Citizen-Initiated Performance Assessment
-- The Experience of Initiation in the State of Iowa, United States

by

Alfred Ho and Paul Coates
Department of Political Science
Iowa State University
Ames, Iowa
E-mail: alfredho@iastate.edu
paulc@iastate.edu
Phone: 515 294-2780

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Abstract

Citizen involvement in the design and implementation of performance assessment is necessary to give performance measures political relevancy and significance. However, many cities have reservations about the concept. Based on the experience of a project in Iowa, the paper finds that officials’ concerns about performance measures being used politically in election years are the greatest hindrance to citizen-initiated performance assessment (CIPA). On the other hand, a positive perception of the usefulness of performance measurement and prior experiences in engaging citizens in decision making encourage a city to adopt CIPA. Unfamiliarity with performance measurement among elected officials also increases the likelihood of a city to adopt CIPA. The paper examines several possible explanations for the puzzling result, which contradicts with theories of the innovation-decision process. Based on the findings, the paper concludes with some suggestions and further questions for those who are interested in promoting greater citizen involvement in performance assessment.
Introduction

Since the mid-1990s, there have been two major movements in the field of public administration. The first movement is a renewed effort to promote performance measurement. Since the early 1990s, many professional organizations, such as the American Society for Public Administration, the Governmental Accounting Standards Board, and the International City/County Management Association, have been promoting various programs to encourage government agencies to adopt performance assessment, so that public officials and citizens can evaluate the inputs, outputs, and outcomes of public services effectively.

The second major movement has been the movement toward citizen governance and reinventing government through citizen participation (Nalbandian, 1999; King and Stivers, 1998; Schachter, 1997). The original reform of reinventing government started with a business perspective and viewed citizens as customers (Osborne and Gaebler, 1992). The more recent effort to reinvent government views citizens not only as customers but also as the owners of government. This value is especially important in city governments, which provide many direct services and have a tremendous impact on the daily lives of citizens.

While these two movements seem to have developed separately, they can be mutually reinforcing and should be integrated. If citizens are involved in performance measurement, performance measures gain greater legitimacy and political support. At the same time, citizen participation benefits from performance assessment by empowering citizens to influence the priorities and performance of government, and providing a mechanism to show real impacts to sustain citizen interest.

This paper examines how the concept of citizen-based performance assessment was received by city governments in the state of Iowa in the United States. In fall, 2000, a project team from Iowa State University, University of Iowa, and the Iowa League of Cities visited Iowa cities with a population of 10,000 or more to explore their interest in integrating citizen participation and performance assessment. In January 2001, nine of these cities committed to participate in a multi-year project to implement “citizen-initiated performance assessment” (CIPA). The following analysis examines the Iowa statewide initiative. In addition, it analyzes statistically whether community size, organizational stability, openness to citizen participation, perception of performance measurement, and resource constraints influenced a city's decision to adopt CIPA. Based on the findings, the paper concludes with some suggestions and
questions for those who are interested in promoting greater citizen involvement in performance assessment.

The Rising Importance of Performance Assessment and its Limitations

Performance measurement is not a recent idea in the public sector. The Hoover Commission in 1949 already called for measurement of program activities to enhance managerial efficiency and effectiveness (Schick, 1966). However, performance measurement did not take root in the practice of public budgeting and management, and was not widespread until the recent decade.

In the early 1990s, there was a renewed effort by the academics and professional organizations to promote performance assessment. For example, the Governmental Accounting Standards Board (GASB) issued Concepts Statement No. 2 on Service Efforts and Accomplishments Reporting in 1994, which elaborated the importance of reporting performance measures in annual financial reports (GASB, 1994). After the statement, GASB took several initiatives to provide for the informational needs of state and local officials in implementing performance measurement. The International City/County Management Association (ICMA) also launched a project in 1994 to help U.S. and Canadian local governments to develop performance measures. The ICMA Center for Performance Measurement currently assists more than 120 towns, cities, and counties of all sizes with measuring performance in 15 different local government service areas (www.icma.org). Other initiatives, such as the Center for Accountability and Performance (CAP) established in 1996 by the American Society for Public Administration (ASPA), the Budget Award program by the Government Finance Officers Association, the Local Government Performance Measurement Project by the Institute of Government at University of North Carolina in 1995, and various programs by the National Center for Productivity at Rutgers University, have also contributed to the rising attention to performance measurement in recent years.

Despite the widespread effort to promote the usage of performance measures, how to encourage politicians and policymakers to actually use performance measures in decision-making is still a challenge. Past studies have found that despite the claimed usefulness of performance measurement in enhancing the quality of resource allocation decisions, many policymakers actually pay little attention to performance measures. For example, a recent study by Wang (2000) finds that in the process of legislative budgetary review and consideration, only 53.3 percent of the counties responding to his nationwide survey use
performance measurement to help determine funding priorities, and only 57.6 percent of the counties use it to determine funding levels of individual programs. Another study of performance measurement by city governments finds that only 50 percent of the responding cities have the mayor or mayor's office as the primary audience of the tool (Poister and Streib, 1999), even though nearly three-quarters of the cities distribute performance reports to department heads, and two-thirds distribute the reports to city council members.

The lack of sufficient attention to performance measures by elected officials starves performance measures of needed political support. Many administrators view their efforts to collect performance data and report the measures as a fruitless and wasteful exercise. Over time, they may gradually develop resistance to the tool since they see little impact from their time investment.

The Need for Citizen-Based Performance Assessment

One of the major reasons why elected officials lack significant interest in performance assessment is that citizens are seldom involved in the design and implementation of performance measurement. Elected officials often look toward citizens for guidance in decision-making. When citizens voice their concerns, elected officials usually pay close attention to them because they recognize citizens as the voters and owners of government. Unfortunately, public managers and departmental staff seldom seek citizen inputs when they develop performance measures of public services. For instance, a survey study of city governments by Poister and Streib (1999) reports that only 3 percent of the cities with a population of 25,000 or more involve citizen groups in developing performance measures.

