

Revolutionize value management: A mode towards sustainability

Nazirah Zainul Abidin ^{a,*}, Christine L. Pasquire ^b

^a School of Housing, Building and Planning, Universiti Sains Malaysia, 11800 Pulau Pinang, Malaysia

^b Department of Civil and Building Engineering, Loughborough University, Loughborough, Leics. LE11 3TU, United Kingdom

Received 21 April 2006; received in revised form 8 August 2006; accepted 12 October 2006

Abstract

The rise of sustainability phenomenon in this modern construction world initiated the search for opportune ways that will enable this concept be infused into present working environments. As one of the well-known techniques conducted to assist in decision-makings, value management (VM) holds a strategic position to incorporate sustainability issues into construction projects. Although VM has many intrinsic capabilities, which heighten its potential as sustainability delivery mechanism, this potential has not been fully realised by the practitioners. A study has been conducted to investigate the crucial aspects to ensure effective sustainability integration in VM. From this understanding, the paper shall introduce a structural model that proposes when and where sustainability issues should be raised within VM techniques. This model is a useful framework to guide the integration of sustainability issues effectively in VM and thus, optimising the opportunity that it offers to the industry.

© 2006 Elsevier Ltd and IPMA. All rights reserved.

Keywords: Sustainability issues; Sustainable construction; Value management

1. Introduction

The industry and its customers are broadening their interpretation of value, and beginning to appreciate the subjective nature of it by adding concerns surrounding environment and society [1]. It was argued that sustainability aspects would contribute to improve project value such as improved quality of output, increase productivity, profitability, reduction to life cost and business enhancement [2–7]. The term sustainability has been adopted to promote balance between the need to continue in business, but does not seek profitability at the expense of the environment or society's needs [8]. The growing pressure for sustainability increases the need to search and introduce effective ways to deliver it. Raising sustainability awareness early in the process project is highly encouraged to optimise the influential potential in determining the course of the project.

Value management (VM) has the capability to assist the absorption of sustainability at the conceptual and design stage of project process [9]. The working environment of VM has the tendency to push the team to work together to achieve sustainability needs within the constraints of the resources available. As a technique aims for improving project value, it is expected that VM practices to abide by this rising interest on sustainability and has taken into account many of sustainability-related issues before crucial decisions of the project are made. The issues of sustainability regularly appeared in VM studies as criteria or components of FAST diagram or value tree. However, from a study [10], it was revealed that the consideration of sustainability issues in one VM study to another differs due to the dependency on the clients' interest and commitment, the knowledge of VM participants and the constraint of time. The intrinsic capabilities of VM to assist in the incorporation of sustainability aspects in construction projects has not been fully realised and optimised. To reduce this variation and to promote wider integration, the element of sustainability thinking and actions need to be absorbed

* Corresponding author. Tel.: +60 4 6533793; fax: +60 4 6576523.

E-mail address: ujie_75@yahoo.com (N.Z. Abidin).

systematically into the VM process. A study has been conducted to investigate the crucial aspects to ensure effective sustainability integration in VM. This study, which is a continuation of the previous study [10], consisted of two activities: a series of interviews with 11 value managers about sustainability consideration within their past VM workshops and one discussion with value manager who has just conducted a workshop for a project that has high interest on sustainability. Several crucial points have been unveiled and discussed. From this understanding, this paper shall introduce a structural model that proposes when and where sustainability issues should be raised within VM techniques. This model is a useful framework to guide the effective integration of sustainability into future practices of VM.

