2006). If the architect and the contractor disagree on the definition of a GMP variation, the architect should convene a meeting of the Adjudication Committee to facilitate the resolution of any unresolved issues, which involves representatives from client, architect, quantity surveyor and main contractor. There must be a commitment and willingness by all parties to make the GMP process work, and it is only through the team spirit and co-operation of all members that this can be achieved (e.g. partnering) (Chan *et al*., 2006).

Background of the Case Study – Chater House

The Chater House private office tower rose 29 storeys on the Hong Kong's Central Business District site, accommodating high-end retail space on the lower floors with international Grade A standard. The project consisted of a 3-storey basement, a 3-storey podium and a 23-storey office tower (Figure 1). The site of Chater House was formerly occupied by Swire House owned by the same private property developer. The construction phase of the building was undertaken under three contracts comprising the demolition of the existing building (Swire House), the construction of foundation and the erection of the above-ground superstructure block. The overall gross floor area was about 74,000 m^2. The final project cost was approximately HK$1.5 billion (around £10.71 million), with the actual project duration of 635 calendar days, spanned from October of 2000 to July of 2002. The GMP procurement contract with a cost saving sharing mechanism was adopted as an incentive formula under a negotiated tendering method.

Figure 1. Outlook of Chater House Project

This project was the second project adopting the GMP scheme in Hong Kong following the success of 1063 King's Road project. The developer made the decision to proceed with the development of Chater House, at a time of serious economic concerns in both Hong Kong and Asia. To achieve the vision of Chater House's prime commercial office and luxury retail

redevelopment that addressed the ever increasing needs of their international tenant base, the developer decided that the best way forward was to adopt an alternative integrated procurement strategy in order to create a constructive and innovative working environment around them which would achieve their vision and objectives.

In addition, set against a backdrop of declining standards in local construction, adversarial working relationship between client and contractor, together with indifference towards progressive thinking, the client of Chater House intended to create a teamwork environment that encouraged the development of innovative ideas, new ways of working and new technologies, with a vision to achieve the elusive win-win outcome and excellent quality, cut construction waste and raise safety standards of workers (HK-BEAM, 2005). Resulting from time and efficiency initiatives, the project was completed ahead of schedule by 6 days and the final project cost was reduced by about HK$27 million (around £1.93 million), equivalent to 15% cost saving from the original budget (Uebergang *et al.*, 2004). According to the contractor's in-house data and records, the construction waste generated from the Chater House project was 25% lower than that of using traditional construction methods for office buildings of a similar size (Hong Kong Construction Innovation, 2006). Under the umbrella of GMP procurement arrangement, the project was delivered ahead of schedule, with cost saving, high quality, less materials wastage, far fewer disputes and more harmonious working relationship.

Research Methodology

An in-depth case study approach was adopted to investigate the operational mechanism, motives behind, benefits, difficulties and success factors of adopting the GMP scheme in comparison with other procurement options in construction. Yin (1981) defined a "case study" as an empirical inquiry that (1) investigates a contemporary phenomenon within its real-life context; (2) is appropriate when the boundaries between phenomenon and context are not clearly evident; and (3) incorporates multiple sources of evidence. Case studies are suitable for projects that are significant (Yin, 2009).

The selected case study under scrutiny, the Chater House, is a typical international Grade A high-rise private office building in Hong Kong. As a successful implementation of GMP scheme within the Hong Kong construction industry, the benefits, difficulties and success factors of implementing the GMP approach are worth examining. The key findings derived from this case study can help in reaping the perceived benefits and exploring the implementation process of GMP contracts for achieving construction excellence for future projects.

Qualitative information was collected from relevant archives and interviews, which were considered as typical and effective data collection methods for the case study approach (Eisenhardt, 1989). A face-to-face interview survey gleaning various major project stakeholders' perceptions was launched in April of 2007 for the case study. Senior representatives from different key participating organisations (i.e. the client, consultant and main contractor) involved in the Chater House project were targeted for the interview. Each interview was conducted at the interviewee's office and lasted for about one to two hours. Altogether, five senior staff members from the participating organisations including 2 from the client side, 1 from the consultant side and 2 from the contractor side were finally confirmed for interviews as listed in Table 1. The interviewees were warranted that all the project information and opinions collected will be solely used for research purposes only and

their names will not be shown to any third parties due to personal privacy and ethical reasoning.