Since citizens have limited roles in performance measurement, they are often unaware of the fact that performance measures can be used to evaluate public services. In addition, performance measures developed by administrators may not reflect the manner used by citizens to evaluate city services. Some of the performance measures may also be so technical that they do not relate to how ordinary citizens understand services. All these decrease the interest of citizens in using the measures as a method for holding government accountable, which further mitigates the political significance of the measures in the eyes of elected officials.

To resolve this problem, performance measurement need to ally with the movement of citizen engagement. If citizens are involved in the design, implementation, and usage of performance
measurement, elected officials have strong incentives to pay attention to the measures, and administrators are more likely to believe that the measures will be used in decision-making. Performance measures become “political credible” as they reflect citizens' concerns about public services.

In addition, citizen involvement in performance measurement is consistent with the recent movement of citizen engagement by city governments. Citizens are the owners of government (Schachter, 1997). While public managers may apply business-like techniques to enhance the efficiency and cost-effectiveness of a program, they have to operate in the wider context by recognizing that citizens have the rights to influence decisions, evaluate policies and program outcomes, and partner with public officials to create and implement policies (Box, 1999).

Citizen involvement in performance measurement is also beneficial from the administrative perspective. Based on the data from a national survey of city managers and administrators, Berman (1997) finds that citizen engagement, such as informing citizens of the performance of public services, involving them in policy dialogues and discussion of controversial issues, and using surveys to solicit their preferences, reduces cynicism and builds stronger trust in government. Glaser and Hildreth (1999) analyze citizens' willingness to pay taxes and find that tax increase is more acceptable if a local government makes more effort to honor citizens' values and priorities, and explain to them how the government spends tax dollars. Putnam (1995) also suggests that citizen engagement enhances the effectiveness of government and the quality of public services.

Hence, performance measurement and citizen participation should be integrated. This leads to the suggestion of citizen-based performance assessment, in which citizens are involved in the following ways (Callahan and Holzer, 1999; Epstein, et al., 2000; Fund for the City of New York, 2000):

- Citizens identify the programs to be measured;
- Citizens state the purpose and desired outcomes of the programs;
- Citizens select the measures or indicators of the programs;
- Citizens set standards for performance and outcomes;
- Citizens monitor and report results and program accomplishments.
“Citizen-Initiated Performance Assessment” (CIPA) in Iowa

In fall 2000, a project team from the Office of State and Local Government Programs at Iowa State University, the Institute of Public Affairs at University of Iowa, and the Iowa League of Cities (the “project team” hereafter) launched a statewide effort to determine the feasibility of developing “citizen-initiated performance assessment” (CIPA) in Iowa cities. The project team contacted cities with a population of 10,000 or above because they have the necessary administrative capacities to implement CIPA. Also, a significant portion of the U.S. population resides in cities of this population range. According to the Census of Government, about 52 percent of the U.S. population is residing in these cities (U.S. Bureau of Census, 1999). The ratio is slightly higher in the Midwest, which is about 55 percent.1 Furthermore, these cities represent a significant portion of city governments in the United States. According to the Census of Government, there are 2,454 city governments in this population range, compared to only 80 cities that have a population of 200,000 or above. Hence, the results of the project will have high generalizability and applicability at least in the Midwest region, if not in other medium-sized and small cities throughout the nation.

The project team contacted 32 Iowa cities, of which 18 showed initial interest in learning more about CIPA. The team then visited with these cities, and where there was continuing interest, made presentations to city managers and staff, mayors, city council members, and citizen groups, respectively. Citizen groups that the project team met varied from city to city. Some cities, such as the city of Des Moines, used their existing neighboring organizations; other cities, such as Clive, Marion, and Indianola, used citizen advisory boards or review committees; the remaining cities used open forums and invited the general public to attend a presentation about CIPA. In most cases, the citizens who attended the meetings were fairly representative of the city population.

The project team made presentations to more than 60 city officials and more than 100 citizen representatives in various cities of Iowa. Eventually, 9 cities or more than one-quarter of the Iowa cities in the targeted population range were selected and committed to implement CIPA over a time frame of approximately three years.
Why are Cities (Not) Interested in CIPA?

To understand what factors motivated these cities to have interest in CIPA, we use a survey dataset of the targeted cities to analyze statistically the differences between these cities and the cities that do not join the project. The survey was sent to the 32 Iowa cities with a population of 10,000 or above in the summer of 2000, before the project team visited with these cities and provided an orientation about CIPA to city officials and citizens. Hence, the survey results were not biased by the project team's effort to promote CIPA.

The survey asked city finance directors about their familiarity with performance measurement, their attitude toward the tool, and the characteristics of city management. To ensure that the respondents clearly understood the meaning of “performance measurement” and “performance budgeting”, the survey provided a definition of performance budgeting and showed examples of performance measures commonly found in city budgets. (Please find the survey attached in Appendix I.)

Hypotheses

There are many possible explanations why a city adopts CIPA. The literature of organizational change and innovation suggests that the environmental factors, external relationship, internal structure and leadership, management systems, and organizational culture of a public agency influence why changes occur in government (Brudney, et al., 1995; Light, 1994; Rogers, 1995). Environmental factors include community size, political stability, and environmental turbulence. Factors of external relationship include the level of cooperation with external parties, and the degree of openness to external influence. Internal structure and leadership, such as organizational hierarchy, the demographics of the workforce, professionalism, and different management styles, may also influence organizational changes. Management systems, such as systems that encourage suggestions of ideas, training programs, and incentive systems, may stimulate innovation. Organizational culture, such as organizational norms and expectations, is another factor that may suppress or encourage changes.