2. Progressing sustainability through value management

Sustainability agenda refers to the protection of the environment, enhancing social prosperity and improving economic performance [5]. VM is a proactive, problem-solving or seeking service, which maximises the functional value of a project by managing its development from concept to use through structured, team-oriented exercises, which make explicit, and appraise subsequent decisions, by reference to the value requirements of the clients [11]. There are many erudite publications on the subject of sustainability and VM, but the ones that relate sustainability with VM are very few. Many of the written sources came from international conferences held by the IVM Australia [12] under the theme of 'Balancing the Scorecard' and IVM Hong Kong [13] under the theme of 'Managing Sustainable Values'. Several papers were presented in these conferences, which discussed the importance of sustainability in improving value and the potential of using VM to improve sustainability. These papers, however, were more theoretical-based than research-based. Zainul Abidin and Pasquire [10] have taken initial step to venture into this area by studying the awareness of VM practitioners on sustainability issues and whether sustainability issues has been included in the actual practice of VM. From this study, it was revealed that the consideration of sustainability issues in one VM study to another differs due to the dependency on the clients' interest and commitment on this aspect of construction, the knowledge of VM participants and the constraint of time. There are also some practical and behavioural barriers identified from this study that hinder effective integration of sustainability into VM.

In the UK, there was some evidence that indicated the use of VM in projects that strived for sustainability. The evidence included the housing development in Stratford, where VM was used to enhance the community benefits [14], the sustainable homes and facilities in Stirlingshire [2] and the Katrine Water Project at Loch Katrine, Scotland [15]. This information was mentioned briefly in the websites and reports. Many other VM workshops might

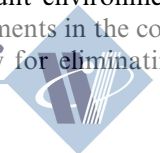
have been conducted to uphold sustainability visions, which are not known by the public.

3. VM as a mode for delivering sustainability

Value can be defined as 'the relationship between the satisfaction of many differing needs and the resources used in doing so' [16]. The 'differing needs' of clients can be extensive, as different clients would have different interests and visions. These differing needs are likely to be influenced by a duty of care to the society and the environment they live in. With the diversification of 'differing needs', it is highly possible that sustainability agenda has already become one of the common drivers to construction projects but it was frequently not recognised as such. When conducting a VM workshop, identifying and delivering project drivers are the main concern. By recognising that this sustainability agenda is fundamental for the delivery of these project drivers, the issues of sustainability would be integrated into the workshop.

The term sustainability may not be used frequently in VM but issues within it such as energy efficiency, minimise waste, good indoor environment, visual effects, low running cost, user comfort, etc. are common in VM. VM players are no strangers to these issues as they regularly appeared in VM studies as criteria or components of FAST diagram or value tree search for basic function, as illustrated by many authors [11,17–21]. From value tree, these functions will be carried forward to the weighting analysis technique to evaluate options in the VM evaluation stage [17,20]. Diagrams taken from VM workshop reports of UK public sector construction projects illustrated clearly that the aspects of sustainability such as environmental impact, user comfort, community, accessibility, life cost were included in the VM decision matrix tool [22]. Zainul Abidin and Pasquire [10] have established a link between sustainability and VM by interpreting what sustainability consideration means within the scope of VM practice using the 10 basic principles of sustainability. This link indicated that sustainability issues are already within the scope of VM, intending to improve the project value and to satisfy needs.

The use of VM for delivering sustainability is further supported by its special characteristics and processes. VM offers opportunity to include sustainability issues early in the project where its impact will be greatest [9]. The series of workshops ensures the sustainability agenda does not dissipate as projects becoming more complex. VM process is systematic as it uses a structured job plan that guides the team through problem seeking and solving in a co-ordinated manner [18]. This effective job plan would ensure that sustainability issues are thoroughly considered and appropriately included before forwarding any VM proposals. Through its tools and techniques, VM offers a means for the client to contribute to a better-built environment and the opportunity to stimulate improvements in the construction process [2]. With VM capability for eliminating



unnecessary cost, it is possible that sustainability could be achieved without unnecessary cost increase.

There are three types of participants in VM workshops namely decision makers (clients or clients' representatives), facilitators and team members [23,24]. Each role can contribute positively towards the integration of sustainability. A study by Leung and Liu [25] confirmed that project goals affected the VM participants' behaviour and the outcome. Identifying sustainability needs as one of the project goals should affect the VM practitioners' behaviour and interest on sustainability. The interaction between clients and VM facilitators at the pre-workshop stage raises the opportunity to encourage client's commitment for sustainability. Dallas [26] stated that the facilitators should take lead on advising sustainability to the clients. The facilitator can relay clients' needs, which should include the need for sustainability, to all team members and ensure that the demand is upheld throughout the decision-making. The skill-mixed will work in unity to achieve what has been targeted. Fong [27] highlighted the strength of VM as an effective knowledge creation and transfer tool. By gathering the participants in one place and at the same time, the process of giving and absorbing information is faster and more effective. The knowledge and importance of sustainability can be planted in the participants' mind, which can later be diffused further in future projects or workshops.

