Government Information Quarterly xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

Government Information Quarterly

journal homepage: www.elsevier.com/locate/govinf

A garbage can model of government IT project failures in developing countries: The effects of leadership, decision structure and team competence

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ARTICLE INFO

Article history:
Received 10 June 2015
Received in revised form 1 August 2016
Accepted 7 August 2016
Available online xxxx

Keywords:
Government IT project
Garbage can theory
Leadership
Decision structure
Project success

ABSTRACT

Government IT projects in developing countries face a number of unique challenges. However, there has been a paucity of research addressing government IT project management in developing countries. Based on the garbage can model, this research discusses and addresses how government IT project in developing countries should be managed from a leadership and decision structure perspective. With samples drawn from 433 IT project participants in Semarang municipal government, Indonesia, this research finds that leadership style is a major predictor of decision structure used in government IT projects. Decision structure, in turn, influences IT project success. Specifically, participative decision structure is positively associated with project success, whereas hierarchical decision structure hurts project performance. Empowering leadership is positively related to participative decision structure, while transactional leadership is positively related to hierarchical decision structure, and laissez-faire leadership is positively associated to specialized decision structure. Finally, team competence moderates the relationship between hierarchical decision structure and project success so that when team competence is low, hierarchical decision making is less negatively related to project success versus when team competence is high. Our findings contribute to the theoretical discourse of garbage can theory by extending it to include leadership style as a key predictor of decision structure in organized anarchy. The implications for government IT project management in developing countries are also discussed.

1. Introduction

The rate of failure for government IT projects is abnormally high in many countries. In the United States, the Government Accountability Office revealed that 49% of federally funded IT projects had been poorly planned, poorly performed, or both (Powner, 2009). In the UK, government agencies have reportedly wasted $4 billion on failed IT projects, achieving a success rate of only 30% (Johnson & Hencke, 2008).

If managing government IT projects is difficult for developed nations, it is even more difficult for developing countries. Research shows that government IT project development efforts in developing countries are largely unsuccessful, with 35% classified as total failures and around 50% classified as partial failures (Heeks, 2008; Heeks & Bailur, 2007).

In light of these high failure rates, extensive research has been devoted to exploring the factors that contribute to the failure of government IT projects. A multitude of causes have been investigated. At the national level, factors such as level of digital literacy, rate of Internet penetration, severity of the digital divide, and trust have been associated with government IT project failures or success (Anthopoulos & Fitsilis, 2014; Heeks & Bailur, 2007; Kim, Pan, & Pan, 2007). At the project level, multiple project failure causes have been identified (for a review, see Dwivedi et al., 2015). For example, Anthopoulos, Reddick, Giannakidou, and Mavridis (2016) found that design-reality gap, poor overall project planning and management, project scope changes, failures in budget and time control led to the failure of an e-government website in the U.S. Gauld (2007) reported that inadequate management support, lack of user involvement, a weak business case and heavy reliance on outsourcing were reasons why an IS project failed in a New Zealand hospital. Janssen, van der Voort, and van Veenstra (2015) highlighted the importance of project dynamics and pointed out that inability to manage project dynamics is an important cause of project failure. For government agencies, power asymmetries, status differences, and self-serving institutional agendas further complicate and introduce risks to IT project management (Dwivedi et al., 2015). These recent findings highlight the importance of conducting research from multiple perspectives and from various organizational contexts. Dwivedi et al.

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http://dx.doi.org/10.1016/j.giq.2016.08.002
0740-624X/

(2015) called for more research examining the underexplored organizational contexts of IS project failure, especially in the public sector.

Government IT projects in developing countries face several unique challenges. First, unlike developed nations, where IT education and training are relatively easy to obtain, developing countries typically do not have educational institutions that provide high-quality training in IT. As a result, government IT staffs and IT managers typically suffer from a lack of proper training and education (Arcieri, Melideo, Nardelli, & Talamo, 2002; Ebrahim & Irani, 2005). Thus, government IT projects are often led by project managers with inadequate competencies in IT and are frequently implemented by team members with insufficient skills and knowledge. Second, developing countries in general have underdeveloped IT industries and deficient IT talent pool. With a few exceptions such as India and China, most developing countries do not have a sizeable IT industry, and generally have poor ICT literacy, awareness, and knowledge (UNCTAD, 2015). Thus, it is very difficult for governments to seek external help to resolve IT issues and therefore must rely on their own resources. Third, governments in developing countries are typically less well-structured compared with those in developed countries. Roles and expectations are typically more fluid, and responsibilities change frequently (Dada, 2006; Ndou, 2004). Finally, government IT projects are typically severely limited in terms of financial resources. Governments in developing countries usually have limited financial resources to spare on IT projects (Beeharry & Schneider, 1996; Gichoya, 2005).

With these limitations, managing government IT projects in developing countries becomes even more challenging. Experiences and insights that are gained from research that is conducted in developed nations may not be readily applied or generalized to developing countries. As the majority of the world's nations are categorized as developing countries, it is imperative that more research on government IT projects are conducted from the perspective of developing countries in order to bridge the gap between the urgent needs for improving government IT projects in developing countries and the paucity of applicable research.

In general, developing countries suffer from a lack of competent people in terms of both team members and leaders for IT projects. Turner (1999) identified the "people" force, i.e. the people on the project, and their management and leadership as two critical factors leading to project success. Leadership is part of the project strategy, which in turn may lead to successful project implementation (Turner, 1999). Unfortunately, most prior literature on project management has largely ignored the impact of project managers and their leadership style on project success (Turner & Müller, 2005). This research attempts to address the challenge of government IT project management in developing countries from a leadership and team competence perspective. Based on the garbage can theory, we develop a theoretical framework that encompasses project leadership, project decision structure, project team competence, and government IT project success. We argue that leadership style determines decision structure in IT project management, which in turn interacts with team competence to predict IT project success.

2. Theoretical framework and hypotheses development

The garbage can model (Cohen, March, & Olsen, 1972) describes organizational decision making in organized anarchies. Organized anarchies are organizations that are characterized by severe ambiguity: there is no clear or consistent notion about what it is they are trying to do (problematic preferences); how it is they are supposed to do it (unclear technology), or who it is that should make decisions (fluid participation). Public sectors are frequently accused of being afflicted with these traits (March & Olsen, 1976; Sager & Rielle, 2013; Sproull, Weiner, & Wolf, 1978). Garbage can theory describes organizations as "collections of choices looking for problems, issues and feelings looking for decision situations in which they might be aired, solutions looking for issues to which there might be an answer, and decision makers looking for work" (Cohen et al., 1972).