The interviewees represented a cross-section of the senior management and project management staff. All of them had gained direct hands-on experience with the GMP procurement process of the Chater House project and were thus able to provide an overall review of the GMP practices in this case study project. A comprehensive review of contemporary literature was initially undertaken to investigate the underlying motives, perceived benefits, potential difficulties and critical success factors of the GMP methodology by the same research team (Chan *et al.*, 2007). These attributes were then presented and verified by those target interviewees through a series of semi-structured interviews. Copies of relevant materials including the project's scope of work, contract terms and letters of award on GMP, in-house guidelines or best practice framework for implementing the GMP scheme, case reports, as well as on-line website materials were obtained as the secondary source of evidence to support primary opinions and information collected during the interviews.

Table 1. List of Five Interviewees for the Case Study Project

ID	Organisation Type	Position of Interviewee
A	Client	Executive Director (Projects and Quantity Surveying) of a leading private property developer
B	Client	Head of Quantity Surveying of a leading private property developer
C	Consultant	Director of a quantity surveying consultant firm
D	Main Contractor	Head of Planning and Pre-construction Engineering of a leading construction company
E	Main Contractor	Construction Manager (Estimating and Subletting) of a leading construction company

Since all target interviewees were senior construction personnel with sufficient experience in delivering GMP projects, the interviews were flexibly structured to facilitate free flow of ideas. The following open-ended questions were asked to convey a general idea of the information solicited, while the interviewees were encouraged to express on the subject, without being restrained by the preset questions related to the case study:

1. What is the implementation mechanism or current practice framework adopted for the GMP methodology?
2. What are the motives behind the decision to implement GMP instead of traditional fixed-price lump-sum contract?
3. What are the major benefits and difficulties in adopting GMP?
4. What are the essential elements for successful GMP scheme?

The information acquired from the interviews was first audio-recorded and later transcribed into written dialogues. The draft interview dialogues were forwarded back to corresponding interviewees subsequently via email transmission for verification. A systematic account of information obtained from in-depth interviews was archived for subsequent analysis. Outcomes derived from the analysis of interviews were cross-referenced to the opinions and observations solicited from various interviewees and to complement each other for validation.

Key Findings from the Case Study

Tendering Process and Key Features of GMP Contract

The Chater House was procured by a negotiated GMP contract with its basic features of price ceiling and a gain-share arrangement. Savings raised through the administration of the GMP contract were shared between the client and the contractor on the basis of 60/40 respectively. The schematic tendering process for the Chater House project is presented in Figure 2. The initial GMP was set when the basic schematic design was completed, i.e. 25%-30% of the overall design, which was the stage of submitting general building plans to the government regulatory body. Negotiations were pursued at the tender stage with the client's preferred contractor by way of a corporate business relationship within the group of companies, based on the following documents:

(1) GMP methodology:	▪ Tender requirements for the GMP and its objectives ▪ Rules for negotiations ▪ Pre-contract and post-contract administration procedures ▪ Division of works packages ▪ Subcontract package procurement ▪ Agreement of variations and scope changes ▪ Adjudication of issues in respect of adjustment to the GMP
(2) Standard form of contract:	▪ Client's Standard Form of Contract with supplementary amendments to reflect the GMP methodology
(3) Design documentation:	▪ Performance specifications ▪ Plans, sections and elevations corresponding with the submission of Buildings Department ▪ Schematic design and design development documentation for major elements including structure, E&M services, fire protection and lifts/escalators
(4) Bills of quantities:	▪ All packages (including E&M services) issued Bills of quantities for guidance only but served as a measured basis for pricing and negotiating the GMP

According to the project documentations, the main contractor submitted a tender based on the tender documents and the client's team of consultants subsequently negotiated the GMP, which comprised: (1) cost for main contractor's direct works; (2) domestic subcontractor's works packages; (3) provisional quantities [1]; (4) provisional sums [2]; and (5) design development allowance. As stated in the 'GMP Methodology' document of the studied project, the information and data provided in the tender documents were not complete and/or not sufficient for construction and completion of the works. Therefore, the main contractor allowed in his tender pricing for design development. Further design information and data were provided by the client and his team of consultants after the GMP was agreed and issued to the main contractor under architect's instructions.

[1] 'Provisional Quantities' include works quantified at the time of contracting based on a specification which is reasonably defined but where the design has not progressed to ascertain a defined quantity of works.
[2] 'Provisional Sums' include sums provided for work or expenditure which cannot be entirely foreseen, defined, quantified or detailed at the time the tender documents are issued (items without Bills of Quantities).