4. The integration of sustainability issues into value management: theoretical concept

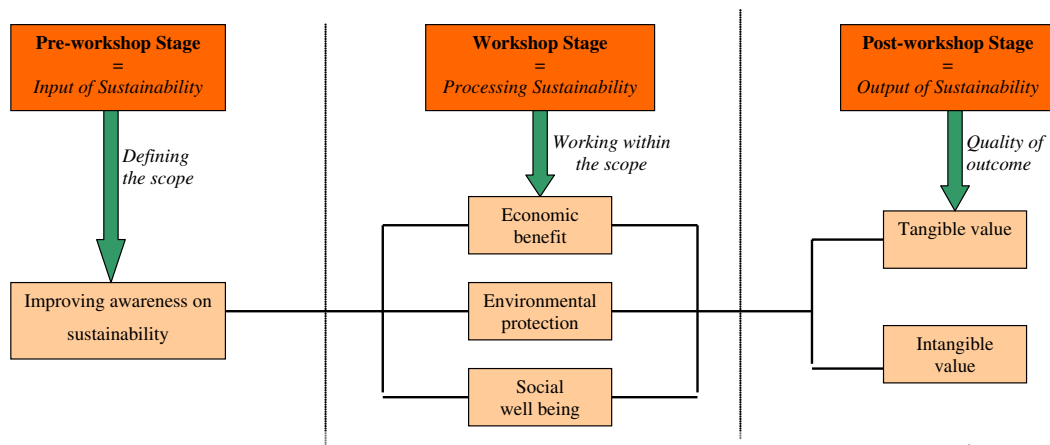
VM participants have opportunities to ensure that construction projects create minimal damage to the environment and society as they are sought before vital decisions that would affect the whole course of the project are being made. They could take a pro-active role, within their sphere of influence, in providing a more sustainable built environment and producing a balanced solution for clients. It is important however, to acknowledge the existence of

certain boundaries, which limit the influence that VM can have on the vision of sustainability such as time constraint and preset scope and interest of study, which vary according to projects and timing of VM practices. Any strategies or actions taken to uphold this idea of integration must account for these boundaries.

Integration refers to the combination of one or more aspects or elements to form a whole body. The concept of integration here refers to the combination of sustainability aspects into VM practices to enable those issues be considered and integrated throughout the whole process and decision-makings in VM. The basic premise of this concept is to introduce sustainability issues prior to workshop, integrate them into the whole VM process and incorporate them into the prepared proposal. The idea behind integrating VM with sustainability is to put this concern at the forefront of VM thinking and along its activities. Being sustainable within VM involves commitment to:

- Economic sustainability – increasing profitability through efficient use of resources (human, materials, financial), effective design and good management, planning and control.
- Environmental sustainability – preventing harmful and irreversible effects on the environment by efficient use of natural resources, encouraging renewable resources, protecting the soil, water, air from contaminations and others.
- Social sustainability – responding to the needs of society including users, neighbours, community, workers and other project stakeholders.

The consideration of sustainability in VM is expected to affect the scope of the study. This is discussed in three levels according to the three stages of VM workshop: input (at pre-workshop stage), process (at workshop stage) and output (at post-workshop stage). This is illustrated in Fig. 1.



