

# The Influential Factors of Organization Adoption of E-government Cloud

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**Abstract.** Cloud computing is the current trend in information application and services, and E-Government is no exception. This paper reports on a case study, which is to explore factors and mechanism of organizations' adoption decision towards E-Government based cloud computing. The decision towards E-government cloud is influenced by multiple factors as drivers and barriers for its adoption. In this study, an integrated model which is based on the TOE, DOI, TAM, and TTF is applied to gain insights concerning all contextual influences on the adoption attitude of E-Government cloud. The results of the study showed that the perceived benefit and perceived barrier from cloud technology characteristics, organizational and environmental context, which can reflect the adoption decision of E-government cloud. These findings contribute to academic research and practical implications, advancing our understanding of E-government cloud applications.

## 1. Introduction

In recent years, the government has begun to consider the use of design framework of cloud computing to meet the development needs of E-government (E-Gov) [1]. Therefore, in order to realize the combination of cloud technology and E-Gov, it is necessary to explore the driving factors that influence the organizations' adoption decision towards E-Gov based on cloud computing [2]. This paper aims to examine the impact of government on perceived benefit and perceived barrier to E-Gov cloud. As the purpose of this study is theoretical construction, the method of exploratory case study is chosen. Diffusion of innovation theory (DOI), technology-organization- environment (TOE) framework, technical acceptance model (TAM) and technology task fit (TTF) are applied to analyze the influencing factors of adoption decision towards E-Gov cloud, and then an integrated model can be structured to reflect the influence factors of adoption attitude towards E-Gov cloud. This paper, on the stand of microscopic view, deeply explore the internal and external driving factors and mechanism of organizations' adoption decision towards E-Gov cloud, so as to provide a theoretical basis for the government to promote the construction of E-Gov cloud[3].

## 2. Research Methods

### 2.1. The Method of Case Study

The purpose of this study is to construct the driving factor model of adoption decision towards E-Gov cloud, analyze the driving mechanism of each factor and find out the key drivers. E-Gov cloud,

as a new technology, has not been widely adopted by the government. And at same time, the relevant research on adoption decision towards E-Gov cloud is limited. Consequently the method of exploratory and qualitative case research has been chosen, and the theoretical framework is established with the collection and analysis of case data.

## **2.2. Data Collection and Analysis**

The methods of data collection are mainly through interviews and secondary data, then interviews with government insiders are the main source of data. The topic of the interviews is about the driver and resistance sources of the implementation of E-Gov cloud. On one hand, after careful consideration Jinan E-Gov cloud is selected as the research object in this paper and the respondents are primarily the leaders or responsible persons that are in charge of information field. On the other hand, the related information about E-Gov cloud can be acquired by government information and network search.

Then, the qualitative analysis software is applied to analyze and encode the collected data. At first, independent analysis is conducted on each interview record in order to search the independent opinions. The earliest indentified concepts will be used in subsequent analysis. After the independent analysis, the interview records are analyzed in an overall way. In this process, the concepts that have occurred repeatedly in the data are kept and the individual concepts are abandoned. Finally a theoretical model is developed to describe the factors and mechanism of adoption decision towards E-Gov cloud, which involved in all the data.

## **3. Findings of the study**

This study finds hidden concepts from the case analysis and then discusses them. These findings include technology characteristics, organizational and environmental context [4].

### **3.1. Technology Characteristics**

(1) Compatibility. Compatibility is an important key factor for innovation adoption. Most of respondents pointed that compatibility is the most serious concern of government. The view is that the degree of compatibility will determine whether organizations adopt E-Gov cloud. From the analysis, the question of compatibility can be divided into two categories: technology fit and organization fit. In terms of technology fit, it is impossible for government departments to abolish the original government system after the application of cloud computing technology. Instead, the government will migrate the original system to the cloud platform. Therefore, due to that the mobility, stability and compatibility of the original system are weak, there will be more concerns about the adoption of cloud computing by government. If the organization fit can be considered, some respondents think that cloud computing is the best method to realize the development goals and needs of government. Through taking into account the decentralization of government resources, the application of cloud computing technology is an effective way to promote government business collaboration and information sharing.