When the initial GMP was agreed, the main contractor submitted a new tender based on the latest tender documents to the client with the agreed GMP, for acceptance by the client. During the negotiation process, the main contractor was required to provide on an 'open-book' basis all information used in support of his tender pricing (Interviewee D). The quantity surveying consultant was responsible to ascertain if the main contractor's direct works were comparable with current market rates. Interviewee B from the client organisation stated that "*if the main contractor's pricing exceeds current market rates and no agreement could be reached between the main contractor and the quantity surveying consultant, then these works would later become competitively tendered*".

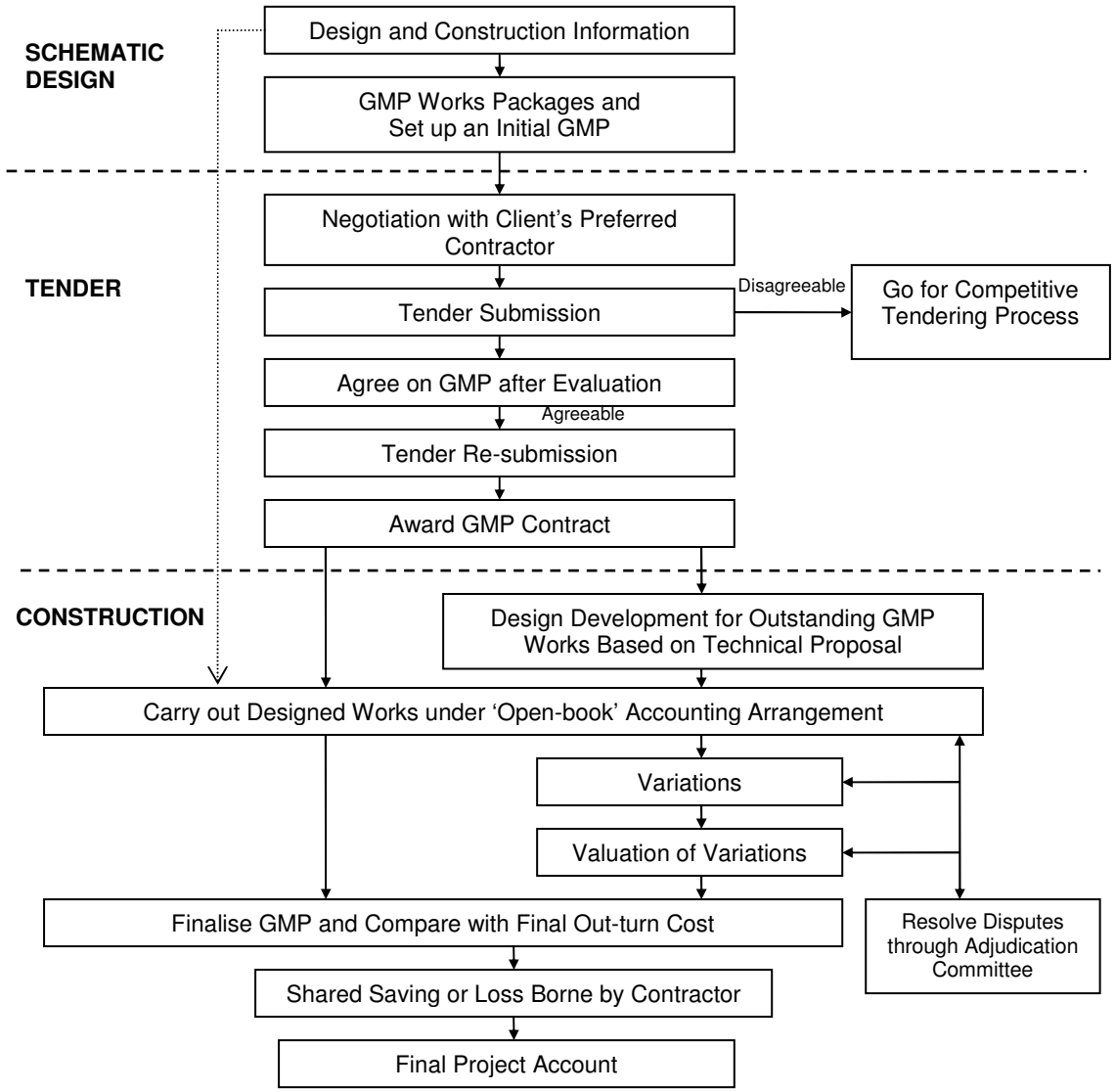

Figure 2. GMP Tendering Process of Chater House Project

A lump sum was given for the erection of building concrete frame but other nominated and domestic subcontract works packages were competitively tendered. The former was principally led by the client's consultant team and the latter by the main contractor. Tenders for subcontracts were then analysed by the main contractor together with consultants and the team jointly made recommendations to the client for award on a competitive 'open-book' arrangement. Subcontractors can be assured of a fair assessment of their tendered sums. "*A*

concept similar to the GMP approach with gain-share arrangement was adopted with domestic subcontractors as an incentive mechanism", Interviewee A from the client body revealed, "*the main contractor must identify any potential GMP variations (i.e. subject to a re-calculation of the GMP) within the subcontract tender documents prior to the issue of tenders to approved subcontractors.*"

Upon issue of the subcontract tender documents to the tenderers, the main contractor was deemed to have accepted that the scope of work described by the tender document for that particular subcontractor's works package was within the allowances included for design development (i.e. not subject to a re-calculation of the GMP). The main contractor then entered into a domestic subcontract with the successful subcontractor. This process eliminated the requirement to adopt nominated subcontracts and their inherent problems (Interviewee B). The main contractor also assured that the subcontractors would not assign or sublet their works without the approval of the client (Interviewee C). Any procurement savings generated in the tendering of the domestic subcontractors' works would be incorporated into the final out-turn costs, and will form the basis for calculation of shared savings at completion of the project.

