

BARRIERS FOR INTEGRATION BETWEEN HOSPITALS AND THE MINISTRY OF HEALTH IN INDONESIA

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Abstract:

Integration between healthcare providers and the Ministry of Health is ultimately crucial in order to provide effective and efficient referral and reporting processes. Nevertheless, integration is not an easy task, thus it is deemed necessary to identify the barriers to provide guidance towards an integrated Indonesia Health System. Hence, this research is aimed to analyze the barriers of process integration among hospitals and between hospitals and the Ministry of Health. First, a literature review was performed to identify a set of barriers in healthcare context. Second, interview with experts was conducted to validate the barriers and third, experts filled the questionnaires in order to produce the barriers rank. The top five barriers resulted from this research are as follows: (1) Lack of skilled human resources, (2) Resistance to change, (3) Business process complexity, (4) Lack of integration knowledge, (5) Weak data security technology.

Keywords: barriers, integration, hospital information system, hospital reporting system, hospital, healthcare, Indonesia

1. INTRODUCTION

As part of Indonesia Health System implementation, the government officially launched the National Health Insurance (NHI) program in the early 2014 in order to provide full coverage for every Indonesian citizen. The program adheres to the Regulation of the Minister of Health of the Republic of Indonesia Number 001/2012 on the Referral System of Individual Health Services which defines the referral health services mechanism. In general, health services are provided by tiers. The entry point for any healthcare services is the primary care (Puskesmas), thus one must initially go to the primary care; if the primary care is incapable in providing the service, the medical staff who handles the patient will refer the patient to the secondary care and so forth.

However, the current healthcare practices in implementing the referral system in most cases show that many healthcare providers are performing redundant medical checking towards patients and that healthcare data input is still performed manually (Kemenkes RI, 2012). Thus, integration specifically on data and processes between health care providers is ultimately crucial in order to provide effective and efficient referral processes.

In order to support the policy making for improving the Indonesia Health System, the Ministry of Health would require data that are reported by hospitals. Annually, every hospital must submit report via the Hospital Information Reporting System (HIRS). The HIRS is an application which functions to collect, analyze and present Indonesian hospital data to the Ministry of Health (Regulation of the Minister of Health of the Republic of Indonesia Number 1171/MENKES/PER/VI/2011). The submitted data are subsequently used to determine Indonesia health profiles that are later utilized for policy and nation-wide decision making.

Nonetheless, this practice is still below expectation since many hospitals do not submit on time or the submitted data are not in good quality (not verified and not validated). Moreover, the duty to send the annual report is quite burdening for hospitals especially those which are not supported by Hospital Information System (HIS). Overlapping activity on collecting and processing data in every hospital unit becomes one of the major reasons of those weaknesses (Kemenkes RI, 2012). Therefore, integration between healthcare providers and the Ministry of Health is ultimately crucial in order to provide effective and efficient referral and reporting processes.

Therefore, it can be inferred that Indonesia Health System has 2 urgent integration issues, namely, the integration among hospitals as healthcare and the integration between hospitals and the Ministry of Health. Both are aimed to provide effective and efficient referral and reporting processes. This integration has been mentioned in some research as it is necessary for boosting health care quality and efficiency (Rosenbaum, M.H, Leifer, Golde, Schulte, & Margulies, 2011). Nevertheless, integration is not an easy task and thus it is deemed necessary to identify the barriers to provide guidance towards an integrated Indonesia Health System. Hence, this research is aimed to analyze the barriers of process integration between hospitals and the Ministry of Health. This paper is organized as follows: Section I Introduction; Section II Literature Review on referral system, hospital information system, barriers of integration process; Section III Methodology; Section IV Result and Analysis; Section V Discussions and Implications, and Section VI Conclusion.