1 About 31 percent of the U.S population resides in cities with a population above 200,000. The ratio is even smaller in the Midwest. Only about 23 percent of the Midwest population resides in the population. Midwest states include Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin.
It is impossible for this paper to look into all of these factors. Hence, the following analysis focuses primarily on two areas. First, it compares some of the environmental factors, such as community size, organizational stability, and the perception of the relationship between the city government and citizens, and examines if they influenced a city's decision of adopting CIPA. Second, it focuses on the tool itself and analyzes statistically the differences in perception of performance measurement by city officials.

The innovation literature suggests that organizational size influences innovativeness. Several studies have found that larger cities tend to be more innovative, possibly because they face more diverse demands for services that require innovative solutions, or because they have more organizational slacks to try on new programs (Brown and Herr, 1978; Damanpour, 1992; Mytinger, 1968; Smith and Taebel, 1985). The literature on citizen participation also finds that larger cities tend to involve citizens more because of their need to address diverse demands (Ebdon, 2000). Hence, we hypothesize that,

1. Cities with a larger population are more likely to participate in the CIPA project.

The literature also suggests that agencies in a highly stable environment are less likely to introduce changes (Hannan and Freeman, 1984; Haveman, 1992). Without major governing crises, significant economic downturns, or social disorder, public officials tend to treat business as usual, and have very low incentives to make changes in the existing process or managerial system. Hence, we hypothesize that,

2. Cities with greater organizational stability are less likely to participate in the CIPA project.

Organizational openness is another factor that may enhance innovativeness (Rogers, 1995). If the members of an organization are closely linked to external parties, they are more likely to take innovative steps to adapt to environmental changes, because the external linkages help generate inputs and ideas from diverse sources.

Openness is especially important in engaging citizens in performance measurement. Epstein, et al. (2000) suggest that if a local government does not have an open organizational culture, it is unlikely to sustain citizen engagement and use innovative approaches to measure performance of public services. The literature on bureaucracy also suggests that bureaucratic norms, such as the emphasis on professional
expertise, organizational control, administrative stability, and efficiency, are generally contradictory to the value of citizen involvement (Kweit and Kweit, 1981). If a city has already overcome these norms and has been actively engaging citizens, we expect that the city should be naturally inclined to participate in the CIPA project because it simply reinforces the current practice. Hence, we hypothesize that,

3. Cities with greater organizational stability are more likely to participate in the CIPA project.

Theories of organizational change and innovation also suggest that decision-makers usually make rational decisions in participating in the CIPA project. If they perceive CIPA as politically threatening to the governance of a city, they are likely to reject the initiative. Hence, we hypothesize that,

4. Cities that are concerned about the information from performance measurement being used politically in elections are less likely to participate in the CIPA project.

Finally, theories of the innovation-decision process suggest that before an organization adopts an innovation, the organization members need to be aware of the tool, perceive some organizational needs or problems, and believe that the tool can help resolve the problem effectively (Rogers, 1995). The knowledge of the tool is therefore a pre-condition for adoption. Without a clear understanding of the tool, organizational members may feel too uncertain to adopt it, or may have stronger resistance in the persuasion stage. Hence, we hypothesize that,

5. Cities in which elected and non-elected officials are more familiar with performance measurement are more likely to participate in the CIPA project.

6. Cities that perceive performance measurement as a useful managerial tool are more likely to participate in the CIPA project.
Results from a Preliminary Analysis

Table 1 and 2 provide a preliminary test of the hypotheses by comparing the average attributes of CIPA and non-CIPA cities. On average, the CIPA group has a slightly smaller population than the non-CIPA group. The finding is contradictory to hypothesis 1, even though the difference is not statistically significant.2

We also find inadequate support for hypothesis 2. We use the number of years that a city manager or a mayor has served in a city as a proxy to measure the degree of organizational stability. If a city faced significant governing crises or turbulent changes, it should have higher turnover rates in the elected offices and the appointment of the city manager. Both groups seemed to be equally stable. On average, the number of years that a city manager served in a city was about 9 years, and the number of years that a mayor served was about 4 years.

We measure organizational openness by channels of citizen engagement that a city institutionalized. The results show that they did not differ significantly in the usage of citizen surveys or citizen forums to solicit public inputs. However, a significantly higher proportion of CIPA cities had citizen advisory committees. These committees, such as the neighborhood associations in Des Moines, the citizen budget advisory committees in Clive and Burlington, and committees in specific service areas, such as the library advisory committee in Indianola and the public works committee in Marion, had regular meetings with city officials throughout a year to give policy inputs and recommendations. The mechanism required strong commitment from both citizens and public officials to participate. The fact that CIPA cities were more likely to use the mechanism seems to support hypothesis 3.

Table 2 shows support for hypothesis 4. City officials in CIPA cities were less concerned about the possibility that performance measures would be used politically in election years. The significant difference suggests that political concerns were a major hindering factor for a city to adopt CIPA. Interestingly, we notice that there was no significant difference between the two groups in the perception of citizens' interest in public affairs and citizen support for the city (see Table 1). This seems to indicate

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2 A small group test (assuming different variances) shows that the t statistics of the difference in mean, which is –0.12, is not statistically significant.
that the political concerns were not tied to the general "friendliness" of citizens toward city hall. (More discussion follows.)

Both groups claimed to be familiar with the tool (see Table 2). Most of the city finance directors in both groups had extensive exposure to performance measurement through professional conferences and regular publications. However, they believed that elected officials were less familiar with performance measurement. The result is consistent with the findings in some previous studies of state and local governments (Melkers and Willoughby, 1998; Poister, et al., 1999; Wang, 2000).

What is surprising is that while the overwhelming majority of the finance directors in the CIPA group did not believe that their elected officials were familiar with performance measurement and budgeting, more than half of the finance directors in non-CIPA cities believed that their elected officials were familiar with the tool. This contradicts sharply with theories of the innovation-decision process, and clearly refutes hypothesis 5.