The agreement of the guaranteed maximum price was an on-going process, with a price agreed at 20% of design complete and reviewed at 40%, 60%, 80% and the full design as the Architect issues instructions throughout the course of the project (Ho, 2002). For main contractor's direct works, architect's instructions which were not classified as GMP variations were deemed to be covered in the fixed lump sums agreed at the stage of main contract award. All other architect's instructions were determined as either design development variations or GMP variations, and valued based on the measured works and schedule of rates specified in the contract. GMP variations emerged only due to: (1) changes in scope of work such as change in floor area or volume; (2) change in function of an area; (3) change in quality of an area; (4) adjustment of provisional quantities or provisional sums; (5) corrected quantity errors by consultants; and (6) unexpected additional fees or charges imposed by statutory authorities. These variations would instigate a re-calculation of the GMP.

The contractor would inform the architect in writing, advising the value and extension of time (if any) if the contractor wished to make a claim generated from a GMP variation; or he objected to the architect's decision on whether or not the architect's instruction was a GMP variation. If both the architect and the contractor could not reach a consensus on the definition of a GMP variation, the architect was required to convene a meeting of the Adjudication Committee comprising the client, architect, main contractor and quantity surveyor to determine the nature and extent of the variation. The intent was to settle any issues at source with the purpose of enhancing efficiency and accountability. Notwithstanding the GMP, the client, consultants and the contractor agreed to work together as a team to reduce costs. This process was launched in parallel with a partnering agreement that was committed by all contracting parties of the project.

Motives behind Introducing GMP

According to the interviewee from the client organization (Interviewee A), traditional forms of building contract were reviewed and discounted as being poorly suited to the open and transparent working relationship fostered by the client. He enlightened that "*the project client intended to follow a procurement route that complemented the partnering strategy*". As a hybrid contract based on the standard negotiated form but capped in price and with a fixed

completion date, the GMP procurement approach had been used successfully on the client's two previous private building developments (1063 King's Road of Hong Kong and One Raffles Link of Singapore). The operational mechanism of the GMP contract was thus advocated, motivating the major project stakeholders including the client, consultants and main contractor to work as a team in determining the construction methods, programmes, pricing, detailed breakdown of direct works, preliminaries, and conditions of contract (Chan *et al.*, 2004). Under the 'open-book' accounting arrangement, the main contractor had to release all his backup data in an open manner to other project team members for perusal. The exchange of this information required a high level of mutual trust amongst the project team members, especially the main contractor (Interviewee E).

