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Improvement of Public Engagement Performance *for* Planning and Development Projects *via* a Value Management Approach – A Pilot Study

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EXECUTIVE SUMMARY

1. In recent years, public engagement (PE) has become a popular way for the government to collect public opinions and achieve a consensus for planning and development projects in Hong Kong (HKSAR Policy Address 2009, 2010). However, the government is still blamed for various blunders and inadequate transparency in making decisions in certain development projects (e.g., the Western Kowloon Cultural District Development, the Queen's Pier Demolition, and the Guangzhou-Shenzhen-Hong Kong Express Rail Link).

2. This project aims to improve the PE outcomes for planning and development projects in Hong Kong by adopting a systematic and logical value management (VM) approach. To achieve this aim, the following objectives need to be reached:

   (1) review the international literatures on PE and VM knowledge and practices;

   (2) identify PE factors in the team process based on VM characteristics;

   (3) identify major criteria for measuring PE outcomes; and

   (4) investigate the relationships between the identified PE factors (item 2) and the PE outcomes (item 3) in society.

3. Based on the extensive literature on PE, VM, and behavioral team decision-making, a questionnaire was designed and given to various stakeholders who have direct experience in PE projects. The data was analyzed systematically with descriptive statistics, reliability analysis, and correlations.

4. On the basis of the literature review, the study identified nine **PE team process** factors, including four **hard systematic phases** (the information phase, function analysis phase, creativity phase, and evaluation phase), five **soft PE team behavioral** factors (team conflict, task conflict, constructive conflict, external efficacy, and internal efficacy), and three **PE outcomes** (project performance, team spirit, and organizational reputation).

5. The results of descriptive analysis indicate that (1) PE stakeholders over age 31 are satisfied with the hard systematic phases and final PE outcomes, while younger stakeholders are satisfied with soft team behaviors; (2) male stakeholders are more satisfied with the PE team process factors and PE outcomes than females; (3) PE stakeholders with higher education levels are more satisfied with PE team process factors, while those who are not highly educated are more satisfied with the PE outcomes; (4) PE projects initiated by the government and statutory bodies garner higher satisfaction for PE hard systematic phase factors and PE outcomes, while those initiated by private organizations garner higher satisfaction for soft team behavioral factors; and (5) the more PE activities stakeholders participated in, the more likely they are to be satisfied with the PE team process and final outcomes.

6. PE *hard systematic phases* (composed of information, function analysis, creativity, and evaluation phases) work together as complementary parts of a systematic approach, helping increase project performance, team spirit, and organizational reputation. The information phase is positively related to project performance, team spirit, and organizational reputation. The function analysis phase is positively related to both team spirit and organizational reputation. The creativity phase is related to team spirit.
7. Among elements of *soft team behavior*, task conflict has a negative linear relationship with final PE project performance, while constructive conflict has a positive relationship with team spirit and organizational reputation. Moreover, external and internal efficacies are found to be positively related to project performance, team spirit, and organizational reputation.
8. The results of this study lead to several practical suggestions. First, the government should focus on soft team behavioral factors and plan a friendly PE for planning and development projects, while private initiators are suggested to use the logical PE process. Second, during the PE team process, a systematic VM approach is highly recommended in order to share information in the information phase, analyze information and specify project objectives in the function analysis phase, and generate ideas in line with project objectives in the creativity phase. Third, specific information (e.g., project background, common issues, and constraints) needs to be well prepared in order to get a better understanding of the planning and development projects during the information phase. Fourth, the function analysis phase should be used to connect all PE phases into a systematic process. Fifth, various creative techniques are applied to generate ideas to fit project functions and objectives and foster team spirit among stakeholders. PE facilitators are recommended to evaluate creative ideas generated in the previous phase. Sixth, in order to reduce task conflict and use it in a constructive way, PE projects need effective conflict management. Last, the PE organizer is suggested to report all public opinions after PE, increasing the publicity of PE projects through multiple channels and approaching public opinions, especially for planning and development projects.
9. The study provides a good platform for further large-scale study. Personal interviews, focus groups, and case studies should be conducted in order to develop a comprehensive PE model and establish integrated PE guidelines. Stakeholder management is highly suggested to be considered in the further PE research. Moreover, a longitudinal study should be conducted to compare differences before and after PE projects.

Content

1. INTRODUCTION

The Hong Kong government has used **public engagement (PE)** in planning and development projects to gauge public opinion and achieve social consensus (HKSAR Policy Address 2009, 2010). Pressure to conduct PE for planning and development projects is particularly high, especially for the booming construction industry, such as the ten major infrastructure projects. However, the public has expressed social discontent and disputed several construction projects, such as the Western Kowloon Cultural District Development, the Guangzhou-Shenzhen-Hong Kong Express Rail Link, and the Hong Kong-Zhuhai-Macao Bridge (SCMP 2011).

PE refers to active citizen participation to establish a relationship with the government and engage in decision-making and policy-making (OECD 2001). Construction projects generally involve multi-disciplinary stakeholders and have the potential to generate severe conflict. Engaging various stakeholders in PE—especially in planning and development projects—is one of the most direct approaches for reducing conflict and increasing social consensus (Rowe and Frewer 2005). However, the current methods, processes, and performance of PE projects are often criticized as window-dressing activities, limited to managing conflict and balancing benefits among stakeholders with different interests and expectations (Gregory 2000).

The Hong Kong government has strongly encouraged the use of **value management (VM)** as a systematic and logical methodology in construction projects since 1998 (WBTC 2002). Apart from establishing a systematic team decision-making process (i.e., information, function analysis, creativity, evaluation, development, and presentation), VM can help stakeholders express their expectations openly, resolve conflicts, evaluate all explicit ideas and options, achieve common goals, and increase final satisfaction and social cohesion (Leung et al. 2004).

This project aims to improve PE outcomes for planning and development projects in Hong Kong with the systematic and logical VM approach. In order to achieve the desired project aim, the following objectives of the project need to be achieved:

1. review the literature on PE and VM knowledge and practices;
2. identify PE factors in the team process based on VM characteristics;
3. identify major criteria for measuring PE outcomes; and
4. investigate the relationships between the identified PE factors and the PE outcomes in society.

One expected deliverable of the project is a list of factors that affect PE outcomes. The project will provide critical data from formal studies, and it will suggest practices in the industry for establishing and standardizing a logical and systematic PE process for planning and development projects in Hong Kong. This could enhance the performance of PE projects in the industry, improve the reputation of the PE organizer (both the governmental departments and the private developer), and strengthen social relationships and team spirit among stakeholders.

2. CURRENT PUBLIC ENGAGEMENT PRACTICES

Following the Hong Kong government's encouragement of PE in planning and development projects (HKSAR Policy Address 2007-2011), PE has been widely adopted to tackle social discontent and gain public support for construction projects (e.g., the Hong Kong Island East Harbor-front project, CARE 2009; the Lok Ma Chau Loop project, Planning Department 2011; the West Kowloon Cultural District, Public Policy Research Institute 2010; Table 1). However, there is still a lack of comprehensive and standardized guidelines and policies for PE in the industry. Therefore, a logical and systematic PE process is urgently needed for planning and development PE projects in Hong Kong. To tackle this challenge, this project proposes using systematic VM for PE for construction projects.

Table 1 Systematic VM Phases and Current PE Processes (CARE 2009; CEDD 2010; Planning Department 2008, 2011; Public Policy Research Institute 2010)

Systematic VM process (SAVE 2007)	**Current /Previous PE Project Activities**					
	Wan~~i~~ Chai Development 05	**Land Use for Closed Area 08**	**HK Island East Harborfront 09**	**Lung Tsun Stong Bridge 10**	**West Kowloon Cul'l District 10**	**Lok Ma Chau Loop 11**
1. **Information phase**	Stage 1 – 1 expert forum 5 public forums	Stage 1 – 3 public forums to collect data on 3 themes	1 Drawing campaign	1 Public forum meetings with DC	Stage 1 – website 3 public forums 61 focus groups	1 website 1 public forum 3 exhibitions
2. **Function analysis phase**	-	-	-	-	-	-
3. **Creativity phase**	2 community charrettes	-	1 Brainstorming workshop 1 drawing campaign	1 Brainstorming workshop	Stage 1 – website 3 public forums 61 focus group	1 public forum
4. **Evaluation phase**	1 expert forum	-	1 Questionnaire	-	Stage 2 – public forum focus group	-
5. **Development phase**	-	-	-	-	Conceptual plan	-
6. **Presentation phase**	1 consolidation forum	Stage 2 – 2 public forums	-	-	Stage 3 – public display	-

Due to the complexity of PE, the government often carries out a number of activities during PE projects, including focus groups, workshops, public forums,

games, road shows, and exhibitions (Lim et al. 2005; Table 1). Some PE activities are categorized as one-way communication methods (e.g., exhibitions, road shows, and surveys), while some are two-way communication with interactive team processes (e.g., focus groups, workshops, and public forums). PE with two-way communication is seen as a direct approach to hear the voices of representative stakeholders and fulfill their vital interests (Rowe and Frewer 2005). This study focuses on two-way interactive PE activities with team decision-making processes.

3. VALUE MANAGEMENT

The construction industry has used systematic VM since 1963 (Dell'Isola 1997). It has also been successfully used in Hong Kong (WBTC 2002). VM is a team decision-making process with participation from stakeholders from different disciplines. VM uses the function-oriented systematic and logical process to achieve the maximum value for the money. This project proposes that VM be applied in PE projects in order to integrate public views, analyze public interests, and meet stakeholder expectations.

