



Evaluate the effectiveness of Technology cloud in a hospital emergency level 3

Rezvan sali¹ and Shahnaz Sali²

¹ department of management, Electronic branch, Islamic Azad University, Tehran, Iran

² Assistant professor, infectious Diseases and Tropical Medicine Research center, Shahid Beheshti University of Medical Science, Tehran, Iran

ABSTRACT

As a Technology cloud with internet and Technology cloud infrastructure solution could be significant benefits in providing medical services to bring in electronic form. In this way, the display patient records covering all problems and diseases such as cardiovascular problems, Hsasythav other cases, quality of care and also reduces the risk of diagnostic errors and the gap between the patient and physician can be the first need to complete a patient's recovery. In this way, due to changes in current methods of treatment centers and the need for education and behavioral change may be resistance In this study, the acceptance of this procedure by physicians, nurses, emergency department and IT experts in specialized teaching hospital martyr doctor Labbafinejad evaluated. The results showed that the use of cloud technology education in emergencies, when dealing with the disease.

Original Article:

Received 20 Sep. 2015

Accepted 1 Dec. 2015

Published 09 Dec. 2015

Keywords:

Technology Cloud, emergency room, hospital

INTRODUCTION

Cloud computing technology that is meant to provide computing services (storage, software development, application software, etc.) via the Internet or cloud. [5] technology to share patient information stored can be significant advantages in providing emergency services to have electronically. Lower costs and ease of access for physicians to patient information at any time and place, the most important factor in the health of addressing the cloud computing electronics. [6] the electronic health record, accounting and electronic medical billing accounts, examples of application of ICT in health is by means of computer networks. [1,13] e-health systems, particularly electronic health records in addition to better management of personal health, reduce health care costs, avoid multiple diagnoses or repeated administration. [4,6]

Emergency hospital is a complex sector in which the struggle between life and death is only the size of a breath. It has problems, such as overcrowding, long waiting time and costs too much. On this basis, reduce waiting times, lowering costs and shortening delays in patient care, research is one of the most important issues. One of today's IT infrastructures emerging in emergency departments around the world are looking to set up and use cloud technology. [14,6,7]

Cloud technology model in which each computer through the network, to connect data centers and instead of raw data, processed data is received. [8] In the present circumstances, data, and tools used in computer manufacturing. But there is no need for software in the cloud technology because information is processed through computers in the network. On the other hand, there is no need for powerful hardware

and computers can easily output their main computers. [4,14] in the other cases it does not matter who you're working with a powerful computer or a mobile phone you intend to use this information. The only essential issue, or through software interface through which it can be connected to the main computer and network hardware can also run the same software as the intermediary. [13, 9]

In studies using cloud more of the security and privacy of patients studied. [7,9] users may not want to use this method. It is therefore essential to factors that affect the resistance of the adoption and use of cloud technology. [2] special attention and recognition of these factors can be used to facilitate the integration of cloud technology in the medical center took an important step. [2,4]

Issues related to cloud technology has been widely discussed in the scientific and practical and the healthcare industry is not an exception. Many executives and experts believe that cloud technology can improve health services and dramatically been able to adopt and use of IT in healthcare change and many previous studies have reported potential benefits of cloud technology and a variety of models and frameworks to improve health services are provided. [12,15] In the Fifty-eighth World Health Assembly (2005), the development of ICT infrastructure, e-health centers for better performance and recommends the creation of a public health information system. In hospitals, potential cloud provides easy access to electronic medical records. Get instant access to the person's medical history can speed up treatment, to help prevent complications, and even save lives.] 9.16 [

In addition, the cloud can be used for patients track their medical history to speed up. However, the privacy and ensuring the security of data on the health of the most

important issues ahead. Also, F. et al. [1,9] technical details, economic, legal, and security, including those presents that need attention. [6]

Cloud technology to share patient information stored can be significant benefits in providing medical services to bring in electronic form. Reduce costs and facilitate access to information for doctors, patients, device and location independence and scalability of cloud technology in the e-health is the most important factor to deal with. Despite the internet and technology infrastructure of the new guidelines, doctors access to any medical information provided at any time and place. [1,9] and that it has become a necessity in countries. Data in the cloud on servers around the world can be stored and processed. Development and adoption of cloud computing for health care organizations depends on the privacy and property issues. [1] policies to how healthcare organizations can run their data locally and external data centers, but they are unable to create policies that affect how the data in the cloud. Before deploying cloud technology can be fully used as a health structure, cloud vendors must earn the trust of users.

