SHM PUBLISHER
SURYA HIJAU MANFAAT

Service Level Agreement Enforcement Model with Human Factor for Electronic Health Record

Amir Mohamed Talib Mohamed[1], Rodziah Atan[2*], Abdulaziz Alshammari[3], Abdulaziz Alsahli[4], Mohammad Nasrollah Rozami[5]

[1,3,4] *College of Computer and Information Sciences, Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, Kingdom of Saudi Arabia*

[2*,5]*Department of Software Engineering and Information Systems, Faculty of Computer Science and Information Technology, Universiti Putra Malaysia, Serdang, Selangor, Malaysia*

Article Info	Abstract
	Service Level Agreement (SLA) is a document contract between the service provider and service recipient which is the expected services to be delivered and received. SLA includes all the information about the services provided and their performance. The SLA identified the level of services performance such as penalties, priorities, compensation and resolution time. If the quality of service does not meet the SLA usage then the service provider need to pay penalties also known as SLA violation. SLA violation occurred might be from software or hardware but another factor such as human factor also involved. The performance of the system and the quality of services requires a human interference to enforce the SLA. In this research work, the human factor such as user willingness, skill/knowledge, information sharing, Staff adequacy was being investigated. The method survey was implemented to find the relationship between human factor and SLA usage. Respondents in IT department are selected to fill in survey form. 11 respondents are used for pilot study to find the reliability of instrument and 24 respondents are used for actual data. The result show there is positive significant value in relationship between human factor and SLA usage.

1. Introduction

The Ministry of Health Malaysia is responsible to help people to achieve or to maintain the health standard for them which people in Malaysia can run a productive economic and social life. The vision of Ministry of Health Malaysia is to assure the individual, family and community get a good health

* ***Corresponding Author:***

Rodziah Atan,
Department of Software Engineering and Information Systems,
Universiti Putra Malaysia,
Selangor, Malaysia.
Email: rodziah@upm.edu.my

through a fair and equitable health system. Delivering health system should be in a simple or easy to understand by the people who receive the service. Ministry of Health Malaysia has taking initiative step to improve the quality of service delivered by implementing of Hospital Information System (HIS). The HIS plays an important role within hospital to delivering the patient's records. With help from the private sector, the management of information within hospital will become faster and accurately. Due to this, the SLA is used to determine the service need to be delivered. SLA is a contract between service provider and end-user or service recipient, which the service is formally defined [1]. Most commonly, the parameter of SLA defines QoS to give overall performance of a service included the response time, throughput, access time, delay and launch complain [2]. Nowadays most of the services are offered through cloud environment, which are accessed remotely. Government agencies such as hospital, immigration department, prime minister's department and other department are striving to deliver the service through cloud environment whether in private or public.

The issues such as system failure, service unavailability, technical problem, or hardware inaccessibility are examples problems occurred in cloud platform-based services. However, this requires human interference to monitor and enforce SLA. Due to this, human factor need to be analyzed to ensure the process of enforcement SLA working properly. The first objective of this paper is to identify human factor that influence the health care information system usage. Second objective is to develop a model that incorporating with human factor and SLA usage. Third objective is to evaluate proposed SLA enforcement model incorporating with human factor. The human factor such as user willingness, skill/knowledge, information sharing, IT staff adequacy will be used as variable to see the relationship with SLA usage.

2. Theoritical Framework

Service Level Agreement (SLA)

The SLA is negotiated document between service provider and service recipient in term or service being provided to service recipient [3]. The structure of (SLA) contain several parts such as name of agreement, the context and the terms which included two types; Service Terms and Guarantee Terms [3]. The most widely used for SLA specification is WS-Agreement. The structure of WS-Agreement is illustrated in Figure 1 as structure of an agreement. In Figure 1 show the structure of an agreement which contain a few sections. It is a set of meta-data called the XML. For section 'Name' can be optional which name of the template. It is used to provide-understandable name to an agreement in case to avoid refer to a wrong template. 'Context' section provides information about the parties, who involved, what service is delivered, the duration of the agreement, the price, the penalty cost of SLA violation etc. 'Terms' section contains two type which is 'Service Description Terms' and 'Guarantee Terms' to describe the functional and non-functional based on agreed service respectively.
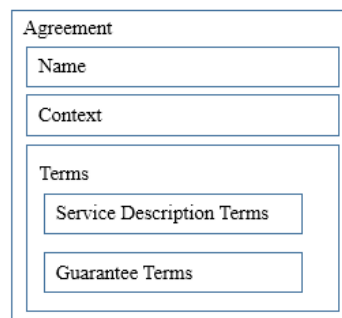

Figure 1. Structure of an agreement

Hospital Information System

The hospital sector has given emphasizing to guarantee the quality of service delivery through cloud computing. The information of patients in cloud become more effectiveness and eases to access. This operation need agreement between service provider and service recipient based on the SLA which describe the details of service need to be delivered and penalties in case if there is any SLA violation occurred within duration of the agreement. The implementation of HIS widely is being used to improve

the quality of public health service and information patient's management [4]. According to Biomedical Informatics Ltd. (2006), the HIS consist several components such as Clinical Information System (CIS), Radiology Information System (RIS), Financial Information System (FIS), Picture Archiving Communication System (PACS), Laboratory Information System (LIS), Pharmacy Information System (PIS) and Nursing Information Systems (NIS) as shown in Figure 2.
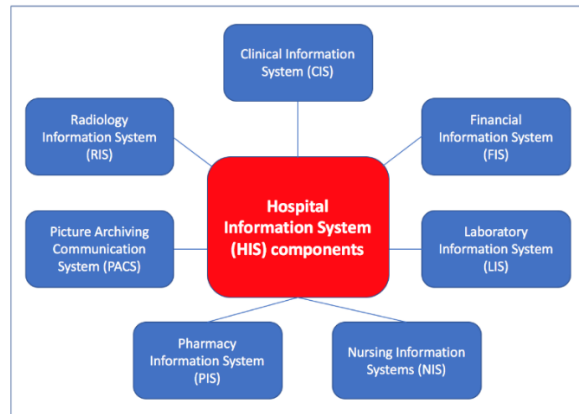

Figure 2. Components in Hospital Information System (HIS) (adapted by Biomedical Informatics Ltd., 2006)

These component of HIS has their own purpose, type of department use and type of user. Table 1 show the type of department and user of HIS component. A Clinical Information System (CIS) is a computer based system used to collecting, storing, manipulating making available clinical information important to the healthcare delivery process. It has been used in clinical department by doctor and nurses. A Radiology Information System (RIS) is a computer system that assists radiology services in the storing, manipulation and retrieving of information. It is also managing and store information regarding the X-ray and imaging department by imaging officers. A Financial Information System (FIS) are computer systems that manage the business aspect of a hospital. It is used by financial department by accountants. Furthermore, A Picture Archiving Communication system (PACS) is a system that facilitates the archiving, processing and viewing of digital radiological images and their related information. It is used in imaging department by Imaging Officers. Moreover, a Laboratory Information System (LIS) is computer information system that manages information about laboratory such as clinical chemistry, haematology and microbiology. A Pharmacy Information Systems (PIS) are complex computer systems that have been designed to meet the needs of a pharmacy department and it is used in pharmacists' department by pharmacists. Lastly, Nursing Information System (NIS) is the systems that manage information about the clinical data from healthcare environment in improving patient care which used in wards by doctors and nurse.