From the VM approach, PE uses a six-phase methodology, which consists of the information phase, function analysis phase, creativity phase, evaluation phase, development phase, and presentation phase (SAVE 2007). All these phases together compose the hard system, which uses various techniques to identify project objectives and solve problems. Each phase achieves particular outcomes through the application of systematic activities in a logical sequence. Current PE activities can be categorized into the different phases shown in Table 1. Moreover, the behavior of the PE team is also critical for the success of PE. Apart from the hard VM system, the major characteristics of soft VM (such as conflict) should also be involved in the PE project (Leung et al. 2002; Liu and Leung 2002; Rowe and Gammack 2004). Soft VM is derived from soft system thinking, which takes into account human behavior in a problem situation.

4. PUBLIC ENGAGEMENT

Researchers have identified various factors important to PE, such as teamwork, conflict, and efficacy. An extensive literature review reveals that PE consists of team process factors and outcomes.

4.1 PE Team Process Factors

PE projects with team processes are commonly used to encourage the public to express their expectations and demands. Yet there is still no systematic and logical procedure for conducting PE projects. This study proposes that VM be applied in the PE process to analyze public interests and meet the demands of stakeholders. In the VM approach, PE team process factors consist of hard systematic phases and soft team behaviors.

4.1.1 PE Hard Systematic Phases

By the application of the VM approach, the PE team process should consist of six systematic phases (the information, function analysis, creativity, evaluation, development, and presentation phase) and various interactive techniques, including functional analysis, brainstorming, and evaluation matrices (Leung et al. 2004; SAVE 2007). The systematic phases are the major hard components of the systematic PE process, which help the PE team resolve technical problems.

In the *information phase*, PE participants review background information for the project, including stakeholder needs and wants, project constraints, budgetary limits, project duration, and quality requirements. In the information phase, PE participants also define current conditions and key issues of the PE project (Leung and Liu 2003; Male et al. 1998). Information needs to be specific, accessible, accurate, and sufficient, and it needs to come from the best possible source with tangible evidence and facts (Leung and Wong 2008).

The *function analysis phase* is a key component of the whole PE process with the application of VM approach. The PE team reviews and analyzes functions to determine how to improve and achieve stakeholder expectations. In this phase, the PE team analyzes the project from a functional perspective, establishes a function model, and identifies value-mismatched functions (SAVE 2007). The purpose of the function analysis phase is to understand the project, clarify the stakeholders' specific values and objectives, and logically analyze the functions of the team dynamics (Leung et al. 2004; Leung and Wong 2008).

The *creativity phase* is usually the most vibrant stage in the overall PE workshop process. It influences the final outcomes by generating an abundance of ideas to fulfill the functions and project objectives (SAVE 2007). In the creativity phase, the PE team uses creativity techniques (e.g., brainstorming) to generate innovative ideas to perform project functions, especially mismatched functions identified in the previous phase (Male et al. 1998).

In the *evaluation phase*, participants evaluate the creative ideas with the greatest potential for improving project performance (SAVE 2007). The PE team follows a structured evaluation process and uses various techniques and multiple criteria to assess ideas to increase value or reduce risk while delivering the project functions and considering performance requirements, stakeholder priority, and resource limitation (Male et al. 1998).

The purpose of the *development phase* is to develop the ideas selected during the preceding evaluation phase into practicable proposals and establish an action plan (Male et al. 1998). In this phase, the PE team needs to compare the proposed solutions based on the functions identified in the function analysis phase and the criteria established in the evaluation phase, prepare a written proposal for each idea, conduct a cost-benefit analysis, generate sketches, and develop an action plan (SAVE 2007).

Finally, the PE team presents a formal presentation and a detailed written report to the client and/or design team in the *presentation phase* (Male et al. 1998; SAVE 2007). This report concludes the development of the project's specific value and identified goal and the establishment of an action plan.

4.1.2 Soft PE Team Behavior

In order to conduct PE projects successfully, human behavior (such as *conflict* and *efficacy*) need to be considered because both systematic procedure and human behavior are equally important (Liu and Leung 2002). Conflict is an omnipresent feature of PE teams that involve multiple stakeholders. Conflict can be recognized as *task conflict* and *team conflict* (Leung et al. 2005). Task conflict arises from differences in judgment or perspective on the projects and tasks (Amason 1996); team conflict arises from incompatibilities between people or prior disputes (Jehn 1994). Although excessive conflicts (i.e., over-stimulation) impede satisfaction, insufficient conflict (i.e., under-stimulation) can actually hamper thorough consideration and interaction, and thereby lead to poor or incomprehensive resolutions (De Dreu 2006). To optimize performance and satisfaction, workshops should have a *moderate level of conflict*. Therefore, this study hypothesized that the relationships between team /task conflict and PE outcomes are curvilinear (i.e., inverted-U shape), as shown in Figure 1.

Constructive conflict makes team members work hard and feel energized (Deutsch 1994;). It is thought of as essential for creative thinking and critical evaluation, which influence the quality of selected solutions and final project outcomes (Leung et al. 2004). Therefore, a linear relationship between constructive conflict and PE outcomes is hypothesized (see Figure 1).

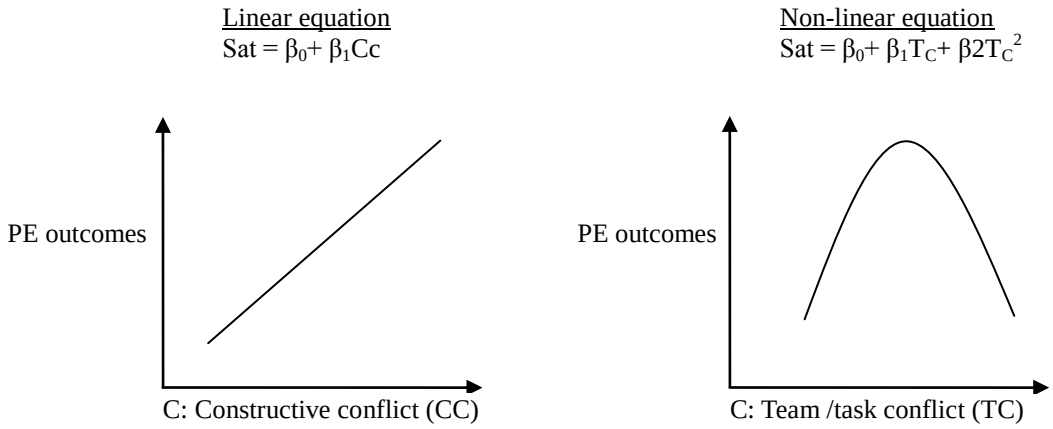


Figure 1 Linear regression line and curvilinear relationship between conflict and PE outcomes (Deutsch 1994; Leung et al. 2005; Rahim 2001)

PE in planning and development projects should take into account the concept of efficacy, while efficacy contains two separate components: internal and external efficacy (Craig et al. 1990). *Internal efficacy* refers to the belief that stakeholders can understand their own competence and participate effectively in the PE process. PE participants with high internal efficacy consider themselves well qualified and well informed about PE activities (Craig et al. 1990). *External efficacy* refers to the level of confidence and trust in the PE project initiator's capability and willingness to bring stakeholders into the decision-making process (Niemi et al. 1991). Stakeholders tend to be engaged in PE projects if they feel the authority pays attention to public needs and demands (i.e., external efficacy) or if stakeholders feel well-informed and qualified and that their opinions can be understood by the authority (i.e., internal efficacy).

4.2 PE Outcomes

PE outcomes can be tangible and intangible (Hackman 1990). PE project outcomes can be categorized as project performance, team spirit, and organizational reputation.

PE *project performance* focuses on physical effectiveness and productive outputs, such as a drawing, a proposal, or decisions made by representative stakeholders. Productive outputs can also be based on criteria like quantity, quality, and timeliness (Hackman 1990). For planning and development projects, PE project performance can be measured in terms of the quality of the decisions made, the objectives achieved, and the future impact.

Through the PE team process, stakeholders tend to collaborate and interact frequently and work together as a team for future implementation of PE so that they develop team spirit. *Team spirit* helps improve communication among

stakeholders, balance stakeholder interests, increase mutual support, and enhance team cohesion (Hoegl and Gemuenden 2001).

Organizational reputation is commonly defined as cognitive representations of the organization shared by the general public (Coombs and Hollabay 2006). Organizations try to protect their reputations because they are a valuable and intangible asset. Organizations develop reputations through their relationship with the public (Yang and Grunig 2005). PE can stimulate a positive interaction between the government and the general public and improve the organizational reputation.

5. MODEL DEVELOPMENT

Successful PE projects need to follow a systematic process that can identify key issues, analyze common problems, specify project objectives, generate creative ideas, evaluate desirable ideas, resolve conflict, and increase the efficacy of stakeholders. Using this team process should improve PE project performance, team spirit, and organizational reputation. Based on the extensive literature review, Figure 2 outlines the PE Team Process-Outcomes (TP-O) conceptual model of PE.