2. LITERATURE REVIEW

2.1. Referral system

The Referral System is a part of Indonesia Health System that manages the delegation of tasks and responsibilities of healthcare providers on a reciprocal basis either vertically or horizontally (Regulation of the Minister of Health of Republic Indonesia Number 75/2014 regarding Community Health Center). This system had been implemented in early 2014 and is still in the early phase where healthcare organization and patient need to adapt to it. With this implementation, one must initially get healthcare service from the primary care (Puskesmas) as the 1st tier; if the primary care is incapable in providing the service, the patient will be referred to the secondary care (hospitals) as the 2nd tier and so on. This scheme is known as the vertical referral between different tiers. The other scheme is the horizontal referral where healthcare provider could refer a patient to another healthcare provider in the same tier (BPJS Kesehatan, 2014). Patient transfer to another referred healthcare provider should also be

complemented by patient profile, history and medical record. This information can be used to prevent redundant medical checking and facilitate medical personnel to treat the patient. Thus, integration of data and process among healthcare providers could ensure the availability of this information. The information needed would not have to be recorded multiple times and resulted on redundant and superfluous information.

This system has four benefits (BUK, n.d):first, since health care services of a significant number of patients would be fully provided by the primary care facilities, patients will not be highly concentrated in certain hospitals, thus prevent hospitals from being overcapacity; next, the hospital development in regional area could be planned systematically, effectively and efficiently; third, referral healthcare services will be more accessible as the healthcare referral facilities are getting closer the poor, remote and border area communities; last, referral regionalization can be employed for medical staff education, especially at the regional referral hospitals.

2.2. Hospital Information Reporting System (HIRS)

Hospital Information Reporting System is an application for collecting, analyzing and presenting Indonesian hospital data to the Ministry of Health (Regulation of the Minister of Health of the Republic of Indonesia Number 1171/MENKES/PER/VI/2011). The report consists of hospital profile and employment, healthcare services recapitulations and compilation data of the inpatients/outpatient diseases/morbidity. Hospitals are obligated to submit the report to the Ministry of Health using a predefined format. The Ministry of Health will use this information to formulate health policies for hospitals, to present hospitals information, and to control, monitor and evaluate hospitals in Indonesia.

Some hospitals was identified not being able to submit the report on time and that the information was incomplete (Diani, 2013; Simanjuntak, 2013). This is mostly because the report is still compiled manually which require the staff to collect data from related units in hospitals, e.g., using excel file. Unfortunately, most hospitals do not have sufficient human resources to perform this activity which subsequently, cause a missing deadline and incomplete information (Diani, 2013; Simanjuntak, 2013).Therefore, the idea of data and process integration between hospitals and the Ministry of Health sounds promising to support the HIRS as it can thus be performed efficiently because hospital staff will not need to spend and waste much of their time to gather and compile the requested information and furthermore, the Ministry of Health would be able to access the information automatically.

2.3. Barriers of integration in healthcare organization

Integration has already been a common technology implementation in many industries (Themistocleous & Irani, 2001). Barriers from its implementation have been studied regarding industries and technology. But, some organization face the same barriers even if they engage in different industry and implement different infrastructure. The common barrierslike resistance to change, reluctant to share, extra cost and time, shortage of employee, complexity of business process, etc. are some barriers faced by organization in integration process (Themistocleous & Irani, 2001).

Matzana and Themistocleous (2006) had studied the barriers of integration in UK hospitals.The studywas based on literature review from previous research of integration in many industries. They adopt the barriers and studied whether they also apply in healthcare organization. Result has been pointed that the barriers also apply in hospitals with some other additions based on interview. Other research conducted by Khoumbati and Themistocleous (2007) aimed to evaluate the benefit and barriers in integration by healthcare organizations, but this study was not done empirically.

These two researches focused on the barriers in implementing integration inside the organization. In this reseach, the authors would like to study the barriers in intregation among many healthcare organizations(hospitals and the Ministry of Health). As a starting point,the barriers identified from previous work would be adopted in this research. Thus, we propose some barriers of integration between hospitals and the Ministry of Health which are presented in Table 1.

