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# DECISION-MAKING STRUCTURES IN INFORMATION MANAGEMENT FOR CLOUD COMPUTING IMPLEMENTATION

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## ABSTRACT

As of right present, the majority of companies are responsible for installing their own programs on their systems. These applications are restricted to usage inside the firm and come with costly initial and continuing maintenance costs. The purpose of this study is to provide a cloud-based information management system design method that tackles this problem by making full use of the advantages offered by the cloud computing platform. Through the simultaneous implementation of equipment, information, and service coordination, it is able to fulfill this aim, which in turn enables the organization to realize resource sharing and achieve specific cost savings targets. The purpose of this paper is to establish a medical cloud service system in order to meet the requirements of the current state of the medical information service. This is accomplished by utilizing both public and private clouds, adopting the distributed and parallel computing method of the medical cloud, and constructing a five-dimensional system that connects patients, hospitals, pharmacies, pharmaceutical factories, medical insurance, and medical facilities.

**KEYWORDS:** Decision-Making, Cloud Computing, Technology

## INTRODUCTION

A number of factors, including the consequences of globalization, the proliferation of internet-based tools, and technical breakthroughs, have made it feasible for new and advanced technologies to emerge, such as cloud computing. A wider usage of virtual reality in enhanced areas has been made feasible as a result of the rising momentum of corporate digitalization. This has made it possible for stakeholders to leverage this technology in order to build a competitive edge and deliver better services. The business, the financial manager, the analyst, and others are all able to benefit from cloud computing since it gives them the ability to personalize reports and choose the kind of analysis that best suits their requirements. These reports can then be given to them whenever they are required. A large number of papers including financial reports, analyses, and other information were required to be carried about by managers in the past. Additionally, managers were required to save spreadsheets on their hard drives. Nevertheless, with the advent of cloud computing, data is now securely kept in an environment that can be accessed anytime it is required to do so. As a consequence, this leads to enhanced protection, better data security, and cost savings in storage. In its most basic form, a cloud may be seen as a specialized environment that has been conceived of with the intention of delivering remote access to data and information whenever it is required.

The integration of cloud computing into the financial management system has as its primary objective the provision of management and the firm with a clear knowledge of the nature of the expenses that are associated with the system. This makes it feasible for the management to properly allocate resources and to monitor the changes that are occurring in the organization's expenses. Furthermore, the principles of cloud computing make it easier to better company information, to engage in strategic financial planning and management, and to get aid in making decisions that will lead to an increase in shareholder value. When it comes to financial management, the use of cloud computing has the potential to enhance cost empowerment, provide assistance with critical analysis of historical data, and maintain a close check on them in order to facilitate rapid decision-making. In order for businesses to maintain their competitive edge, they need to have a cloud strategy. The primary objective of this approach should be to maximize the usage of available resources via appropriate cost management and expanding business operations.

### Using The Cloud for Computing

Cloud computing refers to the provision of on-demand access to computer system resources, in particular processing power and data storage (also known as cloud storage), without the need for direct user management.[2] When it comes to huge clouds, functions are often distributed over a multitude of locations, each of which is a data center. Cloud computing often makes use of a pay-as-you-go method in order to achieve coherence. This technique may help save initial expenditures, but it may also result in consumers incurring operational expenses that were not anticipated.

### Cloud Computing System Management and Administration

In the field of computer science, both theory and practice, there are several definitions of service management, including the following:

- It is more than simply a collection of capabilities since it is made up of a certified team of professionals who have specific knowledge and skills.
- The capability of the firms to satisfy the needs of their customers.
- This refers to the collection of distinct businesses that are able to provide additional benefits to clients in the form of services.

The term "service delivery model" is used in the context of credit cards to refer to a collection of extra customers, assets, resources, and capabilities that allow for flexible payment only for what was consumed. Managing the CC system services is inherently susceptible in a setting that involves cloud computing for a variety of reasons, one of which being virtualization and the vulnerabilities that are linked with it.