The results in Table 2 seem to lend support to hypothesis 6. On average, CIPA cities had a more positive perception about the usefulness of performance measurement and budgeting than non-CIPA cities did. On average, they believed more strongly that the tool helped set spending priorities, audit departmental performance, and improve effectiveness and efficiency. However, the difference is not statistically significant.
Table 1. Comparison of cities that will and will not adopt CIPA

<table>
<thead>
<tr>
<th></th>
<th>The CIPA group (n=9)</th>
<th>The non-CIPA group (n=19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic Characteristics:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average of city population</td>
<td>37,953 (58,680)</td>
<td>40,521 (29,193)</td>
</tr>
<tr>
<td>Governance Characteristics:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average number of years that</td>
<td>3.83 (3.32)</td>
<td>4.36 (3.04)</td>
</tr>
<tr>
<td>the mayor has served the city</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average number of years that</td>
<td>9.22 (6.36)</td>
<td>9.20 (5.53)</td>
</tr>
<tr>
<td>the manager has served the city</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbers of cities that have</td>
<td>3 (33.3%)</td>
<td>10 (52.6%)</td>
</tr>
<tr>
<td>citizen forums or workshops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(other than public budget</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hearings) during budget</td>
<td></td>
<td></td>
</tr>
<tr>
<td>preparation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbers of cities that have</td>
<td>4 (44.4%)</td>
<td>7 (36.8%)</td>
</tr>
<tr>
<td>citizen surveys about program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>priorities and spending needs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of cities that have</td>
<td>6 (66.6%)</td>
<td>2 (10.5%)</td>
</tr>
<tr>
<td>citizen advisory groups /</td>
<td></td>
<td></td>
</tr>
<tr>
<td>committees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average response to the</td>
<td>3.86 (0.38)</td>
<td>3.63 (0.76)</td>
</tr>
<tr>
<td>statement, “Citizens of my</td>
<td></td>
<td></td>
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<tr>
<td>city are supportive of the</td>
<td></td>
<td></td>
</tr>
<tr>
<td>functions of the government.”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5 = strongly agree, 4 =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>agree, 3 = neutral, 2 =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>disagree, 1 = strongly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>disagree)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average response to the</td>
<td>3.43 (0.97)</td>
<td>3.16 (0.83)</td>
</tr>
<tr>
<td>statement, “Most citizens of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>my city are interested in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>public affairs.” (5 = strongly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>agree, 4 = agree, 3 =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>neutral, 2 = disagree, 1 =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>strongly disagree)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: 1. Standard deviations are reported in parentheses, except when percentages are reported.
2. Four cities in the targeted population range did not respond to the survey.
Table 2. Comparison of cities’ attitude toward performance measurement and budgeting

<table>
<thead>
<tr>
<th>Familiarity with Performance Measurement &amp; budgeting</th>
<th>The CIPA group (n = 7)</th>
<th>The non-CIPA group (n = 19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of city finance directors who have attended professional meetings that discuss performance budgeting &amp; measurement.</td>
<td>6 (85.7%)</td>
<td>16 (84.2%)</td>
</tr>
<tr>
<td>Percentage of city finance directors who receive regular publications that discuss performance budgeting &amp; measurement.</td>
<td>5 (71.4%)</td>
<td>11 (57.9%)</td>
</tr>
<tr>
<td>Percentage of city finance directors who think that they are familiar with the idea of performance budgeting and measurement in local governments.</td>
<td>7 (100%)</td>
<td>17 (89.5%)</td>
</tr>
<tr>
<td>Percentage of city finance directors who think that their city managers or administrators are familiar with performance budgeting and measurement.</td>
<td>6 (85.7%)</td>
<td>13 (81.2%)</td>
</tr>
<tr>
<td>Percentage of city finance directors who think that their mayor is familiar with performance budgeting and measurement.</td>
<td>1 (14.3%)</td>
<td>11 (57.9%)</td>
</tr>
<tr>
<td>Percentage of city finance directors who think that their city council is familiar with performance budgeting and measurement.</td>
<td>2 (28.6%)</td>
<td>11 (57.9%)</td>
</tr>
</tbody>
</table>

Average responses to the following statements (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree; standard deviations are reported in parentheses.)

<table>
<thead>
<tr>
<th>Statement</th>
<th>The CIPA group</th>
<th>The non-CIPA group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance measures are useful for setting priorities in resource allocation among programs.”</td>
<td>4.29 (0.49)</td>
<td>3.73 (0.73)</td>
</tr>
<tr>
<td>Performance measures are useful for departmental performance auditing.”</td>
<td>4.29 (0.49)</td>
<td>3.84 (0.60)</td>
</tr>
<tr>
<td>Performance budgeting helps improve managerial effectiveness and efficiency.”</td>
<td>4.00 (0.82)</td>
<td>3.52 (0.69)</td>
</tr>
<tr>
<td>Performance measures provide citizens useful information about what the government has accomplished.”</td>
<td>3.86 (0.90)</td>
<td>3.58 (0.69)</td>
</tr>
<tr>
<td>My city does not have time and resource to collect data for performance measurement.”</td>
<td>3.14 (1.07)</td>
<td>2.95 (0.85)</td>
</tr>
<tr>
<td>I am concerned about the possibility that performance measures are used for political purposes in election years.”</td>
<td>2.28 (0.49)</td>
<td>3.21 (0.85)</td>
</tr>
</tbody>
</table>

Note: 1. Two cities in the CIPA group did not respond to all of the questions. Four cities in the non-CIPA group within the targeted population range did not respond to the survey.
2. Only 16 cities responded to the question.
Logistic Analysis

A limitation of the above analysis is that it does not control for possible interactions among the variables, thus creating difficulties to establish any causal relationship. In addition, a simple comparison of differences in mean does not show to what extent a factor is more important than others in influencing the decision of adopting CIPA. Therefore, the following analysis uses logistic regression to test the hypotheses. The dependent variable of the regression is the predicted odd in natural logarithm that a city adopts CIPA. The regression estimates the probability of adopting CIPA by a city given the influence of independent variables. The independent variables are the organizational characteristics of a city, city officials' perception of performance measurement and citizen participation, and other control variables. For more discussion about the methodology of logistic regression, please refer to Appendix II.