In Malaysia, the implementations of HIS is being expanded used in both of private and public hospital. This is due to improve the healthcare in term of service quality and several initiatives had been taken by Malaysian Government such as enhancing Information Technology (IT) application in Malaysia Public Hospitals [5]. The public hospital is the most critical situation since it serves the larger number of patients. It is important to use the IT application such as HIS which run in the cloud to ensure the patient's information and any related hospital's procedure can be more accessible. The Total Information System (HIS) can be divided into three categories which are Total Hospital Information System (THIS), Intermediate Hospital Information System (IHIS) and Basic Hospital Information System (BHIS) [4]. According to Ismail, N. I., and Abdullah, N. H. (2012) [4] eight (8) hospitals known as THIS, two (2) hospitals known as IHIS and six (6) hospitals known as BHIS as appeared on Table 1.

Table 1. Categories of Hospital Information System (HIS) (adapted by Ismail N.I., 2012

THIS	IHIS	BIH
Hospital Alor Setar, Hospital Ampang, Hospital Selayang, Hospital Serdang, Hospital Pandan, Hospital Putrajaya, Hospital Sg. Buloh and Hospital Sungai Petani	Hospital Keningau, Hospital Lahad Datu	Hospital Kuala Batas, Hospital Setiu, Hospital Pekan, Hospital Pitas, Hospital Kuala Penyu, Hospital Kunak.

Human Factor

Human factor has become more important to be considered to ensure the quality of work can be achieved efficiently. The term of human factor can be defined in several ways but mostly the accepted definition is from Health and Safety Executive [6]. The human factor involved environment, organizational, job factor and human behavior which can affect to the quality of work or service. According to Join Commision Resources (2015) presented some quick guide to human factors terminology, list some question to analyze the system based on human factor and describe human factors engineering strategies. It is about 80% to 90% of error made by human during research analysis and the most common mistake come from human factor such as leadership and communication. According to [7], the human factor is the important issues need to be considered as they play important role in influencing the HIS adoption in hospital. The author provides the information based on the "Hospital Information System", "Electronic Health Record", and "human factor", which the articles were retrieved from several journals. In summarizing the human factor; staff resistance in using HIS, lack of IT knowledge among practitioners, staff refuse to share information and the shortage of IT manpower to regulate the system implementation shown graphically in Figure 3 [8].
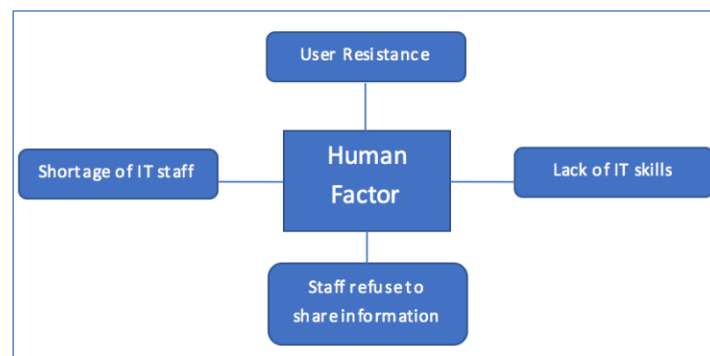

Figure 3. Human factors challenge for HIS implementation

Human factor mentioned by author [7] is the specific in term of human aspect. In this paper, human factor such as user willingness, skill/knowledge, information sharing, and IT staff adequacy is used to see the relationships between these factors with SLA usage. Next section will discuss about these factors. Communication underpins all of the other nontechnical skills, but is particularly crucial for teamwork. As such, it is important that healthcare workers give careful consideration to verbal and written communication, and active listening [9].

User Willingness

According to [10], the human factor such as lack of user's knowledge about objective of HIS, the importance of HIS and benefits of system are the highest means score in the data analysis. Most of the user's HIS give a negative attitude towards the HIS adoption. The most important or critical factor is respondent's attitude towards the system. The negative attitude from colleagues and patients towards the system will only produce low quality of service through HIS system. The system complexity will be a reason of user resistance to the HIS adaption due to time constraint to learn use the system by staff [11]. The poor system interface will cause resistance from users. According to [12], the investigation of the user satisfaction from using HIS in Malaysia has implemented. The author investigates the quality of HIS in term of interface, function, performance and the combination of HIS interface, function and performance. The result show there are significant differences results from different type of user such as physicians, nurses, laboratory technologies, pharmacists and other. According to [13], Korea known as developing countries which has a better technology compared to other countries, but the implementation of information system shows there is strong resistance from the user such as physicians and patients, as well similar problem happens in China. According to [14], the migration from paper-based system to electronic system will only cause the physicians resistance. Nowadays with the latest technology and fast-growing technology, it is hard to move from the traditional way to modern way. Many countries still consider traditional system which is paper-based system and unable to give

respond to the new information system technology. According to [15], the user resistance come from physician and doctor's unwillingness for paper-based system to the new IT-applications in healthcare organization. The migration system from paper-based system to the new system called HIS is to help or improve the service and performance's task by medical practitioners' task.

Skill/Knowledge

According to [16], the one of the challenge human factor to implementing health information system is the skilled workforce that understand the health care purpose, information and communication technology, people or colleagues and organizational. It is important to understand the knowledge and skill of workforce in term of information communication technology (ICT) to improve the quality of health care. According to [17], there are benefit and challenges using Electronic Health Record System on the stakeholders. Table 2 show the summary of benefits and challenges for three types of stakeholders done by [17].

Table 2. Summary of benefits and challenges for three types of stakeholders

Stakeholders	Benefits	Challenges
Hospital	•Record systematically • Efficient for work • Space saving • Data for further research	• High cost • Risk of data loss • Risk of privacy loss
Patient	• Convenient for checking record • Drug safety •Reduce duplicated medical test	• Privacy
Physicians	• Convenient for accessing record • Time saving	• Slow system • Unfamiliar with system •Limited information

From the result, it shows that the knowledge and skill by using the system it is the important challenge need to be considered in hope to improve the quality of care. According to [18], the implementation HIS was low in Malaysia due to the lack of computer skill among the medical practitioners. During the training given to the medical practitioner, they discover the senior medical having a problem using a computer. The word "Fit" between user and technology need to be addressed together with the factor which can influence user acceptance of the health technology [19]. Training is necessary to provide a good skill medial practitioner on the technology health care system. The support training and supervision are more likely produce improved result [20]. The good quality of training will help the organization to achieve the goals of implementation HIS. To ensure the effectiveness of implementation HIS, the medical practitioner should have skill and knowledge in medicine and technology in their daily task. Effective training will help to improve the performance of employees [21]. Therefore, a perfect training should be given to those employees who have the authorized to use the system.

Information Sharing

The implementation of HIS in hospital has a goal which is the communication between medical practitioners to exchange the information among themselves. The doctor and nurse should be able to share or exchange the view when dealing with the patients. This share information can be used by other when they face with the same situation. The medical practitioner comes from different generation, and by sharing information among themselves will help them to strengthen relationship between colleagues. This also will improve the performance task to be more effective and efficiently. In some cases, the doctor might not be able to identify the problem from the patients' illness and treatment. With HIS, the doctor can easily find the answer from the previous medication which has same diagnosed that have been done by other doctor through the system.

In the health care environment, the real situation shows some of the medical practitioners refuse to share the information with other medical practitioners. This happen caused there is no guidance issued to encourage the employees to share the information which is supposed to be mentioned by hospital management. According to [22], lack of willingness to share information is one of the issues occur in hospital China. They said the hospital do not give positive attitude towards sharing information

because some of reason such as the system was self-funded, propriety, expose the information to outsider and fear of criticism by fellow professionals.