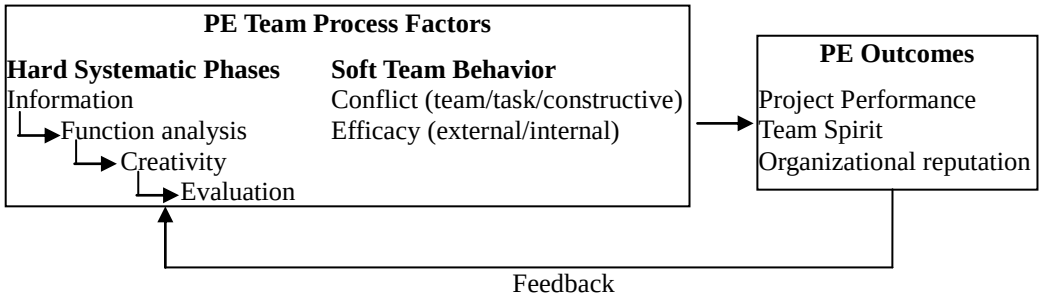


Figure 2 A Conceptual PE TP-O Model for Planning and Development Projects

In Hong Kong, PE projects organize a series of workshops which have been shortened to a half-day or one day long (Planning Department 2009; Public Policy Research Institute 2010). The development and presentation phases are conducted at the post-workshop stage. In this study, the interactive PE team process therefore concentrates on the information phase, function analysis phase, creativity phase, and evaluation phase. This study hypothesizes that both the hard systematic phases with VM (information, function analysis, creativity, and evaluation) and the soft team behavioral factors (team conflict, task conflict, constructive conflict, and efficacy) will affect the final PE outcomes (project performance, team spirit, and organizational reputation). The final PE outcomes can provide feedback for future PE implementation and development.

6. RESEARCH METHODS

In order to investigate the relationships between PE factors in the conceptual PE TP-O model, a questionnaire was designed. The questionnaire had three parts: (1) background information; (2) PE team process factors; and (3) PE outcomes. Participants rated PE team process factors and PE outcomes on a seven-point Likert scale, ranging from one (*strongly disagree*) to seven (*strongly agree*). The literature review revealed measurement scales that have been used for various PE factors, including hard systematic phases (Leung et al. 2004; Leung and Liu 2003; SAVE 2007), soft team behaviors (Leung et al. 2005; Niemi et al. 1991) and PE outcomes (Leung and Liu 2003). All surveys were used in previous studies and proved to be reliable and valid. This study used purposive sampling (Adams and Schvaneveldt 1985), in which respondents were selected only if they: (1) had direct experience participating in PE activities and (2) had participated in a PE for planning and development project before they filled out the survey.

Several statistical methods—descriptive analysis, reliability analysis, and correlation analysis—were used to analyze the quantitative data collected from the questionnaire using SPSS version 19.0. Descriptive analysis was used to explore the characteristics of the PE factors across people of different demographic backgrounds. Reliability analysis was used to ensure the internal consistency of each factor, and correlations were used to investigate how various PE team process factors were related to the final outcomes.

7. RESULTS

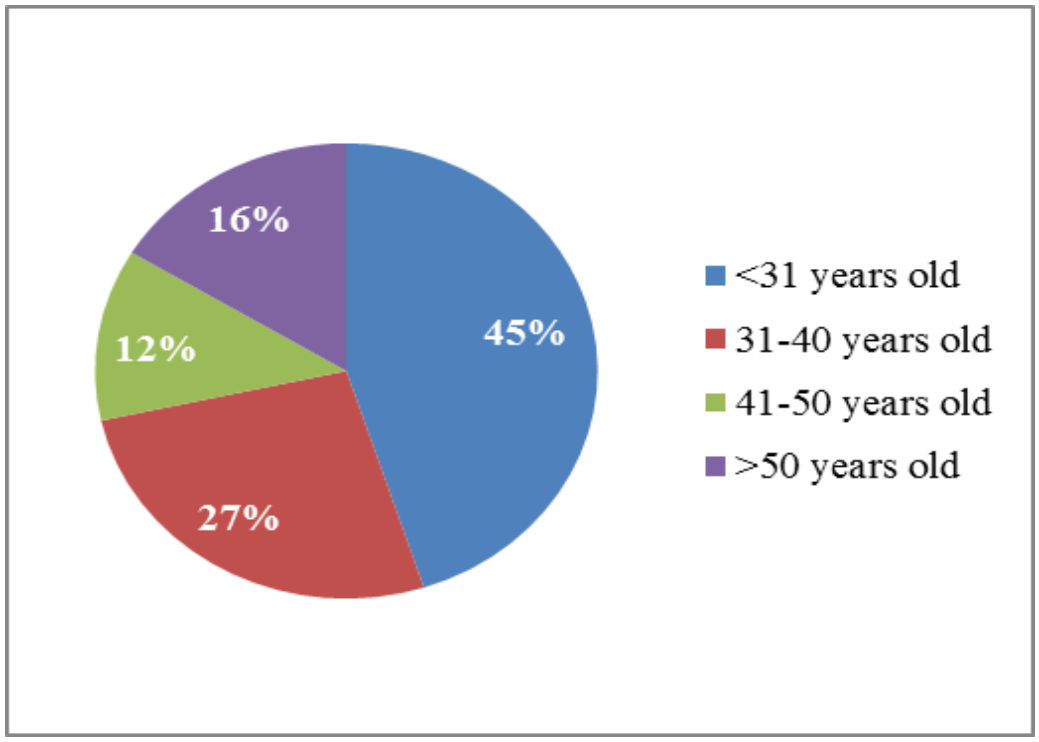
7.1 Background Information

Approximately 400 questionnaires were delivered by hand, email, fax, and mail to various stakeholders who have direct experience in PE projects. In the end, 72 questionnaires were returned, of which 57 sets were valid for data analysis, representing a 14% response rate. The respondents included multi-disciplinary stakeholders, such as district councilors, construction professionals, academic researchers, environmentalists, local residents, and local business owners. Table 2 describes respondents' background information.

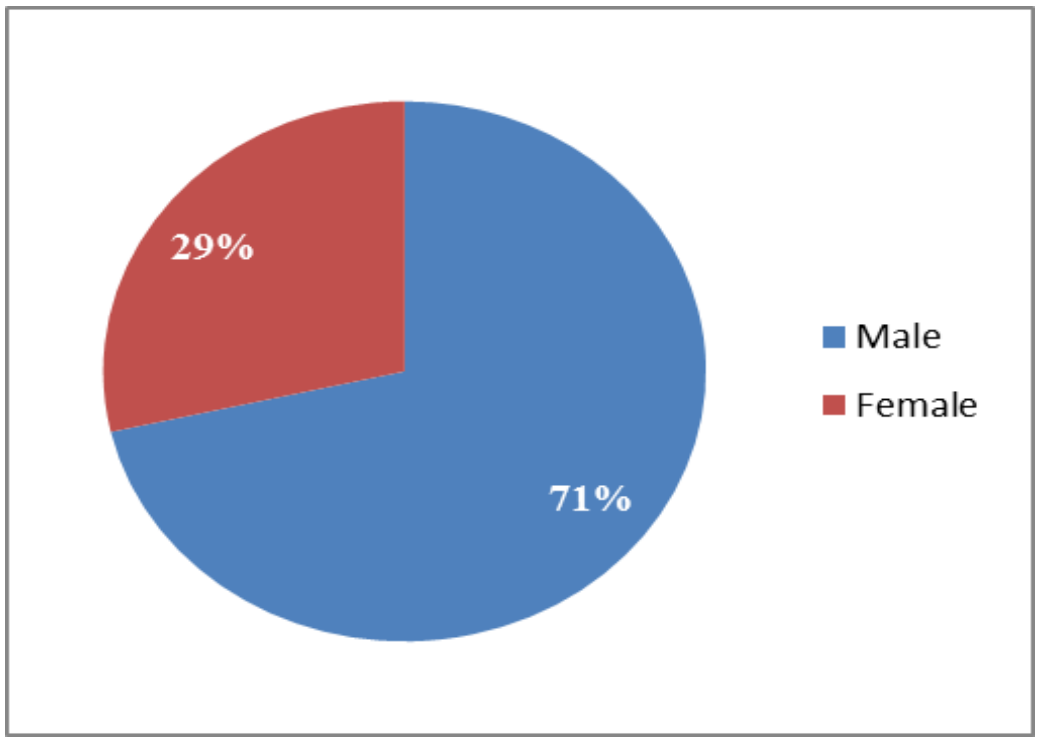
Table 2 Background Information of the Respondents

Background Information		Frequency	Percentage	Cumulative Percent
Age	< 31	22	45.0	45.0
	31-40	13	26.5	71.5
	41-50	6	12.2	83.7
	> 50	8	16.3	100.0
Gender	Male	35	71.4	71.4
	Female	14	28.6	100.0
Education	High School Diploma	6	13.0	13.0
	Bachelor's	20	43.4	56.4
	Master's	11	23.8	80.2
	Doctorate	4	9.0	89.2
	Other	5	10.8	100.0
PE Initiator	Government agency	24	60.0	60.0
	Statutory body	6	15.0	75.0
	Private organization	4	10.0	85.0
	Other	6	15.0	100.0
No. of PE activities conducted in the project	One	9	23.1	23.1
	Two	7	17.9	41.0
	Three	7	17.9	58.9
	Four	5	12.8	71.7
	> Four	11	28.3	100.0
PE activities	Survey	14	24.6	24.6
	Workshop	20	35.1	59.7
	Public forum	23	40.4	100.1
	Citizen hearing	4	7.0	107.1
	Gaming	3	5.3	112.4
	Road show	7	12.3	124.7
	Other	3	5.3	130.0
PE techniques	Brainstorming	20	35.1	35.1
	Gordon technique	3	5.3	40.4
	Functional analysis	10	17.5	57.9
	FAST diagram	2	3.5	61.4
	Mind map	8	14.0	75.4
	Criteria scoring matrix	3	5.3	80.7
	Analysis matrix	2	3.5	84.2
	Feasibility ranking	7	12.3	96.5
	Life cycle cost	1	1.8	98.3
	Time/cost/quality analysis	8	14.0	112.3
	Others	0		