Due to the small number of observations and the concern for multicollinearity, we only control for two factors in all of the models below. First, we include city population as a proxy for organizational need and resource capacity. As discussed earlier, larger cities tend to be more open to organizational changes because they have more organizational slacks and diverse needs.

Second, we control for organizational openness, which measures the extent to which a city has already institutionalized channels of citizen engagement. It specifically measures whether a city had city forums or workshops (other than public hearings that are legally required) during the budgeting process, citizen surveys that solicit citizens’ inputs on program priorities and spending needs, and regularized citizen advisory committees. If a city had all three channels, it has a score of 3. If a city only had two channels, it has a score of 2, and so on.

The model in Table 3 tests the hypothesis that concerns about using performance measures politically in election years decreased the probability of adopting CIPA. The variable is measured by the extent to which the finance director agreed that there was such a concern on a five-point scale (5 = strongly agree, 1 = strongly disagree). The result of the logistic model supports the hypothesis (see Table 3). Political concern significantly decreased the likelihood of adopting CIPA and was a major hindering factor for a city to adopt CIPA. We also confirm that citizen support for city governments and citizen interest in public affairs had no significant impact on the adoption decision (results not reported here), and these two factors were not significantly related to city officials' political concerns about performance.
measurement. Hence, political concerns about performance measurement were specifically tied to electoral politics. Even if citizens were perceived to be generally supportive of the city, officials in the city might still be concerned politically and became disinterested in CIPA.

Table 3. Logistic Model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Parameters</th>
<th>Odd Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>Concern about the possibility that performance measures are used for political purposes in election years</td>
<td>-2.32** (4.19)</td>
<td>0.099</td>
</tr>
<tr>
<td>Population (in thousands)</td>
<td>0.003 (0.01)</td>
<td></td>
</tr>
<tr>
<td>Citizen participation channels</td>
<td>1.46* (0.79)</td>
<td>4.32</td>
</tr>
</tbody>
</table>

-2 Log L  = 17.26
Chi-Square for covariates = 13.0 (probability = 0.005)

Note: * indicates statistical significance at the 10-percent level; ** indicates significance at the 5-percent level.

The models in Table 4 and 5 test the hypothesis that familiarity with performance measurement increased the likelihood of adopting CIPA. The results clearly reject the hypothesis by showing that elected officials' familiarity and the adoption decision were negatively correlated. The more familiar the elected officials of a city were with performance measurement, the less likely that the city would join the CIPA project.

Table 4. Logistic Model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Parameters</th>
<th>Odd Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-5.29</td>
<td></td>
</tr>
<tr>
<td>Mayor's familiarity with performance measurement (1 = familiar, 0 = not familiar)</td>
<td>-11.74** (6.12)</td>
<td>0.000</td>
</tr>
<tr>
<td>Population (in thousands)</td>
<td>0.06* (0.03)</td>
<td>1.06</td>
</tr>
<tr>
<td>Citizen participation channels</td>
<td>3.29* (1.82)</td>
<td>26.96</td>
</tr>
</tbody>
</table>

-2 Log L  = 11.89
Chi-Square for covariates = 18.40 (probability = 0.004)

Note: * indicates statistical significance at the 10-percent level; ** indicates significance at the 5-percent level.

3 The Pearson's correlation of citizen support for city government and officials' political concerns is -0.15 and is statistically insignificant at 10-percent level. The Pearson's correlation of citizen interest in community affairs and officials' political concern is -0.20. It is also statistically insignificant.
Table 5. Logistic Model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Parameters</th>
<th>Odd Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-2.37</td>
<td></td>
</tr>
<tr>
<td>City Council's familiarity with performance measurement (1 = familiar, 0 = not familiar)</td>
<td>-2.93*</td>
<td>0.054</td>
</tr>
<tr>
<td>Population (in thousands)</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Citizen participation channels</td>
<td>1.37*</td>
<td>3.95</td>
</tr>
</tbody>
</table>

-2 Log L = 21.67
Chi-Square for covariates = 8.62 (probability = 0.03)

Note: * indicates statistical significance at the 10-percent level; ** indicates significance at the 5-percent level.

There are several possible explanations for the puzzling result. First, unfamiliarity with performance measurement among elected officials might have motivated the city manager or the finance director to promote the CIPA project, because they wanted the elected officials to have an opportunity to gain understanding about performance measurement. However, we reject this argument because a correlation analysis shows that city administrators' enthusiastic support for performance measurement was related to elected officials' familiarity with the tool (see Table 5). When elected officials were unfamiliar with performance measurement, city administrators were less likely to show enthusiastic support for the tool, and therefore, might not be interested in "educating" elected officials about it.