The information exchange might be unable to be proceed because of some reason such as system interoperability, system downtime, system unavailability etc. This issue happens will cause the information cannot be understandable and the diagnosis not recognized. According to [23], there are three affects from information exchange such as it can improve the quality of hospital care, reduce operation costs for local hospital and increase demand for hospital care due to the quality improvement from data exchange. Therefore, to implement information sharing among the medical practitioners and hospital, the proper system that can enable the communication through the ICT infrastructure need to be adopted. Beside sharing information and knowledge, the medical practitioners also encouraged to be participated in system development process to increase the knowledge about system development. The HIS developer should give and teach the flow of the system development of HIS to those employees who use the system in hospital. Slow adopter Electronic Health Record (HER) in developing stage is one challenges encountered in hospital Ghana [24]. By sharing knowledge and experience among the medical practitioner would give a positive impact on the medical health care.

IT staff Adequacy

Lack of qualified IT employees and infrastructure are common problem face by hospital when they try to improve the quality of healthcare by implementing HIS system. Less IT skilled trainer also lead to low IT manpower which is become the barrier in Saudi Arabia, Syria, Oman and Pakistan [25], [26], [27]. To maintain the HIS system, the skilled manpower is needed to ensure they can support or be assistant to the system. Furthermore, the employees should be motivated and feel responsible to perform their task and willingly to make improvement if it required [25]. This will make time consuming and costly effort. In public hospital, normally HIS system is maintained by Information Technology Department and service provider which known as third party to ensure the HIS system working efficiently in hospital. However, the IT employees should have responsibilities to improve knowledge IT maintenance, include networking, software, PC hardware and other equipment.

3. Methodology

This section describes the research methodology that has been taken to achieve the research objective. The research design and method used in this research is quantitative descriptive research and correlation. The data used are primary data obtained through the survey distributed to the two type of group which is service provider and service recipient in IT department Hospital Serdang to explore causation. In this research work, the government hospital was chosen in Serdang. The purpose researcher choose Hospital Serdang is the SLA was used regarding the HIS system in hospital management and according to the IT officer, there is SLA violation occurred in the hospital. The location of research also near with Universiti Putra Malaysia (UPM) and it make easier to conduct the research.

In this research work, there are two type of variable which is independent variable and dependent variable. The SLA usage is an independent variable and the dependent variable is 4 type of human factor which is (1) user willingness; (2) skill/knowledge; (3) information sharing; (4) IT staff adequacy. Human factor such as user willingness include clear aspect of attitude of respondent during work or interaction between perception respondent with HIS system. Skill/knowledge includes level of respondent regarding knowledge. Information sharing include perception of respondent regarding sharing information in work. IT staff adequacy included portability issue in working place which number of workers is not enough to perform the task.

This study focuses on the measurement of the level of relationship between of SLA usage and 4 type of human factor which is user willingness, skill/knowledge, information sharing and IT staff adequacy. This show that the first objective is achieved by identify the human factor which can be influence to SLA usage.
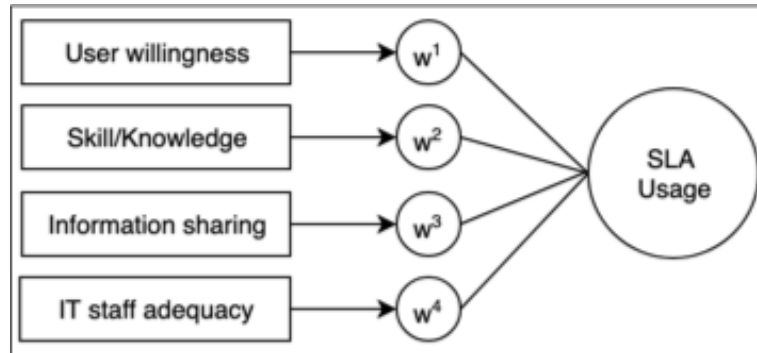
Figure 4. SLA Enforcement Model

Figure 4 show the SLA enforcement model was developed from referring to the several previous researcher papers which described about the human factor toward the service efficiency by implementing HIS system in government hospital. With this model, the author will achieve the result or goal of this research.

The hypothesis will be developed to see the relationship between two variables. Then the hypothesis will be tested to see the difference number of mean score and if there is a significant relationship between human factor and SLA usage. The hypothesis just as follow:

Hypothesis 1
H_0^1:   There is a difference in the mean score of level SLA usage with the level human factor (user willingness, skill/knowledge, information sharing and IT staff adequacy).
H_1^1:   There is a difference in the mean score of level SLA usage with the level human factor (user willingness, skill/knowledge, information sharing and IT staff adequacy).

Hypothesis 2
H_0^2:   There is a significant relationship between the user willingness and SLA usage.
H_1^2:   There is a significant relationship between the user willingness and SLA usage.

Hypothesis 3
H_0^3:   There is a significant relationship between skill/knowledge and SLA usage.
H_1^3:   There is a significant relationship between skill/knowledge and SLA usage.

Hypothesis 4
H_0^4:   There is a significant relationship between information sharing and SLA usage.
H_1^4:   There is a significant relationship between information sharing and SLA usage.

Hypothesis 5
H_0^5:   There is no significant relationship between the IT staff adequacy and SLA usage.
H_1^5:   There is a significant relationship between the IT staff adequacy and SLA usage.

The hypothesis will be tested to achieve the objective for this paper. The result will be discussed in section 4 to see which hypothesis can be accepted.

Survey instrument

In this research work, the survey form act as instrument to conduct the research. From the previous researcher conclude the human factor such as user willingness, skills or knowledge, IT staff adequacy and information sharing are the impact to the adoption of information system in hospital. The survey form consists of three parts: Part A consists of 4 questions about respondents' background which consists of gender, age, position and level education. Part B consists of type Likert scale question which is question that only regarding the SLA document and SLA management. Part C consists of 4 category which is human factor such as IT staff adequacy, skill or knowledge, user willingness and information sharing. All items are consisting positive and negative question.

Part A: Respondent Demographic Information

Part A contains the items formed to obtain respondents' background information such as gender, age, position and level education. From here, the researcher can collect information about the subject in population.

Part B: Service Level Agreement (SLA)

Part B questionnaire form is 5 points Likert scale which is (1) very disagree, (2) disagree, (3) neutral, (4) agrees and (5) strongly agree based-on SLA document. The Likert scale used as weighting factor. The purpose this section is to see level respondent regarding the SLA document. To analyse the meaning of this mean value it is divided into three points [8]. This value is used to interpret the level of human factor on the use of SLA. The three min score points set are mean values between 1.00 and 2.33 are considered low or weak, mean values between 2.34 and 3.67 are considered to be moderate and mean values between 3.68 and 5.00 are considered high or good as shown in Table 3:

Table 3. Mean Score Interpretation

Min Score	Interpretation
1.00 to 2.33	Low
2.34 to 3.67	Medium
3.68 to 5.00	High

Part C: Human Factor

Part C contains 4 component such as (1) User willingness; (2) skill/knowledge; (3) information sharing; (4) IT staff adequacy. In this study, a questionnaire form is 5 points Likert scale which is (1) very disagree, (2) disagree, (3) neutral, (4) agrees and (5) strongly agree.

Before the actual data collection, pilot study was conducted to obtain the reliability of the instrument and to ensure the terms used in the research instrument can be clearly understood by the respondent. According to [28], the pilot study is a small-sample size is being studied to test the research protocol. It should be an important step in research that will help researcher to identify the suitability of the instruments used in the study. In this research work, the researcher will use 11 respondents to test the questionnaire form in survey. The researcher will find the reliability for 24 respondents for actual data since to test reliability cannot use same respondent. Table 4 shows the reliability of variables in pilot studies and actual studies.