The garbage can model elaborated on two aspects of organizational structure: organizational decision-making structure, i.e., the mapping of choices onto decision makers, and access structure, i.e., the mapping of problems onto choices (Levitt & Nass, 1989). The garbage can model implies that in organized anarchies, random outcomes should be expected, as the connections between decisions and outcomes are determined by temporal factors such as loading of the system or timing. However, several studies reported decision making processes tend to become less random and more organized if deadlines are imposed (Eisenhardt & Zbaracki, 1992). Similarly, Levitt and Nass (1989) found that despite the anarchical organizational context, institutional environments may constrain the garbage can processes and lead to homogenized outputs, thus putting a lid on the garbage can. Pinfield (1986) found that participation was not always randomly fluid, but rather a consequence of institutional roles, politics, and the phase of decision process.

Extending the work of Levitt and Nass (1989) and Pinfield (1986), the present research further argues that, in addition to institutional environments and roles, the organizational context influences the garbage-can process and thus may be used to predict outcomes. Specifically, we seek to explore the influence of one particular factor, leadership, in decision-making and project outcomes in organized anarchies.

2.1. Leadership and decision structure in IT projects

There are three types of decision making structure in the garbage can model: hierarchical decision structure, participative decision structure and specialized decision structure (Cohen et al., 1972). If decision makers and choices are arranged in a hierarchy, such that important choices must be made by important decision makers, then it belongs to hierarchical decision making. In participative decision structure, any decision maker can participate in any active choice opportunities. Finally, in specialized decision structure, each decision maker is associated with a single choice and each choice has a single decision maker (Cohen, March, & Olsen, 1972). The three decision structures can coexist in the same team. For example, the manager can engage team members or experts in decision making process (participative or specialized decision structure) for some decisions such as technology choice or timeline projection, but keep the right to make certain decisions such as vendor selection solely to him/herself (hierarchical decision structure). Or, the manager can solicit team member and experts input at the beginning (participative or specialized decision structure), but hold firmly to the final decision rights in the end (hierarchical decision structure).

Decision authority is the hallmark of leadership (van Knippenberg, 2013). Leadership and decision making are greatly interwoven. People who make the final decisions are usually leaders, and those whom we call leaders are always engaged in the decision-making process (Heller, 1992, p2). While firms tend to encourage open discussions and debate, final decision authority often lies with the leader. Leaders have not only the final decision authority, but also the power to structure the decision process, i.e., how decisions are made as they are in charge of the organization structure and allocation of resources (Kotter, 2001; Mintzberg, 2003). van Knippenberg (2013) notes that leaders decide the extent to which followers are involved in the decision-making process.

The processes of decision making overlap with leadership in that both require expertise, effort, formal-informal interaction, and authority level (Heller, 1992). Therefore, what one exhibits as a leader may also be observed in the decision-making process. Therefore, we argue that leadership style is a predictor of the decision-making structure of a team. Specifically, we look at transactional, empowering, and laissez-faire

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leadership and their respective influences on the decision-making structure. Fig. 1 summarizes the research framework.

Transactional leaders influence followers by supplying rewards and punishment strategically and in line with follower performance (Bass & Stogdill, 1990). As performance monitoring is key to the provision of transactional leadership, it is unlikely that leaders involve members in the decision-making process, especially for important decisions, as doing so would make it difficult to identify who contributed to what. Indeed, transactional leadership has been found to negatively related to consensus decision making (Flood et al., 2000). On the contrary, transactional leaders, because of their emphasis on performance and rewards/punishment, are more likely to engage in hierarchical decision making, i.e., leaders make the final decisions, especially for important ones, because transactional leaders tend to work within the existing organizational system (Bass, Waldman, Avolio, & Bebb, 1987), and decision making in traditional organizational systems is typically viewed as the leader's responsibility (Mintzberg, 2003). Thus, we propose:

H1. Transactional leadership style is positively related to hierarchical decision structure.

Empowering leaders encourage employees to actively participate and influence organizational activities and decisions (Spreitzer, 1996). Empowering leaders delegate responsibilities to followers, enhancing followers' capacity to think on their own and encourage them to come up with new and creative ideas (Dvir, Eden, Avolio, & Shamir, 2002; Kark, Shamir, & Chen, 2003). Empowering leadership involves highlighting the significance of the work, providing participation in decision making, conveying confidence, and removing bureaucratic constraints (Ahearne, Mathieu, & Rapp, 2005). Therefore, participative decision making is one important dimension for empowering leadership. Thus, we propose:

H2. Empowering leadership style is positive related to participative decision structure.

Laissez-faire leaders give their members freedom in make decision, how they do their work, and how they fulfill their job. They provide support with resources and advice if needed, but otherwise they do not get involved (Bass & Stogdill, 1990). Under laissez-faire leadership, leaders avoid making decision, while members have total freedom as to who make what decisions. This situation is similar to autonomous or semi-autonomous work groups, where a team of employees are granted autonomy or independence over the work they do within an organization (Pearson, 1992). Researchers observed that in autonomous groups, workers with tacit knowledge closest to the point of production are making operational decisions (Batt, 2004). Therefore, under Laissez-faire leadership, decisions are likely made by those with the most knowledge of the issue, which corresponds to specialized decision structure.

H3. Laissez-faire leadership style is positively related to specialized decision structure.

2.2. Decision structure and IT project outcome

Pinfield (1986) highlighted the role of decision process in the outcomes of organized anarchy. Decision making is vital for IT project success (Jago & Scamell, 1982; Müller & Turner, 2010). Different contexts may favor different decision structures (Andersen & Segars, 2001). In predictable environments where few discrepancies on organizational processes are imposed, hierarchical decision structure is favored. Conversely, in unpredictable environments, organizations face non-routine situations, and are better served through mutual adjustment processes with decentralized decision making (Andersen & Segars, 2001).