The client expected that the GMP procurement approach together with partnering spirit would promote deeper collaboration between the client and the main contractor (Interviewee A). This shared vision and the 'open-book' accounting regime cultivate a sense of partnership and a degree of mutual trust between project stakeholders. Periodic partnering review meetings and the adjudication committee operated under the GMP umbrella might also establish a solid platform to discuss any difficulties encountered and resolve any confrontational issues (Chan *et al.*, 2003). Additionally, referring to a number of research literature such as "Choices in Building Procurement and Contract Selection" and the "Latham Report", the client followed the direction of the GMP, a 'co-operative contracting' approach that would achieve the following objectives (Hong Kong Construction Innovation, 2006):

- To obtain a competitive price;
- To exercise control over the design and construction processes;
- To ensure a "fast-track" procurement route;
- To maximise value for money;
- To achieve a level of quality in line with the rest of client's portfolio and its expectations for the new building; and
- To facilitate a transfer of risk and a sharing of reward with the main contractor.

Major Benefits of Adopting GMP

The overall performance of constructing the Chater House project was superior when compared with a similar project procured by the conventional approach. All the interviewees expressed that the GMP contract helped achieve competitive price, value for money and excellent quality as well as provided stronger incentive to innovation and cost saving stemmed from the gain-share arrangement.

During the tender stage, all the nominated and domestic subcontract works packages were competitively tendered; the former being principally led by the client's consultant team, the latter by the main contractor. A common thread running through the procurement process was the "round-table" agreement by all parties on those subcontractors invited to tender for the work and the subsequent award of those subcontracts. Interviewee B representing the project client expressed that "*this 'open-book' tendering process ensured that the client received competitively priced tenders from approved subcontractors and specialists"*. By issuing tenders only to those client's approved subcontractors, the client retained a critical element of control over the subcontractors to be considered for various works packages. The use of open-book accounting regime had therefore enhanced accountability and quantification of the costs of risk, as claimed by the National Economic Development Office (1982). At the same time, retaining control over the design process circumvented any natural tendency by the contractor to adopt a lowest-cost approach (as opposed to a value-for-money approach) to

maximise his share of potential cost savings (Interviewee E).

The gain-share mechanism was another unique feature of the GMP procurement strategy introduced to the construction contract (Trench, 1991). If there was any savings resulting from a difference between the actual cost at completion and the agreed maximum price, there was a sharing function to split the 'gain' between the client and the contractor. Not only were the diverse interests of various contracting parties integrated, this mechanism also contributed to the 15% project cost saving. As mentioned by the representative from the main contractor (Interviewee D), this mechanism indeed created a strong incentive for them to save project cost by incorporating contractor's expertise as well as innovations in both design and construction methods. The GMP approach did enable the early involvement of the contractor to tap in his buildability expertise on alternative construction techniques and materials during the design process. Hence, both time and quality performances were guaranteed.

A total of 47 innovations were introduced to the project development, according to an interviewee from the client organisation (Interviewee B). For instance, the typical floor construction applied a combination of self-climbing hydraulic steel formwork for the central core and aluminium table formwork for the post-tensioned slabs. The self-climbing steel formwork was first used in Hong Kong and the small aluminium formwork tables, which were designed, supplied, installed and operated by the main contractor were also "the first". Both formwork methods significantly improved the efficiency of site production when compared to the traditional formwork system. They had enhanced the quality of the finished concrete with regard to concrete finish and construction tolerances. Wastage had also been reduced. The contractor's data indicated that waste generated using traditional methods of construction for office buildings of a similar size was 25% higher when compared to the Chater House project (Hong Kong Construction Innovation, 2006).

The GMP procurement process also accomplished a mutually acceptable risk sharing mechanism and rewards with the main contractor (Interviewee C). The contractor had taken into consideration the design development risk by way of GMP allowance in the tender, and the client was offered the comfort of a "not-to-exceed" contract sum early in the project development stage, which can only be adjusted to reflect either scope changes or adjustments to provisional quantities or provisional sums. It allowed a certain degree of flexibility on cost by setting aside the design development fund for miscellaneous variations at the same time moderating the financial risks borne by the client (Boukendour and Bah, 2001). Additionally, Interviewee A stated that "*the GMP form of contract was conducive to implementing partnering approach into the working relationships between various key project stakeholders, with the objective of achieving the 'maximum price' by adopting a more co-operative and less contentious or litigious approach to the contract*". Interviewee C, from the quantity surveying consultant, added that "*as the valuation of variations must be agreed progressively during the construction phase, the occurrence of disputes was greatly reduced and the preparation and agreement of the final project account was finalised earlier than an average traditional lump-sum contract*".