Company NEC 1 and Fujitsu 2 uses cloud technology in hospitals in Japan as a solution, have proposed or in America IBM 3 using the services of cloud-based data management system clinic hospitals offered. [10,11,17] Many software companies of the world such as Microsoft, Oracle and Amazon enterprise-wide or in the cloud to provide computing services in the field of health have done. [13]

In relation to the use of cloud technology systems in the healthcare sector, numerous studies have been carried out mainly in foreign research and a few in the country have examined various aspects of the system. Jurist and his privacy as a prerequisite for the development of e-health patients studied. They provide an overview of how privacy in selected countries and examines the current state of the country's electronic health data privacy solution for the country. [1,7] Jacoby and his colleagues are key factors influencing the adoption of cloud technologies in eHealth identified and ranked. [2] The results showed that the experts when making decisions about the use of cloud technology in eHealth should technological factors, human, and environmental organizations consider the discussion of emerging cloud technologies in the field of technology and the computer is due to the development of service-oriented approach to the use of the computers. In this processing model, based on computer networks like the Internet is the new model for the supply, use and delivery of IT services offered. This technical and economic debate in many circles and big business world of computers. Significantly reduce costs, increase flexibility, efficiency, accessibility, sharing and teamwork among its advantages is easier. Many countries with large investments in this area have been imported. In Iran, the research done in this area, and some companies offer cloud services to their customers.

In the field of health care is one of the most important sites of use of cloud technology in the emergency department and emergency services related to it. Health care and emergency medical services prehospital and in-hospital 4 to provide a concept that includes a wide range of related activities and interaction between emergency centers and

hospitals. The best way to improve the process of creating an infrastructure to support emergency medical services coordination and information sharing required by organizations involved in emergency medical services. On the other hand the possibility to create a cloud that has large amounts of processing power and storage on demand 5 users and organizations to be given, rushed to help various industries and fields, one of which is health.

We can use the clouds to take to put technology in the hands of individuals and larger groups. Even people who use technology, because it do not use complicated or expensive. Since Amrvz-hmrakz University of Medical Sciences, the most important medical centers have the need for a unified access Svabf this study at a medical center was a martyr Beheshti University of Medical Sciences. The main objective of this study was to investigate the factors influencing the adoption of cloud technology systems and efficiency in the delivery of emergency services and the effectiveness of this system was evaluated in the emergency department.

2 - Methodology

This descriptive study survey through questionnaires distributed to physicians, emergency nurses and IT experts Specialty Hospital martyr martyr Beheshti Medical Sciences University Labbafinejad and then using statistical tests were validated data.

2-1 Data

Topics of the questionnaire include electronic health records, emergency medical center in the state of IT infrastructure, data security and privacy of the patient.

2.2 The research community

The population of the investigation 25 people, emergency doctors, 10 nurses and 10 tons of IT experts Hospital emergency doctor martyr martyr Beheshti Medical Sciences University formed Labbafinejad.

2-3 data analysis method

The responses and comments of some software SPSS 19, after ensuring normal data, different statistical tests such as the T6 and correlation 7 on data to assess the effect of each factor on each other and the relationship between them examined that .. for the design of the model and collection of required data such as the time required for emergency care services when visiting patients by doctors and IT structure needed to implement the system through the distribution of questionnaires using statistical tests of data results were validated.

3 - Results and Discussion

Distributed questionnaires to investigate the factors influencing the adoption of cloud technology system implementation in the emergency department, and these factors were measured by the index. These include the effectiveness, ease of use of cloud services, the impact of risk, security and privacy in the use of cloud services, the impact of adjustment on the use of cloud services, the effects of cloud services in costs, supported cloud service providers, the decision to use cloud services and factors influencing decision makers information technology.

