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Abstract

The importance of e-government (EG) has been widely recognized. However, we know little about the civil servants' collective actions in EG development. This paper examines the collective action problems of getting civil servants to cooperating in EG developing process, to understand the so-called "free-riding" behavior of servants. In particularly, we propose that information literacy is a critical factor that may significantly affect whether civil servants behave cooperatively. Drawing on a case study of Kaohsiung City, Taiwan, the structural dimension of collective actions is examined. The preliminary findings of the study show that the servants' information literacies influence on the structural dimension of cooperative behaviors negatively, in turn the emerged collective action problems deleterious the efforts for EG development. The implications of the lessons learned are also discussed.

Keywords: E-government, Cooperation, Collective action problems, Information literacy

1. Introduction

E-government (EG) provides public services to gain and retain competitiveness in a complex and turbulent global political environment (Welch and Wong, 2001). Essentially, EG is using the Internet and other information and communication technologies (ICTs) as enablers to deliver public services in a smarter way, improve citizen-state relations, and transform the scope of administrative actions and the political processes. Indeed, government on-line provides a foundation for richer public dialogue and greater citizen input (Alexander, 2000). Although the development of EG is still ongoing, the administrative-focus has gradually shifted from web pages to a customer-focus, serving citizens and trading partners directly by providing services, information and transactions on-line via the Internet (Devadoss et al., 2002). Under these circumstances, seeking efficient EG development is now of critical importance for all governments.

In pursuing "many agencies, one government", this paper argues that the civil servants' cooperative behaviors are extremely important to facilitate the EG development efficiently. Here, cooperation refers to the actor's cooperative motives of working toward a common goal (Chen et al., 1998). From a collective viewpoint, Olson's (1965) classic book, The Logic of Collective Action, suggested that rational self-interested individuals in large groups would not automatically join together to solve a collective action problem, despite it being in their best interest to do so. Collective action problems are situations in which individual rationality leads to collective irrationality (Kollock, 1998). That is, individually reasonable cooperative behavior leads to a situation in which everyone is worse off then they have been otherwise.

Collective action theories have been used in examining various micro and macro social phenomena such as worker resistance (Roscigno and Hodson, 2004), group heterogeneity (Heckathron, 1993), social capital (Rudd, 2000), social exchange (Gächter and Fehr, 2003), collective organizations (Barnett et al., 2000) and online social structure (Wasko & Teigland, 2004). All these studies suggest that many of the most challenging problems we face, from the interpersonal to the international, are at their collective action problems (Kollock, 1998). However, civil servants' cooperative behaviors and their collective actions have received the least research attention in the study of EG development.

Moreover, since IT plays a vital part in information handling process of EG, improving competences of the individuals in information processing are extremely crucial (Koniger and Janowitz, 1995). Accordingly, this paper examines the cooperative behaviors and collective actions from civil servants' information literacies (IL), which can be defined as the abilities to recognize information needs and identify, evaluate and use information effectively (Bruce, 1999). We argue that civil servants may have different levels of IL and, in turn may give EG development different interpretations, based on their underlying assumptions, expectations and knowledge (Orlikowski and Gash, 1994). Therefore, to understand the collective action problems caused by civil servants' IL is meaningful for pursuing the efficient EG development.

Specifically, we ask the following research questions: Have collective actions problems emerged in the EG development process is due to civil servants' IL? What is the nature of these collective actions problems? How do these collective action problems influence the cooperation and development of EG? After the introduction, the next section discusses the background of the major research issues. This is followed by a case description. The analysis and findings of the study will be discussed in the penultimate section. The final section concludes the current work.

2. Research Background

EG employs technology, particularly the Internet, to enhance the access to and delivery of government information and services to citizens, businesses, government civil servants, and other agencies (Jaeger, 2003). Although public sectors are generally not involved in obtaining competitive advantage like business units, they are now often viewed as primary mechanism for creating more efficient and better service organizations (Rocheleau, 2000). Accordingly, the scope of EG has extended and many governments now establish their national development action plans such as e-Korea, and e-Japan to pursue information society and incorporate EG, e-learning, e-industry…etc. In contrast to conventional EG initiatives, these action plans are broader in their scopes and provide the blueprints for building the information society of the future.