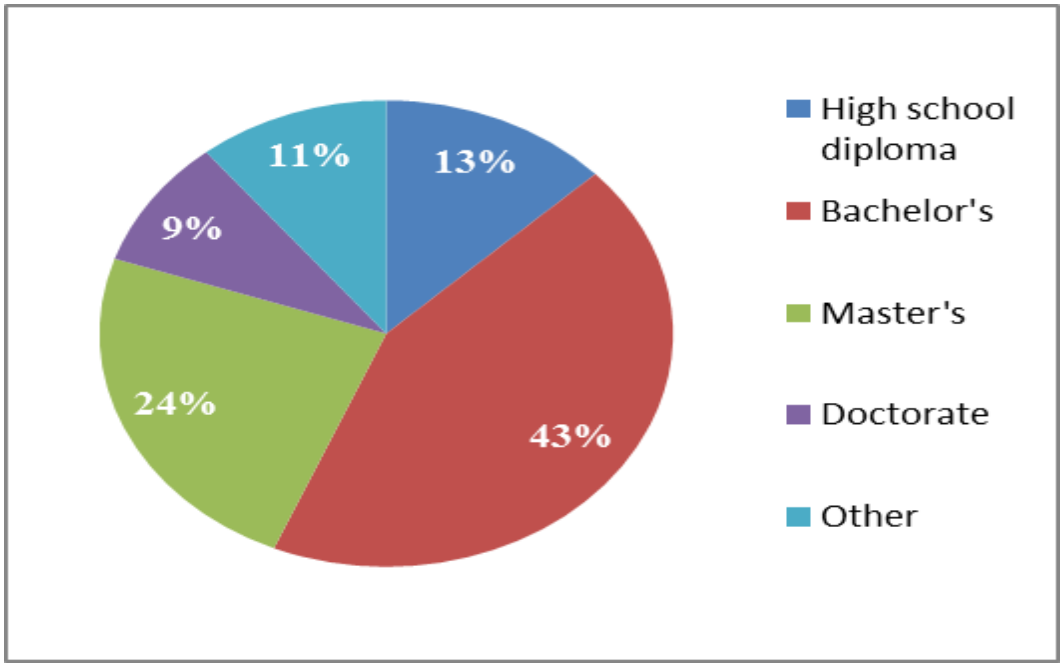
The majority of respondents are male (71.4%), aged below 31 (45%), and hold bachelor's degrees (43.4%; shown in Table 3 and Figure 3). There were 22 (45%) respondents below age 30, 13 (26.5%) between 31 and 40, 6 (12.2%) between 41 and 50, and 8 (16.3%) above 50. Most of respondents had tertiary education; 43.4% had bachelor's degrees, and 32.8% had master's or doctorate degrees.



(a) Age



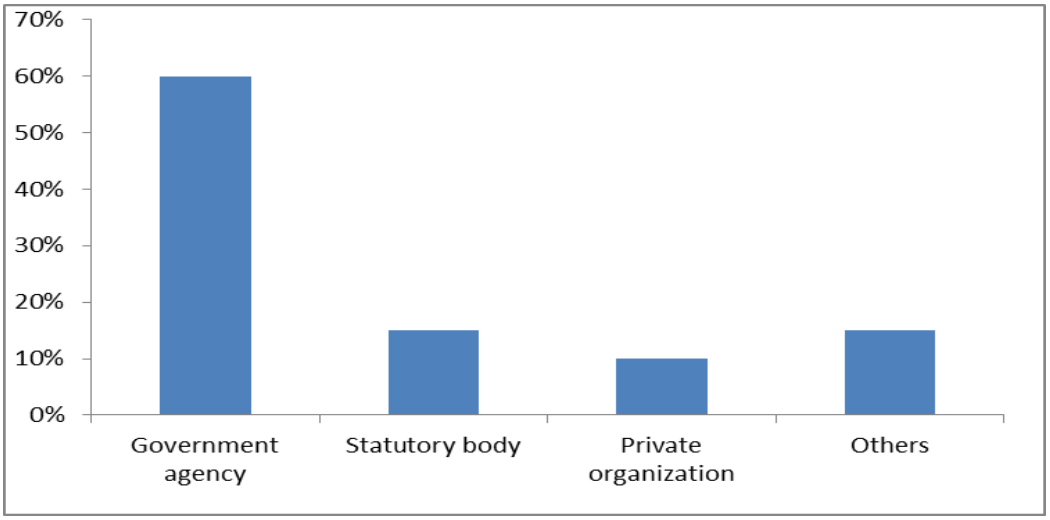
(b) Gender



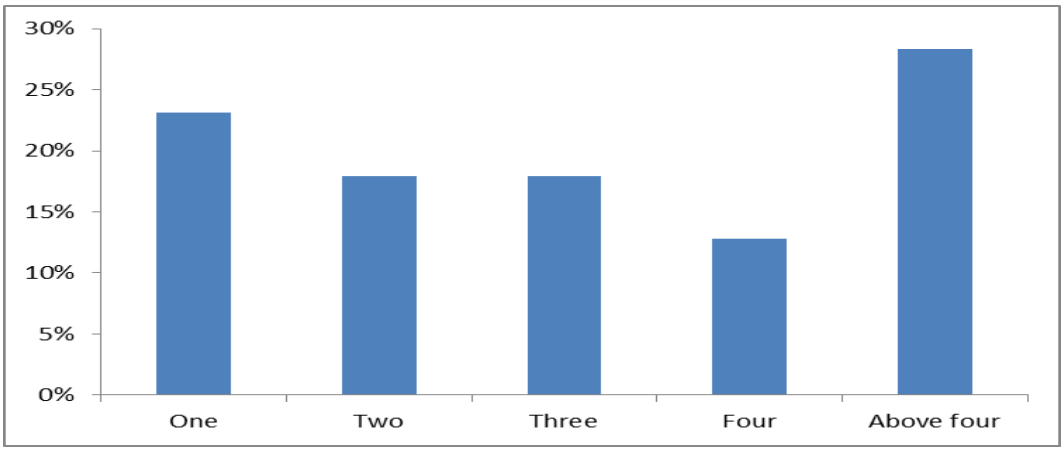
(c) Education

Figure 3 Background Information of the Respondents

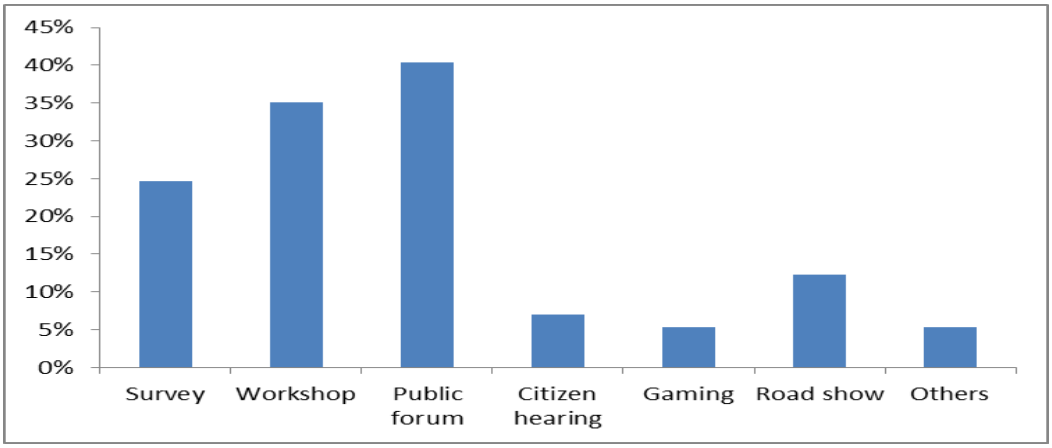
As shown in Figure 4, the PE projects that respondents had participated in were organized by government agencies (60.0%), statutory bodies such as the Legislative Council (15.0%), the private sector (10.0%), and others (15.0%). The PE projects included one PE activity (23.1%), two PE activities (17.9%), three PE activities (17.9%), four PE activities (12.8%), and more than four PE activities (28.3%). The most frequent PE activities were surveys (24.6%), workshops (35.1%), and public forums (40.4%). Citizen hearings (7%), games (5.3%), road shows (12.3%), and other activities (5.3%) were less common. Commonly used techniques in the PE team process included brainstorming (35.1%), functional analysis (17.5%), mind mapping (14.0%), and time/cost/quality analysis (14.0%).