This research also views the barriers from the perspective of new technology implementation acceptance. This would help to cover all aspects from organization and the individual acceptance of the integration process. Technology, organization and environment (TOE) framework is a well-known

framework to identify aspects that influence enterprise adoption related to technological innovation (Oliveira & Martins, 2011). The three aspects introduced in this framework are technological aspect, organizational aspect and environmental aspect. Technological aspect addresses any technological issue relevant to the enterprise. Organizational aspect relates to the descriptive measure about organizations such as scope, size, managerial structure, etc. In this research organizational aspect will emphasize on organization business process, culture and standard operating procedure. Environmental aspects are associated with the condition in which the organization conducts its business. This aspect could originate from the government, competitors and its industries. The organizational factor from the original TOE framework do not include financial and human resources factor. Financial factor is related to any funding from organization in implementing the integration where as human resources aspect covers the individual skill, knowledge and behaviors.

Table 1: Barriers of integration based on literature review

Aspect	Barriers	Reference
Financial	Business process and structure redesign cost	(Themistocleus & Matzana, 2006)
	Integration implementation cost	
	Additional cost and time for training	
Organizational	Lack of data/information security procedure	(Themistocleus & Matzana, 2006)
	Business process complexity	
	Opposing organizational culture	
Human Resources	Sharing data resistance	(Themistocleus & Matzana, 2006)
	Resistance to change	
	Lack of integration knowledge	
	Lack of skilled human resources	
Technology	Incompatible and complex process	(Themistocleus & Matzana, 2006)
	Weak data security technology	
	Confusing technology and integration standard	
Environment	Lack of supporting government regulation	(Khoumbati & Themistocleus, 2007)

Financial

The first three barriers are related to the cost that might be needed in implementing the integration, namely business process and structure redesign cost, integration implementation cost, and additional cost and time for employee training. Integration derived by IT can improve quality of interconnection and data accessibility, such as lower transmission cost, increase speed and availability of data (Benjamin & Morton, 1988). The improvement of interconnectivity and accessibility leads to change behavior within organization in form of structural change in process and function (Benjamin & Morton, 1988). Organization should have redesign business process and IT infrastructure to develop integrated IT and increase productivity (Benjamin & Morton, 1988; Themistocleus & Irani, 2001). Redesign business process includes combining, eliminating, and rearranging current process that resulted in changing of functional structure within organization, such as downsizing and establish new position (Benjamin & Morton, 1988). Redesign business process and structure are not simple task. Organization needed some expertise and time to redesign that cause an extra cost to execute it. Another cost would be spent on redesigning IT infrastructure. Organization needs integration implementation cost that includes expertise fee and integrated IT infrastructure procurement expenses (Themistocleus & Irani, 2001). Integration cost depends on current IT infrastructure that has been used by organization. Higher varieties of applications and its technology need more cost to integrate them (Schwinn & Winter, 2005). Successful implementation of integration technology in organization could not be separated from employees' involvement. However, sometimes organization does not have employee that has sufficient skill and experience to operate the new technology (Zakaria, Affendi, & Zakaria). Training should have given to all involved employees to adapt with new technology. Therefore, organization needs extra cost and time to train employees on integration technologies (Zhanjun, 2003).

Organizational

The next three barriers referred to organizational issue: lack of data/information security procedure, business process complexity, and opposing organizational culture. Huston (2001) states that security and confidentiality of patients' data is important (Khoumbati, Themistocleus, & Irani, 2005). Patients' data may contain sensitive information like patients' medical history, therefore establishment of

procedure and policy is necessary to control the data access (Khoumbati, Themistocleus, & Irani, 2005). Complexity of business process related to difficulty, uncertainty, and dependency of business process' activity (Schäfermeyer, Rosenkranz, & Holten, 2012). Healthcare sector is better known to have a complex business process with so many units involved. Complex business process has high variety of task and process, it's also hard to analyze and understand the process. Therefore, redesign and integrate process became difficult task (Themistocleus & Irani, 2001). Organization culture could become the obstacle in the implementation of application integration (Mantzana & Themistocleus, 2005). Organization culture is norm, value and practices that had been adhere in organization as a whole. This has resided in organization for a long time. Changing the culture that does not support the new technology implementation would not be easy as the change has to be done in organization entirely.