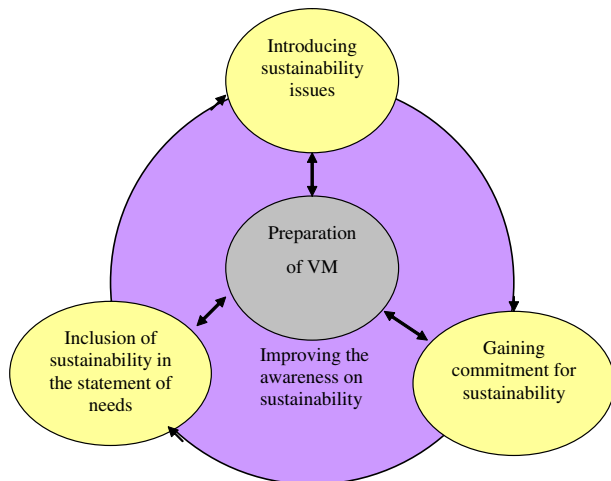
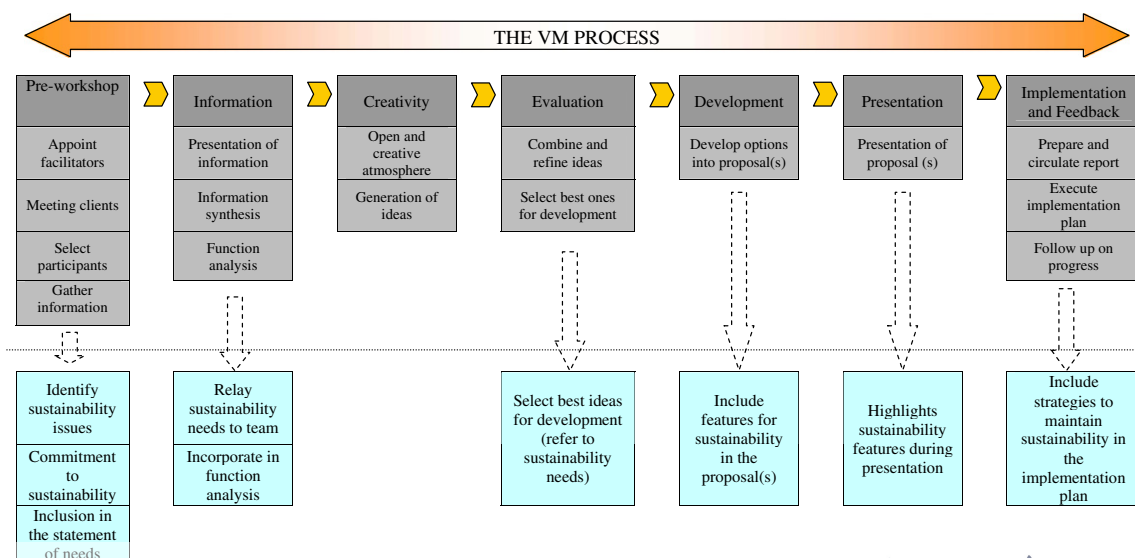


Fig. 2. Improving the awareness on sustainability at pre-workshop stage of VM.

1. *The input of sustainability:* At pre-workshop stage, the needs of clients are defined and the information required for the workshop is gathered. The importance of sustainability issues to the project should be made explicit to attract clients' interest and stimulate demand for it. Commitment to sustainability at this early stage of VM practices is vital to secure the inclusion of these issues throughout the VM activities. The activities involved in raising awareness on sustainability at this early stage of VM are illustrated in Fig. 2.
2. *Processing sustainability:* Workshop stage is where all efforts are directed to produce the best solution for the clients or when the input is transformed into output. The consideration given to sustainability is influenced by the demand from clients, which should have been identified prior to the workshop. Having identified sustainability as part of project's objectives, they would

be presented to all team members and included during functional analysis stage. Ideas generated during creativity phase are evaluated against the defined functions and objectives. The proposals are then developed and presented to the decision makers. Innately, features that protecting the environment, social interest and long term economic return should be highlighted together with cost estimation and other important aspects of the proposal. Fig. 3 pictures the synchronised activities of VM workshop to support sustainability needs. Efforts at pre-workshop and post-workshop are included as well. This figure was adapted from the procedure of VM as presented by Male et al. [11].