3-1 describes the indicators, validity and reliability

All indicators are scored using the Likert scale (1 = complete agreement and 5 = total opposition shows).

In general, survey questionnaire sought to assess the effectiveness of cloud technology in emergency preparedness emergency department to implement cloud and analyze the strengths and potential improvements in the sector. It would be desirable to identify solutions for successful cloud implementation plan will help in hospital emergency specialized training.

The questions in previous studies used a variety of internal and external validity of Articles 8, it has been confirmed. To verify the reliability of the 9 questionnaires usually used Cronbach's alpha coefficient 10. The computational aspects of alpha Inventory questionnaire and evaluate the effectiveness of cloud technology in various aspects of emergency was to show that the reliability of the data collected.

Table 1 Cronbach's alpha evaluate the effectiveness of cloud technology in emergency

<i>Imfact alpha</i>	<i>The number of questions</i>
0.757	40

Since Cronbach's alpha coefficient of 7.0 is obtained, the reliability is approved.

3-2 demographic sample

First, evaluate the effectiveness of cloud technology in the ED questionnaire among 52 physicians, nurses, emergency department and IT department staff and the information distributed 45 questionnaires were analyzed. Demographic information sample seen in the following tables.

Table 2 Sex

<i>Percentage</i>	<i>Number</i>	<i>Sex</i>
55.6	25	Female
44.4	20	Male
100	45	Total

3-4 Statistical analysis of indicators and statements questionnaire

Inventory analysis of the strengths and improve knowledge management organization except the primary questions that enable participants to gather demographic information, the main question is 40 (buoy-R). In this section, using univariate chi-square and correlation analysis 11 12 Statistical analysis of the replies to the questionnaire to pay.

3-5 Statistical analysis

The questionnaire contains 8 index, each index is measured by a number of questions. Given that the purpose of this questionnaire, evaluate and analyze the indicators, the first index was analyzed. The index uses the sum of responses to questions relating to each respondent, a distance variable to the index to be evaluated.

After reliability, normality test was conducted, the results show that the non-parametric variables. The frequency response of any statements using univariate nonparametric chi-square test, compared with uniform distribution. Another test is used, the correlation coefficient. This test measures the intensity and connecting the two variables and the purpose of it, identify correlated factors affecting the implementation of cloud technology in the indices.

3-6 Data

Index analysis by parametric tests require a normal distribution of data. For this purpose, the Kolmogorov-Smirnov (KS) was used and the test result, normal distribution of replies to the questionnaire at a significance level of 5% more statements were not confirmed.

So make a decision based on parametric tests such as t-test was not possible and therefore nonparametric test for nonparametric variables and chi-square were used univariate.

The results of the chi-square test for sample After significant in Table 3 below. These results are described below and on the strength or Bbhvdvbn criteria decision-square Ast.zmvn Two on the

3-6-1 analyze strengths and cloud technology to improve emergency

According to the results of the chi-square test criteria are divided into three categories: So strengths are considered. It is, therefore, seen as a weakness.

3. Indicators reflects the strengths and the relative improvement in the indicators of removing variables that the results of the chi-square test, no significant difference in the distribution decision, they can not be decided according to the number of variables or variable residual strength and recovery times and therefore can not in general comment on the situation through the Chi-square test. The t-test was used and the relative strength and relative improvement in decision-making and adapted.

3.6 2 indicators reflect the strengths of the implementation of cloud technology in emergency

Benefits of cloud technology in the index, according to the results of Table 3, according to the respondents use cloud technology in emergency unparalleled advantages such as automatic Rsalny updated patient information, can be used in any place and time, coordination between various departments such as radiology , ultrasound, etc., reduce the recovery time of patients and collect biometric data, and the storage of patients' medical records in a single document and to facilitate the preparation of the reports said. As a result, all the variables are the strong point, so this indicator as a strong point in the implementation of cloud technology in emergency points.

Ease of use of the cloud: According to comments Recent completion of the questionnaire, the use of cloud technology has not led to technical problems and use of this service requires no mental effort and overall very easy to work with cloud technology tools. As a result, this indicator is also a strong point for the deployment of cloud technologies is an emergency.