Nevertheless, the major benefit of the GMP approach in this project was the capability to cope with serious problems such as late design changes by the 'open-book' accounting arrangement and the co-operative working relationship via partnering (Interviewees A and B). In the case of Chater House project, as the office rental market was declining in 2000, the architects were requested to revisit the design that had already obtained the approval from the Buildings Department. The building was re-designed as a more regular shape that would cost

less to build while offering a footprint that tenants preferred (Tam, 2002). "*This usually would result in significant problems and delay to the project,*" Interviewee A remarked, "*however, under the GMP contractual arrangement, these issues were resolved in a timely and efficient manner on account of the effective project management, partnering spirit and proper decision-making methodologies adopted throughout*".

Major Difficulties in Implementing GMP

The principal problem of applying the GMP approach to the Chater House project, analogous to those revealed by scholars (e.g. Gander and Hemsley, 1997; Fan and Greenwood, 2004) was the definition of the scope of work leading to the largest area exposed to disputes, as reflected by most of the interviewees. Unforeseen changes occurred inevitably during construction, and the price required necessary adjustment on the agreed contract GMP value. Besides, the extent of design development variations was also difficult to define. Interviewee D from the contractor side stressed that poor handling on these issues may cause intractable disputes and diminish the developed mutual trust amongst the project participants, which also echoes the concern raised by Chevin (1996) and Chan *et al.* (2010). Hence, the GMP scheme might not be an appropriate procurement approach for contracts where numerous changes are expected or it would be difficult to define the scope of work early (Trench, 1991).

The natural tendency of the client was to pull in opposite directions with the contractor to achieve their individual own objectives when unforeseen changes occurred. Despite that the definition of GMP variations was recorded in the methodology document, the contractor tended to view variations as a scope change to maximise end savings whereas the client showed a preference for those costs to be covered by design development allowance to maximise the value of the works even if potential cost savings were sacrificed (Interviewee C). Tang and Lam (2003) also stressed that it is difficult to evaluate the revised contract price when an alternative design is proposed by the contractor and it takes time to reassess the cost implication. The performance of the project was really driven by the successful team building and mutual trust established amongst the project stakeholders. Besides, the tender briefing and the dispute resolution mechanism should also be comprehensive, transparent and fair to mitigate this risk.

Interviewees from both the client and contractor organisations (Interviewees B and E) also discerned that one major difficulty inherent with the GMP approach was the financial risk towards both client and contractor as there was uncertainty related to the scope of work. Interviewee E advised that, "*compared with the conventional procurement method, not only that the contractor had to bear risks in both the design and construction processes, his risks were further inflated for a GMP project due to the "guaranteed price" but with the absence of pain-share mechanism*". The contractor would raise his tender price to cover any potential risks, since additions or changes in the scope of work can only be claimed if they were categorised to be GMP variations. Hence, assessment and negotiation to reach an achievable, mutually agreed GMP and provisional sum was essential to project success (Interviewees C and D).

Another difficulty was the disapproval and unfamiliarity with the GMP contractual arrangement, as the GMP scheme was still at an infant stage of development in Hong Kong, as argued by all the interviewees. Despite that GMP was procured by a structured process, the team of consultants did not entirely trust in this procurement method when drafting the contract with the client. If frequent variations were made without setting aside sufficient

design development allowance, or if serious conflicts between contractor and consultants occurred, the GMP contract may be unsuccessful (Interviewee A). A plethora of interviewees (Interviewees B, D and E) also pointed out that subcontractors did not fully understand the underlying concepts and accept the GMP arrangement, which might adversely affect the proper implementation of GMP contract and might consequently lead to failure of the whole project.

Critical Success Factors for GMP

Interviewees shared a unanimous view that the genuine willingness to achieve co-operation had made the Chater House project a success. This finding echoes the proposition made by Tay *et al.* (2000) that partnering spirit or close working relationship amongst all contracting parties is one of the most critical factors for driving the success of a construction project. A structured partnering process as portrayed in Figure 3 was adopted as a complementary strategy to the GMP approach, which included a series of partnering workshops at different stages of construction, nomination of partnering champions, conflict resolution mechanism, partnering performance monitoring system, together with evaluation and feedback at completion. The partnering approach allowed various project participants opportunities to express their concerns and problems freely. It helped facilitate effective communication, enhance mutual trust and improve working relationships amongst project team members in order to achieve stated common goals (Chan *et al.*, 2004). With the relationship of developed mutual trust amongst the contracting parties, the 'gain-share' mechanism and 'open-book' accounting arrangement under the GMP contract further enhanced confidence and generated an essential factor to project success (Interviewees A and D).