Similar to other R&D projects, IT projects typically involve high levels of uncertainty arising from various factors, including: user needs, technological environments, competitive environments, and organizational resources (Souder & Moenaert, 1992). Furthermore, projects may consist of multiple, concurrent, and mutually interrelated workflows (Lawler & Mohrman, 2003). As complexity increases, a project often exceeds the capacity of a single person, or a single team (Hoegl, Weinkauf, & Gemuenden, 2004). For overall performance and successful project integration, both intra-team and inter-team collaboration are vital (Hoegl et al., 2004; Souder & Moenaert, 1992). Thus, considering the complexity and necessity of collaboration, IT projects that adopt a

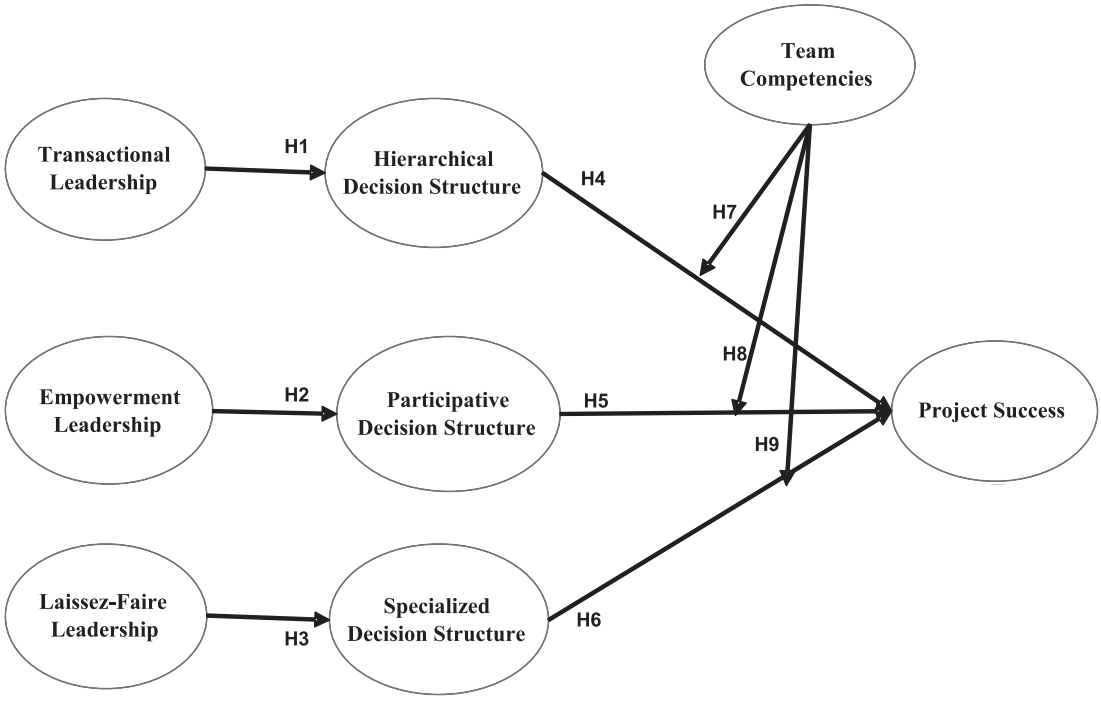

Fig. 1. Research framework.

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decentralized (e.g., participative or specialized) approach to decision making are expected to achieve relatively better project outcomes, while IT projects that adopt a hierarchical approach to decision making are expected to achieve relatively poorer project success. Therefore, we propose:

H4. Hierarchical decision structure is negatively related to project success.

H5. Participative decision structure is positively related to project success.

H6. Specialized decision structure is positively related to project success.

2.3. Team competence as a moderator

Ruuska and Teigland (2009) defined team competence as a group's ability to work together and combine practical competence and interpersonal competence towards a common goal and collective outcome. Collective competence enables the team to achieve ultimate project goals.

However, in most developing countries, government IT project teams suffer from a lack of talent. Imagine that a leader poses a technical question to the team that nobody is able to resolve. In this scenario, it may be more efficient and effective for the leader to assign one team member to research and answer the question properly rather than allowing team members to make random guesses. Alternatively, the leader may choose to consult external sources and make the decision based on expert advice. Thus, when team competence is low, hierarchical decision making and specialized decision making may be positively related to project success, whereas when team competence is high, hierarchical decision making and specialized decision making may be negatively related to project success. Therefore, we hypothesize:

H7. Team competence moderates the relationship between hierarchical decision structure and project success so that when team competence is low, hierarchical decision making is less negatively related to project success versus when team competence is high.

H8. Team competence moderates the relationship between participative decision structure and project success so that when team competence is high, participative decision making is more positively related to project success versus when team competence is low.

H9. Team competence moderates the relationship between specialized decision structure and project success so that when team competence is high, specialized decision making is more positively related to project success versus when team competence is low.

3. Research method

3.1. Participants and data collection

The present research used the survey method to collect data. The target of data collection was the IT Department of Semarang City, the capital of Central Java province. Semarang City is the sixth most-populous city in Indonesia, with a population of approximately 2 million. The city government has 273 branch offices, including district and sub-district offices. One hundred and twelve of these offices maintain an internal IT team.

The IT Department of the Semarang City Government consists of 312 IT engineers, 210 IT project leaders, and 113 functional managers. The latter are responsible for supervising the IT project leaders. A total of 630 questionnaires were distributed and 433 were returned, with a response rate of 69%.

Table 1
Demographic information of project leaders.

Variable	Category	#	Percent
Gender	Male	134	79.8
	Female	34	20.2
Age	≤30	5	3.0
	31–40	41	25.0
	41–50	93	52.4
	51+	29	17.6
Education level	High school	6	3.6
	Diploma	27	16.1
	Bachelor	125	74.4
	Master	10	6.0
Degree type	Non IT	145	85.7
	IT-related	23	14.3
IT-related degree type	Vocational high school	1	4.3
	Diploma	11	47.8
	Bachelor	9	39.1
	Master	2	8.7
# of IT certifications	None	143	85.1
	One or more	25	14.9
# of IT trainings	No IT training	94	56.0
	1 training/year	49	29.2
	2 trainings/year	22	13.1
	3 trainings/year	3	1.8

The 433 questionnaires that were returned included 168 that were completed by project leaders, 168 that were completed by IT staff, and 97 that were completed by functional managers. The 433 participants came from a total of 168 IT projects in categories such as website and software development, e-kiosk, e-procurement, and networking. The project teams usually comprise 3 to 5 government IT staffs and several outside vendors.

Table 1 shows that 79.8% of project leader participants were male and 20.2% were female. The mean age of project leaders was 44.52 years. A majority held a bachelor's degree (74.4%) and were trained in a non-IT-related field (85.7%). Most (85%) had no IT certificate and 56% had never attended an IT training session.

Table 2 summarizes the demographic information of IT project member participants. A total of 68.5% were male and 31.5% were female; over 41% were 31–40 years of age; and 51% did not have an IT-related education background. 93.5% of these participants had no IT

Table 2
Demographic information of IT project members.