(2) Relative advantage. In general, organizations tend to analyze which particular types of relative advantages are most important to them before they decide to adopt innovative technologies. Respondents presented the relative advantages of E-Gov cloud are mainly reflected in two aspects: individual level and organizations level. On the stand of individual level, some respondents believed that after adopting E-Gov cloud, workers in government IT departments can be freed from heavy IT operations, thus the workloads can be reduced. In terms of organization level, there are different opinions about the relative advantages of E-Gov cloud. Some people think that the advantages of E-Gov cloud computing are not obvious, mainly due to the facts that cloud computing technology is not mature enough, or organizations do not have the need to use cloud computing in the near future. But on the other hand, some government IT officials pointed out that E-Gov cloud could provide virtualization services and improve resource utilization.

(3) Complexity. Complexity is the degree of difficulty in the use, cognition and implementation for innovation. Data analysis shows that some respondents think that cloud computing solutions

may be more complex than the current IT architectures. And most of the respondents believe that the most important point is that E-Gov cloud is a organizational change with complex technological-social interaction. The maintainability of cloud computing has been mentioned many times in interviews. Respondents noted that when considering the adoption of E-Gov cloud, maintainability is often a more important indicator. Government agencies can make organizations less costly by selecting cloud service providers to get maintenance services.

(4) Observability. Observability means that there will be successful cases that can be referred to as well as the visibility of practice. All the respondents indicated that their organization will not easily adopt new technology to replace the original architecture, unless the superior government organization and leadership can provide a clear plan, and E-Gov cloud can reflect the advantages compared to the existing technology. Some people put forward that cloud computing are still a concept, so its advantages and effectiveness are not clear.

(5) Trialability. Trialability represents that the potential adoption organizations can test E-Gov cloud services on a limited basis. The trial-ability of E-Gov cloud will lead to an increase in the adoption rate of organizations. In the interviews, some respondents are willing to try using E-Gov cloud to complete their work, and they are aware of the advantages of using cloud solutions.

### **3.2. Organizational Context**

Organizational context refers to the organizational characteristic that promotes or constrains the adoption and implementation of E-Gov cloud. The impact of organizational factors on government adoption decision of cloud computing technology is critical. All respondents considered that in the organizational dimension, the organization's high-level attitude towards cloud computing technology plays an extremely important role.

(1) Top management support. The top management support is an important factor in adopting E-Gov cloud. This is because the organization's leader can guide the allocation of resources and the integration of services. If top managements are familiar with the advantages of E-Gov cloud, they can allocate the necessary resources for the cloud adoption. Conversely, when top managements are more sensitive to the risks associated with E-Gov cloud, they will object to the adoption. From the interviews, the opinion can be acquired that the top managements tend to know little about cloud computing, and more support for superior's work, thus indirectly determine the adoption of cloud decision-making. Therefore the cognitive of top managements, such as understanding of cloud platform, resource control, innovation and risk consciousness, have important impact on the formation of cloud trust to adoption behavior.

(2) Organization inertia. Organization inertia refers to the characteristic that does not change arbitrarily with the environment and technological change. The greater the organization inertia, the greater the resistance to acceptance of emerging technologies, and then the probability of cloud adoption will be obviously reduced. Some leaders may worry that after adopting E-Gov cloud, it will increase the difficulty of work.

(3) Scale and complexity IT resources. The scale and complexity IT resources are the number of information personal in this department, the scale of information systems and the complexity of IS cloud migration. The arrangement of the original information staff and the transformation of function are the problems that organizations need to face when the organizations decide to adopt cloud computing. In addition to that, the quantity and mobility of the original system determine whether to adopt the cloud. Other respondents expressed that departments with fewer IS business services and lower demand for information will also adopt E-Gov cloud. This is because that the common system or software with the use of the government cloud platform can reduce the departmental maintenance costs.

(4) IT knowledge. IT knowledge is an important factor in considering cloud adoption. Most respondents know that the cloud solution architecture is significantly different from the previous IT architecture. The gap between existing IT/IS knowledge, skills and experience and cloud computing will affect costs, cloud project quality and specific requirement.