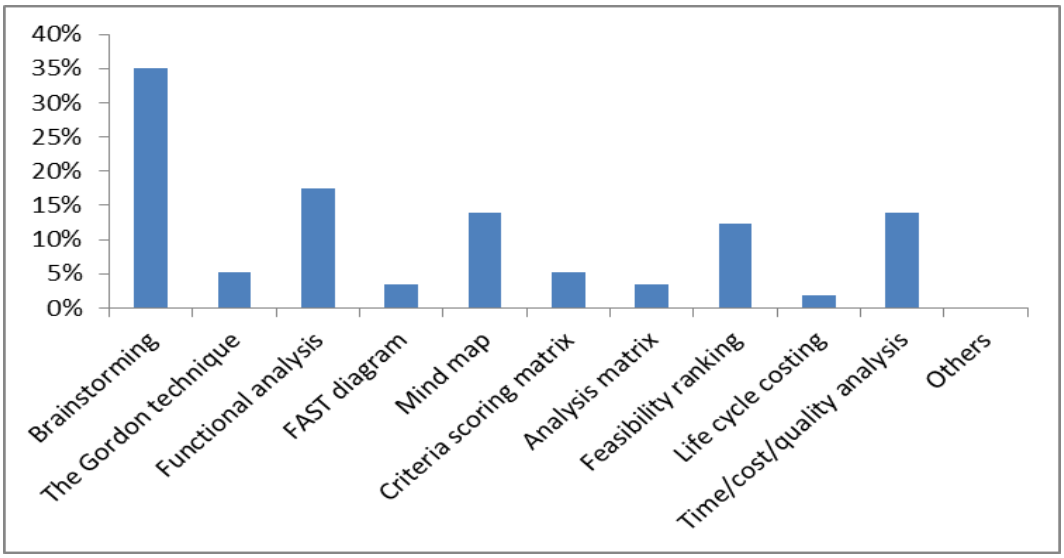
(a) PE initiator



(b) No. of PE activities



(c) PE activities



(d) PE techniques

Figure 4 Background of Respondents' PE Experience of the Respondents

In sum, most of the PE projects respondents had participated in were organized by government agencies (60.0%), with more than four activities (28.3%). The most common activity was public forums (40.4%; shown in Table 3 and Figure 4). The most common technique used in PE team process was brainstorming (35.1%).

7.2 PE Factors

Although previous studies validated the measurement scales for PE factors, Cronbach's alpha tests of reliability test were calculated to ensure the internal consistency of each factor. A factor with a Cronbach's alpha value greater than 0.5 is acceptable for an early stage of research (Nually 1978). With Cronbach's alphas ranging from 0.531 to 0.900, all PE factors were reliable (see Table 3). In total, there were nine PE **team process factors:** hard systematic phases using the VM approach (i.e., *the information phase [TP1], analysis phase [TP2], creativity phase [TP3], and evaluation phase [TP4]*); soft team behaviors (i.e., *team conflict [TP5], task conflict [TP6],* and *constructive conflict [TP7], external efficacy [TP8],* and *internal efficacy [TP9]*). The three PE **outcome** factors (*project performance [PO1], team spirit [PO2],* and *organizational reputation [PO3]*) got the alpha values of 0.70, 0.80, and 0.584.

Table 3 Summary of PE team process factors

PE Factors	Description	Alpha
TP1 – Information phase	Expressing views openly Sharing /specifying /understanding /exchanging information Identifying project requirements	0.843
TP2 – Function analysis phase	Defining functions with verb-noun phases Asking "why" and "how" questions Doing function analysis or FAST diagrams	0.691
TP3 – Creativity phase	Emphasizing quantity of ideas Generating creative ideas	0.531
TP4 – Evaluation phase	Voting on /scoring /evaluating ideas Combining similar ideas into categories Eliminating nonsense ideas	0.637
TP5 – Team conflict	Tension /personal friction among participants Conflicting ideas in the team	0.859
TP6 – Task conflict	Disagreeing with others' opinions for the project /PE process Excessive conflict about the project	0.765
TP7 – Constructive conflict	Working through /benefiting from conflict Constructive changes from conflict Influence to accept ideas	0.570
TP8 – External efficacy	Influence on PE project Caring about what people think	0.857
TP9 – Internal efficacy	Being well-informed /good understanding of PE Being well-qualified for PE Competent at PE	0.695

7.3 Descriptive Analysis of PE Team Process Factors and PE Outcomes

Since the differing backgrounds of the stakeholders and of the PE projects they participated in might influence the team process factors and outcomes, descriptive analysis was used to compare all PE factors based on age, gender, and education of PE participants, PE project initiator, and number of PE activities.

The results of descriptive analysis in Table 4 indicate that PE stakeholders over 31 years old were more satisfied with the hard systematic phases (Mean = 67.0), while those younger than 31 were more satisfied with the soft team behaviors (73.5). Male stakeholders tended to be more pleased with the systematic phases and team behaviors (66.72 and 72.79, respectively) than female participants. PE stakeholders with higher education levels were more satisfied with PE team process factors (69.67 for hard systematic phases and 71.10 for soft team behaviors).

PE projects that were initiated by the government and statutory bodies got higher levels of satisfaction with hard systematic phases (Mean = 66.82), while those initiated by private organizations got more satisfaction with their team behaviors (72.90). Participants were more satisfied with PE projects that had more than three activities in both hard systematic phases and soft team behavioral factors (70.89 and 71.43, respectively).

Table 4 Satisfactory of PE Team Process Factors (Hard Systematic Phases and Soft Team Behaviors) with Respect to Different Backgrounds

PE Background Information		Hard systematic phases		Soft team behaviors	
		Mean	**SD**	**Mean**	**SD**
General		65.75	11.09	71.58	8.94
Age	< 31	65.14	10.70	**73.50**	9.76
	≥ 31	**67.00**	11.17	69.48	8.81
Gender	Male	**66.72**	9.39	**72.79**	8.95
	Female	64.54	14.53	67.07	8.90
Education	< Bachelor	65.54	11.84	70.20	7.60
	≥ Bachelor	**69.67**	6.01	**71.10**	9.73
PE Initiator	Gov. & Statutory	**66.82**	9.08	67.64	8.72
	Private & others	64.70	11.40	**72.90**	7.56
No. of activities	< Three	60.81	12.39	67.27	10.13
	≥ Three	**70.89**	10.62	**71.43**	7.80

As shown in Table 5, PE stakeholders over age 31 years are satisfied with project performance (Mean = 14.75), team spirit (18.00), and organizational reputation (9.37). Male PE stakeholders were more pleased with PE project performance (14.69), team spirit (17.89), and organizational reputation (9.29). PE stakeholders with higher education levels were more satisfied with PE

outcome factors: project performance (14.83), team spirit (18.17), and organizational reputation (9.50).

PE projects initiated by government agencies and statutory bodies scored higher on project performance, team spirit, and organizational reputation (Mean = 15.07, 17.90, and 9.40, respectively). PE projects that conducted more than three PE activities had higher satisfaction with project performance, team spirit, and organizational reputation (15.88, 18.09, and 10.00, respectively).

Table 5 Satisfaction with PE Outcomes with Respect to Different Backgrounds

PE and Background Factors		Project Performance		Team Spirit		Org. Reputation	
		Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
General		14.48	2.92	17.79	3.79	9.07	2.21
Age	< 31	14.18	2.26	17.36	4.11	8.91	2.04
	≥ 31	**14.75**	2.99	**18.00**	3.67	**9.37**	2.40
Gender	Male	**14.69**	2.82	**17.89**	4.24	**9.29**	2.31
	Female	13.43	1.79	16.93	2.65	8.57	2.21
Education	< Bachelor	**14.83**	2.12	**18.17**	3.06	**9.50**	1.64
	≥ Bachelor	13.09	2.48	17.90	3.86	9.08	2.44
PE Initiator	Gov. & statutory	**15.07**	2.83	**17.90**	3.54	**9.40**	2.36
	Private & others	13.70	1.57	17.20	5.41	8.90	2.51
No. of activities	< Three	14.48	2.43	16.81	4.29	8.19	2.20
	≥ Three	**15.88**	2.87	**18.09**	3.68	**10.00**	2.38

The results of the descriptive analysis indicate that the demographic background of the stakeholder groups and factors of the PE project are related to satisfaction with PE team process factors and PE outcomes. PE organizers should consider stakeholder composition and project particulars when planning PE projects. PE stakeholders over age 31 are concerned with the hard systematic phases and are pleased with PE outcomes, while younger stakeholders focus more on soft team behaviors and are less satisfied with PE outcomes. Male stakeholders are more satisfied with PE team process factors and PE outcomes than females. Stakeholders with higher education levels emphasize PE team process factors, while those who are not as highly educated are more satisfied with final PE outcomes. Stakeholders are more satisfied with the outcomes of PE projects initiated by the government and statutory bodies, in which systematic phases are emphasized. The results suggest that, as PE projects include more activities, satisfaction with both the team process and PE outcomes increase.

7.4 Correlation Analysis

Correlations were used to identify the major PE factors related to final PE outcomes in planning and development projects. The relationships between PE team process factors and PE outcomes can inspire PE organizers and

construction professionals in their planning and conducting of PE projects. Pearson's correlation coefficients are a measurement of linear association between two variables. Coefficients range from -1 to +1, where -1 represents a perfectly negative relationship, +1 means a perfectly positive relationship, and zero means no relationship at all. P-values are the probability that the correlation coefficient is in fact zero (null hypothesis). If the p-value is lower than the conventional 5% ($p < 0.05$) and 1% ($p < 0.01$), the correlation coefficient is considered statistically significant at the 0.05 and 0.01 levels, respectively.