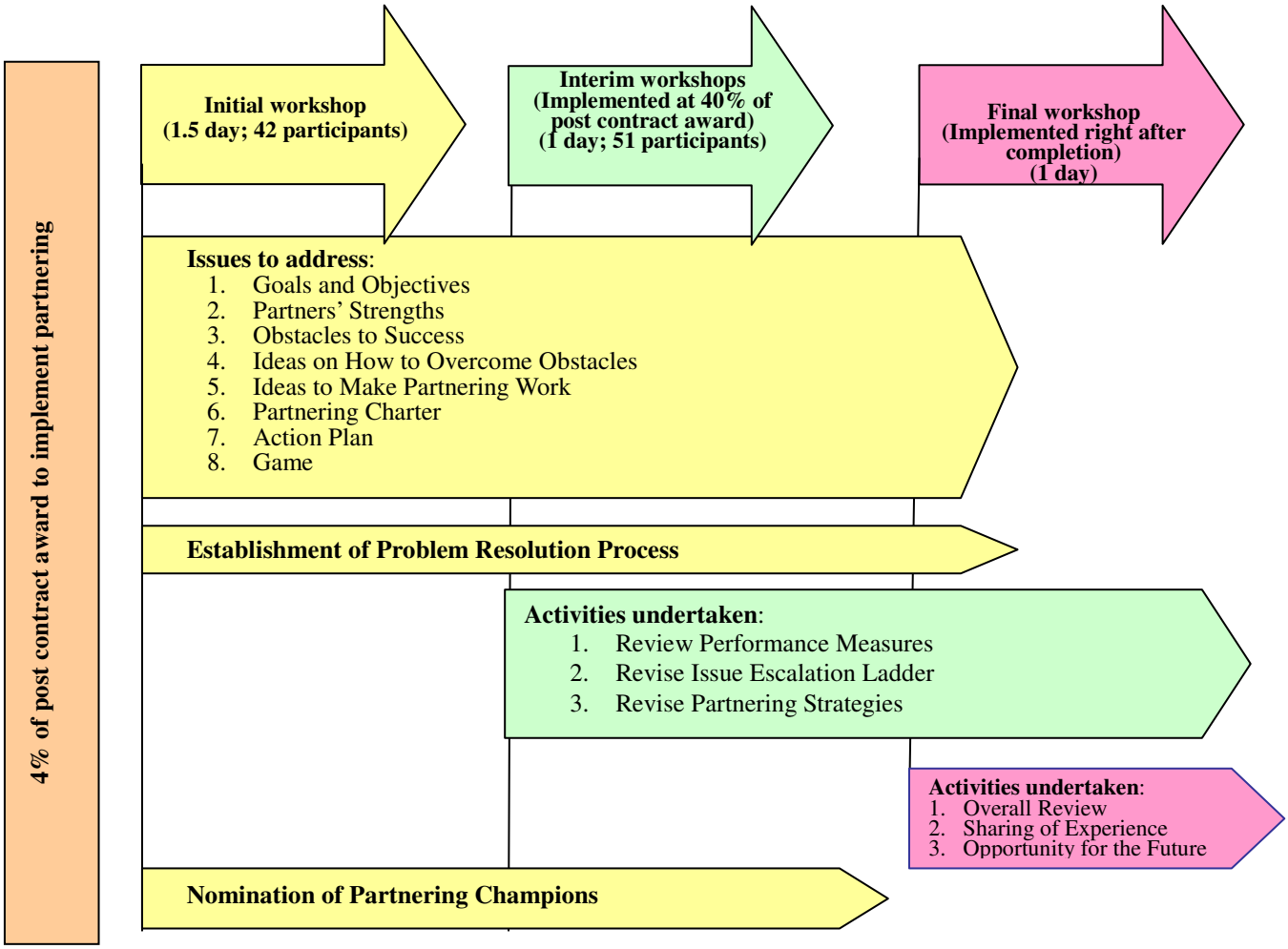

Figure 3. Partnering Approach and Process for Chater House Project (Chan *et al.*, 2004)

Most of the interviewees also mentioned that crucial to the GMP contract were the establishment of an effective adjudication process and the adjudication committee. The adjudication committee reported on the status of a variation submission and determined the classification of various variations submitted by the contractor, i.e. whether the variation was a "design development" (cost to the agreed design development budget and therefore causing no impact on the agreed value of GMP) or a "scope change" (defined generally as a material change to the overall floor plan area, function, quantity or quality of an area) which can adjust the agreed value of GMP. It was also important to reach a mutual agreement on the valuation of variations as prompt as possible in order not to affect the overall progress of the project (Interviewee C). The impartiality of the quantity surveying consultant within the adjudication committee was considered to be an influential success factor for GMP (Interviewee A).