### 3.3. Environmental Context

The environmental context reflects external constraints and feasible conditions in process of adoption decision towards E-Gov cloud. In the interview, the conclusion can be acquired that the government departments at all levels faced many problems in adopting E-Gov cloud.

(1) Financial fund. The financial fund of the government is the key to the success of E-Gov cloud. Through the interviews, the information can be known that the financial of Shandong Province has no longer approved the new self-built system, and the actual expenses of IT operations and maintenance in the department which has a larger business system are far greater than the appropriation of the financial special funds. Because that the main source of funds for government investment in information technology is financial appropriation, the main impediment to E-Gov cloud is the cost of construction.

(2) Policy and regulation. As cloud computing is an emerging technology, many government departments and the public have taken a wait-and-see attitude towards their adoption and application. Once the national policy supports, then cloud computing technology will be widely promoted. On the other hand, whether E-Gov cloud conforms to E-Gov policy and development plan is an important factor for organizations to adopt cloud computing. If the security level and infrastructure of the cloud computing cannot meet the relevant policy, then government agencies are very cautious about adopting cloud computing.

(3) E-Gov cloud standard. The electronic government industry standard is the explanation of the specific content of E-Gov cloud. And it is obviously that the detailed industry standard is the sign of the maturity for E-Gov cloud. For organizations with the intention to adopt, there are standards that can be applied as a practical guide for the adoption of cloud.

(4) Best case. Governments everywhere attach great importance to the demonstration of successful cases. Therefore best cases have a significant impact on the adoption decisions of government. At present, E-Gov cloud have developed very rapidly, and there have been active attempts in provinces such as Beijing and Shandong. For organizations with the intention to adopt, the replication performance of best cases is sufficient to improve cloud adoption behavior.

(5) Requirement of citizens. The informatization of government departments should provide a platform for the sharing of resources towards public services. Therefore, the public's support for cloud computing technology is also an important factor for government departments to take into account cloud computing. In interviews, "public demand" and "public acceptance" were repeatedly mentioned by respondents, and if the citizens are dissatisfied with the public services provided by E-Gov cloud, then the government will not easily implement cloud computing.

## 4. Discussions

According to the case study, three factors influencing organizational adoption attitude are extracted: technology characteristics, organizational and environmental context. Then a model can be structured to reflect the influence factors of organization adoption attitude towards E-Gov cloud, as figure.1 shows. In the integration model, TAM model is used to analyze the influence of different factors on adoption decision from perceived benefit and perceived barrier. And TTF model is applied to explain the matching degree between cloud computing and organization. Then use the TOE model to explore influencing factors of the organizational context and environmental context, and use DOI to analyze the technology characteristics of cloud computing.

If a department is more receptive to new technologies and ideas, then the more perceived benefit will acquire from cloud computing. On the contrary, once the existing information construction will no longer meet the development, these problems can lead to perceived barriers to the departments. Therefore, TAM can reflect the organization's perception on government cloud.

With the application of cloud platform construction model, the government can make full use of the advantages of cloud technology to improve the efficiency of resource utilization and reduce the cost of operation and maintenance. These advantages enhance the perceived benefit of the organizations, and make it easier for organizations to adopt E-Gov cloud. So TTF model can

measure the matching degree between E-Gov cloud and organization from the aspects of cost, internal innovation, service satisfaction and social benefit.