3. *The output of sustainability:* Post-workshop stage is where the outcome from the workshop shall be implemented. The clients would decide to accept, partially accept or reject the proposal produced from the workshop. If accepted, plans and strategies will be formulated to implement the proposal. At present, there is no research conducted to demonstrate that VM proposals that incorporate sustainability issues would have higher chances of being accepted. This is subjected to future research project. As shown in Fig. 1, incorporating sustainability could lead to the improvement of tangible and intangible value. Tangible value includes profit, life cost and productivity, shorter time, quality improvement and others. They are usually the direct purpose of conducting a VM workshop. Intangible value includes sense of security, image, responsibility, pride and others, which relates to feelings and positive appreciation. Intangible values will be the additional advantage to the project. The effects of intangible value would last longer even after the completion of the construction works. Both should increase the quality of the proposals and make them more attractive.



5. Investigating the integration of sustainability issues in VM practices

5.1. The fieldwork

The theoretical concept emanated from understanding the literature forwarded the idea that VM has the capability to be one of the means to promote sustainability issues into the early stages of project process and that VM should be able to absorb sustainability issues within its activities without major changes to its well-accepted processes. A series of interviews were conducted to investigate whether present VM practices able to fulfil and integrate sustainability needs. Thirty-seven value managers were approached to request for participation in this study. The list of value managers were obtained from the Institute of Value Management, United Kingdom. Eleven certified value managers agreed to participate in this research. Data gathered was analysed qualitatively as they were in the form of opinions and comments from the preset open-ended questions. Contextualising strategy was used to connect statements, opinion and comments to provide a coherent picture. Prior to these interviews, one value manager who has just conducted a workshop for an environmental-conscious construction project in Abu Dhabi, has been approached. The discussion was focussed on how the sustainable issues being handled in the workshop. The results from both activities are discussed next.

5.2. The findings

Although the methodology and structure of VM lends itself to the consideration of sustainability, the holistic picture of sustainability integration is not straightforward. The field studies revealed several issues that have not been accounted for when discussing the theoretical view of integration. These issues helped to deepen our understanding about the actual practices of VM and how the practitioners perceived sustainability issues should be brought into their workshop.

- Each client has different value drivers and usually, sustainability priorities were not perceived as one of the main drivers. From the value managers' perspectives, their clients were uninterested in sustainability due to three key reasons: (1) lack of knowledge and understanding on sustainability; (2) time and cost constraints; and (3) they fail to recognise that their project drivers required the consideration of sustainability issues. Clients' interests on sustainability issues need to be raised and to achieve this, the facilitators and the team members, who are aware of the importance of sustainability, should play their pro-active role in forwarding this knowledge to the clients. By making clients' needs for sustainability explicit, it is believed that this would promote sustainability issues into VM practices and could

demonstrate clients' commitment to sustainability. Clients' commitments are vital, as they are the ones commissioning the workshop.

- The integration of sustainability issues into VM needs to be handled without causing conflict with the client's other interests. More attention is required if the workshop is dealing with client with less knowledge on sustainability. Sustainability issues should be discussed by relating them to the other value drivers so that the clients would see how these issues would be prudent in achieving their main drivers. It is believed that the clients would be interested in sustainability when there was a real incentive for it. If not, they would focus more on cost reduction.
- VM facilitators hold a strategic position to promote sustainability issues to the clients and to relay these issues to the team members. However, from the field study, the problem of using VM facilitators to bring these issues to the clients was raised. The facilitators were worried that this could stimulate bias to value drivers and risking facing professional liabilities. They usually want to avoid raising conflicting interest in VM. It was proposed to promote sustainability issues into VM without posing liabilities to the facilitators. The facilitators' professional liability could be reduced if the issues were delivered after discussion with the rest of the team members.
- For efficient integration of sustainability issues into VM, these issues should received continuous attention throughout the workshop phase. The role of the team member in bringing sustainability into VM should be appraised. In practice, discussion about the client's needs and wants will take place when building the function analysis. Theoretically, the issues of sustainability, if they were incorporated in the statement of needs, would also be included in that discussion. It is important to acknowledge the possibility that the client's needs for sustainability might change after the function analysis stage.