Table 6 shows the relationships between various PE hard systematic phases. The results indicate that (1) information phase (TP1) is significantly positively related with the function analysis phase (TP2), $r = 0.563$, $p < 0.01$. (2) The function analysis phase (TP2), creativity phase (TP3), and evaluation phase (TP4) are significantly interrelated (the function analysis phase was positively related to the creativity phase and evaluation phase, $r = 0.544$ and 0.605, $p < 0.01$; the creativity phase was positively related to the evaluation phase, $r = 0.467$, $p < 0.01$). The example of the correlation between information phase (TP1) and function analysis phase (TP2) is illustrated in Figure 5. The figure demonstrates the positive linear relationship between two variables.

Table 6 Correlations among PE Hard Systematic Phases

PE Hard Systematic Phases	TP1	TP2	TP3	TP4
TP1 – Information phase	1			
TP2 – Function analysis phase	**0.563****	1		
TP3 – Creativity phase	0.244	**0.544****	1	
TP4 – Evaluation phase	0.115	**0.605****	**0.467****	1

Note: * Correlation is significant at the 0.05 level (2-tailed);
** Correlation is significant at the 0.01 level (2-tailed).

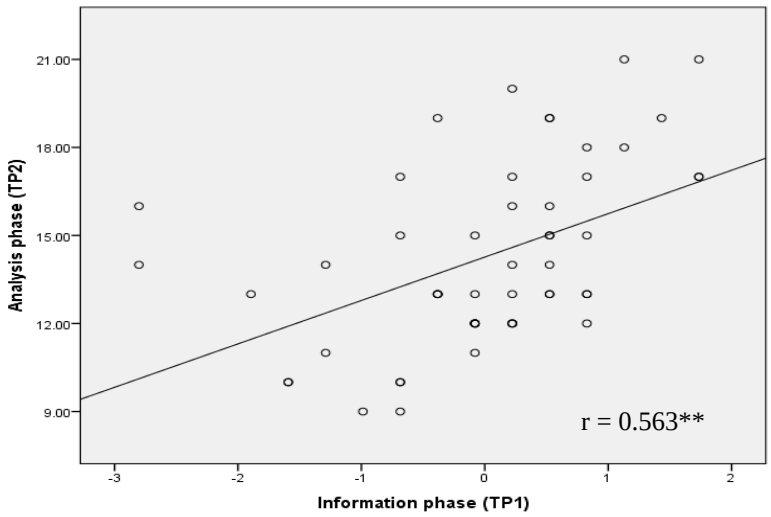


Figure 5 Linear Relationships between Information (TP1) & Function Analysis phases (TP2)
Note: ○– Individual observations; ——— – Linear regression line

Among soft team behavioral factors, there were significant positive relationships between team conflict (TP5) and task conflict (TP6), $r = 0.410$, $p < 0.01$, and between external efficacy (TP8) and internal efficacy (TP9), $r = 0.304$, $p < 0.05$ (see Table 7). Figure 6, as an example, illustrates the correlation between team conflict (TP5) and task conflict (TP6).

Table 7 Correlations among PE Soft Team Behaviors

PE Soft Team Behaviors	TP5	TP6	TP7	TP8	TP9
TP5 – Team conflict	1				
TP6 – Task conflict	**0.410****	1			
TP7 – Constructive conflict	0.236	0.238	1		
TP8 – External efficacy	0.246	0.261	0.018	1	
TP9 – Internal efficacy	-0.165	-0.139	0.227	**0.304***	1

Note: * Correlation is significant at the 0.05 level (2-tailed);
** Correlation is significant at the 0.01 level (2-tailed).

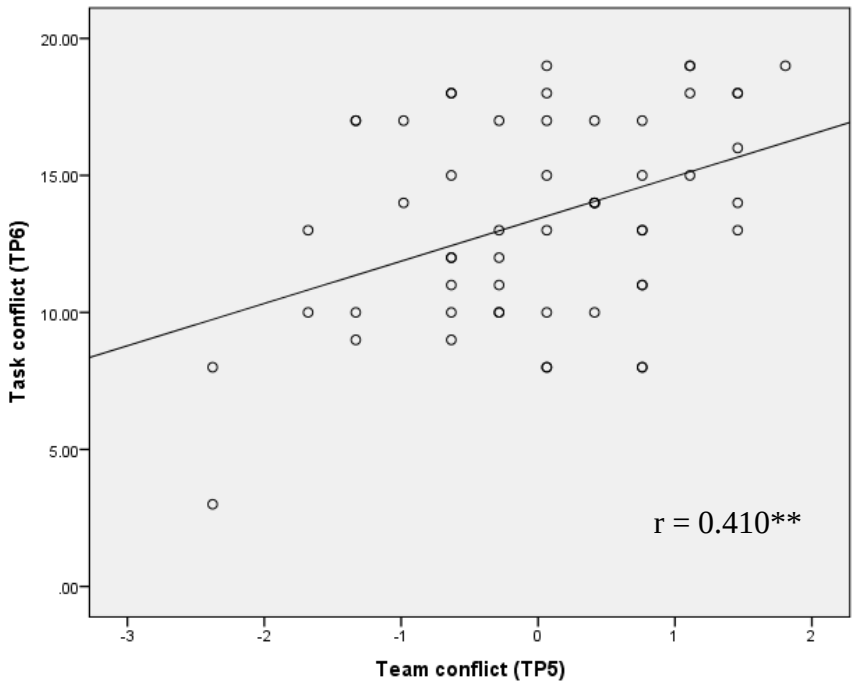


Figure 6 Linear Relationships between Team conflict (TP5) and Task conflict (TP6)
Note: ○– Individual observations; ——— – Linear regression line

The relationships among team process factors and PE outcomes were also investigated. The results in Table 8 show that (1) hard systematic phases, especially the information, function analysis, and creativity phases (TP1, TP2 and TP3), had significant and positive relationships with PE outcomes (the information phase [TP1] was positively related to PE project performance [PO1], $r = 0.478$, $p < 0.01$, team spirit [PO2], $r = 0.583$, $p < 0.01$, and organizational reputation [PO3], $r = 0.525$, $p < 0.01$; the function analysis phase

[TP2] was positively related to team spirit [PO2], $r = 0.412$, $p < 0.01$, and organizational reputation [PO3], $r = 0.584$, $p < 0.01$; the creativity phase [TP3] was positively related to team spirit [PO2], $r = 0.384$, $p < 0.01$). (2) Task conflict (TP6) was negatively related to PE project performance (PO1), $r = -0.350$, $p < 0.01$, and constructive conflict (TP7) was positively related to team spirit (PO2), $r = 0.336$, $p < 0.05$, and organizational reputation (PO3), $r = 0.474$, $p < 0.01$. (3) External efficacy (TP8) and internal efficacy (TP9) were positively related to project performance (PO1), $r = 0.352$, 0.413, $p < 0.01$, team spirit (PO2), $r = 0.349$, 0.473, $p < 0.01$, and organizational reputation (PO3), $r = 0.301$, $p < 0.05$, $r = 0.464$, $p < 0.01$.

Table 8 Correlations between PE Team Process Factors and PE Outcomes

PE Outcomes	PE Team Process factors								
	Hard Systematic Phases				Soft Team Behaviors				
	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9
PO1 – Performance	**0.478****	0.148	0.260	-0.160	-0.175	**-0.350****	0.195	**0.352****	**0.413****
PO2 – Team spirit	**0.583****	**0.412****	**0.384****	0.218	-0.193	-0.150	**0.336***	**0.349****	**0.473****
PO3 – Organizational reputation	**0.525****	**0.584****	0.070	-0.009	-0.205	-0.058	**0.474****	**0.301***	**0.464****

Note: * Correlation is significant at the 0.05 level (2-tailed);
** Correlation is significant at the 0.01 level (2-tailed);
PE factors refer to Table 3.

Figures 7 illustrate examples of the correlations between PE team process factor (TP1: information phase) and PE outcomes (PO1: project performance and PO2: team spirit). The figures revealed that the variables are significantly related in a linear fashion. In addition, as the points form a line pointing upwards to the right, the relationships between the variables were positive.

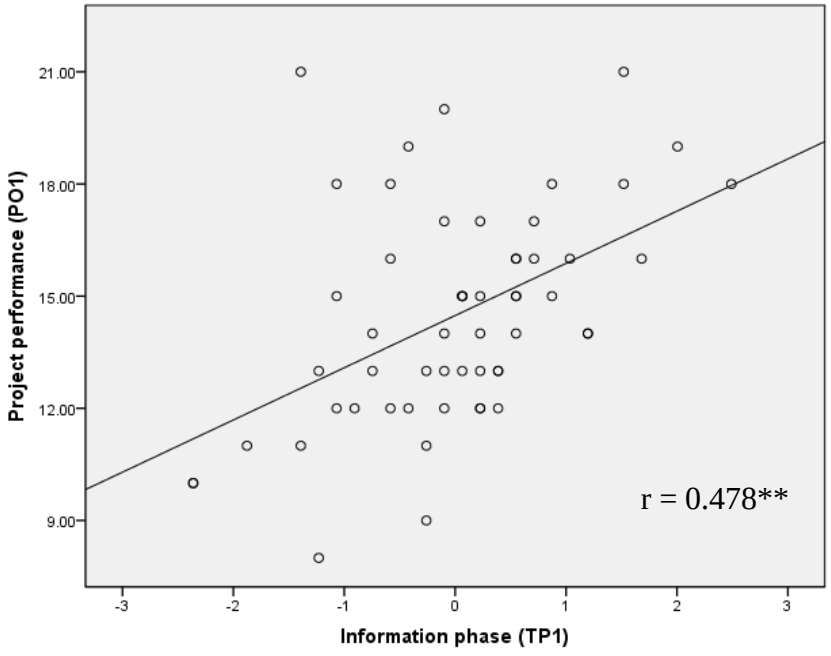


Figure 7 Linear Relationships between Information Phase (TP1) and Project performance (PO1)
Note: ○– Individual observations; ——— – Linear regression line

8. DISCUSSION

Based on the results of the correlation analysis (see Tables 6-8), Figure 8 summarizes the complicated relationships between PE team process factors and PE outcomes.