Table 4. Variable Reliability in Pilot and Actual Study

Variable	Alpha Value	
	Pilot Study	Actual Data
SLA usage	0.713	0.819
User Willingness	0.776	0.898
Skill/knowledge	0.689	0.929
Information sharing	0.840	0.938
IT staff adequacy	0.860	0.961

According to "rule of thumb", alpha> 0.90 is in excellent level, alpha> 0.80 is good and alpha> 0.60 is in questionable but still acceptable. Overall, the instruments in this study have good reliability and acceptable levels. Table 5 show the Guildford's Rule of Thumb Index Interpretation.

Table 5. Guilford's Rule of Thumb Index Interpretation

Size of Correlation	Interpretation
.90 to 1.00 (-.90 to –1.00)	Very high positive (negative) correlation
.70 to .90 (-.70 to -.90)	High positive (negative) correlation
.50 to .70 (-.50 to -.70)	Moderate positive (negative) correlation
.30 to .50 (-.30 to -.50)	Low positive (negative) correlation
.00 to .30 (.00 to -.30)	Little if any correlation

According to Guildford's Rule of Thumb Index Interpretation, the size of correlation indicates that the reliability of the instrument was in high positive correlation. This means the instrument can be accepted to analysed the data to see the result of the variables. The alpha values in pilot test show the

lowest from the actual data because the researcher made some changes to the instrument to ensure the reliability was at high accurate.

4. Prototyping

A prototyping is a system development method in which prototype is built, tested and then reworked as necessary until an acceptable prototype is finally achieved from which complete system can be developed. A prototype is developed to prove the concept for the correlation of factors in a message representation. Simply put, the prototyping is the process of building a prototype to demonstrate the proposed system for end user. By interacting with prototype, user can get better understanding from the information requirements.

Prototype based on SLA enforcement model

In this section, the prototyping is developed based on the result from data analysis that show there are positive significant between relationship human factor and SLA usage. The level of significant value show was at moderate level yet need to consider when delivering services. Some multiplication formula is used to find the number of percentages of SLA usage which represent as the importance of SLA document.

The weighting factor is a constant number given to each human factor. Weighting factor is a weight given based on to the system as multiplication factor. Figure 5 show the formula to get the weighted mean.

$$\text{Equation} = [(m^1 * w^1) + (m^2 * w^2) + (m^3 * m^3) + (m^4 * m^4)] / (w^1 + w^2 + w^3 + w^4)$$
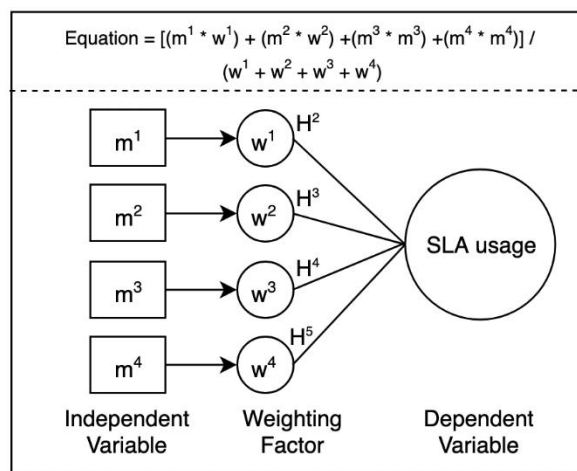
Figure 5. SLA enforcement model equation

The independent variable will use human factor such as user resistance, lack of skill/knowledge, refuse to share information, and shortage IT staff which represent as m1, m2, m3 and m4. The dependent variable will be SLA usage and measured in percentage. H2, H3, H4, and H5 will be hypothesis testing to see if there is a significant relationship between the human factor and SLA usage. Null hypothesis will be rejected if there is no significant relationship between the factors and SLA usage. The alternative hypothesis will be accepted if there is a significant relationship between the factors and SLA usage.

Table 6. Weighted Scores

Human factor	Weight	Mean score
User Willingness	25%	3.449
Skill/knowledge	20%	3.161
Information Sharing	25%	3.357
IT staff Adequacy	30%	3.557

Table 6 show the weighting factor for each human factor. The value from dependent variable will changed based on the independent variable. The weighting factor is based on the result from data analysis of mean score regarding each factor. The amount given is based on importance of these factor.

The weight to assign appropriate importance to user willingness, skill or knowledge, information sharing and IT staff adequacy (independent variable). The weight scores are often a percentage of a total of 100. The formula used based on equation in Figure 5.

Human factor with specific aspect will be used in prototype such as user resistance, lack of skill/knowledge, refuse to share information and shortage IT staff. Figure 6 show the SLA enforcement model equation implemented in prototype development.
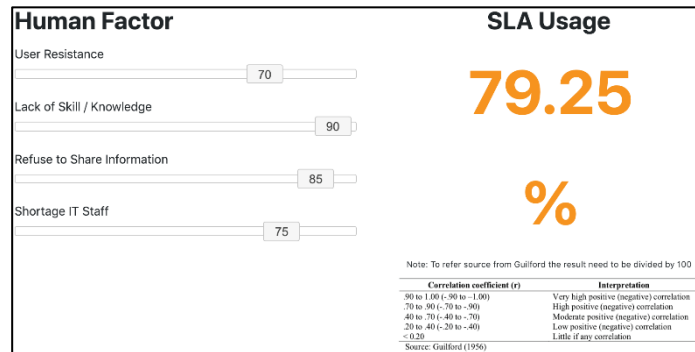

Figure 6. The prototype SLA enforcement model incorporating human factor (high percentage)

Figure 6 show the highest percentage of impact on the SLA usage after the handle slider for each human factor changes. This illustrate that the number of issues such as SLA violation, pricing and costs, penalty, SLA terminated or further negotiation will rise if the number of human factor is not considered during delivering services. Based on Table 5, this result can be illustrated that the correlation between human factor and SLA usage was at high positive relationship between variable. This mean the higher the number of impacts on SLA usage the higher chance to rise the number of issues on SLA usage. The SLA is a document which is not only a burdensome but it is to cover or protect between two sides. But if the unexpected issues arise during delivering services then it will become burdensome to two party. Hence, it is important to consider human factor in services industries.

5. Result and Discussion

In this section, the result from data collection via survey form will be described. To analyze the data, the authors used Statistical Package for The Social Science (SPSS) version 23. There are two types of statistical analysis used in the presentation of the study results such as static descriptive and inferential statistics. Descriptive analysis is a statistic used to describe variable characteristics [29]. Descriptive analysis such as frequency, mean and percentage is used to describe independent variables and dependent variables as well as respondent profiles. The Pearson correlation analysis method is used to see the relationship between the human factor (user willingness, skill/knowledge, information sharing, IT staff adequacy) and SLA usage.

Descriptive Statistics

Table 7 shows the frequency distribution of subjects by type of respondent, gender, age, position and education among employees of IT department in Hospital Serdang. Since in this research the researcher focusses on the party involved with SLA, the type of respondent should be service provider and service recipient. For service recipient, it can be nurse or medical practitioner but for this research, it will be staff of IT department. The reason is the researcher want to know the level of knowledge's staff in IT department regarding SLA are at which level.