Impact on cost: summing up the comments suggest that the use of cloud technology in emergency on the one hand reduce IT costs in this sector and the other new software licensing costs and promote the removal and reduction of investment in infrastructure as well have. Save money and time, according to the participants in the training process and the deployment of cloud technology also seen. As a result of the effects of the use of cloud technology in the emergency department also considered a strong factor.

Support service providers in Table 3 is seen that the group of participants who have used the IT systems of loyalty Aradhdndgan cloud in emergency support cloud services

have been satisfied and this is another strong point in encouraging the use of IT systems in the cloud.

3-6-3 indices reflects the improvement in the implementation of cloud technology in emergency

The cloud technology is implemented. The majority of participants believe that because of lack of bandwidth, there may well not implemented cloud technologies, as well as the risk that Internet hackers out of control patient data and privacy issues is in addition to. On the other hand the lack of security in the data recovery and backup, Bvdnayn poor indicator confirms. Another important issue is though doctors believe cloud service providers and data centers are struggling to maintain the confidentiality of patient information, but in terms of the communication channel used to transmit data to the cloud emergency department is not safe.

Factors influencing IT decision-makers: Statistical analysis views of respondents indicated that among the five questions related to these indicators, three of the "model pricing cloud", "cloud structure and different types of clouds" and "adequacy Advantages cloud technology in the emergency department "has not been approved and the majority of participants ranging from doctors and nurses in the emergency department and IT staff did not have complete data in the field. But the majority is willing to use new ideas in their work and take risks in doing things differently declared. Taken together, these indicators are also among the indicators will be improved.

3-6-4 Index of relative improvement in the implementation of cloud technology in emergency

Consistency in the use of cloud services: on this indicator should be said that, according to most respondents "uses cloud technology to fit the known emergency work" and of "the cloud easily integrated with IT infrastructure." However, the statement, "unwillingness of personnel to use cloud systems because of the need to change working practices" and "different from all the previous experience of the personnel" is also confirmed that a weakness is considered. Taken together, all of the indicators and weaknesses, which refer to the t-test results on this indicator can be seen that there is a significant difference between the data collected is above average, and as the relative strength Cloud technology is implemented in the emergency department.

The decision to use cloud services, according to statistical analysis, IT cloud services to attract positive people and encourages them to use cloud services that makes people your positive feedback In this context, to others it is considered a strong point. On the other hand the need to change working practices and the need for training in the beginning of the use of cloud IT service challenges that people are only at the request of the service your superiors will be used by. So all of the indicators and weaknesses, which refer to the t-test results on this indicator can be seen that there is a significant difference between the data collected is above average, and the relative strength of the walk Cloud Technology is an emergency.

The following table summarizes the factors affecting the implementation of cloud technology in an emergency situation in accordance with the results of t-tests and chi-square test shows:

Table 3 Comparison of the effective implementation of cloud technology in emergency

<i>Status Indicator</i>	<i>Indicator</i>
strengths	Benefits of cloud technology
strengths	Ease of use of cloud services
strengths	The effects of cloud services costs
strengths	Support for cloud service providers
Relative strength	Consistency in the use of cloud services
Relative strength	The decision to use cloud services
Point improvement	On risk, security and privacy in the use of cloud services
Point improvement	Factors influencing IT decision makers

-7 Correlation analysis

Using Pearson correlation, the correlation between indices of the questionnaire were evaluated according to the views of respondents. Given the importance of the correlation between the effectiveness of cloud technology and other factors cloud the effective implementation of the emergency, the matrix below summarizes the results of the correlation coefficient is inserted. To facilitate and increase the accuracy of inference from the table, the correlation coefficients were significant at the one percent level error content and they have a distinctive color. Pale housing association homes in the middle level and high level of correlation between two variables highlight the show.