However, previous EG studies have neglected the cooperative and collective behavior perspective of civil servants. The importance of cooperative behavior among individuals and groups has been a dominant research question in the behavior science (Deutsch, 1994). In particularly, cooperative behaviors are said to foster positive work climates, thus promoting greater commitment, stability, and interpersonal effectiveness among participants (Song et al., 1998). From collective viewpoint, collective action refers to joint action in pursuit of a common objective (Okamoto, 2003). While collective action problems (or social dilemmas, free-rider problems) occur whenever individuals in interdependent situations face choices in which the maximization of short-term self-interest yields outcomes, leaving all participants worse off than feasible alternatives (Ostrom, 1998). That is, there is a behavior that is clearly

dominant, in that performing will guarantee a maximum personal outcome, regardless of what other do; however, if all persons act in this way, outcomes in the long run are poorer than they would have been had everyone cooperated (Parks et al.1996).

In EG development, civil servants must be literate with computer operation and other job related processes. From this perspective, EG development should incorporating computer skills and training programs to be part of every civil servant' working experience. Moreover, IL is envisaged as comprising not only "an understanding of the general concepts of information processing", but also "how computer systems support and shape a person's job function" and " the trade-off between investment and benefits, time expended, and time saved" (Mutch, 1997). We argue that: although we recognize the potential power of EG poses for governmental reform, without systematic consideration of IL, civil servants cannot realized the potential of the Internet and in turn the emerged collective action problems deleterious efforts for EG development.

Collective action has been studies in two largely disjoint approaches, one focusing on influence of social structure (macro level) and another focusing on the incentive for individual participation (micro level) (Chwe, 1999; Kollock 1998). Following by Kollock's (1998) suggestions, there are three issues included in individual motivation dimension: social value orientation, communication and group identity; there are six issues included in structure dimension: iteration and identifiability, payoff structure, efficacy, group size, boundary and sanctions. Because of the limited length of the paper, the study will focus on the social structure dimension only. Table 1 shows the issues and descriptions for the study.

Table1: Major Issues of the Structural Dimension of Collective Actions

Critical issue	Description
Iteration and identifiability	Iteration represents interactions between civil servants and the identifiability (also called observability, anonymity, accountability and task visibility) involves the degree to which others can observe and assess an individual's behaviors (Wagner, 1995). If individuals will not interact in the future, if identity is unknown or unstable, and if there is no recollection or record of past interactions, individual will be motivated to behave selfishly because they will not be accountable for their actions.
Payoff structure	The payoff structure refers to informal rewards of individuals' cooperation from others. The greater the personal return from cooperation and the lower the return from defecting, the higher the level of cooperation.
Efficacy	The efficacy refers to that individuals can have a noticeable effect on the outcomes. One of the key reasons people do not cooperate is the fact a single person's actions may have no discernable effect on the situation.
Group size	The group size refers to the number of workers performing a task. Cooperation declines as group size increases.
Boundary	The boundary refers to the extent that civil employees perceive EG as a public good. The higher the boundary of EG, the lower the incentive to voluntarily contribute of developing EG.
Sanctions	The sanction refers to the organization's formal reward system. The cooperators would be rewarded for their actions and defectors punished.

3. Methodology –The Case

In studying EG, Taiwan is a particularly appropriate context for study because it is characterized by information-intensive competition and rapid technological advancements. According to the Global E-government Survey conducted by the World Markets Research Center (WMRC) in 2001 and 2002, Taiwan has been ranked as the first among 196 other nations in terms of the provision of on-line services (www.insidepolitics.org). The survey suggests that Taiwan as one of best practitioners of government web sites. We selected Kaohsiung City, the biggest commercial harbor and the second biggest city in Taiwan, for our case study.

Qualitative data were gathered from document archives, face-to-face unstructured interviews, and field-notes. One of the authors of this paper is an civil servant of Kaohsiung city, carried out 20 interviews with civil servants from the Kaohsiung city government. In-depth interviews were conducted with the MIS and non-MIS staffs in both MIS and non-MIS departments at the city government. All informants shown in Table 2 were selected and scrutinized carefully to ensure the quality of the collected data. According to informants' self-reported computer skills and educational backgrounds, we accessed their IL and assigned as very high, high, medium and weak, respectively. The face-to-face interviews were unstructured; the standard set of questions used was designed to only help initiate and guide the interview process. All the interviews were tape-recorded; notes were taken during the sessions as well. Additional observations were noted immediately after each interview was completed.