30

Table 7. Profile Respondents (N=24)

Variable	Percent (%)	
Type		
Service Provider (SR)	15	62.5
Service Recipient (SR)	9	37.5
Age		
20-25	4	16.7
26-30	8	33.3
31-35	7	29.2
36-40	3	12.5
41 or above	2	8.3
Gender		
Male	11	45.8
Female	13	54.2
Position		
Project or Team leader	1	4.2
Operation manager	1	4.2
System Support Engineer	5	20.8
Customer Support Engineer	4	16.7
Application Support Engineer	5	20.8
Network support Engineer	2	8.3
Technical Support Engineer	4	16.7
Database Administrator	1	4.2
Other	1	4.2
Education		
Degree	6	25.0
Diploma	15	62.5
SPM	2	8.3
Other	1	4.2

From the Table 7, total of respondent is 24 which show the 15 people (62.5%) from service provider and 9 people (37.5%) from service recipient. This show the number of staff in service recipient less than number of staff in service provider.

In terms of age, most worker are less than 30 years old (33.3%), followed by 29.2% aged between 31-35, 12.5% aged 40 years and 16.7% aged between 20 and 25 years old. Respondents ages 41 or above only had 2 people (8.3%). The aged between 26 – 35 show the high number compare to other. This show many people in working area are from young people. In terms of gender, it shows that there are significant differences in the number of respondents by gender. Data analysis shows that the majority of respondents are female worker. A total of 54.2% (n = 13) respondents consisted of female worker and the remaining 45.8% (n = 11) were male worker. This show the majority people in IT department are female worker. In terms of position, the data analysis showed that 1 (4.2%) of the respondents represent for 1 position such as team leader, operation manager, database administrator and other. Other position detected as assistant information technology officer. Position as system support engineer and application support engineer show that 5 people (20.8%) represent for each position. While the position as customer support engineer and technical support engineer show that 4 people (16.7%) represent for each position. Lastly only 2 people (8.3%) represent as network support engineer. In terms of education, show that there are 15 people (62.5%) of respondent hold diploma certificate. Only 6 people (25%) of respondent hold degree certificate. For other education detected such as worker that hold skills certificate.

To answer the third objective, analysis regarding the level of employees' knowledge on human factor (user willingness, skill/knowledge, information sharing, IT staff adequacy) among worker towards SLA usage. The respondents' answers to this section question show how their work commitment to the field of employment they choose and what they are doing. Respondents need to answer according to five scores based on Likert Scale (Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5). Table 8 show a result from respondents' knowledge level regarding on SLA usage which divided in two section which is service level agreement document and service level management. Overall results are obtained is showing a high level of respondent regarding SLA management in term

of role of workers between 4.13 (SD: 1.154) AND 3.92 (SD:1.248). Many of worker know their responsibilities or role in hospital such as to provide user inquiries regarding HIS and ensure the communication system is working properly. Meanwhile the mean value of SLA document was at low level showing the level of respondent regarding the SLA document is not high. Simply put, they do not know much more about SLA is about but they know their responsivities.

Out of the overall score of the level respondent's knowledge on SLA usage among workers, the average SLA usage was 3.38. This shows that the majority of respondents are aware the content of SLA. This is clearly seen when the majority of respondents choose a high score. From the result, it can be concluded that it is importance for service recipient to know the purpose of SLA which help them to see the quality of service being delivered by the service provider [1]. With SLA document, the service recipient will know the performance from service provider and allow the service recipient to check if they violate SLA or not.

The Service Level Objectives (SLO) should be identified in the SLA document so that each party involved can avoid compensation and penalty if it breaches SLA. According to [30], the SLA agreement is very important between service provider and service recipient to ensure the service is delivered as the agreement defined in SLA.

Table 8. Identifying the level of employees' knowledge on SLA usage among workers

No	Question	1 Num (%)	2 Num (%)	3 Num (%)	4 Num (%)	5 Num (%)	Mean	Std.
1	Provide information and advice on any user inquiries regarding HIS	2 (8.3)	0	2 (8.3)	9 (37.5)	11 (45.8)	4.13	1.154
2	Ensure communication between systems that integrates with HIS works properly.	2 (8.3)	0	4 (16.7)	6 (25.0)	12 (50.0)	4.08	1.213
3	Maintain all hardware, network equipment, software and application systems to always be in good condition and function perfectly.	2 (8.3)	0	2 (8.3)	10 (41.7)	10 (41.7)	4.08	1.139
4	The project team should be at hospital during the main working hours.	2 (8.3)	0	5 (20.8)	4 (16.7)	13 (54.2)	4.08	1.248
5	Record all complaints / problems into the Helpdesk System and assign the Log number to the problem reporter.	3 (12.5)	0	1 (4.2)	12 (50.0)	8 (33.3)	3.92	1.248
6	Implement network trends analysis to ensure system performance stability.	3 (12.5)	1 (3.2)	1 (4.2)	14 (58.3)	5 (20.8)	3.71	1.233
7	SLA should include the level of damage for each complaint.	8 (33.3)	5 (20.8)	5 (20.8)	6 (25.0)	0	2.38	1.209
8	SLA should include statements concerning the payment of penalty.	10 (41.7)	1 (4.2)	9 (37.5)	3 (12.5)	1 (4.2)	2.33	1.274
9	SLA include the response time from user complaint to Helpdesk.	12 (50.0)	2 (8.3)	2 (8.3)	6 (25.0)	2 (8.3)	2.33	1.523
10	SLA should include notification of penalty interest for late payments.	8 (33.3)	4 (16.7)	9 (37.5)	3 (12.5)	0	2.29	1.083
11	SLA should cover the payment terms for charges.	14 (58.3)	2 (8.3)	5 (20.8)	2 (8.3)	1 (4.2)	1.92	1.248

Minimum = 2.82   Max = 4.27   Mean = 3.386   Std Deviation: 0.3508
Note: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree
Num = number of samples

To answer the third objective regarding user willingness among workers, Table 9 is referred, it shows that the perspective from majority of respondent to the human factor such as user willingness among workers are at high level based on Table 3. The item regarding with user interface of the system stated that the mean value between 3.71 (1.083) and 4.29 (0.464). Most of the worker think the user interface of the system is not friendly and it cause the factor user resistance occurred during work hence effect to the works performance. The issue with work and manager in working area also give impact to the works performance with mean value 3.71 which is at high level from respondent. While the average mean of the show is 3.18.

The working style should be considered very well in order to deliver a good quality of work. Majority of respondent agree with question relate with the way of problem solving which is rarely use any type of technique such as brainstorming to solve a problem. According to [31], define the study about the effectiveness of the brainstorming techniques to learn basic skill hence it will give the positive impact in performing skill. Most of the respondent agree with learning the HIS system which is require a lot of time to adapt. Which means the HIS system has a lot of functionality that allow the user to use the system in a good way. Maintaining the big system need a lot of time to ensure the system working properly and to avoid the negative impact to the system. Since it handles hospital's information, it should be accurate and correct when delivering the information to the user. The lowest of mean value is 3.04 with standard deviation 1.197 show the respondent not really want to say the rate of pay is not affordable. Which mean all respondent satisfied with the pay rate they get each month. The impact pays and promotion on job satisfaction and the result show the there is significant influence on job satisfaction [32].