Human Resources

The next four barriers related to human resources issue: sharing data resistance, resistance to change, lack of integration knowledge, and lack of skilled human resources. The changing on environment because of integration makes people reluctant to change and adopt with the new technology. This behavior is one of individual's natural behavioral reactions (Lin, Lin, & Roan, 2012). People also resist sharing data because integration leads to redesign process that eliminating, and rearranging current process (Benjamin & Morton, 1988). In addition, people have notion that their role will be eliminated and they will lose control to some important process by sharing anything that they own (Themistocleus & Irani, 2001). Other issues are regarding with employees' skill and knowledge. Organization needs employee with qualified knowledge and skill to make integration success. Knowledgeable and skilled employee makes adoption of integrated technology faster. It also increases employees' awareness about the important of integration.

Technology

Barriers that fall in this category are incompatible and complex process, weak data security technology and confusing technology and integration standard. Healthcare sector is known as organization with rapid development in technology, administration and business process (Grilo, Jardim-Goncalves, Lapao, & Cruz-Machado, 2009). In addition, healthcare organizations generate intensive and huge volume of data from the healthcare providers such as hospitals, clinics, laboratory (Grimson, 2001). Because of complexity and variety of business process in healthcare sector, they are many systems that cover the processes separately. Each system could be developed in different platform, not to mention the possibility of different platform use that by different hospitals and the other healthcare providers. Varieties of platform that used to build the existing system would cause difficulties in integration process (Schwinn & Winter, 2005). Therefore, organization needs to consider existing IT application and infrastructure to makes decision on integration. It is also difficult to find standard and technology for integration because every healthcare provider has different process and infrastructure. Other issue in technology used by healthcare organizations is the data involved. Healthcare data is very sensitive because they contain of patient medical record which is a confidential data. This issue is also important to be covered because integration can makes new problem, such as security of data and information.

Environment

The last barrier related to environment factor that affected the organizational business and structure is government policy. Policy makes healthcare organization more aware of integration and can assure organization with stability (Priest, 2012). Policy can become a guideline to integration process and implementation. However policies had to be well established and can be applied by various healthcare providers.

3. METHODOLOGY

3.1. Data collecting procedure

In general, this research consists of 3 steps: step 1, literature review was conducted to identify a set of barriers for integration process in healthcare sectors; step 2, expert evaluation towards the initial set of

barriers to produce the set of barriers; lastly step 3, expert ranking towards the set of barriers to yield the barrier rank.

Literature review in step 1 was performed to find any integration barrier within the healthcare domain. In step 2, 5 experts were engaged, i.e., 3 Heads of the Hospital Information System Dept. from 3 different hospitals namely from Tangerang Regency General Hospital, Pasar Rebo Regency General Hospitals and Persahabatan Central General Hospital, 1 administrative staff of the Directorate of Referral Health Effort of the Ministry of Health, 1 executive member of the Hospital Accreditation Commission. The evaluation was conducted using structured interviews in which respondents were asked to assess each barrier factor and determine whether the factor is significant towards the data and process integration between hospitals and the Ministry of Health. Any insignificant factor was dropped if more than a half experts (3 experts) consider it would not impede the integration. Whereas, any new factor identified and proposed by the experts was added to the set. Next, in step 3, 6 experts were involved, i.e., 3 Heads of Hospital Information System Dept. from 3 hospitals in Tangerang Regency General Hospital, Pasar Rebo Regency General Hospitals and Persahabatan Central General Hospital, Head of Systems Development of the Data and Information Center of the Ministry of Health, a Health Management Information Systems Officer–WHO Country Office Indonesia, and Head of IT Division in Hospital Accreditation Commission. Questionnaires were distributed to the 6 experts. Three experts in this study are from hospitals in which Hospital Information System has been at least partially implemented. The remaining are from the Hospital Accreditation Commission, the Directorate of the Referral Health Effort and the Data and Information Center of the Ministry of Health, and the World Health Organization (Indonesia Office) who have vast and deep knowledge on health policies and regulations in Indonesia. Each expert assessed the importance level of each barrier provided by the questionnaires (Likert scale, 1-least important, 5-most important). From the questionnaire data, the rank is produced using the Entropy method.