The process of subcontract procurement was also perceived as an essential ingredient with the client achieving his expectations in terms of quality and performance (Interviewees B and E). "*The project was procured based on an 'open-book' accounting arrangement with joint tendering and selection of subcontractors*", Interviewee E stated, "*the main contractor was offered an opportunity to participate in the selection process of subcontractors that would ideally result in better working relationships with the appointed subcontractors, and resolving interface omissions between various works packages"*. Interviewee D added that project management was enhanced by prohibiting the use of multi-player or multi-layered subcontracting under the main contract document unless prior approval from the client is sought. Moreover, the sharing of cost savings between the main contractor and trade subcontractors encouraged construction excellence through innovation and efficiency (Interviewee C).

Besides, under the GMP form of procurement adopted in the Chater House project, the main contractor team was able to participate at an early design stage. Interviewee D opined that integrating the expertise of the contractor at the design stage is beneficial to the target cost-type contracts. Mutual trust could be smoothly transferred to site level and extended throughout the whole contract period. Correspondence became more constructive in getting matters resolved promptly at site level instead of through contractual procedures (Interviewee E). The technical innovations implemented by the main contractor also helped reduce project cost and time significantly (Interviewee C). The introduction of GMP concepts at the initial stage of project development can thus allow early contribution by the contractor to both design and construction methods.

Conclusions

The acknowledgement of the important role of motivation and its influence on project success has prompted the increased application of incentive schemes in construction. "Guaranteed maximum price (GMP)" contract is such an emerging project delivery strategy, which has recently attracted a lot of enthusiasms in Hong Kong, as recommended by the Report of the Construction Industry Review Committee (CIRC) of the Hong Kong SAR Government published in January 2001.

Target cost-based procurement approach derives a plethora of benefits from the operation of a construction project, including helping establish common objectives, incorporating

contractor's expertise into building designs and construction innovations and producing an integrated and trustful working team. Although GMP contracts could not resolve all the problems encountered during the construction process, it creates an effective platform for conflict resolution via adjudication committee and improves overall project performance by providing financial incentives to service providers.

This paper has fully presented the operational mechanism, motives behind adopting GMP, benefits, difficulties and success factors of implementing this alternative procurement approach based on an in-depth case study of a successful GMP private office development project in Hong Kong. Under the umbrella of GMP procurement arrangement, the project was delivered ahead of schedule, with cost saving, high quality, less materials wastage, far fewer disputes and more harmonious working atmosphere. The lessons learned from this successful GMP project could help the industrial practitioners to minimise the detriments brought about by potential difficulties, and maximise the benefits gained from implementing GMP philosophy. Such an improved understanding could well generate essential strategies to eradicate the root causes of adverse project performance, win-lose consequence and confrontational working relationship amongst various project stakeholders.

The case study findings are particularly useful in promoting best practices and establishing effective practical guidelines or strategies for the successful implementation of future GMP projects, both locally and internationally. Those success factors identified to be significant from this GMP case study project included:

- Cultivation of partnering spirit within the project team;
- Reasonable share of cost savings between client and main contractor;
- Early involvement of the contractor in design development;
- Right selection of qualified subcontractors for various works packages;
- Establishment of adjudication committee to resolve contentious issues; and
- Open-book accounting arrangement for tender pricing by main contractor.

Therefore, it is recommended that GMP contracts be adopted across a wider spectrum of the construction industry to reap sustainable benefits and achieve construction excellence.

This research study provides solid groundwork for client bodies and contracting organisations to develop a best practice framework for implementing successful GMP scheme in construction. Although the implementation practices reported from the case study represent some local findings which are particularly related to Hong Kong, the research outcomes and lessons learned are valuable to key project stakeholders in overseas countries as well while undertaking GMP schemes in future construction projects.

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