Table 9. Identifying the level of user willingness among workers

No	Question	1 Num (%)	2 Num (%)	3 Num (%)	4 Num (%)	5 Num (%)	Mean	Std.
1	I think the user interface of system HIS is not user friendly.	0	0	0	17 (70.8)	7 (29.2)	4.29	0.464
2	I have much work need to do.	0	2 (8.3)	8 (33.3)	9 (37.5)	5 (20.8)	3.71	0.098
3	My manager pretends to be knowledgeable person.	0	5 (20.8)	3 (12.5)	10 (41.7)	6 (25.0)	3.71	1.083
4	My colleague always does not brainstorming to solve the problem.	1 (4.2)	7 (29.2)	2 (8.3)	11 (45.8)	3 (12.5)	3.33	1.167
5	I need a lot of time to adapt the flow of HIS system.	1 (4.2)	6 (25.0)	5 (20.8)	8 (33.3)	4 (16.7)	3.33	1.167
6	My colleague was dependent.	1 (4.2)	9 (37.5)	1 (4.2)	8 (33.3)	5 (20.8)	3.29	1.301
7	I am not feel valued among the staff.	3 (12.5)	8 (33.3)	2 (8.3)	4 (16.7)	7 (29.2)	3.17	1.494
8	My colleague did not have the initiative to do the work.	1 (4.2)	10 (41.7)	2 (8.3)	6 (25.0)	5 (20.8)	3.17	1.308
9	I am thinking the rate of pay is not affordable.	2 (8.3)	8 (33.3)	3 (12.5)	9 (37.5)	2 (8.3)	3.04	1.197

Minimum = 2.11   Max = 4.44   Mean = 3.449   Std. Deviation: 0.8566
Note: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree
Num = number of samples

To answer the third objective regarding skill/knowledge among workers, Table 10 is referred, it shows the overall mean value was in moderate level based on Table 3. The highest mean is 3.46 with standard deviation 1.285 show the majority agree with question relate with user manual about the HIS system is hard to understand. Majority of respondent also agree with question regarding take a lot of

time to adapt the flow of HIS system. Which means, one of the reason why they take a lot of time to adapt HIS system is because the user manual of system is hard to understand.

The second highest mean value is 3.29 with standard deviation 1.628 which respondent agree with question joining a course to gain knowledge. Each respondent might have different reasons not to join any courses provided. With 45.8 percent of respondent agree with not able to understand with training provided. The lowest mean value in Table 9 show that 3.00 with standard deviation 1.063 related with question ambiguity of the nature of job role. As a manager, it is their responsibility to explain job role for each worker to ensure they know their role [33] and [34]. Misunderstood role can lead the worker not perform very well when deliver service thus lead the business destruction. Customer Relationship Management (CRM) is business process for business to customers as well as for business to business [35]. If the service recipient not satisfied with the service being delivered from the service provider then it can lead two party end the business relationship.

Overall for this section it shows that the mean value is 3.16. Even though it is in the level moderate still need to be considered in hope each worker willing to increase the knowledge. The importance of knowledge as growth perspective to increase the skill of employees [36].

Table 10. Identifying the level of skill/knowledge among workers

No	Question	1 Num (%)	2 Num (%)	3 Num (%)	4 Num (%)	5 Num (%)	Mean	Std.
1	I think the user manual about the HIS system is hard to understand.	0	9 (37.5)	2 (8.3)	6 (25.0)	7 (29.2)	3.46	1.285
2	I don't like to join a course to gain knowledge.	4 (16.7)	7 (29.2)	0	4 (16.7)	9 (37.5)	3.29	1.628
3	I am not able to understand the whole training provided. (ex: System HIS)	0	10 (41.7)	3 (12.5)	9 (37.5)	2 (8.3)	3.13	1.076
4	My skills do not fit with my job.	1 (4.2)	10 (41.7)	3 (12.5)	5 (20.8)	5 (20.8)	3.13	1.296
5	The guideline was not described by expert/trainer.	1 (4.2)	9 (37.5)	3 (12.5)	9 (37.5)	2 (8.3)	3.08	1.139
6	Unreasonable division of work.	1 (4.2)	8 (33.3)	5 (20.8)	9 (37.5)	1 (4.2)	3.04	1.042
7	Ambiguity of the nature of job role.	1 (4.2)	9 (37.5)	4 (16.7)	9 (37.5)	1 (4.2)	3.00	1.063

Minimum = 1.57   Max = 4.43   Mean = 3.161   Std Deviation: 1.033

Note: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

Num = number of samples

To answer the third objective regarding information sharing among workers, Table 11 is referred, it shows the overall mean value was in moderate level based on Table 3. The highest mean value is 3.50 (1.351 & 1.504) show the majority of respondent agree with question regarding the trainer of HIS's developer unwilling to train staff. Other than that, around 54.2 percent of respondent agree regarding the question related workers unwilling to provide opinion during performing task at work. For this question, about 8.3 percent of respondent give neutral response which mean they wish not to give respond. This factor measured referring from the Table 3, this can be seen the factor of the refusing to share the information perceived not all people did brainstorming during meeting. Majority of respondent with 54.1 percent agree with question regarding sharing information during brainstorming. Unfortunately, some of respondent with 20.8 percent did not give respond about sharing information during brainstorming.

The lowest mean for this section regarding cooperation of respondent with another department is 3.21 with standard deviation 1.351 and this follow with question as about the initiative respondent to get the information out of their own field with mean 3.38 (1.377). This show the respondent did not have initiative with sharing information from other department thus sharing information will not occurred.

From the previous study, it is individual's decision to share information among workers [22]. There is no general guidance need to be followed and large hospital not willing to share information with their smaller counterpart.

Table 11. Identifying the level of refuse to share information among workers

No	Question	1 Num (%)	2 Num (%)	3 Num (%)	4 Num (%)	5 Num (%)	Mean	Std.
1	The trainer or expert unwilling to train staff.	0	10 (41.7)	0	6 (25.0)	8 (33.3)	3.50	1.351
2	I don't like to provide opinion during performing task at work.	2 (8.3)	7 (29.2)	2 (8.3)	3 (12.5)	10 (41.7)	3.50	1.504
3	Sometimes I keep silent during brainstorming / meeting.	0	6 (25.0)	5 (20.8)	11 (45.8)	2 (8.3)	3.38	0.970
4	My colleague did not have the initiative to get information other than their own field.	2 (8.3)	7 (29.2)	1 (4.2)	8 (33.3)	6 (25.0)	3.38	1.377
5	My information that I gain in work cannot be shared.	2 (8.3)	8 (33.3)	3 (12.5)	2 (8.3)	9 (37.5)	3.33	1.494
6	My colleagues refuse to help me with my work.	1 (4.2)	8 (33.3)	4 (16.7)	7 (29.2)	4 (16.7)	3.21	1.215
7	I don't like to get cooperation from another department.	3 (12.5)	6 (25.0)	2 (8.3)	9 (37.5)	4 (16.7)	3.21	1.351

Minimum = 1.57   Max = 4.57   Mean = 3.357   Std Deviation: 1.138
Note: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree
Num = number of samples

To answer the third objective regarding IT staff adequacy, Table 12 is referred, it shows the overall mean value was in moderate level based on Table 3. The highest mean value is 4.04 with standard deviation 0.690. Majority of respondent agree regarding question the problem with discipline caused for staff's termination from the industry. With 8.3 percent of respondent wish not give respond for this question and only 4.2 percent only respondent not agree with this question. With same result on this factor, majority of respondent agree with the difficulty of finding a suitable person to perform any task and due to low budget to recruit new staff. Based on the Table 10, it shows the mean is 3.63 with standard deviation 1.245 which in a moderate level.

With 70.8 percent of respondent agree regarding question time constraint to recruit new staff. Respondent also agree regarding the loyalty of employee to company caused the lack of IT staff. In previous study, the level of loyalty covers several aspects such as recruitment policies, training and development, productivity-linked and much more [33]. Thus, developing a desirable technique would produce or give positive effect on employee loyalty. The last and least mean value is 3.29 with standard deviation 1.459, around 71.5 percent of respondent agree with this question regarding the lack of IT staff is due to low workforce growth.