Table 4 shows the correlation of test results

Save images and pathology in order to expedite the detection, treatment	Unique documentation of patients' medical records	Reduce the time searching for the data treatment process	Improving coordination between the various sectors of emergency	Can be used in any place and time	
0.252	0.269	0.410	0.212	0.223	Ease
0.154	0.105	0.163	0.173	0.259	Risk
-0.019	0.125	0.072	0.162	0.036	Compatibility
0.117	0.158	-0.01	0.19	0.122	The impact on costs
0.403	0.136	-0.021	-0.05	0.217	Support
0.288	0.299	0.129	0.168	0.429	The decision to use
-0.048	0.56	0.233	0.124	0.005	Factors affecting IT

As can be seen in the matrix above a large number of indicators are correlated with each other as a pair. The compatibility of ease of use, and support the decision to use cloud service providers with a high correlation with the benefits of cloud technology is the most important indicator in terms of having relation with the implementation of cloud

technology in emergency impact on costs, risk, security and privacy particularly in the use of cloud services was the next time.

4. Conclusions

Grow, expand and increase the speed and pervasiveness of large-scale networks in recent years has been a shift in

various aspects of human life and the impact of technology on science, technology, and business rise to new areas such as government, education and eHealth is. EHealth to create electronic health records, health information and seamlessly integrate that aggregate this information to various stakeholders is very effective.

An emerging phenomenon in recent decades has made it possible to provide cloud technologies. Cloud computing is a new technology that is meant to provide computing services (storage, software development, application software, etc.) via the Internet or cloud. The technology to share patient information stored can be significant advantages in providing medical services to have electronically. Lower costs and ease of access for physicians to patient information, the most important factor in the health of addressing the cloud computing electronics. Despite the technology infrastructure solutions, Internet and new users to provide any medical information at any time and place and that it has become a necessity in the country. The electronic health record, accounting and electronic medical billing accounts, examples of application of ICT in health is by means of computer networks. E-health systems, particularly electronic health records in addition to better management of personal health, reduce health care costs, in addition to avoiding multiple diagnoses or repeated administration. Kern provides emergency medical services, including health services inside and outside the hospital, which includes a wide range of related activities and is in the interaction between emergency centers and hospitals. Cloud computing has created the possibility that a large amount of processing power and storage on demand to users and organizations to be given. In this thesis, a model based on cloud computing and is designed to integrate patient information and available system that puts patients and doctors. This comprehensive system significantly reduces processing time and service to the patient and also the display of patient records, including all the problems and diseases such as cardiovascular problems, allergies and other items, the quality of treatment and the likelihood of error The diagnosis also reduces. Using this model, we can divide the space between the patient and doctor to doctor until her complete recovery from the beginning need not be filled.

The design required for data collection, including the time needed to provide emergency services, physician visit time and IT structure to implement the system of distributing questionnaires to doctors, nurses, IT specialists specialized hospital emergency training martyr doctor Labbafinejad used. The survey topics include electronic health records, the IT infrastructure of treatment centers, data security and patient privacy. Collected data analyzed by SPSS 19 software experts questionnaire and validated, and finally presented the final results with regard to limitations.

and information technology, implementation of cloud systems according to the experts and the experts assessed and recognized its advantages.

According to the results of the statistical analysis made in the questionnaire for assessing the effectiveness of cloud technology in emergency, this system is located at the beginning and the institutionalization of the everyday business processes that require careful planning emergency

department a long distance and Long-term, comprehensive training, cultural activities to promote the use of technology and equipping the IT infrastructure is in the emergency department.

In this study, the effectiveness of cloud technology in eight indicators, "the utility", "ease of use", risk, security and patient privacy, "" compatibility "," Tasyrbhrzhynhha "," support "," The decision to use "and" factors affecting IT decision-makers "by doctors, nurses, emergency department were studied.

The results show that the use of cloud technology in emergency situations when dealing with the disease. The deployment of cloud technology in hospital emergency rooms due to the investment costs for effective implementation of cloud systems on the quality of the treatment process of a medical view of efficiency.

According to the analysis carried out and experts in the field of medicine and in the field of information technology in emergency measures must be taken to institutionalize cloud technology that these measures are:

- Training for emergency personnel to be aware of the benefits of cloud deployment in an emergency;
- Justification of the decision-making in the area of IT infrastructure, including pricing models, the cloud and the different types of brows ...
- Development of information technology solutions and cloud services integration capabilities with other IT equipment.