3.2. Instruments

The second phase using structured interview, 14 statements in Bahasa Indonesia were given to the experts each represent the barriers identified from previous research. The statements were categorized by five aspects based on Table 1. For the phase, 12 of the statements still relevant with additional two statements added to the questionnaires set.

3.3. Data processing using entropy

The data processing in this research to rank the barrier is conducted using the Entropy technique to determine the weighting of each factor (criterion). The steps undertaken to perform the weighting using the Entropy methods are (Hsu & Hsu, 2008):

1. Normalizing matrix of the questionnaire result. As the given value to a criterion goes higher, the criterion becomes more important. Normalization of the matrix values given by subtracting all the criteria with the highest value.
2. The value obtained in step 1 is divided by the total value of all the criteria. The formula used is as follows:

$$a_{ij} = \frac{k_{ij}}{\sum_{i=1}^m \sum_{j=1}^n k_{ij}}$$

form $a_{ij} > 1$, $i=1, \dots, n$; $j=1, \dots, m$, where n is the number of decision-makers, and m is the number of criteria.

3. Determining the value of entropy, dispersion and the weight to each criterion. The formula being used to determine the entropy is as follows:

$$E_i = \left[\frac{-1}{\ln(n_i)} \right] \sum_{j=1}^n [a_{ij} \ln(a_{ij})]$$

Dispersion of each criterion can be calculated using the following formula:

$$D_i = 1 - E_i$$

Weighting of each criterion can be calculated using the following formula:

$$W_i = \frac{D_i}{\sum D_i}$$

4. RESULT AND ANALYSIS

As mentioned in the methodology section, this study starts with literature review to identify a set of barriers for integration process in healthcare sectors. The barriers were validated by experts resulting Table 2, the new set of barriers. A barrier were deleted from the set, business process and structure redesign cost as experts believed that it is considered to be insignificant for the integration since there would not be necessary to change the business process or organization structure. Other barriers were added to the set based on experts' opinion, namely lack of hospital operation standard, commonality of hospitals vision, top management support and lack of data standard. The experts claim that these would affect the integration process in organization. Lack of hospital operation standard and data standard would make it difficult to integrate process between units and resulting difficulties in integration between organizations. Commonality of hospital vision and other healthcare services need to be clearly defined to easing the management control and monitor the activities. They have to be stayed on track and be assured to be done according to plan and met the goals (Kaye, Kokia, Shalev, Idar, & Chinitz, 2010). Top management support had been listed as one of the critical success factor in IT project implementation (Kaye, Kokia, Shalev, Idar, & Chinitz, 2010). It includes the willingness to step in order to solve problems, willingness to invest and commit organizational resources to implementation process (Kaye, Kokia, Shalev, Idar, & Chinitz, 2010).

Table 2: Barriers of integration based on interview

Aspect	Barriers	Reference
Financial	Integration implementation cost	(Themistocleus & Matzana, 2006)
	Additional cost and time for training	
Organizational	Lack of data/information security procedure	Additional factor from experts
	Business process complexity	
	Opposing organizational culture	
	Lack of hospital operation standard	
	Lack of top management support	
	Lack of communality in vision	
Human Resources	Sharing data resistance	(Themistocleus & Matzana, 2006)
	Resistance to change	
	Lack of integration knowledge	
	Lack of skilled human resources	
Technology	Incompatible and complex process	(Khoumbati & Themistocleus, 2007)
	Weak data security technology	
	Confusing technology and integration standard	
	Lack of data standard	
Environment	Lack of supporting government regulation	(Khoumbati & Themistocleus, 2007)