Variable	Category	#	Percent
Gender	Male	115	68.5
	Female	53	31.5
Age	≤30	52	31.5
	31–40	70	41.5
	41–50	46	27.0
	51+	0	0.0
Education level	High school	13	7.7
	Diploma	78	46.4
	Bachelor	74	44.0
	Master	3	1.8
Degree type	Non IT	96	57.1
	IT-related	72	42.9
IT-related degree type	Vocational High school	2	2.8
	Diploma	48	66.7
	Bachelor	20	27.8
	Master	2	2.8
# of IT certifications	None	143	93.5
	One or more	25	6.5
# of IT trainings	No IT training	51	30.0
	1 training/year	105	62.0
	2 trainings/year	11	6.5
	3 trainings/year	1	0.6

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certificate. Data from these tables confirm that IT competencies are quite lacking in the Semarang City Government, with project participants commonly not equipped with proper IT related education, IT training, or IT certification.

3.2. Constructs and measures

All items in the questionnaire were presented in Bahasa Indonesia, with a translation - back-translation procedure used to ensure the accuracy of the translation from the original English (Brislin, 1970). Unless otherwise specified, a five-point Likert scale was used for all measures.

Transactional and laissez-faire leadership styles were measured using the Multifactor Leadership Questionnaire (Avolio & Bass, 2004). Following the original design of Bass and Avolio (1997), the project leader assessed the transactional-leadership characteristics of participants. Laissez-faire scales consist mostly of passive behaviors (e.g., avoiding involvement in important issues; is absent when needed) that are commonly considered to be socially undesirable (Geyer & Steyrer, 1998) and thus may be affected negatively by social desirability biases and low validity when self-assessed (King & Bruner, 2000). Therefore, project members assessed the laissez-faire questionnaire.

Empowering leadership style was measured with Zhang and Bartol's (2010) scales, which were based on Ahearne et al. (2005). Twelve items were used to measure empowering leadership. Consistent with prior research (Zhang & Bartol, 2010), the project members made assessments of their leaders.

Team competence measures were from Margerison (2001) and were assessed by IT project leaders. Decision structure measurement items were developed based on the garbage can literature (Cohen et al., 1972; Hirokawa & Poole, 1996). Nine items measured specialized decision structure, participative decision structure and hierarchical decision structure, with 3 items for each type. IT project leaders reported the decision structure in their project team.

To measure project success we used measures from Shenhar, Dvir, Levy, and Maltz (2001). The wording of some items was refined to reflect the government IT Project context. The higher managers that project managers report to assessed the project success measures.

3.3. Analysis and results

All constructs demonstrated acceptable to good internal consistencies. The values of variance inflation factor (VIF) for transactional empowering and laissez-faire leadership are around one (suggested range: <5), eliminating concerns for multicollinearity. Table 3 below summarized the inter-correlation matrix and, reliability statistics.

Convergence validity is conducted by examining the average variance explained (AVE) of each construct. AVE of a given construct should be >0.50, indicating more than half of the variance is true score instead of error (Fornell & Larcker, 1981). As Table 3 indicates, all constructs exhibit acceptable convergent validity. Discriminant validity is measured by comparing the construct correlation with the square root of AVE. The square root of AVE should be greater than the correlation between construct pairs (Fornell & Larcker, 1981). Table 3 contains the construct correlations with the square root of AVE on the diagonal. All correlations are less than the corresponding square root of AVE, exhibiting good discriminant validity.

Confirmatory Factor Analysis (CFA) was performed to test whether the eight-factor model fitted our data. Due to the complexity and the length of leadership scales, following Jin, Seo, and Shapiro (2016), the four facet scores of empowering leadership and two facet scores of transactional leadership were used as manifest indicators ("parceling"; Kishton & Widaman, 1994). As shown in Table 4, the proposed eight-factor model had acceptable fit indices (chi-square = 1361.9, df = 677, cmin = 2.01, CFI = 0.86, GFI = 0.75, TLI = 0.83, RMSEA = 0.078), suggesting a good fit of our data and the model. The eight-factor model was a better model than any alternatives ones.

Harman's Single Factor technique estimates the common method variance of factors. The Harman's Single Factor analysis identified eleven factors with eigenvalues > 1.00, with the variance explained by each factor accounting for no >23% of total variances. This suggests that common method bias is not a serious concern with this dataset.

3.4. Hypotheses testing

We used AMOS to test Hypothesis 1 to 6. The results are summarized in Fig. 2 and Table 5. The overall model exhibited a good fit: Chi-square = 12.09 (df = 7, N = 168), TLI = 0.95; RMSEA = 0.06; SRMR = 0.055. The results supported Hypothesis 1 to 5, while Hypothesis 6 failed to receive support. Specifically, transactional leadership is positively related to hierarchical decision structure (coefficient = 0.48, P < 0.01). Empowering leadership is positively related to participative decision structure (coefficient = 0.49, P < 0.01). Laissez-faire leadership is positively associated with specialized decision structure (coefficient = 0.50, P < 0.01). As expected, hierarchical decision structure is negatively related to project success (coefficient = −0.21, P < 0.01). Participative decision structure is significantly positively associated to project success (coefficient = 0.42, P < 0.01). However, specialized decision structure is not significantly associated to project success; therefore Hypothesis 6 was not supported.

Finally, the test of moderation was conducted in SPSS. The results were summarized in Table 6. Hypothesis 7 received support, with a significant interaction term of −0.17, while Hypothesis 8 to 9 failed to be supported. Fig. 3 below presented the interaction pattern (West, Aiken, & Krull, 1996). As we can see from Fig. 3, when team competence is high, the relationship between hierarchical decision structure and project success is negative, whereas when team competence is low, the relationship between hierarchical decision structure and project

Table 3
Descriptive statistics and correlations of variables.

Construct	M	SD	Cronbach's α	1	2	3	4	5	6	7	8
1. Transactional leadership	3.41	0.59	0.74	**0.80**							
2. Empowering leadership	3.39	0.70	0.78	−0.09	**0.77**						
3. Laissez-faire leadership	2.55	0.76	0.85	0.32**	−0.22**	**0.88**					
4. Hierarchical decision structure	4.35	0.70	0.82	0.46**	−0.01	−0.03	**0.87**				
5. Specialized decision structure	4.22	0.70	0.78	−0.09	0.48**	−0.47**	0.21**	**0.85**			
6. Participative decision structure	4.69	0.76	0.80	0.13	0.03	0.45**	0.26**	0.03	**0.86**		
7. Team competence	4.22	0.78	0.86	−0.10	0.19*	−0.67**	0.13	0.57**	−0.40**	**0.88**	
8. Project success	4.03	0.60	0.80	−0.03	0.24**	−0.14	−0.13	0.39**	−0.07	0.24**	**0.73**

Note: N = 168. **Bold texts** are square roots of AVE.
** P < 0.01.
* P < 0.05.

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Table 4
Results of Confirmatory Factor Analysis.