Table 12. Identifying the level of IT staff adequacy

No	Question	1 Num (%)	2 Num (%)	3 Num (%)	4 Num (%)	5 Num (%)	Mean	Std.
1	I think because the discipline problems caused for staffs' termination	0	1 (4.2)	2 (8.3)	16 (66.7)	5 (20.8)	4.04	0.690
2	I think it is hard to find a suitable person to perform the task.	2 (8.3)	4 (16.7)	0	13 (54.2)	5 (20.8)	3.63	1.245
3	I think the lack of IT staff due to low budget to recruit new staff.	2 (8.3)	4 (16.7)	0	13 (54.2)	5 (20.8)	3.63	1.245
4	Time constraint to recruit new staff.	2 (8.3)	4 (16.7)	1 (4.2)	12 (50.0)	5 (20.8)	3.58	1.248
5	I think employee not loyal to the company caused for lack IT staff.	1 (4.2)	7 (29.2)	$\pi 1$ (4.2)	10 (41.7)	5 (20.8)	3.46	1.250
6	Having to adopt negative role such as making unsuitable decision.	0	9 (37.5)	1 (4.2)	9 (37.5)	5 (20.8)	3.42	1.213
7	Lack of skills from top employer to select workers.	0	8 (33.3)	3 (12.5)	8 (33.3)	5 (20.8)	3.42	1.176
8	I think the lack of IT staff due to low workforce growth.	4 (16.7)	5 (20.8)	0	10 (41.7)	5 (20.8)	3.29	1.459

Minimum = 1.88   Max = 5.00   Mean = 3.557   Std Deviation: 1.069
Note: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree
Num = number of samples

The result from Table 8 – 12 show the reader the frequency, mean, standard deviation, percentage and the content of survey. In section 5.2 will be inference analysis which the author uses Pearson correlation analysis method to answer the second and third objectives with identifying the relationship between human factor (user willingness, skill/knowledge, information sharing, IT staff adequacy) and SLA usage.

Inference Analysis

The results of the analysis will be presented in the order of hypotheses that have been formed and elaborated with the table. In this decision, the level of significance set is 0.05. The researchers have used statistical inference methods such as regression analysis to test the hypothesis which is to see the significant value in human factor toward SLA usage.

Each of factor show the positive significant value between relationship human factor and SLA usage. Even though the level of significant value is moderate, it is still can give an impact to the SLA violation. Table 13 show the correlation value between human factor and SLA usage.

Table 13. Pearson Correlation Coefficient for Relationship between X and Y

	Variable	Y	X1	X2	X3	X4
Y	SLA usage					
X1	User willingness	0.454^*				
X2	Skill/Knowledge	0.416^*	0.919^{**}			
X3	Information sharing	0.410^*	0.909^{**}	0.939^{**}		
X4	IT staff adequacy	0.423^*	0.889^{**}	0.886^{**}	0.880^{**}	

Note: ** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Discussion

In this section, the result of analyze will be discussed. The results in Table 13 show that overall in moderate level (p<0.5). It shows that there is significant correlation between the variables of user resistance and SLA usage. This means the hypothesis is accepted because there has significant relationship between the human factor (user willingness, skill/knowledge, information sharing, IT staff adequacy) with SLA usage.

The findings show that there is positive relationship between SLA usage and user willingness but the strength of the relationship between SLA usage and user willingness is still at moderate level of relationship (r = 0.454). This mean the user willingness occurred among the workers can cause the SLA violation. According [9], the indication of the quality of Hospital Information System (HIS) depend on the type of HIS users such as physicians, laboratory technologies and other. Each of them play an important role to ensure the quality of HIS at high level and prevent the SLA breached occurred. User willingness involves with individuals to interact with the system is overall can give impact to the quality of the system. The higher of user resistance the higher rate of SLA violation happen. The employer should provide any solution to overcome with user resistance among workers. The relationship between user acceptance factor and HIS implementation also need to be considered [37].

The result also shows that there is positive relationship between SLA usage and skill or knowledge (r = 0.416). The use of system in the healthcare require a knowledge and skill to ensure the it meet the user requirements and provide a good quality of service. The use of system in the healthcare require a knowledge and skill to ensure the it meet the user requirements and provide a good quality of service. According to [17] and [18], the lack of knowledge or skill become one of the challenges for the physicians to use electronic health record system more efficiently. The interface of the system also play role to make the system user friendly. The slower the system run the low productivity of work will produced. The employee should ensure the user interface easy to understand when first look or first-time use.

The strength of the relationship between SLA usage and information sharing is r = 0.410. Each hospital has different perception or motivation to share data because the lack of consistency in the system [23]. Some of hospital would exchange the information and some do not. The unwilling sharing information from the external agency will lead to the less productivity of work. In study [24], in Ghana there is no legislation or rules for sharing data among staff through electronic health record. It is very important to provide a guideline to exchanging data to implement Electronic Health Record system.

Last but not least, the strength of the relationship between SLA usage and shortage IT staff is still at moderate level of relationship (r = 0.423). Unavailability of IT staff is common problems in hospital when implementing the electronic healthcare information system. In study [27], the unavailability of well-trained IT staff from private and public sector show the difference which stated as barrier in adaption of health technology. To overcome this barrier, the adequate training should be done before they use the hospital information system. According to study [11], the lack of well-trained medical informatics is one of barriers to adopt a health information technology. The organization should have a clear understanding of the requirement involving the knowledge of medical and IT. This will be highly cost and time consuming to this workforce.

6. Conclusion

Hospital in Malaysia growing rapidly either public or private hospital. A HIS was implemented to ensure the hospital management running smoothly. To ensure the quality of service meet user requirement, the service provider and service recipient should follow the SLA. SLA management should consider human factor while delivering services so that the organization can avoid the SLA violation. In this paper, the human factor such as user resistance, lack of skill/knowledge, refuse to share information, shortage IT staff was being investigated to see its relationship with SLA usage. The finding shows the relationship between human factor (user resistance, lack of skill/knowledge, shortage IT staff) and SLA usage have a positive significant relationship. Although it is in moderate level, the organization should consider the human factor that can lead to the SLA violation.

Credit Authorship Contribution Statement

Amir Mohamed Talib Mohamed[1]: Project administration, Validation**. Rodziah Atan[2*]:** Conceptualization, Writing – review, updating & editing, Corresponding author. **Abdulaziz Alshammari[3], Abdulaziz Alsahli[4] :** Project members, Committee members. **Nasrollah Rozami[5]** Software, Methodology, Writing – original draft.

References

[1]   G. J. Mirobi and L. Arockiam, "Service level agreement in cloud computing: An overview," in *2015 International Conference on Control, Instrumentation, Communication and Computational Technologies (ICCICCT)*, IEEE, 2015, pp. 753–758.

[2]   A. Akbari-Moghanjoughi, J. R. D. A. Amazonas, G. Santos-Boada, and J. Solé-Pareta, "Service level agreements for communication networks: A survey," *arXiv preprint arXiv:2309.07272*, 2023.

[3]   A. Andrieux *et al.*, "Web services agreement specification (WS-Agreement)," in *Open grid forum*, 2007, p. 216.

[4]   N. I. Ismail and N. H. Abdullah, "An overview of hospital information system (HIS) implementation in Malaysia," in *3rd International Conference on Business and Economic Research Proceeding*, 2012, pp. 1176–1182.

[5]   N. I. Ismail, N. H. Abdullah, and A. Shamsuddin, "Adoption of hospital information system (HIS) in Malaysian public hospitals," *Procedia-Social and Behavioral Sciences*, vol. 172, pp. 336–343, 2015.

[6]   P. Carayon, A. Xie, and S. Kianfar, "Human factors and ergonomics as a patient safety practice," *BMJ Qual Saf*, 2013.