Table 2. Background of Participants and Information Literacy

Civil servant	Sex	Age	Work experience	Department	Educational Major	Information literacy
A1	Male	46	21	MIS	Computer Science	Very high
A2	Male	36	12	MIS	Electronic Engineering	Very high
A3	Female	52	23	MIS	Computer Science	Very high
A4	Male	34	8	MIS	Electronic Engineering	Very high
B1	Female	48	21	Land Administration	Math.	High
B2	Male	36	12	Urban Planning	Electronic Engineering	High
B3	Male	46	17	Civil Affairs	Information Management	High
B4	Male	50	22	Labor Affairs	Electronic Engineering	High
B5	Female	35	7	Transportation	Computer Science	High
C1	Female	31	4	MIS	History	Medium
C2	Female	28	3	MIS	Business	Medium
D1	Male	42	17	Information Office	Sociology	Weak
D2	Female	39	15	Secretariat	Law	Weak
D3	Female	41	14	Finance	General Mgt.	Weak
D4	Male	46	16	Government Ethics	Tourism	Weak
D5	Female	32	5	Budget	Accounting	Weak

4. Case findings

Finding 1: In EG developing process, the lower IL civil servants perceive a lower level of iteration and identifiability, which can lead to the collective action problems.

Firstly, iteration and identifiability are considered. Previous studies (e.g., Kollock, 1998) suggest that if individuals will not interact in the future, if identity is unknown or unstable, and if there is no recollection or record of past interactions, individual will be motivated to behave selfishly because they will not be accountable for their actions. In our data analysis, several civil servants (most notably, A2, A3 and B3) stated that their jobs have recorded clearly, and highly interact with each other. For example, as stated by civil servants A3: "We feel very tired to have meetings with the staffs of The Research, Development and Evaluation Commission (RDEC) of our city government. The results of each meeting are recorded clearly, and they will trace and review our progress in the following meetings". In contrast, civil servants C1 and D4 indicate that their jobs have no relevance to EG development. As noted by D4: "There are other departments in charge of EG adoption. We have no relevance about this issue".

Apparently, in EG development, an effective recoding system of civil servants' interactions will motivate their cooperative behaviors, will reduce the collective action problems and facilitate the EG development. Since the lower IL civil servants' jobs are not related to EG directly, their efforts and activities cannot be identified systematically. In turn, they don't need to interact with others and have no formal records of their interactions. In this case, these civil servants are likely to behave selfishly and uncooperatively, and in turn will attenuate the collective actions.

Finding 2: In EG developing process, the lower IL civil servants perceive a lower level of pay-off for their cooperative behaviors, which can to lead to the collective action problems.

As indicated earlier, the payoff structure refers to informal rewards of individuals' cooperation from others. Obviously, the greater the personal return from cooperation, the higher the level of cooperation (Kollock, 1998). Our analysis shows that civil servants (particularly A1, B1 and B2) expressed they perceived positive pay-off from their colleagues and other departments. For example, as indicated by civil servants A1: "Our team is in charge of city government's informationization, including applications development, planning and consultation. Our efforts in cross-department communication have attained very positive feedbacks and cooperations". Unlikely, civil servants D3, D2 and D5 indicate that they do not perceive positive pay-off from their colleagues and other departments. For example, as civil servant D2 summarized: "We don't have our own IT/IS staffs. We do have hard time, because we need to do everything by ourselves. Even we win an award in promoting Electronic Official Document Interchange (EODI), the reward is quite minor".

Obviously, human interaction always shapes actor's perceptions of opportunities for defection, and actors try to influence their neighbors (Kim and Bearman, 1997). Actors tend to base their decision about participation upon other's decisions, and one's participation tends to encourage other's participation by making collective action to succeed (Kim and Bearman, 1997). If low IL civil servants' cannot perceive a higher level of payoff from other servants, they will not delight to cooperate with others and will increase the collective action problems.

Finding 3: In EG developing process, the lower IL of civil servants perceive a lower level of their contributions toward EG, which can lead to the collective action problems.