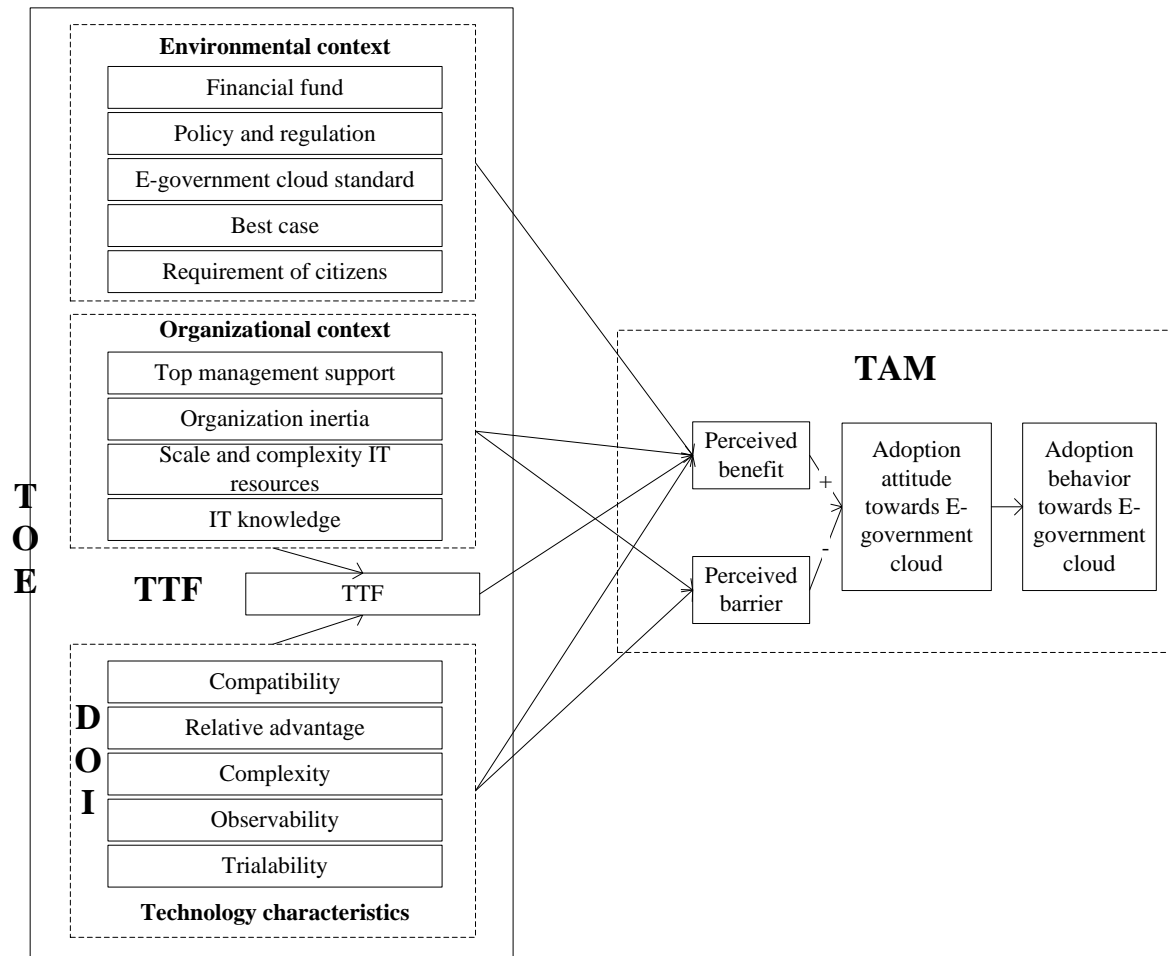


Fig. 1 The integration model of adoption decision towards E-Gov cloud

Technical characteristics reflect the technological drivers and mechanism, and the organizational context describes whether there are sufficient conditions in the organization to support the adoption of E-Gov cloud. Environmental context means the external constraints and the feasible conditions in process of organization's adoption decision towards E-Gov cloud, which has an influence on adoption process. The more relative advantages, the better compatibility, observability and trialability in technical characteristics, the more top management support, financial support and IT knowledge in organizational context and the more detailed policy and standard, best case and public support in environmental context, the more perceived benefits the organization can acquire. As result, DOI and TOE can reflect the impact of TOE on technology adoption.

## 5. Conclusion

This paper explores the factors and mechanism of adoption decision towards E-Gov cloud with the application of case study, then relevant concepts of E-Gov cloud adoption were discovered from the collected data, and at the same time the integrated model that can systematically and comprehensively reflect the technical, organizational and environmental factors was established. This study integrated the multiple adoption theoretical models from the perspective of the system to explore the influence factors of adoption decision towards E-Gov cloud.

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