**Computing In The Cloud and Management of The Cloud**

The management of cloud computing entails keeping an eye on and managing the resources and services that are provided by the cloud, regardless of whether the cloud is public, private, or hybrid. Capacity, deployment, load balancing, performance, storage, and backups are some of the characteristics that it makes available. In order to do this, a member of the cloud management team has to have full access to all of the functions that are associated with cloud resources. The combination of a number of different software products and technologies results in the creation of a cloud management strategy and method that is consistent. To the best of our knowledge, either the organization itself or a third party is responsible for the maintenance of private cloud infrastructure, which is exclusively managed for the benefit of a single entity. Every member of the general public has access to the network that may be utilized to provide public cloud services. The public has the ability to purchase or lease data storage or processing capacity according to their needs under this structure. A commercial company is in charge of the information technology infrastructure. Hybrid cloud environments are created by combining public and private cloud services from a number of different providers. As a result of concerns over privacy, the majority of businesses make use of public cloud applications for less sensitive data which can be stored at a lower cost, while private cloud servers are used to store more sensitive data. Cloud servers that take use of both public and private cloud services are referred to as hybrid cloud servers.

**OBJECTIVES OF THE STUDY**

1. To investigate possibilities for decision-making that are based on cloud computing
2. To conduct research on cloud computing and the challenges associated with putting it into practice

**RESEARCH METHOD**

**Analytic Hierarchy Process (AHP):**

The Analytic Hierarchy Process (AHP) was used in conjunction with the Delphi Analysis approach for the purpose of this research. We conducted interviews with nine Korean professionals throughout the first two weeks of the month of August in 2017. Using the Delphi method and criteria developed by five cloud computing experts, the first step was to investigate the essential features and attributes that are associated with the decision to adopt cloud computing. The goal was to identify objective determinants that were previously discovered via research. Extracting strategic alternatives and significant elements for cloud computing adoption was the first step in the decision-making process, which was accomplished via the use of AHP analysis. Saaty was the one who conceived up and developed the decision-making model, which was based on the factors that were mentioned in the AHP analysis. The ideal solution is brought about via the use of AHP analysis, which makes use of hierarchical analysis for problems involving decision-making. Through a pair wise comparison of the components that comprise the decision-making hierarchy, this research was able to determine the evaluators' knowledge, experience, and intuition. This was accomplished by utilizing this approach as a tool for decision-making and process prioritizing.

It has been shown that the AHP is useful in decision-making situations in which it is difficult to quantify some aspects using this technique. According to the findings of this research, the decision-making framework that was initially developed does not take into account the complexity of prospective technological area considerations. Additionally, it updated the security concerns into the security concern characteristics of the attributes connected with the related benefit. Even if there are nine experts, the AHP is a respectable research technique in the field of social science. In addition, the Analytic Hierarchy Process (AHP) method is used extensively in the field of information systems research, in addition to being utilized in the decision-making processes of corporate management.

**Research Framework and Variables**

The TOE framework was used as the foundation for the construction of the decision-making framework for the implementation of cloud computing systems (Figure 1). The feature set of this framework, which includes decision regions, decision factors, and decision characteristics, was developed as a three-tier architecture with the intention of assisting decision-makers in making judgments in a manner that is both intuitive and rapid. When it came to the components and characteristics of the research model, each and every known factor from past studies on the implementation of cloud computing was carried out and taken into account. These aspects were a logical fit for the components and attributes that were associated with the framework. In addition, after discussing with specialists, we decided to exclude a number of particular elements, including "complexity" and "firm size" in the qualifications.

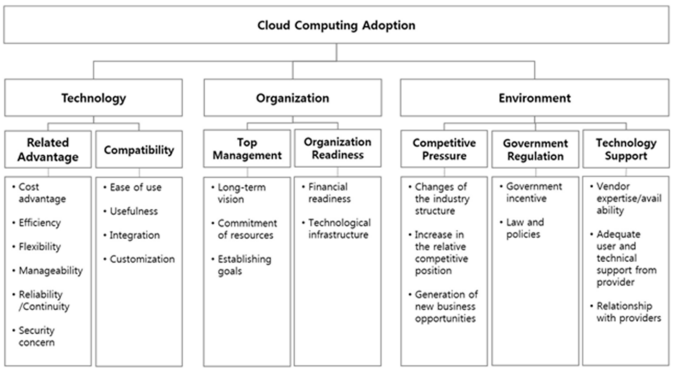


**Figure 1: The hierarchy of decision-making for the adoption of the cloud computing system.**

For the purpose of determining the determinants of choice and attributes that were evaluated in pertinent research on the adoption of cloud computing, the variables were grouped according to the study that was cited the most often. Every individual component and quality