Efficacy refers to that individuals can have a noticeable effect on the outcomes; if they can make an efficacious contribution, cooperation rates can increase (Kollock, 1998). Efficacy concerns whether a single person's actions may have a discernable effect on the situation. In this regard, if civil servants' can perceive the noticeable effects of EG development, the collective action problems are likely to decrease. Undoubtedly, effective performance measurement is always an issue of public bureaucracies. Our analysis suggests that civil servants (particularly A1, B1 and B4) expressed they perceived that their efforts can significantly contribute to the EG initiatives. For example, indicate by civil servants A1: "In EG adoption process, our department would lead the development in city government. We start the adoption process from our department, such as electric documents and KM system. In turn, other departments will mimic our successful experiences". In contrast, civil servants C1, C2, D1, D2 and D3 indicate that they have no significantly contribute to the EG initiatives. For example, as indicate by C1: "Besides typing documents and Internet, my computer technique is poor! I can do noting and have no contribution in adopting EG".

Obviously, government always suffers from the absence of economic markets for outputs and diffused goals (Rainey, 1999), and it is difficult for each member to ascertain what returns are from his or her contributions. In this case, the lower IL civil servants are likely to perceived little contribution in EG developing process.

Finding 4: In EG developing process, the lower IL civil servants perceive to be posted in a larger group in performing their EG related tasks, which can lead to the collective action problems.

Researchers found that increasing the number of workers performing a task reduced the average individual effort devoted to task performance (Wagner, 1995). Based on this, in EG development, as perceived group size increase, the benefit to the individual from cooperation decrease. However, the groups are not necessary in formal organization structure, but also some informal teams in pursuing EG development. Also, group size is a quite subjective concept. For example, several civil servants (most notably, A2, A4, B1 and B5) stated that their departments are small and facilitate their cooperation in pursuing EG. As indicate by A2: "We need to form and attain some small workshops and learning groups to learn new techniques. As you know, the learning new tech is complicate. Our colleagues will share their experiences, not only to extend our knowledge but get close to each other". In contrast, civil servants D1 and D3 indicate that they are in a bigger department and are always to count on the others' helps; they have no motivations to learn by themselves. For example, as indicate by D1: "We are in a large department and not everyone is good in computer techniques. However, some of the staffs have the capabilities to solve our problems".

Although we have no specific numbers of groups in judging their size, obviously, low IL civil servants are likely to perceive as be posted in a bigger department and count on others' helps. Especially, as groups become large, individual contributions to the collective action tend to greater than the perceived individual proportion of the public goods shared by each member (Brito, 2001). Also, in large groups members are more likely to tolerate instances of non-contribution. Therefore, Olson (1965) asserts that the larger the number of members in a group, the less likely that the group will exhibit successful collective action.

Finding 5: In EG developing process, the lower IL civil servants perceive a higher level of the results of EG as public goods, which can lead to the collective action problems.

The boundaries of collective good have an effect on collaboration. EG initiations may create a public good (or collective goods) of new-form government that is available to anyone in the government, making it easy for individuals to free-ride on the efforts of others. Two characteristics are associated with public goods: non-rivalry and non-excludability (Wasko and Teigland, 2004). Nonrival means that good that is not used up or depleted in its consumption, and non-execludability occurs when non-contributors cannot be excluded from consuming the good (Wasko and Teigland, 2004). Our analysis suggests that civil servants (particularly A1, A4, B1 and B2) expressed the desire to involve on the EG adoption processes, which means that they do not see the results of EG as public goods. As stated by civil servants A1: "The Research, Development and Evaluation Commission (RDEC) of city government don't have any IT/IS staff in formulation EG policy. All EG initiatives are highly related to IT, and IT department is the window to pursue it. We need to take the responsibilities".

However, lower IL civil servants show that they are likely to take the results of EG as public goods. Although they realized that the services provided by EG are valued, no efforts have been made to contribute themselves in adoption EG. This was especially true for civil servants C2, D3, D4 and D5. As civil servants D4 said: "I have no idea about using computer. But, I know every one can use online government and it is quite convenient".