Model	χ^2	df	χ^2/df	$\Delta\chi^2$	TLI	CFI	RMSEA
Eight-factor model	1361.9	677	2.01	Baseline	0.83	0.86	0.078
Six-factor model 1: All leadership style combined	1896	691	2.75	534.1	0.711	0.74	0.102
Six-factor model 2: All decision structures combined	1562	690	2.26	200.1	0.79	0.82	0.087
Four-factor model: All leadership style combined and three decision structures combined.	2078	700	2.96	716.1	0.67	0.71	0.109
Three factor model: leadership style combined into one, three decision structures combined and team competence combined with project success.	2424	703	3.45	1062.1	0.60	0.63	0.121

success is less negative, with a slope that is almost positive, therefore validating the hypothesis that hierarchical decision structure is less harmful when team competence is low.

The results indicate that participative decision structure benefits project success regardless of team competence levels. Even if team competence is low, using participative decision structure still greatly benefits project success. Finally, specialized decision structure does not seem to be associated with project success in any conditions. This is probably due to the highly interdependent nature of IT projects. Making decisions independently and without consulting the whole team may introduce inconsistencies into the system, which may cause trouble and system-wide errors.

4. Discussion and conclusion

Government IT projects in developing countries face unique challenges. As a result of these challenges, organized anarchy has become the norm in the governmental decision-making process in developing countries, and high rates of failure in IT projects are typical. Applying and extending the garbage can theory, this research worked to seek order in chaos and to identify an appropriate decision-making structure and leadership style for developing countries. The findings support participative-decision structure as one potentially effective approach to increasing the effectiveness and rate of success of government IT projects in developing countries. Moreover, hierarchical-decision structure was found to negatively impact IT project success. Furthermore, empowering leadership was identified as conducive to fostering a participative decision-making environment.

The present research contributes to the extant literature in four important ways. First, it enhances scholarly insight into the garbage can theory by including leadership style as a key predictor of project outcomes in organized anarchies. Government agencies are often claimed to be in a state of "organized anarchy" where outcomes are random and unpredictable (Sager & Rielle, 2013). Prior research has identified imposing deadlines (Eisenhardt & Zbaracki, 1992) and institutional environments (Levitt & Nass, 1989) to constrain the garbage can processes and lead to homogenized outputs. This study enriches our knowledge of how to reduce chaos in organized anarchy by introducing leadership as a constraint to the garbage can process. With given leadership style, the outcomes in government projects can become homogenized and predictable, thus reducing the uncertainty and risks that are associated with government IT projects.

Second, we investigated how leadership style influences the decision structure in government projects. Although leadership and decision making are highly interrelated and decision authority has been recognized as the hallmark of leadership (van Knippenberg, 2013), little prior research, to our knowledge, has investigated the relationship between leadership style and how decisions are made within a team environment. Project failure causes can typically be categorized into failures of people, process, product and technology (Dwivedi et al., 2015; McConnell, 1996). By integrating theories of leadership and decision making, we explored and linked two of the four common categories: failures of people, and failures of process, and provide a holistic view of the people-process dynamics in government IT projects.

Third, by investigating the relationship between decision structure and government IT project success, we answered the call for more IS research to focus on the alignment of IS project with organizational

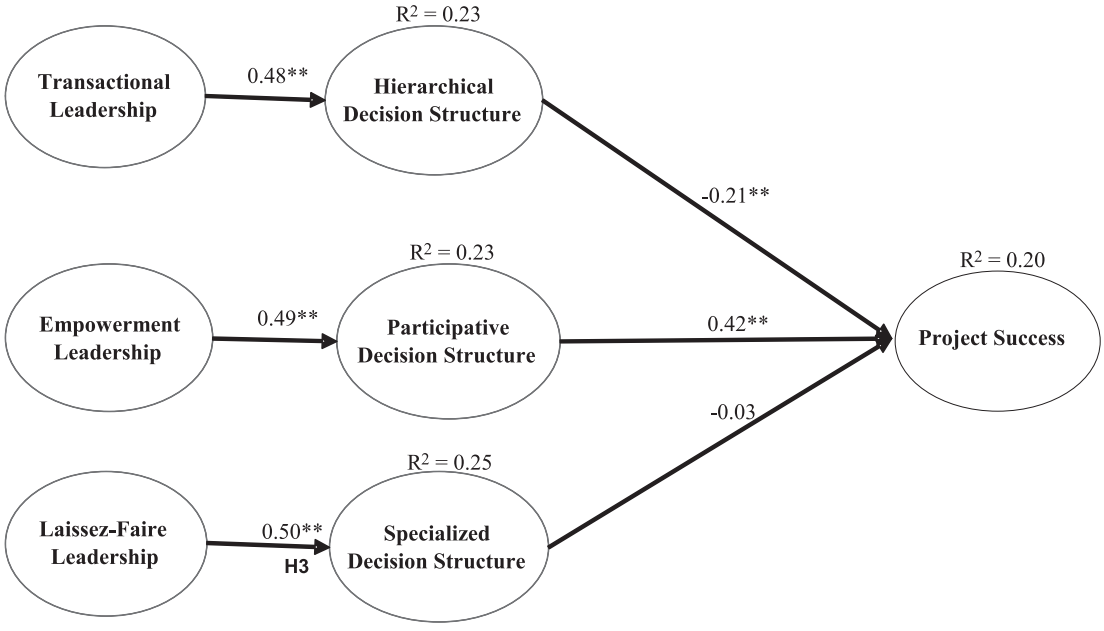

Fig. 2. Path analysis of leadership, decision structure and project success, **P < 0.01.

Table 5
Summary of hypotheses tests of path analysis, df = 7 P ≤ 0.05, bold text is significant.

Hypothesis		Coefficient	t-Value
H1	Transactional leadership ➔ hierarchical decision structure	0.328	**4.787**
H2	Empowering leadership ➔ participative decision structure	0.249	**3.511**
H3	Laissez-faire leadership ➔ specialized decision structure	0.411	**5.922**
H4	Hierarchical decision structure ➔ project success	−0.211	**−2.849**
H5	Participative decision structure ➔ project success	0.433	**6.702**
H6	Specialized decision structure ➔ project success	−0.028	−0.391

processes (Dwivedi et al., 2015) and enabled a better integration of institutional forces into the discussion of why IS projects fail or succeed.

Finally, the present research presents unique experiences from one of the world's most populous developing countries. Indonesia shares many commonalities with other developing countries in terms of its lack of IT talent, lack of adequate budgets, and poor infrastructure. Thus, the findings contribute empirically to scholarly knowledge regarding the success of government IT projects in developing countries.