**DATA COLLECTION**

For the purpose of data collection, in-person interviews were carried out over the months of August and September in 2017. There was one interview conducted over email with a resident of another country. The entire demographic information of those who participated in the survey is shown in Table 1. Twenty individuals who are experts in the implementation of cutting-edge technologies and have previous experience working with cloud computing systems used in businesses were selected for this research. There were twenty answers, which were comprised of ten askers and ten suppliers. The twenty individuals who responded were selected because they have more than fifteen years of experience doing tasks related to information technology (IT). The selection process included selecting ten demanders who had prior experience and engagement in the decision-making process about the adoption of cloud computing in the communication, manufacturing, and financial sectors. We have selected 10 service providers that have substantial expertise in delivering cloud computing services to a variety of local South Korean enterprises. These service providers include prominent worldwide cloud computing service providers such as Microsoft, Cisco, Symantec, and Hewlett Packard Enterprise.

| Section | Characteristics | Frequency | Ratio(%) |
|---|---|---|---|
| Work experience in the related field | 15–20 years | 8 | 40 |
| | 20–25 years | 6 | 30 |
| | Over 25 years | 6 | 30 |
| Professional area | Application manager | 1 | 5 |
| | System engineer | 1 | 5 |
| | IT Infrastructure operating manager | 2 | 10 |
| | IT architect | 3 | 15 |
| | IT planning team leader | 4 | 20 |
| | IT project manager | 2 | 10 |
| | IT consultant | 5 | 25 |
| | IT sales | 2 | 10 |
| Highest education received | Bachelor's degree | 14 | 70 |
| | Master's degree | 6 | 30 |
| Age | 40–50 years | 17 | 85 |
| | Over 50 year | 3 | 25 |
| Gender | Male | 18 | 90 |
| | Female | 2 | 10 |
| Role and responsibility | Cloud computing demander | 10 | 50 |
| | Cloud computing provider | 10 | 50 |

**Table 1: Details about Demographics.**

This study, which included over twenty experts, is statistically reliable in contrast to prior research that surveyed 10 experts on the issue of AHP in order to investigate the aspects that contribute to the success of internet service adoption. In order to gather information for the present research, questionnaires were distributed to a wide variety of professional categories. These categories included application managers, systems engineers, IT infrastructure operating managers, IT architects, IT planning team leaders, IT project managers, IT consultants, and IT sales. For the purpose of providing support for the opinions held by respondents about the implementation of cloud computing systems in enterprises, several categories were developed. The age distribution of the respondents was as follows: 15% were in their 50s, and 85% were in their 40s. Seventy percent of the individuals had a bachelor's degree, while thirty percent had a master's degree.

**There were 10% female and 90% male participants.**

For the purpose of analyzing the weights, Business Performance Management Singapore (BPMSG) generated an AHP Excel template, which was then employed by utilizing Microsoft Excel 2013 on Windows 10. The eigenvector method (EVM) was used by the template in order to resolve the eigenvalue problem, and the row geometric mean method (RGMM) was utilized in order to determine the priorities. In addition to that, it provided comparisons between pairs, a compilation of all judgments, and results together. It was found that the consistency ratio (CR) of the responders was lower than 0.1 for each and every questionnaire. Values that are less than 0.1 indicate that the responses were meaningful and logically consistent. These values include: Related Advantage: 0.013, Compatibility: 0.016, Top Management Support: 0.000, Organization Readiness: 0.001, Competitive Pressure: 0.005, Government Regulation: 0.001, and Technology Support Infrastructure: 0.001.

In the current investigation, the computation of the area, factor, and attribute weightings was carried out into four distinct stages, and pair wise comparisons were carried out. Before anything else, the relative significance of each decision area, factor, and attribute was established. This was done after the different weights were computed via the use of pair wise comparisons. In the next step, a priority vector was computed. In the third step, it was determined whether or not the judgments of each answer were consistent. Following the division of the respondents into those who demanded and those who provided, we finally carried out an analysis of the relative relevance.