Olson (1965) suggested that individuals seek to reap the benefits of others' participation while evading the costs to themselves because the individuals who cannot be excluded from the benefits of a public good have little incentive to voluntarily contribute once the good is produced. Therefore, if civil servants perceive a higher degree of non-rivalry and non-excludability, they are likely to have little incentive to voluntarily contribute of developing EG, thus the boundaries of collective good lead to the collective action problems.

Finding 6: In EG developing process, the lower IL civil servants need a more specific sanction system in performing their EG related tasks, otherwise it can lead to the collective action problems.

The last one factor is the sanction related to EG development. Unlike pay-off structure, the sanction refers to the organization's formal reward system, that the cooperators would be rewarded for their action and defectors punished. Several civil servants (A2, A3, B2 and B3) expressed the sanction system for EG adoption is not strong enough, but they are happy to have significant awards. For example, as observed by A2: "Personally, the sanctions are still the major incentive for our hard work. However, it' our duties and responsibilities to dedicate ourselves in EG development, no matter what awards our supervised mangers would give to us".

With respect to same issue, civil servants (C2, D2 and D3) more emphases that they need more positive feedbacks to motivate their efforts in EG adoption. Since the sanction system for EG adoption is not significant, the data show these civil servants are quite reactive in EG development. For example, civil servant D3 commented: "In pursuing Electronic Official Document Interchange (EODI), there is only a date for initiative. However, there is no compulsory of not doing. Basically, all we have to do is met the minimal requirement: to learn how to type official document electronically. No thing else!"

Sanctions are actions taken on behalf of communities to enforce laws (Whitworth and De Moor, 2003). However, civil servants are also more likely to be characterized by an ethic hat prioritizes intrinsic rewards over extrinsic rewards (Crewson, 1997). Because of the effects of the reward/sanction system on EG adoption, the importance of setting "right" quotas should be underscored. Overall, an effective sanction system will encourage all civil servants positively, but it has a serious impact on those low IL civil servants.

5. Conclusion

The main purpose of this research has been to seek an understanding of collective behaviors of civil servants in terms of their IL. Six issues in structure dimension: iteration and identifiability, payoff structure, efficacy, group size, boundary and sanctions have examined. Our study makes several contributions to the study of EG development process. First, civil servants' behaviors and expectations are taken into account in EG development research. Civil servants who are engaged in cooperative behavior have different goals and attitudes toward risk (Eisenhardt, 1989). In fact, the study of collective action problems is the study of the tension between individual and collective rationality (Kollock, 1998) and considering spontaneous cooperation in a group achieved through individually rational decisions.

Second, collective actions underlie many ongoing collective action problems, such as the functioning of large organizations and the mobilization of political movements. As suggested by Brito (2001), when large collectivities offer public goods as their sole incentive both the "imperceptible effect" and the "free-rider problem" are likely to jeopardize collective actions. In this context, any member acting on rational and utilitarian basis may maximize his or her benefits by not making any effort on behalf of the group (Brito, 2001). Since governmental agencies are always very big in their size, the influence of collective action problems in informtionization is likely more severe than private business organizations.

Third, more recently, social processes that facilitate cooperation have become more prominent (Kollock, 1994). Besides the size of group, civil servants' behavior is affected by many other structural variables, including heterogeneity of participants, their dependence on the benefits received, their discount rates, the type and predictability of transformation processes involved, the nesting of organizational levels, monitoring techniques, and the information available to participants. (Ostrom,1998). From this perspective, the understanding of collective action problems helps to promote a normative environment that encourages cooperation between actors, and in turn improve the efficiency of EG development.

In short, we learned that the structural dimension of collective actions of civil servants do influence the efficiency of EG development. Notwithstanding, the purpose of this paper has not been to present generalizable solutions to those collective action problems, but to awaken interest in the civil servants' IL in pursuing EG development.

Reference:
Alexander, C.J. "Wiring the nation! Including first nations? Aboriginal Canadians and federal e-government initiatives," Journal of Canadian Studies (35), 2000, pp.277-296.
Barnett, W.P., Mischke, G.A. and Ocasio, W. "The evolution of collective strategies among organizations," Organization Studies (21:2), 2000, pp.325-354.

Brito, C.M. "Towards an institutional theory of the dynamics of industrial networks," The Journal of Business & Industrial Marketing (16:3), 2001, pp.150-164.