6. Proposing structural model of integration

The theoretical concept discussed earlier highlighted several important factors of integration. These factors are

- Identification of sustainability issues relevant to the VM workshop;
- clients commitment on these sustainability issues prior to the workshop;
- the role of VM facilitator to raise awareness of sustainability to clients;
- the support of team members to uphold these issues; and
- the need to integrate these issues within the process of VM itself.

The field studies conducted, raised several more issues to deepen our understanding on the roles of the three groups

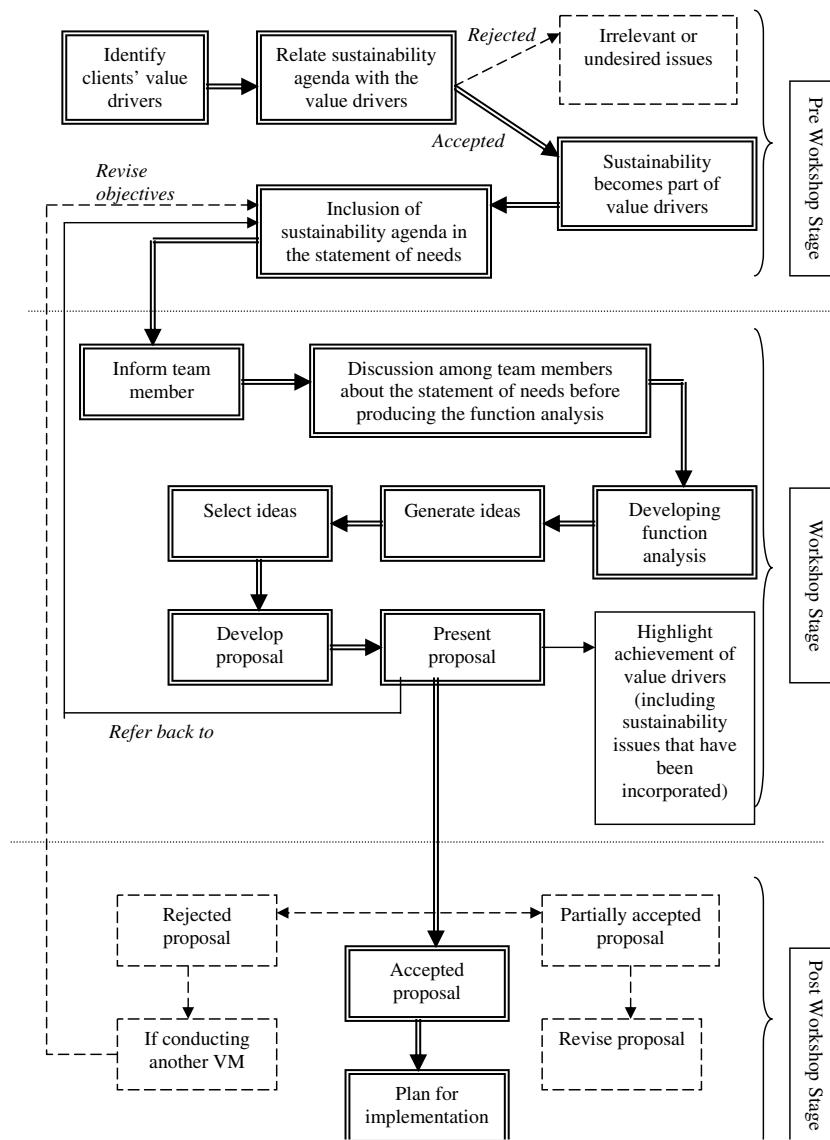


of players of VM namely clients, facilitators and team members. The studies revealed where sustainability issues need to be focused and what are the hurdles that need to be account for to promote effective integration.