4.1. Measurement with Entropy

For the third phase data processing is performed using the Entropy technique to determine the weighting of each criterion. The steps undertaken to perform the weighting using the Entropy methods are: (1) Normalize the matrix of the questionnaire result (Table 3). (2) Divide the value obtained in step1 by the total value of all the criteria. (3) Determine the value of entropy, dispersion and the weight of each criterion (Table 4)

Table 3: Normalize matrix

Barriers	N1	N2	N3	N4	N5	N6
Integration implementation cost	-1	-2	-3	-3	-2	-1
Additional cost and time for training	-3	-2	-2	-3	-2	-1
Lack of data/information security procedure	-2	-2	-2	-3	-2	-2
Business process complexity	-2	-1	0	-1	-1	-1
Opposing organizational culture	-3	-1	0	-1	0	-2
Lack of hospital operation standard	-2	-1	-2	-1	0	-1
Lack of top management support	-3	-2	-4	-1	-1	-1
Lack of communality in vision	-3	-2	-2	-1	-2	-1
Sharing data resistance	-3	-1	-2	-1	0	-1
Resistance to change	-3	-1	0	-1	0	-1
Lack of integration knowledge	-1	-2	0	-1	-1	-1
Lack of skilled human resources	-1	-1	0	-1	0	0
Incompatible and complex process	-1	-2	-1	-3	0	-1
Weak data security technology	-1	-1	-2	-1	0	-1
Confusing technology and integration standard	-1	-1	-2	-3	0	-2
Lack of data standard	0	-5	-1	-1	0	-1
Lack of supporting government regulation	0	-5	-2	-3	0	-1

This technique enabled us to rank the barriers to determine which barrier is the most important challenge to be addressed by healthcare organization when integrating their data or application. Each barrier would be rank by its weight from the calculation with entropy formula. The result can be seen in Table 4.

Table 4: Entropy, Dispersion and Weight value

Barriers	Entropy	Dispersion	Weight
Lack of skilled human resources	0.073868	0.926132	0.066653
Resistance to change	0.131452	0.868548	0.062508
Business process complexity	0.140887	0.859113	0.061829
Lack of integration knowledge	0.140887	0.859113	0.061829
Weak data security technology	0.140887	0.859113	0.061829
Opposing organizational culture	0.149226	0.850774	0.061229
Lack of data standard	0.157223	0.842778	0.060654
Lack of hospital operation standard	0.15866	0.84134	0.06055
Sharing data resistance	0.173848	0.826152	0.059457
Incompatible and complex process	0.173848	0.826152	0.059457
Confusing technology and integration standard	0.191622	0.808378	0.058178
Lack of supporting government regulation	0.207957	0.792043	0.057002
Lack of communality in vision	0.234018	0.765982	0.055127
Lack of top management support	0.244942	0.755058	0.054341
Integration implementation cost	0.249206	0.750794	0.054034
Additional cost and time for training	0.266979	0.733021	0.052755
Lack of data/information security procedure	0.269565	0.730436	0.052569

5. DISCUSSIONS AND IMPLICATIONS

The end result of the barriers' ranking is shown in Table 5. From the table, the top 5 barriers for integration between hospitals and the Ministry of Health are: (1) Lack of skilled human resources, (2) Resistance to change, (3) Business process complexity, (4) Lack of integration knowledge, (5) Weak data security technology.

It is found that the biggest hurdle in implementing data and process integration is the skills of the human resources. The people involved are both IT users and IT people who directly manage the data and process of IT integration. For hospitals this means they need to improve the skills of the human resources especially concerning IT skills. For IT users, hospitals could provide IT short course or IT support staff to guide IT user in using the technology implemented. For IT people, hospital needs to improve recruitment process and conduct IT training for them. To support this improvement the Ministry of Health could recruit people with IT capacity in some standard and assign them to the hospitals.