[7]   N. F. Ab Aziz and N. A. Mohamadali, "The challenges of human factors for implementation of information systems in the healthcare," *ARPN Journal of Engineering and Applied Sciences*, vol. 10, no. 23, pp. 17914–17922, 2015.

[8]   C. C. Keong, M. F. A. Ghani, and Z. Abdullah, "Amalan komuniti pembelajaran profesional (KPP) di Sekolah Berprestasi Tinggi (SBT) Malaysia: Sebuah sekolah jenis kebangsaan Cina (SJKC) di Sarawak," *JuPiDi: Jurnal Kepimpinan Pendidikan*, vol. 3, no. 1, pp. 43–70, 2017.

[9]   P. O'Connor and A. O'Dea, "An Introduction to Human Factors for Healthcare Workers," *Medical Care Research and Review*, vol. 70, no. 4, pp. 351–379, 2021.

[10]   L. Ahmadian, R. Khajouei, S. S. Nejad, M. Ebrahimzadeh, and S. E. Nikkar, "Prioritizing barriers to successful implementation of hospital information systems," *J Med Syst*, vol. 38, pp. 1–6, 2014.

[11]   S. Nugawela and T. Sahama, "Barriers to the adoption of health information technology," in *International Conference on Innovation and Management (IAM) 2011*, 2011.

[12]   I. M. Amin, S. S. Hussein, and W. A. Isa, "Assessing user satisfaction of using hospital information system (HIS) in Malaysia," *People (Wash DC)*, vol. 12, p. 13, 2011.

[13]   Y. Chen and J. Lee, "Analysis and evaluation about the barriers of the adoption and implementation of Electronic Health Record system: A comparison study between China and Korea," in *2012 International Symposium on Information Technologies in Medicine and Education*, IEEE, 2012, pp. 828–832.

[14]   M. R. Hassibian, "Electronic health records acceptance and implementation in developing countries: challenges and barriers," *Razavi International Journal of Medicine*, vol. 1, no. 1, pp. 11–16, 2013.

[15]   Q. A. Qureshi, "DETERMINING THE USERS'WILLINGNESS TO ADOPT ELECTRONIC HEALTH RECORDS (EHR) IN DEVELOPING COUNTRIES," *Gomal University Journal of Research*, vol. 28, no. 2, pp. 140–148, 2012.

[16]   W. Hersh, A. Margolis, F. Quirós, and P. Otero, "Building a health informatics workforce in developing countries," *Health Aff*, vol. 29, no. 2, pp. 274–277, 2010.

[17]   W. C. Chao, H. Hu, C. O. L. Ung, and Y. Cai, "Benefits and challenges of electronic health record system on stakeholders: a qualitative study of outpatient physicians," *J Med Syst*, vol. 37, pp. 1–6, 2013.

[18]   R. Hassan and M. Z. M. Tajuddin, "Implementation of total hospital information system (THIS) in Malaysian public hospitals: Challenges and future prospects," *International Journal of Business and Social Research (IJBSR)*, vol. 2, no. 2, pp. 33–41, 2012.

[19]   N. A. K. S. Mohamadali and J. M. Garibaldi, "Understanding and Addressing the 'Fit'between User, Technology and Organization in Evaluating user Acceptance of Healthcare Technology.," in *HEALTHINF*, 2012, pp. 119–124.

[20]   Y. Glèlè Ahanhanzo, L. T. Ouedraogo, A. Kpozèhouen, Y. Coppieters, M. Makoutodé, and M. Wilmet-Dramaix, "Factors associated with data quality in the routine health information system of Benin," *Archives of public health*, vol. 72, no. 1, pp. 1–8, 2014.

[21]   S. Tetteh, W. C. Sheng, L. D. Yong, O. C. Narh, and O. E. Sackitey, "The impact of training and development on employees' performance (a case study of millicom ghana limited—TIGO)," *International Journal of Information Research and Review*, vol. 4, no. 1, pp. 3482–3487, 2017.

[22]   X. Gao, J. Xu, G. Sorwar, and P. Croll, "Implementation of E-health record systems and E-medical record systems in China," *The International Technology Management Review*, vol. 3, no. 2, pp. 127–139, 2013.

[23]   A. R. Miller and C. Tucker, "Health information exchange, system size and information silos," *J Health Econ*, vol. 33, pp. 28–42, 2014.

[24]   E. K. Achampong, "Electronic health record system: a survey in Ghanaian hospitals," 2012.

[25]   S. A. Hayajneh and A. A. Zaghloul, "Barriers to the adoption of health information technology in arab countries' hospitals: practitioners' perspective," in *24th International Conference of the European Federation for Medical Informatics Quality of Life through Quality of Information−MIE2012*, 2012.

[26]   K. N. Al-Gharbi, S. M. Gattoufi, A. H. Al-Badi, and A. A. Al-Hashmi, "Al-Shifa Healthcare Information System in Oman: A Debatable Implementation Success," *The Electronic Journal of Information Systems in Developing Countries*, vol. 66, no. 1, pp. 1–17, 2015.

[27]   F. Anwar and A. Shamim, "Barriers in adoption of health information technology in developing societies," *International journal of advanced computer science and Applications*, vol. 2, no. 8, 2011.

[28]   C. G. Moore, R. E. Carter, P. J. Nietert, and P. W. Stewart, "Recommendations for planning pilot studies in clinical and translational research," *Clin Transl Sci*, vol. 4, no. 5, pp. 332–337, 2011.

[29]   S. Loeb, S. Dynarski, D. McFarland, P. Morris, S. Reardon, and S. Reber, "Descriptive Analysis in Education: A Guide for Researchers. NCEE 2017-4023.," *National Center for Education Evaluation and Regional Assistance*, 2017.

[30]   L. Wu and R. Buyya, "Service level agreement (SLA) in utility computing systems," in *Performance and dependability in service computing: Concepts, techniques and research directions*, IGI global, 2012, pp. 1–25.

[31]   A. Al-Maghawry, "Effectiveness of using the brainstorming technique to learn some basic skills and collection of knowledge for beginners in volleyball," *World Journal of Sport Sciences*, vol. 6, no. 4, pp. 361–366, 2012.

[32]   M. E. Malik, R. Q. Danish, and Y. Munir, "The impact of pay and promotion on job satisfaction: Evidence from higher education institutes of Pakistan," *American journal of economics*, vol. 2, no. 4, pp. 6–9, 2012.

[33]   H. L. Wan, "Employee loyalty at the workplace: The impact of Japanese style of human resource management," *International journal of applied hrm*, vol. 3, no. 1, pp. 1–17, 2012.

[34]   E. Strukan, M. Nikolić, and S. Sefić, "IMPACT OF TRANSFORMATIONAL LEADERSHIP ON BUSINESS PERFORMANCE.," *Tehnicki vjesnik/Technical Gazette*, vol. 24, 2017.

[35]   W. Reinartz, M. Krafft, and W. D. Hoyer, "The customer relationship management process: Its measurement and impact on performance," *Journal of marketing research*, vol. 41, no. 3, pp. 293–305, 2004.

[36]   D. Jelenic, "The importance of knowledge management in Organizations–with emphasis on the balanced scorecard learning and growth Perspective," in *Management, Knowledge and Learning, International Conference*, 2011, pp. 33–43.

[37]   P. W. Handayani, A. N. Hidayanto, A. A. Pinem, P. I. Sandhyaduhita, and I. Budi, "Hospital information system user acceptance factors: User group perspectives," *Inform Health Soc Care*, vol. 43, no. 1, pp. 84–107, 2018.