Table 5. Correlation between Officials' Familiarity with Performance Measurement and their Enthusiastic Support for the Tool

<table>
<thead>
<tr>
<th></th>
<th>City Manager's Support</th>
<th>Departments' Support</th>
<th>Mayor's Support</th>
<th>City Council's Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance Director's familiarity</td>
<td>-0.09 (0.66)</td>
<td>-0.12 (0.56)</td>
<td>0.00 (1.00)</td>
<td>0.01 (0.95)</td>
</tr>
<tr>
<td>Department heads' familiarity</td>
<td>0.25 (0.22)</td>
<td>0.09 (0.67)</td>
<td>0.29 (0.15)</td>
<td>0.32 (0.11)</td>
</tr>
<tr>
<td>City Manager's familiarity</td>
<td>0.24 (0.28)</td>
<td>0.08 (0.71)</td>
<td>0.11 (0.62)</td>
<td>0.13 (0.55)</td>
</tr>
<tr>
<td>Mayor's familiarity</td>
<td>0.35* (0.08)</td>
<td>0.48*** (0.01)</td>
<td>0.56*** (0.003)</td>
<td>0.41** (0.04)</td>
</tr>
<tr>
<td>City Council's familiarity</td>
<td>0.48*** (0.01)</td>
<td>0.60*** (0.001)</td>
<td>0.55*** (0.003)</td>
<td>0.58*** (0.002)</td>
</tr>
</tbody>
</table>

Note: The correlation is measured by Pearson's correlation. The significance is reported in parentheses. * indicates statistical significance at the 10-percent level; ** indicates significance at the 5-percent level, *** indicates significance at the 1-percent level.
Another possible explanation is that elected officials who were unfamiliar with performance measurement might have "naively" supported CIPA without fully understanding the political and administrative implications. For example, their unfamiliarity might have reduced their political concerns about performance measurement, thus "mistakenly" leading them to support the CIPA project.

We also reject this argument because of two reasons. First, there is no significant correlation between elected officials' familiarity with performance measurement and the concern that performance measures would be used politically. Their unfamiliarity did not increase or reduce the political fear. Second, Table 5 shows a significant correlation between elected officials' familiarity with performance measurement and their enthusiasm for the tool. The analysis in Table 4 above and Table 6 below also supports that city officials made rational choices in adopting CIPA by evaluating the benefits and costs of the mechanism. Hence, it is unlikely that they would support CIPA if they did not understand it fully.

We offer an alternative explanation. Elected officials who were unfamiliar with performance measurement were more open to the new idea of CIPA. They did not have the presumption or bias that performance measurement should be an internal, managerial exercise focusing primarily on cost-efficiency. As a result, when the project team presented the concept of CIPA to them, they were more ready to support it. While this seems to be a plausible answer to the surprising result in Table 4, more empirical research about the elected officials' attitude and expectations is needed to prove the validity of the argument.

Finally, we test the hypothesis that the perception of the usefulness of performance measurement increased the probability of adopting CIPA. The variable is the average of the following measures on a five point scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree):

- The extent to which the finance director agreed that “performance measures are useful for setting priorities in resource allocation among programs”;
- The extent to which the finance director agreed that “performance measures are useful for departmental performance auditing”;
- The extent to which the finance director agreed that “performance budgeting helps improve managerial effectiveness and efficiency”;
The extent to which the finance director agreed that “performance measures provide citizens useful information about what the government has accomplished”;

The results in Table 6 show that after controlling for population and channels of citizen participation, a positive perception of the usefulness of performance measurement increased the likelihood of participating in the project to adopt CIPA, and the variable is statistically significant at the 10-percent level. Hence, hypothesis 6 is supported.

Table 6. Logistic Model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Parameters</th>
<th>Odd Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-14.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(6.92)</td>
<td></td>
</tr>
<tr>
<td>Perception of the usefulness of performance measurement &amp; budgeting</td>
<td>2.99*</td>
<td>19.82</td>
</tr>
<tr>
<td></td>
<td>(1.64)</td>
<td></td>
</tr>
<tr>
<td>Population (in thousands)</td>
<td>-0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td></td>
</tr>
<tr>
<td>Citizen participation channels</td>
<td>1.55**</td>
<td>4.73</td>
</tr>
<tr>
<td></td>
<td>(0.78)</td>
<td></td>
</tr>
<tr>
<td>-2 Log L = 20.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chi-Square for covariates = 9.82 (probability = 0.02)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * indicates statistical significance at the 10-percent level; ** indicates significance at the 5-percent level.

Population does not have a consistent sign in the above models and is only statistically significant in Table 4. Even in that model, the substantive impact is negligible, as indicated by the odd ratio of the variable. Therefore, hypothesis 1 that population matters is rejected. We also reject hypothesis 2 that organizational stability influenced the decision of adopting CIPA. The number of years that the mayor or the city manager served in a city is not statistically significant (results now shown). We also test the significance of other factors, such as the perceived time and resource constraints in implementing performance measurement, and familiarity with performance measurement by city managers or departmental staff. None of these factors are statistically significant (results not reported here).

Organizational openness, which is measured by the number of citizen participatory channels, is statistically significant in all of the above models and shows a substantial impact on the likelihood of adopting CIPA by a city. Therefore, hypothesis 3 is supported. Cities that were already open to the idea of citizen engagement were more likely to take an additional step and support citizen participation in performance measurement.
Discussion

The results above show that the attitude of elected officials matters significantly in the decision of adopting CIPA by a city. Also, the concern about performance measurement being used politically is a major obstacle for CIPA. Hence, how to overcome the political fear and gain support from elected officials are the major challenges for promoters of citizen-based performance assessment. From our meetings with city officials, we find that several factors are helpful to generate the necessary political support. First, the rising citizen expectation of city services may help stimulate officials' interest in CIPA. The mayors and city council members of several cities that we met with have expressed to us a concern that citizens are making more diverse and conflicting demands for city services. This is especially true in the area of parks and recreations, in which young professionals, "soccer moms," "football dads", and retired elderly often make competing demands for program and facility improvements. It is also true in public works, in which city officials have to make tough choices between building new roads and maintaining the existing infrastructure. We find that when officials face the pressure of these rising but competing expectations from citizens, they tend to support CIPA more because they need citizen inputs to help them prioritize goals and allocate resources.