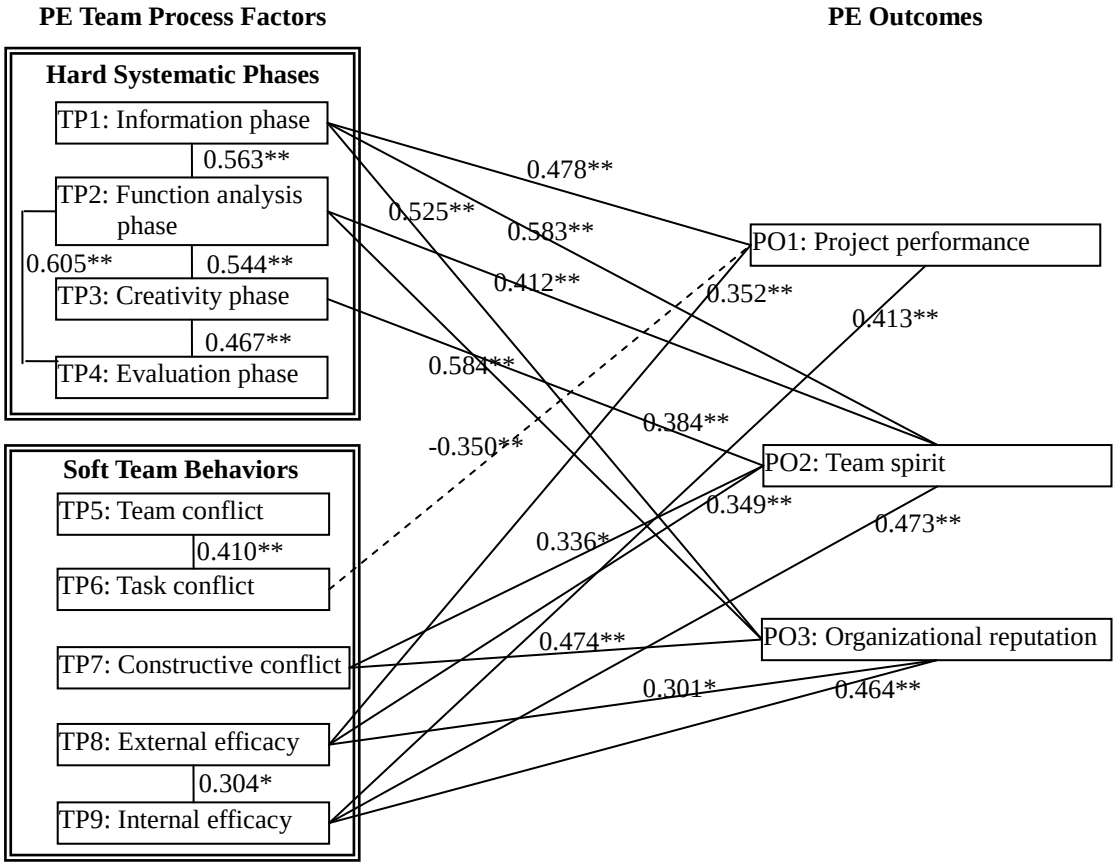


Figure 8 Relationships between PE Team Process Factors and PE Outcomes

Note: Refer to Tables 6-8 for all correlations;
——— positive, significant linear relationship (correlation shown);
- - - - - negative, significant linear relationship (correlation shown).

8.1 The Relationship between PE Hard Systematic Phases and PE Outcomes

In this study, most hard PE team process factors had significant positive interrelationships. The results indicate that PE is a *systematic process* with different phases related to each other. Applying the VM approach makes the PE team process a standard system. All systematic VM phases are meant to be used as a whole to collect public opinions, analyze common issues, generate creative ideas, select appropriate solutions, resolve common problems, and finally improve project outcomes.

The systematic hard PE process—especially the information, function analysis, and creativity phases—relates to final PE outcomes directly. As the first phase of the PE team decision-making process, the *information phase* is positively related to the subsequent function analysis phase. It has a direct impact on project performance, team spirit, and organizational reputation. In the information phase, stakeholders can share background information, express opinions openly, and identify key issues (Dell'Isola 1997). As the planning and development projects are often complicated, it is helpful for stakeholders to get basic understandings of the whole project through information phase. Thus, sufficient and specific information leads to improved decisions, project performance, team spirit, and organizational reputation.

The *function analysis phase* is positively related to team spirit and organizational reputation. It is a crucial phase that is positively related with other phases in the PE team process (i.e., the information, creativity, and evaluation phase). The planning and development projects often involve multi-discipline stakeholders with disparate objectives. In the function analysis phase, stakeholders are encouraged to use various analytical techniques to analyze the project from a functional perspective, identify diffident requirements and objectives as well as specify the project major missions and functions. At the end of the analysis phase, specific objectives should be established with common understanding and consensus among stakeholders (Leung and Liu 2003). This study therefore indicates that the function analysis phase helps use specific information from the information phase, stimulate the creativity and evaluation phases, cultivate team spirit, and promote organizational reputation.

The results indicated that the *creativity phase* had a positive relationship with team spirit. It was also positively related to the function analysis and evaluation phases. In the creativity phase, stakeholders develop a broad array of ideas, which tally with the project functions and objectives developed in analysis phase. Those creative ideas still need to be assessed in the subsequent evaluation phase. As the liveliest phase in the systematic PE process, the creativity phase helps stakeholders produce possible solutions in an open atmosphere. That kind of team discussion environment is good at fostering team spirit among relevant stakeholders (Deutsch 1994).

It is interesting that the evaluation phase had no direct relationship with PE outcomes. However, the *evaluation phase* is significantly related to the function analysis and creativity phases. In the evaluation phase, stakeholders are asked to evaluate all ideas raised in the creativity phase in terms of project functions, specific objectives, and other evaluation criteria. It is difficult to distinguish the unique effects of the evaluation phase, which is the last phase of the whole

systematic PE decision-making process. The evaluation phase has impact on PE outcomes by interacting with the function analysis and creativity phases.

8.2 The Relationship between PE Soft Team Behaviors and PE Performance

Apart from the hard systematic phases, soft team behaviors involved in the PE team process were also related to PE outcomes. Conflict is inevitable in the planning and development projects which often engage multiple stakeholders with different opinions, requirements and demands. Task conflict is negatively related to project performance, while constructive conflict is positively related to team spirit and organizational reputation. Team conflict among relevant stakeholders may be serious in the PE decision-making process, but it has no relationship with final PE outcomes. PE stakeholders may be so rational and task-oriented that they are concerned about task conflict for the complicated planning projects, but not personal tension among stakeholders (Leung et al. 2004). However, constructive conflict leads stakeholders to work hard, makes them feel energized and satisfied, promotes useful exchanges, encourages teamwork, and produces intangible benefits (Deutsch 1994). Constructive conflict is directly positively related to team spirit and organizational reputation.

Efficacy can be seen as the major motivation of stakeholders to engage in social and community activities (Niemi et al. 1991). Both external and internal efficacies are positively related to final PE outcomes. With higher *external efficacy*, stakeholders feel that they have more influence on the final PE decisions and that the authority cares about their needs and demands. Stakeholders thus tend to more actively participate in PE projects, share their opinions, and express what they really want (Petts 2008). Therefore, it can improve the final PE outcomes in all three aspects. *Internal efficacy* is positively related with external efficacy and PE outcomes and influences the final PE outcomes through an interaction with external efficacy. High internal efficacy enables participants to feel more competent to engage in the PE team decision-making process, improving team spirit, PE performance, and organizational reputation.

8.3 The Integrated PE Model

To sum up, the model shown in Figure 8 indicates the complex relationships among PE team process factors and final PE outcomes identified in the study. Various PE phases (i.e., the information, function analysis, creativity, and evaluation phases) can be conducted as a systematic process. The hard systematic phases (especially the information, function analysis, and creativity phases) are directly related to project performance, team spirit, and

organizational reputation. Besides the systematic phases, soft team behaviors including conflict and efficacy affect are related to final PE outcomes. Task conflict is the only PE team process factor that is negatively related to project performance. Constructive conflict and external/internal efficacy are positively related to project performance, team spirit, and organizational reputation. VM (both hard systematic phases and soft team behavioral factors) therefore can be used to improve PE outcomes for planning and development projects in terms of project performance, team spirit, and organizational reputation.