From the knowledge gathered, a structural model of integration is proposed, which integrates the concept and issues of sustainability within the activities of VM. This model, which is shown in Fig. 4, illustrates where sustainability issues should be raised and revisited within VM. The flow of this model followed the widely accepted process of VM. This model proposed that sustainability issues should be introduced to the clients at pre-workshop stage. These issues should be discussed in conjunction with the clients' value drivers. Issues that have gained client's interests would be treated as part of client's needs and then brought into the VM workshop to be incorporated into the function analysis. It is a common practice to have the

team members discussing about the clients' needs and interest. Changes to improve value drivers at this point are usually allowable. It is important to ensure that sustainability priorities are not sidelined after this discussion. Inclusion of these issues in the function analysis diagram would ensure these issues received continuous attention throughout the workshop phase. Then, ideas would be generated and the best ones would be selected for further development. When presenting the proposal, it was expected that the features of sustainability would be highlighted along with other important aspects such as cost estimation, time estimation and others.

This model has outlined the likely path for bringing sustainability issues to the attention of the clients and other VM participants and proposed that the decisions made on sustainability before the workshop takes place will influence the rest of VM process and will affect the extent of sus-



tainability issues considered in VM. The model is a useful framework for better integration of sustainability issues into future practices of VM.

7. Recommendation

The integration of sustainability into VM is a new territory in research. Research can be extended in many angles. Among those are

- The role of VM clients in bringing wider attention to sustainability issues during the workshops is important. The level of clients' demand for sustainability varied across workshop, which would affect the level of sustainability being considered in the workshops. For future works, it is recommended to focus on the client's perspective and experience of this area and search for ways to bring clients into sustainability thinking and visions. Research could be pursued in improving the pre-workshop stage where there is a close interaction between clients and the VM facilitators in determining the workshop scopes and identifying needs. A study on sustainability priorities on different groups of stakeholders and the issue of how it affects the scope of VM workshop would be useful. This would widen sustainability issues beyond those considered important by the VM practitioners and promote satisfaction to the projects' stakeholders.
- It is believed that clients would be interested in sustainability if there were a real incentive for it. They need evidence that sustainability issues would benefit them in monetary terms i.e. profit, low cost, etc. Research on how sustainability issues benefited the clients and projects, how it became important in real decision-makings and where VM stands in this situation would bring confidence to clients on sustainability issues.
- The early interaction between clients and facilitators creates an opportunity to persuade clients' commitment to it. The presence of the facilitator is ideal to advise and guide the team members into producing sustainable outcomes. However, the facilitators are hesitant to persuade clients towards sustainability. It would be useful to conduct research on the VM facilitators' role in bringing about more sustainable visions and thinking.
- The role of the team members in incorporating sustainability issues into VM is also important. Study in this area would assist in understanding the contribution and the limitations of team members for improving sustainability.

8. Conclusion

VM is a robust mechanism to deliver the balance triumvirate of society, environmental and economics because of the integrated decision-making process inherent in the VM process; the potential of VM in distilling objectives towards

the desired outcomes and the powerful facilitation. This positive remark on VM to support sustainability came from the realisation of the apparent strengths of VM to raise sustainability in the project process. The integration of sustainability into VM refers to the combination of sustainability aspects into VM practices to enable those issues be considered and integrated throughout the whole process and decision-makings in VM. Bringing sustainability into VM would affect the scope and focus of study. The effects of bringing sustainability into VM were discussed in three levels: input, process and output. Field studies were conducted to investigate whether present VM practices able to fulfil and integrate sustainability needs. The theoretical aspect of integration form a strong platform for understanding the use of VM as a mode to deliver sustainability, while the field study deepen this understanding on the roles of the three groups of players of VM. From the findings of the field studies, it was concluded that the integration of sustainability required participation from all players of VM to ensure effective integration. A structural model was presented to illustrate the holistic picture of integration. It is hoped that the findings of this research will become a stepping-stone towards further research in this field.