Second, incremental changes help. Cities that have already taken steps to engage citizens in a regular manner, such as through citizen advisory committees, are more likely to support CIPA. These cities have experienced how active citizen engagement can help officials communicate city problems to citizens openly, assist citizens understand policy dilemmas and resource constraints, and generate innovative ideas from citizens to handle the policy challenges. For example, the city of Burlington previously formed a "citizen academy" to help the police understand how citizens perceived problems of public safety. The experience was so positive that the police department of Burlington is now committed to participate in the CIPA project because they want citizen participation in developing program priorities and performance measures of public safety programs. The story of Burlington and other similar experiences in the CIPA group suggest that incremental changes toward citizen engagement help overcome the political hindrance.

Third, reformers of CIPA need to focus on the political benefits of citizen engagement in CIPA and communicate these clearly to city administrators and elected officials. We find that city officials are
interested in citizen-based performance measurement primarily because of the values of citizen engagement, rather than because of the benefits of performance measurement. For example, two of the participating cities (Des Moines and Urbandale) are already in the performance measurement program of the International City/Council Management Association. While they find the program very helpful in developing performance measures for managerial purposes, the cities miss the citizen perspective in performance measurement, and are therefore highly interested in the CIPA project. Many other city officials not in the CIPA group whom we met with also expressed stronger interest in the citizen participation component than in the performance measurement part of the project. Hence, effective communication of the value of citizen engagement is a key to the success in promoting citizen-based performance assessment.

Fourth, the roles of city managers in promoting CIPA cannot be overstressed. Although their sole support for performance measurement is not sufficient to make a city adopt performance assessment, they are the critical bridge to get the political support of departmental staff and encourage elected officials to support the implementation of CIPA. City councils often trust the professional judgment of city managers on policy decisions. City managers also have the formal power and informal influence over departmental staff to support reforms and organizational changes. In meeting with officials and citizens, we find that if city managers are enthusiastic about citizen engagement and performance assessment, they are often the strongest advocates for the project.

Conclusion

Students of public administration have tried to promote performance measurement and integration of the tool into budgeting for decades. However, the progress has often been slowed primarily because elected officials are unfamiliar with the tool and do not see the political relevancy and significance of measuring the performance of public services quantitatively.

Citizen-based performance measurement tries to overcome this political hurdle by directly involving citizens in the design and implementation of performance measurement. In the process, citizens inform public officials how they perceive the effectiveness and impact of public services, and what their priority concerns are. They also determine the performance measures, so that elected officials and managers have citizen-based parameters to guide their resource allocation decisions.
Despite the potential benefits of citizen-based performance assessment, many cities are unwilling to implement it. We examine the experience of Iowa cities, and analyze why some cities are interested in CIPA based on theories of organizational change and innovativeness. The results show that city officials are rational decision-makers. If they perceive performance measurement as a positive tool, they are more likely to adopt CIPA. If officials are concerned about the possibility that performance measures will be used politically in election years, they are unlikely to support the mechanism.

Since the Iowa project is in the initial stage, there are still many questions that will need to be addressed and analyzed carefully. We therefore conclude by listing some of these questions, and hope that we will be able to examine them in the future when we gather more data and information from the Iowa CIPA project:

- Why are non-CIPA cities more concerned about the possibility that performance measures will be used politically, when both the CIPA and non-CIPA group have comparable levels of citizen support of city government? How can the concern be overcome?
- Similarly, what motivates elected officials and city administrators in the CIPA group to engage citizens more? Is it caused by personal factors, leadership dynamics, organizational characteristics, the history of a city, or the characteristics of citizens?
- What are the political and administrative benefits of involving citizens in performance measures? Does it make cities more efficiently and effectively run? Can it help cities generate more positive image of city administration? Does it help reduce political cynicism that is so commonly held by citizens today?
- What are the effective ways to engage citizens in the design of performance measurement? Besides using small group techniques, such as focus-group discussion, how can cities get representative citizen inputs in a cost-effective way? How can information technology help the process?
- How to promote and sustain citizen interest in citizen-based performance assessment? What can be done to make citizens feel that the exercise is worth their time investment?4

4 Callahan (1999) suggests that better communication between citizens and officials, education and training, clear goals in citizen programs, and strong staff support, are critical to sustain citizens’ interest in participation. King, et al. (1998) emphasize the need to re-orient public officials to a new model of governance and re-educate them about “authentic participation”. Different natures of decisions, such as whether they are efficiency-focused and technical in nature, and whether there is clear
• What is the impact on citizens' perception and expectation of their roles in city government? How should city officials respond to the perception and expectation?

• What are the expectations of CIPA by elected officials, city administrators, and citizens? Do they differ significantly? Are they in conflicts? Will the CIPA project be able to fulfill their expectations?

These are some of the questions that we will focus on when the nine cities in Iowa start to implement different mechanisms to engage citizens in performance assessment.

Reference


Consensus among stakeholders, also determine the appropriate ways to engage citizens (Thomas, 1993; Walter, et al., 2000). We will build on these findings to study more how city officials can sustain citizens' interest in performance measurement.