4.1. Policy implications and recommendations

Our findings have direct implications for government IT project management in developing countries. First, despite the general lack of talent, participative decision structure seems to be an effective way to achieve government IT project success in developing countries. IT projects, like other R&D projects, are highly interdependent (Lawler & Mohrman, 2003) and require close coordination between team members and different teams (Hoegl et al., 2004). Thus, to ensure project success, government IT project managers in developing countries are recommended to implement participative decision making. >20 years ago, Osborne and Gaebler (1992) had argued for a paradigm shift for government to change from hierarchy to teamwork and participation. This advice, 20 and more years later, is still valid and sensible, especially for developing countries. However, in developing countries, one of the challenges to encourage participative decision structure is that many developing countries fall into the high power-distance category in national culture (Hofstede, 2001), where there are strong social hierarchies, thus, it may be a challenge for IT project team members and managers to adapt to the participative decision structure, which works best where social hierarchy is low (Sagie & Aycan, 2003). In high power distant cultures, there is fear of punishment if employees question, challenge, or disagree with their management's decisions (Sagie & Aycan, 2003). Therefore, although the teams may be asked to participate in decision making, they may not be brave enough to voice what they really think, but instead try to look participative by echoing what the leader has hinted or suggested, which Heller (1992) termed "pseudo participative decision making".

Table 6
Results of Moderated Regression analysis of team competence and decision structure.

Predictor	β	R^2	ΔR^2
Hypothesis 7		0.106	0.027
Hierarchical decision structure	−0.17*		
Team competence	0.21**		
Team competence × hierarchical decision structure	−0.169*		
Hypothesis 8		0.106	0.001
Participative decision structure	0.373**		
Team competence	0.025		
Team competence × participative decision structure	0.023		
Hypothesis 9		0.063	0.006
Specialized decision structure	0.023		
Team competence	0.243**		
Team competence × specialized decision structure	−0.08		

Note. Correlations are significant at *P < 0.05, **P < 0.01.

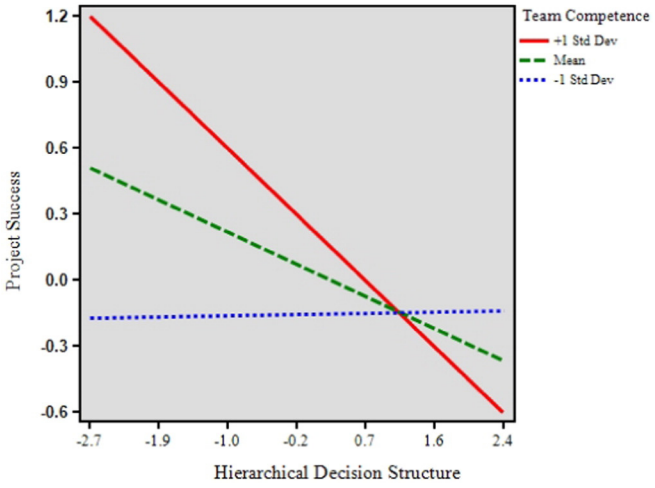

Fig. 3. Hierarchical decision structure and team competence interaction for project success.

The high power distant culture of developing countries is further complicated by the fact that many governments in developing countries still adhere to the traditional bureaucratic paradigm, characterized by functional rationality, departmentalization, hierarchical control and rule-based management, where hierarchy is the most traditional of cultural values and the defining feature (Ndou, 2004). Despite the fact that in our sample the average participative decision structure is high, we also have very high hierarchical decision ratings, signaling that in many teams, although members are allowed to participate, leaders still make the final call. As we can see from the results, hierarchical decision structure is negatively related to project performance. Further, from the moderation effects, we can see that hierarchical decision structure hurts project performance even more as team competence increases. Thus, to truly realize the potential of all team members and benefit from participative decision making, we may need to address the deeper issue: the emphasis and culture of hierarchical control in governments.

One way to change from hierarchy to teamwork and participation is through promoting empowering leadership. For project managers to effectively manage IT projects, empowering leadership seems to be most conducive to building a participative decision making environment, as under empowering leadership, members are encouraged, and not afraid to participate in decision making, contribute their talent, and build a collaborative working environment (Zhang & Bartol, 2010). To truly become empowering leaders, managers need to provide participation in decision making, and removing bureaucratic constraints (Ahearne et al., 2005). Inherent in empowering leadership is the delegating authority to an employee, so as to enable the employee to make decisions and implement actions without direct supervision or intervention (Jung, Chow, & Wu, 2003). Therefore, for a team to change from hierarchy to teamwork and participation, the role leader plays is crucial. Leaders need to truly adopt empowering leadership, reduce hierarchy, and delegate authority to their team members.

To summarize, we offer the following recommendations to government IT policy makers. First, to ensure project success, we suggest project managers in developing countries implement participative decision making. Second, avoid using hierarchical decision structure, which is negatively related to project performance. Third, to change from hierarchy to teamwork and participation, we recommend project managers to become empowering leaders by delegating authority to employees, and enabling employees to make decisions and implement actions without direct supervision or intervention. We are aware that in developing countries, government agencies are likely still adhering to the traditional bureaucratic paradigm with a high power distance culture, and the changes will not be easy, nor should changes be expected overnight.

Please cite this article as: Zhu, Y.-Q., & Kindarto, A., A garbage can model of government IT project failures in developing countries: The effects of leadership, decision structure and t..., *Government Information Quarterly* (2016), http://dx.doi.org/10.1016/j.giq.2016.08.002

Based on our results, we echo the call for a paradigm shift for governments in developing countries to change from hierarchy to teamwork and participation (Osborne & Gaebler, 1992). Only through a paradigm shift, can we truly embrace full participation, innovation and excellence in performance in government IT projects.

4.2. Limitation and future research

The findings of the present research must be considered in light of several methodological limitations. First, the focus on Indonesia proscribes the direct application of findings to developing countries that have different cultural and/or developmental backgrounds. Although Indonesia shares many commonalities with other developing countries, there are still considerable differences between developing countries. For example, government agencies in China are typically allocated adequate IT budgets while government agencies in India are typically staffed with sufficient IT talent. Therefore, the findings of the present study are more likely to be generalizable to countries with similar conditions in terms of talent and budget. Future research should include appropriate considerations of talent, budget, and cultural factors.

Second, all of the data for the present study were collected using questionnaires. Only one member from each project team reported on leadership style and 168 of the projects were from just one municipal government. Future research should expand the breadth of data collection by involving participants from multiple cities and by recruiting more members from the same team.