**ANALYSIS RESULTS**

**Comparing the Evaluative Elements:**

The composite weights and priorities of cloud computing system selection domains, criteria, and features We compared the values of the suppliers' and requesters' donations. The local mean weight was utilized to calculate the relative relevance of each decision location, factor, and attribute. The adjective "global" refers to the framework's holistic weight of decision areas, factors, and traits. An expert on cloud computing in Indian enterprises ranks the environment sector first, ranking 0.38618. Experts contributed this information. Organization (0.34116) was the second most important option area, while technology (0.27265) was the least important. Top Management Support scored 0.21190, making it the most important choice variable. It was the most important. Competitive Pressure (0.17662) was second in priority. Compatibility was the third most important

criteria after 0.17437. The fourth-highest Organization Readiness factor average was 0.12910. Related Advantage was the lowest (0.09816) and Government Regulation the sixth highest (0.10887). The Related Advantage factor was also lowest. According to research, top management support is vital when choosing a cloud computing solution. However, compatibility did not match previous research. According to this report, South Korean decision-makers evaluate compatibility with legacy systems while deploying a cloud computing system to preserve stability. thought the various pricing structures would hurt the Relative Advantage. However, our study found no evidence that Relative Advantage hinders cloud computing adoption.

The trait that boosted relative competitiveness was the most important. This characteristic scored 0.08889. Second place went to Long-Term Vision at 0.08084. Third place went to Commitment of Resources at 0.07784. Law and Policy had the fourth-highest attributes (0.06867). The fifth most important aspect was Technological Infrastructure, with 0.06458 priority. Cost Benefit had the lowest priority at 0.00736, for example. Decision-makers that wanted to provide their organization a long-term competitive edge with cloud computing technology offered the choice attributes prioritizing outcomes. As an added bonus, the Law and Policy aspects show how the South Korean government's cloud development act has affected cloud computing decision-makers. Contrary to previous studies, technological infrastructure was also valued.

**Comparative Study of Determination Elements**

Research has been conducted to investigate the decision factors for the adoption of cloud computing in business, with the goal of determining how the priorities of the demander and the provider differ. In contrast to the comparison results shown in Table 2, presents a variety of viewpoints from both suppliers and demanders about the use of cloud computing in commercial settings. After receiving a score of 0.78120, the provider determined that the Related Advantage component was the most significant of the three. The Top Management Support factor (0.34747), the Competitive Pressure factor (0.17204), the Organization Readiness factor (0.13660), the Compatibility factor (0.12372), and the Technology Support Infrastructure factor (0.06009) were the choice criteria that were given the greatest importance. It was the other elements that were given the least amount of importance. At 0.22608, the compatibility component was seen as having the greatest importance from the perspective of the person who made the request. The factor that had the lowest priority among the decision factors was the Organization Readiness factor (0.10764), followed by the factor that had the fourth highest priority was the Government Regulation factor (0.13008), the factor that had the second highest priority was the Competitive Pressure factor (0.14770), and the factor that had the third highest priority was the Technology Support Infrastructure factor (0.14761).

| Decision Factors | Demander | | Provider | |
|---|---|---|---|---|
| | The Weights (Mean) | Priority | The Weights (Mean) | Priority |
| Related Advantage | 0.11345 | 6 | 0.78120 | 1 |
| Compatibility | 0.22608 | 1 | 0.12372 | 5 |
| Top Management Support | 0.11401 | 5 | 0.34747 | 2 |
| Organization Readiness | 0.10764 | 7 | 0.13660 | 4 |
| Competitive Pressure | 0.14770 | 2 | 0.17204 | 3 |
| Government Regulation | 0.13008 | 4 | 0.08083 | 6 |
| Technology Support Infrastructure | 0.14761 | 3 | 0.06009 | 7 |

**Table 2: The findings of the comparison between demander and provider choice variables for cloud computing adoption.**

It can be deduced from these findings that the competitive pressure was a significant factor that contributed to the situation for both the suppliers and the demanders. On the other hand, the relative advantage and top management support give evidence that cloud computing service providers are more likely to highlight the benefits of using cloud computing systems, and that top management has a substantial influence on the decision-making process of cloud computing service providers. When it comes to increasing their competitiveness, demands are more likely than suppliers to make advantage of cloud computing. There is also a greater likelihood that they will upgrade their systems without making significant changes to the legacy system, and they want system stability.