Recommendations for future research

In this study, using a questionnaire to establish the effectiveness and acceptance of cloud technology in the emergency department were studied. Because of the work done and the results can be developed and new variables added to it. The variables considered in this study include variables within the hospital and because of limitations in data collection and the lack of reliable documentation, including factors outside of hospital emergency speed and equipment for ambulance cars, an ambulance traffic lanes, the type of emergency patients in critical condition and is not taken into account.

The recommendations for future research include cloud-based smart tools to collect biometric data of patients, emergency co-ordination between various departments such as laboratory, radiology, ultrasound, etc. can be used. It can also be used in the statistical analysis of fuzzy techniques to achieve good qualitative variables to be slightly turned.

References

- [1] Mehdi jurist, Memarzade Tehran, Gholam-Hossein darning threshold, the privacy of patients, a prerequisite for the development of e-health, medical ethics journal, Issue XII, the summer of 1389
- [2] Yqvy Noor Mohammad, a magnificent Jawad Hamid Jafari, identification and ranking of key factors influencing the adoption of cloud Rabansh eHealth, Quarterly Journal of Science and Technology Information Research Institute, October 1393
- [3] Earth, inspired by the approach to the dissertation research, publications Daryt Cultural Center, Tehran, Second Edition, 1378.
- [4] Yunesian Younis, hospital design and implement a new model of agile and portable tablets and cloud-based

- architecture as infrastructure systems, telemedicine, first telemedicine conference - Amirkabir University of Technology, 1391.
- [5] Buzhabad Abdullah, cloud, PNU Sabzevar, Faculty of Engineering, Department of Information Technology, Dey 1391.
- [6] The success of Shahram Hatami sweet, Taheri wish, providing a new model based on cloud computing to improve health care
Emergency first telemedicine conference - Amirkabir University of Technology, 1391.
- [7] A. Soleimani, Hamidzada J., S. Mahmoudi, cloud security by encrypting the group Shamir health, science and technology progress ninth Symposium, December 1393.
- [8] Amir Reza Ghaffari, cloud computing systems: examples, applications, challenges, master's thesis martyr Beheshti University, 1389.
- [9] Aslam Khan Farrukh, Ali Aftab, Abbas Haidar, Haldar Nur Al Hasan, A cloud-based healthcare framework for security and patient's data privacy using wireless body area networks, *Procedia Computer Science* 34 (2014) 511 – 517
- [10] Nabil Sultan, Making use of cloud computing for healthcare provision: opportunities and challenges, *International Journal of Information Management* 34 (2014) 177–184
- [11] Abbas Assad, Bilal Kashif, Zhang Limin, Sammee U.Khan, A cloud based health insurance plan recommendation system: A user centered approach *Future Generation Computer Systems* 43–44 (2015) 99–109
- [12] Hussain Shah Sajjad, Kabeer Khan Fazle, Zarhouni Houada, Said EL Hajji, WSN&cloud computing framework for E-medication, 2nd International Conference on Latest Computational Technologies (ICLCT'2013) June 17-18
- [13] Saju Mathew, Cloud computing: A new foundation towards healthcare, *International Journal of Innovative Technology and Exploring Engineering (IJITEE)* Volume-3, Issue-2, July 2013
- [14] Arindam Banerjee¹, Prateek Agrawal² and R. Rajkumar, Design of a Cloud Based Emergency Healthcare Service Model, *International Journal of Applied Engineering Research*, ISSN 0973-4562, Vol. 8, No. 19 (2013)
- [15] Lena Griebel, Hans-Ulrich Prokosch, A scoping review of cloud computing in healthcare, Griebel et al. *BMC Medical Informatics and Decision Making* (2015) 15:17
- [16] Eman AbuKhoua, Nader Mohamed, Jameela Al-Jaroodi, e-Health Cloud: Opportunities and Challenges, *Future Internet* 2012, 4, 621-645;
- [17] Yan Hu, Fangjie Lu, Israr Khan, Guohua Bai, A Cloud Computing Solution for Sharing Healthcare Information, The Seven International Conference for Internet technology and Secured Transactions.