Bruce, C.S. "Workplace experiences of information literacy," International Journal of Information Management (19), 1999, pp.33-47.

Chen, C., Chen, X. and Meindl, J. "How can cooperation be fostered? The cultural effects of individualism-collectivism," Academy of Management (23:2), 1998, pp.285-304.

Chwe, M.S. "Structure and strategy in collective action," The American Journal of Sociology (105:1), 1999, pp.128-156.

Crewson, P.E. "Public-service motivation: building empirical evidence of incidence and effect," Journal of Public Administration Research and Theory (7), 1997, pp.499-518.

Devadoss, P.R., Pan, S.L. and Huang, J.C. "Structurational analysis of e-government initiatives: a case study of SCO," Decision Support Systems (34), 2002, pp.253-269.

Deutsch, M. "Constructive conflict for the world today," International Journal of Conflict Management (5), 1994, pp.111-129.

Eisenhardt, K. "Agency theory: an assessment and review," Academy of Management Review (14:2), 1989, pp.57-74.

Gächter, S. and Fehr, E. "Collective action as a social exchange," Journal of Economic Behavior & Organization (39), 2003, pp.341-369.

Heckathorn, D.D. "Collective action and group heterogeneity: voluntary provision versus selective incentives," American Sociological Review (58:3), 1993, pp.329-350.

Jaeger, P.T. "The endless wire: e-government as global phenomenon," Government Information Quarterly (20), 2003, pp.323-331.

Kim, H. and Bearman, P.S. "The structure of dynamics of movement participation," American Sociological Review (62:1), 1997, pp.70-93.

Kollock, P. "Social dilemmas: the anatomy of cooperation," Annual Review of Sociology (24), 1998, pp.183-214.

Koniger, P. and Janowitz, K. "Drowning in information, but thirsty for knowledge," International Journal of Information Management (15:1), 1995, pp.5-16.

Mutch, A. "Information literacy: an exploration," International Journal of Information Management (17:5), 1997, pp.377-386.

Okamoto, D.G. "Toward a theory of panethnicity: explaining Asian American collective action," American Sociological Review (68:6), 2003, pp.811-842.

Olson, M. The logic of collective action, Harvard University Press, Cambridge, M.A. (1965).

Orlikowski, W.J. & Gash, D.C. "Technological frames: making sense of information technology in organizations," ACM Transactions on Information Systems (12:2), 1994, pp.174-207.

Ostrom, E. "A behavioral approach to the rational choice theory of collective action," American Political Science Review (92:1), 1998, pp.1-22.

Parks, C.D., Henager, R.F. and Scamahorn, S.D. "Trust and reactions to messages of intent in social dilemmas," The Journal of Conflict Resolution (40:1), 1996, pp.134-151.

Rainey, H.G. "Using comparisons of public and private organizations to assess innovative attitudes among member of organizations", Public Productivity & Management Review (23:2), 1999, pp.130-149.

Rocheleau, B. "Prescriptions for public-sector information management: a review, analysis and critique," American Review of Public Administration (30), 2000, pp.414-435.

Roscigno, V. and Hodson, R. "The organizational and social foundations of worker resistance," American Sociological Review (69:1), 2004, pp.14-39.

Rudd, M.A. "Live long and prosper: collective action, social capital and social vision," Ecological Economics (34), 2000, pp.131-144.

Song, C., Sommer, S., Hartman, A. "The impact of adding external rater on interdepartmental cooperative behaviors of works," The international Journal of conflict Management (9:2), 1998, pp.117.138.

Wagner J.A. III "Studies of individualism-collectivism: effects on cooperation in groups," Academy of Management Journal (38:1), 1995, pp.152-172.

Wasko, M.M. and Teigland, R. "Public goods or virtual commons? Applying theories of public goods, social dilemmas, and collective action to electronic networks of practice," Journal of Information Technology Theory and Application (6:1), 2004, pp.25-41.

Welch, E.W. and Wong, W. "Global information technology pressure and government accountability: the mediating effect of domestic context on website openness," Journal of Public Administration Research and Theory (11:4), 2001, pp. 509-538.

Whitworth, B. and De Moor, A. "Legitimate by design: towards trusted socio-technical systems," Behaviour & Information Technology (22:1), 2003, pp31-51.