The second barrier is a classic hurdle in almost every case of changes in organizations, resistance to change (Themistocleous & Irani, 2001) as people are basically inert (Lin, Lin, & Roan, 2012). Hospitals and the Ministry of health could implement change management strategy to assure user awareness of the integration process. User can be involved in the integration process thus project management should accommodate users' early involvement as a part of the project. They also need to be familiar with the benefit new technology to be implemented thus the perceived of usefulness could influence user intention of use as state in technology acceptance model (TAM) theory (Davis, 1989). The Ministry of Health could help to minimize this barrier with applying strict control and monitoring process from the regulation with reward or punishment. This would force hospital to encourage its employee to accept the innovation. For example, technology practice has been written in hospital standard accreditation guideline (KARS, 2012) as one of criteria in hospital accreditation category determination. Thus follow up of the regulation need to be conducted to assure the regulation has been deploy as it intended to be.

The third barrier is complexity of the processes in hospitals. First thing to need to be done is analyzing the business process. This will be resulting business process modeling document from some different level. High level modeling to be presented for board members, and low level in more detailed technical and operating term for developer and hospital staff. Thus, this modeling have to described business process in layered level and using easily understood notation. For example, hospitals could use Design and Engineering Methodology for Organization (DEMO) methodology for modeling as it is claimed that this methodology could minimize business complexity and formulate it into models in different level (Dietz, 2006). To facilitate the integration process among hospitals and between hospitals and the Ministry of Health, it will be necessary to standardize high level business process, the Ministry of Health could take the role as the regulator to provide business process standard to be implemented in every hospital.

The fourth, lack of integration knowledge, can be dealt by asking consultants to give better insights and methodology to perform the integration as there are systematic steps to perform the implementation effectively and efficiently. The Ministry of Health could provide consultation service to hospitals including project integration and technical knowledge for integration implementation. This barrier is related to the first barrier that the solution for the first barrier could also minimize the challenge from this barrier.

The next barrier is weak data security technology. Security is important issue that has to be addressed by healthcare organization that they would store very sensitive data about patient medical record. In Indonesia, regulation regarding medical record written in the Regulation of the Minister of Health of the Republic of Indonesia Number 269/2008 on Medical Record. Procedure related to storage, extermination, confidentiality, ownership, usage, responsibility and control of medical record used in electronic means need to comply the regulation. Thus the hospitals need technical security staff. The Ministry of Health can provide similar security certification training like HealthCare Information Security and Privacy Practitioner (HCSIPP) (ISC2, n.d) for hospitals staff. This training is very expensive for hospital to send their staff to, so the Ministry of Health could conduct the training for hospitals. The Ministry of Health could train their staff in the original HCSIPP training and after that they could help to train the staff from hospitals. This would help hospital and the Ministry of Health could conduct a customized training material that applies in Indonesia.

Three of four barriers that define in to human resources issue rank in top five barriers that need to be addressed by organization. Hospitals and the Ministry of Health need to empower the human resources especially IT related skill to minimize the challenge of integration thus maximize the probability of integration success.

The other two barriers in the top five associated with health care sector characteristic. Organizational issue regarding the complexity of business process in line with healthcare organization characteristic that involve many unit and business process. Technological issue is related to data security concerning confidential data of patient medical record as a primary data in healthcare sector. The last finding is that financial and external factors is not quite important compared to human resources, organization and technology in integration among hospitals and between hospitals and Ministry of Health.

6. CONCLUSION

The top five barriers for integration between hospitals and the Ministry of Health in Indonesia are: (1) Lack of skilled human resources, (2) Resistance to change, (3) Business process complexity, (4) Lack of integration knowledge, (5) Weak data security technology. In general, hospitals and the Ministry of Health need to focus on human resources, organizational and technology, external and financial issues consecutively. Some alternatives that can be used by hospitals or the Ministry of Health to deal with these barriers are human resource's IT skills improvement, using change management strategy, hospital business process modeling in different level, acquiring consultants' assistance for better insights and methodology in implementing the integration, and implementing strong security aspect to protect data from any kind of breach with IT security certification.

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