Finally, we only investigated three leadership styles in our research based on relevance and popularity, while leaving other leadership styles, such as transformational leadership and authentic leadership uninvestigated. Future research could explore different leadership styles and their impact on decision structure and project success.

Acknowledgements

This research was funded by the Ministry of Science and Technology, Taiwan (Fund #: MOST 104-2410-H-011-009).

Appendix A. Measurement items

Transactional leadership and laissez-faire leadership (Avolio & Bass, 2004).[1]

Empowering leadership (Ahearne et al., 2005).

1. My manager helps me understand how my objectives and goals relate to that of the government
2. My manager helps me understand the importance of my work to the overall effectiveness of the government
3. My manager helps me understand how my job fits into the bigger picture
4. My manager makes many decisions together with me
5. My manager often consults me on strategic decisions.
6. My manager solicits my opinion on decisions that may affect me.
7. My manager believes that I can handle demanding tasks
8. My manager believes in my ability to improve even when I make mistakes.
9. My manager expresses confidence in my ability to perform at a high level
10. My manager allows me to do my job my way
11. My manager makes it more efficient for me to do my job by keeping the rules and regulations simple
12. My manager allows me to make important decisions quickly to satisfy customer needs

[1] Transactional leadership and laissez-faire leadership items were copyrighted by Avolio and Bass (2004) and are thus not listed in the Appendix.

Hierarchical decision structure (Cohen et al., 1972; Hirokawa & Poole, 1996).

1. I make decision of the IT project by myself
2. I have full authority to make solution of IT Problems
3. I take control of all decisions

Participative Decision Structure (Cohen et al., 1972; Hirokawa & Poole, 1996).

1. I let my group make decisions
2. I engage my group to make decisions
3. Team/Group is responsible for solutions to problems

Specialized Decision Structure (Cohen et al., 1972; Hirokawa & Poole, 1996).

1. I let employees who have the expertise and abilities in IT to make decisions.
2. I engage experts in the team to make decisions
3. I assign employees who have the expertise to solve problems

Team Competence (Margerison, 2001).

1. I am confident about my team's ability to carry IT projects
2. I am self assured about my team's capabilities to perform IT project activities
3. My team has mastered the skills necessary for our projects

Project Success (Shenhar et al., 2001).

1. All Project goals were achieved
2. The project was finished on time
3. The project was finished within the specific budget
4. The project met user expectations
5. The project enhanced productivity
6. The project fulfilled the requirements that had been planned
7. The project helped to solve user problems
8. The project met technical/business requirements

References

Ahearne, M., Mathieu, J., & Rapp, A. (2005). To empower or not to empower your sales force? An empirical examination of the influence of leadership empowerment behavior on customer satisfaction and performance. *Journal of Applied Psychology*, *90*(5), 945.

Andersen, T. J., & Segars, A. H. (2001). The impact of IT on decision structure and firm performance: Evidence from the textile and apparel industry. *Information Management*, *39*(2), 85–100.

Anthopoulos, L., & Fitsilis, P. (2014). Trends in e-strategic management: How do governments transform their policies? *International Journal of Public Administration in the Digital Age*, *1*(1), 15–38.

Anthopoulos, L., Reddick, C. G., Giannakidou, I., & Mavridis, N. (2016). Why e-government projects fail? An analysis of the Healthcare.gov website. *Government Information Quarterly*, *33*(1), 161–173.

Arcieri, F., Melideo, G., Nardelli, E., & Talamo, M. (2002). Experiences and issues in the realization of e-government services. *12th International Workshop on Research Issues in Data Engineering: Engineering E-commerce/E-Business Systems (RIDE'02)* (pp. 143–148). Newyork: IEEEE.

Avolio, B. J., & Bass, B. M. (2004). *MLQ: Multifactor leadership questionnaire*. Mind Garden.

Bass, B. M., & Avolio, B. J. (1997). *Full range leadership development: Manual for the Multifactor Leadership Questionnaire*. Palo Alto, CA: Mind Garden.

Bass, B. M., & Stogdill, R. M. (1990). *Bass & Stogdill's handbook of leadership: Theory, research, and managerial applications*. Simon and Schuster.

Bass, B. M., Waldman, D. A., Avolio, B. J., & Bebb, M. (1987). Transformational leadership and the falling dominoes effect. *Group & Organization Management*, *12*(1), 73–87.

Batt, R. (2004). Who benefits from teams? Comparing workers, supervisors, and managers. *Industrial Relations: A Journal of Economy and Society*, *43*(1), 183–212.

Beeharry, A., & Schneider, G. (1996). Creating a campus network culture in a newly developing economy. *Information Technology for Development*, *7*(1), 3–16.

Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, *1*(3), 185–216.

Cohen, M. D., March, J. G., & Olsen, J. P. (1972). A garbage can model of organizational choice. *Administrative Science Quarterly*, 1–25.

Dada, D. (2006). The failure of e-government in developing countries: A literature review. *The Electronic Journal of Information Systems in Developing Countries*, 26.

Dvir, T., Eden, D., Avolio, B. J., & Shamir, B. (2002). Impact of transformational leadership on follower development and performance: A field experiment. *Academy of Management Journal*, *45*(4), 735–744.

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Dwivedi, Y. K., Wastell, D., Laumer, S., Henriksen, H. Z., Myers, M. D., Bunker, D., ... Srivastava, S. C. (2015). Research on information systems failures and successes: Status update and future directions. *Information Systems Frontiers*, *17*(1), 143–157.

Ebrahim, Z., & Irani, Z. (2005). E-government adoption: Architecture and barriers. *Business Process Management Journal*, *11*(5), 589–611.

Eisenhardt, K. M., & Zbaracki, M. J. (1992). Strategic decision making. *Strategic Management Journal*, *13*(S2), 17–37.

Flood, P. C., Hannan, E., Smith, K. G., Turner, T., West, M. A., & Dawson, J. (2000). Chief executive leadership style, consensus decision making, and top management team effectiveness. *European Journal of Work and Organizational Psychology*, *9*(3), 401–420.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 39–50.

Gauld, R. (2007). Public sector information system project failures: Lessons from a New Zealand hospital organization. *Government Information Quarterly*, *24*(1), 102–114.

Geyer, A. L., & Steyrer, J. M. (1998). Transformational leadership and objective performance in banks. *Applied Psychology*, *47*(3), 397–420.

Gichoya, D. (2005). Factors affecting the successful implementation of ICT projects in government. *The Electronic Journal of e-government*, *3*(4), 175–184.