9. RECOMMENDATIONS

The final model provides practical recommendations for how to implement systematic VM in the PE team process to improve the final outcomes for planning and development projects. To improve project performance, team spirit, and organizational reputation, we need to conduct VM *systematically*, prepare specific information, analyze the project functionally, specify project objectives, generate creative ideas, improve efficacy (external and internal), reduce task conflict, and use task conflict in a constructive way. Based on the results of the current study, Table 9 summarizes a number of recommendations, which establish a logical and systematic PE process for planning and development projects in Hong Kong.

Table 9 Practical Recommendations for Future PE Projects

Background Information	**Plan PE**	**PE outcomes**
- Project initiators	- Encourage the government to pay attention to soft team behavioral factors and conduct the PE in a friendly manner; and - Encourage private organizations to consider the logical PE process applied by the government.	- Increases satisfaction with PE outcomes.
PE Team Process Factors		
Hard Systematic Phases	***Use the Systematic Logical VM Process***	***PE outcomes***
- Systematic VM process	- Conduct systematic VM phase-by-phase; - Identify project issues and establish a base for the function analysis phase ; - Analyze project information functionally and specify project objectives in the function analysis phase; and - Generate ideas in line with the functions identified in the creativity phase.	- Improves PE project performance, team spirit, and organizational reputation.
- Information phase	- Prepare and share specific information, including project background, project constraints, environment impact, etc.; and - Create a transparent and open environment.	- Improves PE project performance, team spirit, and organizational reputation.

- Function analysis phase	- Emphasize the application of the function analysis phase; and - Adopt the systematic PE team process completely without eliminating any parts of the phases.	- Improves team spirit and organizational reputation.
- Creativity phase	- Use creative techniques and rules during the PE team process.	- Improves team spirit.
- Evaluation phase	- Evaluate the creative ideas based on the identified functions.	- Improve PE outcomes via other hard systematic phases
Soft Team Behaviors	***Manage conflict***	***PE outcomes***
- Task conflict	- Satisfy urgent need for an effective conflict management approach to reduce task conflict.	- Improve PE project performance.
- Constructive conflict	- Encourage open communication to utilize constructive conflict.	- Enhance team spirit and organizational reputation.
Soft Team Behaviors	***Improve efficacy***	***PE outcomes***
- Internal efficacy	- Report all discussed contents to the general public after each PE activity; and - Encourage publicity of the PE projects through multiple media.	- Improves PE project performance, team spirit, and organizational reputation.
- External efficacy	- Listen to stakeholder and care about stakeholder needs and demands.	- Improves PE project performance, team spirit, and organizational reputation.

First, PE projects initiated by public and private organizations get different levels of satisfaction. When planning PE for development projects, the government and the statutory body should pay attention to the soft team behavioral factors for *conducting a friendly PE process*. Private organizations, which tend to use customized PE, should *consider the logical PE process adopted by the government*.

Second, VM affects PE outcomes, especially the information, function analysis, and creativity phases. As a systematic and logical workshop-based method, VM should be *conducted phase-by-phase* with appropriate techniques. During the PE team process, the information phase is expected to bring stakeholders to a *common understanding* and help them identify project issues, which become an analysis basis for the following phase. After information sharing, participants should *analyze information from a functional perspective and specify project objectives* in the function analysis phase. In the creativity phase, stakeholders are expected to *generate many ideas corresponding to the project objectives and functions* identified in the previous phase.

Third, since the information phase is beneficial for project performance, team spirit, and organizational reputation, *specific information* should be well prepared in the information phase, including project background, project

constraints, and environmental impact (Dahlin et al. 2005). Stakeholders, thus, can get a comprehensive understanding of the whole planning and development projects. Hopefully, the information phase could create a transparent and open atmosphere to encourage team discussion in the following phases.

Fourth, in practice, PE projects often ignore the function analysis phase and simply focus on the information collection (e.g., the Hong Kong Island East Harborfront Study, the Hung Shui Kiu New Development; Planning Department 2011). Yet this study found positive relationships of the function analysis phase with other phases and final PE outcomes. It is strongly suggested that PE facilitators *adopt the function analysis in the systematic PE team process as a whole*, rather than eliminating part of the phase or ignoring the function of the analysis phase. In the creativity phase, various *creative techniques and rules* have been suggested to help foster team spirit among stakeholders (Petts 2008). Stakeholders are encouraged to evaluate creative ideas according to project functions and objectives.

The impact of conflict on final PE outcomes can be constructive and destructive. This study suggests that task conflict should be reduced and used in a constructive way. There is thus an urgent need to *bring in an effective conflict management approach* (Rowe and Gammack 2004). To manage conflict constructively, this study recommends *open communication* to help stakeholders understand and ultimately resolve disagreements of the planning and development projects.

Finally, to better inform stakeholders and improve their efficacy for the complicated planning and development project, governmental departments and other PE organizers should *report and publish all discussed contents* to the general public after each PE activity, rather than at the end of the whole PE project. Moreover, PE organizers are advised to take more effort in *publicizing PE projects through multiple channels*, such as leaflets, roadshows, websites, Internet forums, and Facebook. PE organizers should also *listen to stakeholder opinions and care about what stakeholders really want*.

10. FURTHER RESEARCH

This study collected 57 surveys in total, which is a relatively small sample and might involve a potential risk of method biases. However, the current study does establish a preliminary model to provide a reliable platform for the next *large-scale study*. Therefore, we strongly recommend that *more data be collected* in order to refine the current model.

As stakeholders with different backgrounds induce different satisfaction level of the PE project, *stakeholder management* is suggested to be considered in the future PE research. To identify stakeholders involved in PE, *stakeholder attributes* such as power and interest is highly recommended to be investigated. Through the study of stakeholder power and interest, it is expected to engage more representative stakeholders in the PE process to express their views and subsequently establish PE guidelines for stakeholder identification and analysis.

Since the PE team process (including workshops, focus groups, and public forums) emphasizes interaction among participants, participants may have deeper, more contextualized insight into their experiences that questionnaires cannot pick up. To improve reliability, future studies should *distribute the questionnaire after the PE team process to obtain more timely feedback from the participants*. Future studies, such as *personal interview, case studies, and focus groups,* are recommended in order to verify the PE model and deepen understanding of PE. Moreover, PE projects often take several months. Therefore, *longitudinal studies* should be conducted to compare differences before and after PE projects.

11. CONCLUSION

Although the Hong Kong government recently encouraged it, PE has been criticized as lacking a systematic and logical team decision-making process in the planning and development projects. This project applies VM to the PE decision-making process in order to identify stakeholder needs and values, set common goals, improve project performance, and foster team spirit and trusting relationships among representative stakeholders. Based on the literature review of PE and VM, this project identified three PE outcomes: project performance, team spirit, and organizational reputation. This project also identified PE factors that affect the final PE outcomes, four of which are hard systematic phases (the information, function analysis, creativity, and evaluation phases) and five of which are soft team behavioral factors (team, task, and constructive conflict and external and internal efficacy).

The results of the descriptive analysis indicate that stakeholder backgrounds and the PE project itself might affect PE team process factors and outcomes. PE stakeholders older than 31 are more satisfied with the hard systematic phases and PE outcomes, while younger stakeholders are more satisfied with soft team behaviors. Male stakeholders are more satisfied with PE team process factors and final outcomes than females. Stakeholders who are highly educated are more satisfied with the PE team process factors, while those who are not as

highly educated are more satisfied with the PE outcomes. PE project initiated by the government get higher satisfaction ratings of PE hard systematic phases factors and PE outcomes, while those initiated by the private organizations get higher satisfaction ratings of soft team behavioral factors. The more PE activities that are conducted, the more stakeholders are satisfied with the PE team process and PE outcomes.

The study finds that the systematic PE process (especially the information, function analysis, and creativity phases) increase project performance, team spirit, and organizational reputation. Task conflict has a negative linear relationship with project performance, while constructive conflict has a positive relationship with team spirit and organizational reputation. Both external and internal efficacy are directly positively related to the three PE outcome factors.

Based on the results, several practical suggestions are provided in order to establish a logical and systematic PE process in the industry. The government should conduct a friendly PE process and focus on soft team behavioral factors when conducting PE in the planning and development projects. Private organizations are recommended to adopt the logical process in the PE projects. It is highly suggested to incorporate systematic VM phases into the complicated PE team decision-making process for planning and development projects in Hong Kong. In the *information phase*, various techniques should be used to create a transparent environment in which participants can share information openly, identify project issues, and reach a common understanding of the planning and development projects. PE facilitators should adopt function analysis techniques in the *analysis phase* to connect other phases into a systematic team decision-making process. In the *creativity phase*, stakeholders are encouraged to use creative techniques and rules to generate ideas in line with project objectives and improve team spirit. PE participants are recommended to evaluate and assess the creative ideas according to the identified functions and project objectives. To reduce task conflict and use it in a constructive manner, an effective *conflict management* approach is urgently needed. PE organizers are highly encouraged to enlarge PE publicity and publish PE reports through the mass media in order to inform the stakeholders engaged in the planning and development projects. PE organizers should also listen to stakeholder opinions and care about public needs.

To develop a comprehensive PE model and establish PE guidelines for implementation, we strongly recommend that a large-scale survey, interview, focus group, and case study be run to collect more data and verify the preliminary model. Moreover, a longitudinal study is suggested to compare differences before and after PE projects.

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