Appendix I. Survey of City Officials

1. What is your city: ___________________________
2. How many employees work for the budget/finance office? ________ full-time equivalent (FTE)
3. How long has the city manager been with the city? ________ years. Not applicable
4. How long has the mayor been in office? _________________ years
5. How long has the budget/finance director been with the city? ________________ years
6. What is the percentage of city council members who have been in the council for more than 4 years?
   __0% __ 1-20% __ 21-40% __ 41-60% __ 61-80% __ 81-100%
7. Performance budgeting integrates performance measurement and budgeting by focusing on results and outcomes in the budgetary process. Here are some examples of performance measures adopted in city budgets:
   - the response time for an emergency vehicle to arrive after a 911 call is made
   - the response time for the city to fix pothole or traffic light problems after a complaint is made
   - $X per mile of road construction
   - $X per ton of snow removed
   - number of citizen complaints annually
   - per-resident crime statistics
   - property valuation loss as a result of crimes or fire
   - number of book circulation per month in the city library
   - the amount of time required to process a building permit application

Do you collect performance data similar to the above measures in the following areas? Please check one of the four options for each area:

<table>
<thead>
<tr>
<th>Area</th>
<th>Currently collect</th>
<th>No, but plan to in a year</th>
<th>Do not collect</th>
<th>Service not provided by the city</th>
</tr>
</thead>
<tbody>
<tr>
<td>law enforcement</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>fire protection</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>ambulance services</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>road construction &amp; maintenance</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>traffic control &amp; safety</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>snow removal</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>garbage collection</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>sewage &amp; sanitation</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>water utility</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>electric utility</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>park &amp; recreational programs</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>library</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>arts &amp; cultural programs</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>econ. &amp; community development</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>health &amp; environ. regulation</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>city managerial effectiveness</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>fiscal health</td>
<td>1.</td>
<td>2.</td>
<td>3.</td>
<td>4.</td>
</tr>
</tbody>
</table>
8. How are citizens involved in the operating budgetary process of your city (check all that apply):

___ indirect involvement through their representatives in the City Council
___ indirect involvement through comments to local newspapers and the media
___ indirect involvement through business and community organizational representatives
___ through public budgetary hearings
___ meetings with council members or city staff
___ citizens can get a free copy of budget summary or document
___ forums or workshops open to citizen participation during budget preparation
___ through citizen surveys about program priorities and spending needs of the city
___ posting budget materials on internet sites
___ using local cable access channels to broadcast council meetings
___ through a special citizen advisory group / committee
___ other. Please explain:

____________________________________________________________________________
____________________________________________________________________________

Due to the sensitiveness of your responses to Question 9 and 10, your responses will be analyzed statistically and reported in aggregate. Individual responses will not be cited to protect the confidentiality of the respondents.

Question 9. Please circle one of the responses:

a. “I am familiar with the idea of performance budgeting and measurement in local governments.” Yes No

b. “The mayor is familiar with performance budgeting and measurement.” Yes No Don't know

c. “The city council is familiar with performance budgeting and measurement.” Yes No Don't know

d. “The city manager/administrator is familiar with performance measurement and budgeting.” (Leave empty if not applicable.) Yes No Don't know

e. “Most department heads in my city are familiar with performance budgeting and measurement.” Yes No Don't know

f. "I have attended professional meetings that discuss performance budgeting & measurement." Yes No

g. "I receive regular publications that discuss performance budgeting & measurement." Yes No

→ Next page continues …
Question 10. To what extent do you agree with the following statement?

Note: SA = Strongly agree, A = agree, N = neutral, D = disagree, SD = Strongly disagree

a. “Performance measures are useful for departmental performance auditing.”
   SA A N D SD

b. “Performance measures are useful for setting priorities in resource allocation among programs.”
   SA A N D SD

c. “The city manager is enthusiastic about using performance budgeting and measurement.”
   SA A N D SD

d. “The mayor is enthusiastic about using performance budgeting and measurement.”
   SA A N D SD

e. “The city council is enthusiastic about using performance budgeting and measurement.”
   SA A N D SD

f. “Most city departments are enthusiastic about using performance budgeting and measurement.”
   SA A N D SD

g. “Performance measures provide citizens useful information about what the government has accomplished.”
   SA A N D SD

h. “Performance benchmarks from other cities similar to mine will be useful for decision-making.”
   SA A N D SD

i. “My city does not have time and resource to collect data for performance measurement.”
   SA A N D SD

j. “Even though/if the city reports performance measures, the city council does not use them for budgetary decision-making.”
   SA A N D SD

k. “Even though/if the city reports performance measures in budget documents, citizens do not pay attention to them.”
   SA A N D SD

l. “The economic cost of implementing performance measurement outweighs the benefits.”
   SA A N D SD

m. “The city council is interested in innovation of governmental practices.”
   SA A N D SD

n. “Most citizens of my city are supportive of the functions of the government.”
   SA A N D SD

o. “Most citizens of my city are interested in public affairs.”
   SA A N D SD

   SA A N D SD

q. "I am concerned about the possibility that performance measures are used for political purposes in election years.”
   SA A N D SD

r. "Most departmental staff are comfortable with using spreadsheet computer programs, such as Microsoft EXCEL.”
   SA A N D SD
11. If a professional association provides training about performance budgeting and benchmarking, would you be interested in participating?

   Yes      No

12. How much are you willing to pay to attend an intensive 2-day training session? $ _____________

13. What is the title of your official position: ________________________________

This is the end of the survey. Thank you for your cooperation.
Appendix II. Technical explanation of logistic modeling

The logistic regression method assumes that the probability of adopting CIPA \( P \) is a logistic function of some independent variables \( (X) \), which is specified as follows,

\[
P = F(\alpha + \beta X) = \frac{e^{\alpha + \beta X}}{1 + e^{\alpha + \beta X}} \quad (1)
\]

Equation (1) can be transformed to estimate the odds of having concrete plans, \( P / (1 - P) \), in natural logarithm. The result is as follows,

\[
\log \left( \frac{P}{1 - P} \right) = \alpha + \beta X \quad (2)
\]

Taking the exponential function of the predicted odds, we can calculate the predicted probability of adopting CIPA by a city, which is always between 0 and 1. The logistic method is better than the ordinary least square (OLS) regression because the linear prediction of the probability by OLS may lay outside the (0,1) range. It is also better than the constrained regression method (constraining the prediction to be between 0 and 1) because the constrained model may give biased estimates. For more detailed explanation of logistic modeling, please refer to Pindyck and Rubinfeld (1998) and Greene (1993).