Heeks, R. (2008). Success and failure rates of eGovernment in developing/transitional countries: Overview. Retrieved 02 June 2015 from http://www.egov4dev.org/success/sfrates.shtml

Heeks, R., & Bailur, S. (2007). Analyzing e-government research: Perspectives, philosophies, theories, methods, and practice. *Government Information Quarterly*, *24*(2), 243–265.

Heller, F. A. (1992). *Decision-making and leadership*. CUP Archive.

Hirokawa, R. Y., & Poole, M. S. (1996). *Communication and group decision making*. Sage Publications.

Hoegl, M., Weinkauf, K., & Gemuenden, H. G. (2004). Interteam coordination, project commitment, and teamwork in multiteam R&D projects: A longitudinal study. *Organization Science*, *15*(1), 38–55.

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Sage.

Jago, A. G., & Scamell, R. W. (1982). Decision-making styles of mis managers: A comparative evaluation. *Information & Management*, *5*(1), 19–29.

Janssen, M., van der Voort, H., & van Veenstra, A. F. E. (2015). Failure of large transformation projects from the viewpoint of complex adaptive systems: Management principles for dealing with project dynamics. *Information Systems Frontiers*, *17*, 15–29.

Jin, S., Seo, M. G., & Shapiro, D. L. (2016). Do happy leaders lead better? Affective and attitudinal antecedents of transformational leadership. *The Leadership Quarterly*, *27*(1), 64–84.

Johnson, B., & Hencke, D. (2008). Not fit for purpose: £2bn cost of government's IT blunders. Retrieved June 02, 2015 from https://www.theguardian.com/technology/2008/jan/05/ (computing.egovernment)

Jung, D. I., Chow, C., & Wu, A. (2003). The role of transformational leadership in enhancing organizational innovation: Hypotheses and some preliminary findings. *The Leadership Quarterly*, *14*, 525–544.

Kark, R., Shamir, B., & Chen, G. (2003). The two faces of transformational leadership: Empowerment and dependency. *Journal of Applied Psychology*, *88*(2), 246–255.

Kim, H. J., Pan, G., & Pan, S. L. (2007). Managing IT-enabled transformation in the public sector: A case study on e-government in South Korea. *Government Information Quarterly*, *24*, 338–352.

King, M. F., & Bruner, G. C. (2000). Social desirability bias: A neglected aspect of validity testing. *Psychology and Marketing*, *17*(2), 79–103.

Kishton, J. M., & Widaman, K. F. (1994). Unidimensional versus domain representative parceling of questionnaire items: An empirical example. *Educational and Psychological Measurement*, *54*(3), 757–765.

Kotter, J. P. (2001). What leaders really do. *Harvard Business Review*, *68*(3), 103–111.

Lawler, E. E., & Mohrman, S. A. (2003). *Creating an effective human resources organization: Trends and new directions*. Stanford University Press.

Levitt, B., & Nass, C. (1989). The lid on the garbage can: Institutional constraints on decision making in the technical core of college-text publishers. *Administrative Science Quarterly*, 190–207.

March, J. G., & Olsen, J. P. (1976). *Ambiguity and choice in organizations*. Bergen, Norway: Universitetsforlaget.

Margerison, C. (2001). Team competencies. *Team Performance Management*, *7*(7/8), 117–122.

McConnell, S. (1996). Avoiding classic mistakes. *IEEE Software*, *13*(5), 111–112.

Mintzberg, H. (2003). *The manager's job: Folklore and fact*. London: Routledge.

Müller, R., & Turner, R. (2010). Leadership competency profiles of successful project managers. *International Journal of Project Management*, *28*(5), 437–448.

Ndou, V. (2004). E-government for developing countries: Opportunities and challenges. *The Electronic Journal of Information Systems in Developing Countries*, *18*(1), 1–24.

Osborne, D., & Gaebler, T. (1992). *Reinventing government: How the entrepreneurial spirit is transforming government*. Reading, MA: Addison Wesley.

Pearson, C. A. (1992). Autonomous workgroups: An evaluation at an industrial site. *Human Relations*, *45*(9), 905–936.

Pinfield, L. T. (1986). A field evaluation of perspectives on organizational decision making. *Administrative Science Quarterly*, 365–388.

Powner, D. A. (2009). *Information technology: OMB and agencies need to improve planning, management, and oversight of projects totaling billions of dollars: Congressional testimony*. DIANE Publishing.

Ruuska, I., & Teigland, R. (2009). Ensuring project success through collective competence and creative conflict in public–private partnerships–A case study of Bygga Villa, a Swedish triple helix e-government initiative. *International Journal of Project Management*, *27*(4), 323–334.

Sager, F., & Rielle, Y. (2013). Sorting through the garbage can: Under what conditions do governments adopt policy programs? *Policy Sciences*, *46*(1), 1–21.

Sagie, A., & Aycan, Z. (2003). A cross-cultural analysis of participative decision-making in organizations. *Human Relations*, *56*(4), 453–473.

Shenhar, A. J., Dvir, D., Levy, O., & Maltz, A. C. (2001). Project success: A multidimensional strategic concept. *Long Range Planning*, *34*(6), 699–725.

Souder, W. E., & Moenaert, R. K. (1992). Integrating marketing and R&D project personnel within innovation projects: An information uncertainty model. *Journal of Management Studies*, *29*(4), 485–512.

Spreitzer, G. M. (1996). Social structural characteristics of psychological empowerment. *Academy of Management Journal*, *39*(2), 483–504.

Sproull, L., Weiner, S., & Wolf, D. (1978). *Organizing an anarchy*. Chicago: University of Chicago Press.

Turner, J. R. (1999). *The handbook of project-based management: Improving the processes for achieving strategic objectives*. London: McGrawHill.

Turner, J. R., & Müller, R. (2005). The project manager's leadership style as a success factor on projects: A literature review. *Project Management Journal*, *36*(2), 49–61.

UNCTAD (2015). *Information economy report 2015*. United Nations Conference on Trade and Development.

van Knippenberg, D. (2013). Leadership and decision making: Defining a field. *Judgment and decision making at work* (pp. 140).

West, S. G., Aiken, L. S., & Krull, J. L. (1996). Experimental personality designs: Analyzing categorical by continuous variable interactions. *Journal of Personality*, *64*(1), 1–48.

Zhang, X., & Bartol, K. M. (2010). Linking empowering leadership and employee creativity: The influence of psychological empowerment, intrinsic motivation, and creative process engagement. *Academy of Management Journal*, *53*(1), 107–128.

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Please cite this article as: Zhu, Y.-Q., & Kindarto, A., A garbage can model of government IT project failures in developing countries: The effects of leadership, decision structure and t..., *Government Information Quarterly* (2016), http://dx.doi.org/10.1016/j.giq.2016.08.002