**Comparative Evaluation of Decision Factors**

The purpose of this research was to investigate the ways in which the priorities of demanders and suppliers varied with regard to the implementation of cloud computing for businesses. Table 5 presents a comparison of the decision criteria that influence the adoption of cloud computing in businesses, both from the perspective of the provider and the demander. One of the characteristics that has emerged as the most important from the perspective of the providers is the Long-term Vision trait, which received a score of 0.14913. Among the characteristics, the ones with the greatest importance were Commitment of Resources (0.13755), Generation of New Business Opportunities (0.09763), Financial Readiness (0.08915), Establishing Goal (0.06079), and Manageability (0.00778). The trait with the lowest priority was Commitment of Resources (0.13755). The attribute of Vendor Expertise/Availability was seen as having the greatest relevance (0.10735) from the perspective of the person who made the request. It was determined that the qualities with the greatest importance were Law and Policy (0.08294), Usefulness (0.08280), Technological Infrastructure (0.07034), Generation of New Business Opportunities (0.06408), and Manageability (0.00851). The attribute with the lowest priority was Technological Infrastructure.

| Decision Factors | Decision Attributes | Demander | | Provider | |
|---|---|---|---|---|---|
| | | The Weights (Mean) | Priority | The Weights (Mean) | Priority |
| Related Advantage | Cost benefit | 0.01388 | 20 | 0.01872 | 17 |
| | Efficiency | 0.01549 | 19 | 0.01351 | 19 |
| | Flexibility | 0.01228 | 21 | 0.01058 | 21 |
| | Manageability | 0.00851 | 22 | 0.00778 | 22 |
| | Reliability/ continuity | 0.02939 | 18 | 0.01102 | 20 |
| | Security Concern | 0.03390 | 17 | 0.01653 | 18 |
| Compatibility | Ease of Use | 0.05291 | 6 | 0.02482 | 16 |
| | Usefulness | 0.08280 | 3 | 0.04361 | 8 |
| | Integration | 0.05124 | 7 | 0.02692 | 15 |
| | Customization | 0.03914 | 12 | 0.02836 | 14 |
| Top Management Support | Long-term Vision | 0.03716 | 15 | 0.14913 | 1 |
| | Commitment of Resources | 0.03735 | 13 | 0.13755 | 2 |
| | Establishing Goal | 0.03952 | 11 | 0.06079 | 5 |
| Organization Readiness | Financial Readiness | 0.03725 | 14 | 0.08915 | 4 |
| | Technological Infrastructure | 0.07034 | 4 | 0.04739 | 7 |
| Competitive Pressure | Change of the Industry Structure | 0.04794 | 8 | 003204 | 10 |
| | Increases in the Relative Competitive Position | 0.03567 | 16 | 0.04236 | 9 |
| | Generation of New Business Opportunities | 0.06408 | 5 | 0.09763 | 3 |
| Government Regulation | Government Incentive | 0.04708 | 9 | 0.03036 | 12 |
| | Law and Policy | 0.08294 | 2 | 0.05043 | 6 |
| Technology Support Infrastructure | Vendor Expertise/ Availability | 0.10735 | 1 | 0.03103 | 11 |
| | Adequate User and Technological Support from Provide | 0.0420 | 10 | 0.02986 | 13 |

**Table 3: The comparison of the decision-making criteria between providers and demanders for the adoption of cloud computing.**

When it came to the characteristics of the demanders, the availability of the vendor and their knowledge came out on top. This is consistent with the results of a previous study, which found that the amount of trust that existed between the client organization and the cloud provider was a critical success factor in the deployment of cloud computing. In the field of information technology, it is made clear that the decision to accept a service is contingent on a number of elements, including trust and rapport with the service provider. Providers rated long-term vision as the most significant aspect of their products and services. Because South Korean businesses are so sensitive to the consequences of their financial situation and the needs of the government, they often develop short-term plans and make regular revisions to those plans. However, in order for cloud computing adoption and system management to be successful, they need a well-defined long-term plan as well as a clear vision. The results of this discussion highlight how important it is to have a long-term perspective when it comes to the implementation of cloud computing services.

## CONCLUSION

The transition to cloud computing is a strategic organizational option that should be considered because of its complexity and dynamic nature. In light of this, the need of DSS to allow systematic analysis in order to assist well-informed decision making has been pushed to the forefront of attention. The vast majority of the DSSes that are now in use and are designed to make cloud migration easier have certain restrictions. Price is the key factor that is taken into account throughout the evaluation and vendor selection process, which is supported by the bulk of the information that those individuals supply. Nevertheless, a number of fundamentalist concepts have not been addressed throughout this discussion. They often do not offer sufficient information about the cloud environment, particularly for customers who are not acquainted with it, and they only supply a tiny amount of the data that is necessary for businesses to decide whether or not their own services are suitable for the cloud. Within the scope of this study, a model was developed to facilitate the decision-making process about the transition to cloud computing.

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