References

- [1] Thomson DS, Austin SA, Mills GR, Devine-Wright H. Addressing the subjective view of value delivery. In: The proceedings of the RICS foundation construction and building research conference, second September 2003, University of Wolverhampton, p. 197–213.
- [2] Hayles C. The role of value management in the construction of sustainable communities. *The Value Manager* 2004;10(1). <http://www.hkivm.com.hk/publications/04/TVM2004-1.pdf>.
- [3] BedZED. BioRegional Zero Energy Development. <http://www.bio-regional.com/zero>, 2002.
- [4] Commission for Architecture and the Built Environment (CABE). The value of good design: public perception. <http://www.cabe.org.uk/pdf/TheValueofGoodDesign.pdf>, 2002.
- [5] Addis B, Talbot R. Sustainable construction procurement: a guide to delivering environmentally responsible projects, CIRIA C571, London: CIRIA, 2001.
- [6] WS Atkins Consultants. Sustainable construction: company indicator, CIRIA C563, London: CIRIA, 2001.
- [7] Stansfield K. Setting a new agenda for sustainable construction. *Struct Eng* 2001;79(12):19. June 14–15.
- [8] MaSC. Managing sustainable companies (formerly known as Managing Sustainable Construction Profiting from Sustainability), http://projects.bre.co.uk/masc/pdfs/masc_brochure.pdf, 2002.
- [9] Zainul Abidin N, Pasquire CL. Moving towards sustainability through value management. In: Proceedings of the joint international symposium of CIB working commissions W55, W65 and W107, Singapore, vol. 2, October 2003. p. 258–68.
- [10] Zainul Abidin N, Pasquire CL. Delivering sustainability through value management: the concept and performance overview. *Eng Constr Archit Manage* 2005;12(2):168–80.
- [11] Male S, Kelly J, Fernie S, Gronquist M, Bowles G. The value management benchmark: a good practice framework for clients and practitioners. London: Thomas Telford; 1998.
- [12] Institute of Value Management Australia. In: International conference of the Institute of Value Management 2002, Balancing the Scorecard, Hobart, Tasmania, Australia.



- [13] Institute of Value Management Hong Kong. In: International conference of the Institute of Value Management 1999, Managing Sustainable Value, Hong Kong.
- [14] BRE Scotland. Report on value management workshops for community self build Scotland. <http://www.bre.co.uk/scotlab>, 2001.
- [15] Stephenson M. How can value engineering be used to enhance the sustainability of major engineering developments? MSc Dissertation. United Kingdom: University of Strathclyde, 2003.
- [16] Institute of Value Management United Kingdom. Fact sheet – what is value management, http://www.ivm.org.uk/vm_whatism.htm, 2002.
- [17] Hamilton A. Considering value during early project development: a product case study. *Int J Project Manage* 2002;20:131–6.
- [18] Woodhead RM, Downs C. Value management: improving capabilities. London: Thomas Telford; 2001.
- [19] Schneider M. Value management and sustainability: an opportunity to revolutionize the construction industry. Managing Sustainable Values. In: Proceedings of the international conference of the Institute of Value Management, 6–7 May, Hong Kong, 1999.
- [20] Connaughton JN, Green SD. Value management in construction: a client's guide. London: CIRIA; 1996.
- [21] Norton BR, McElligott WC. Value management in construction: a practical guide. London: Macmillan Press; 1995.
- [22] Kelly J, Hunter K, Male S. The client's value system explored: case studies from the UK public sector. In: Proceedings of the joint international symposium of CIB working commissions W55, W65 and W107, Singapore, vol. 1, 2003. p. 423–33.
- [23] British Standard EN 12973. BS EN 12973: value management. <http://bsonline.techindex.co.uk>, 2000.
- [24] Pasquire CL, Maruo K. A comparison of value management methodology in the UK, USA and Japan. *J Financial Property Constr* 2001;6(1):19–29.
- [25] Leung MY, Liu AMM. Developing a value management model – by value-goal system approach. In: Proceeding of the 14th annual conference of the association of researchers in construction management (ARCOM), Reading, 1998. p. 496–505.
- [26] Dallas M. Revolutionising the way we build. Managing sustainable values. In: Proceedings of the international conference of the Institute of Value Management, 6–7 May, Hong Kong, 1999.
- [27] Fong SW. Value management – going all out for knowledge creation. *The Value Manager* 2003;9(1). <http://www.hkivm.com.hk/publications/03/TVM2003-1.pdf>.
- [28] Zainul Abidin N. Using value management to improve the consideration of sustainability within construction, PhD thesis, United Kingdom: Loughborough University, 2005.

