

Leonard Barolli
Aneta Poniszewska-Maranda
Tomoya Enokido *Editors*

Complex, Intelligent and Software Intensive Systems

Proceedings of the 14th International
Conference on Complex, Intelligent
and Software Intensive Systems
(CISIS-2020)

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Tomoya Enokido
Editors

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 Springer

Editors

Leonard Barolli
Department of Information
and Communication Engineering,
Faculty of Information Engineering
Fukuoka Institute of Technology
Fukuoka, Japan

Aneta Poniszewska-Maranda
Institute of Information Technology
Lodz University of Technology
Łódź, Poland

Tomoya Enokido
Faculty of Business Administration
Rissho University
Tokyo, Japan

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Welcome Message of CISIS-2020 International Conference Organizers

Welcome to the 14th International Conference on Complex, Intelligent and Software Intensive Systems (CISIS-2020), which will be held from July 1st to July 3rd, 2020, at Lodz University of Technology, Poland, in conjunction with the 14th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2020).

The aim of the conference is to deliver a platform of scientific interaction between the three interwoven challenging areas of research and development of future ICT-enabled applications: software-intensive systems, complex systems and intelligent Systems.

Software-intensive systems are systems, which heavily interact with other systems, sensors, actuators, devices, other software systems and users. More and more domains are involved with software-intensive systems, e.g., automotive, telecommunication systems, embedded systems in general, industrial automation systems and business applications. Moreover, the outcome of web services delivers a new platform for enabling software intensive systems. The conference is thus focused on tools, practically relevant and theoretical foundations for engineering software-intensive systems.

Complex systems research is focused on the overall understanding of systems rather than its components. Complex systems are very much characterized by the changing environments in which they act by their multiple internal and external interactions. They evolve and adapt through internal and external dynamic interactions.

The development of intelligent systems and agents, which is each time more characterized by the use of ontologies and their logical foundations, builds a fruitful impulse for both software-intensive systems and complex systems. Recent research in the field of intelligent systems, robotics, neuroscience, artificial intelligence and cognitive sciences is very important factor for the future development and innovation of software-intensive and complex systems.

The CISIS-2020 is aiming at delivering a forum for in-depth scientific discussions among the three communities. The papers included in the proceedings cover all aspects of theory, design and application of complex systems, intelligent systems and software-intensive systems.

We are very proud and honored to have two distinguished keynote talks by Prof. Beniamino Di Martino, University of Campania “Luigi Vanvitelli,” Italy, and Prof. Chiba Institute of Technology, Japan, who will present their recent work and will give new insights and ideas to the conference participants.

The organization of an International Conference requires the support and help of many people. A lot of people have helped and worked hard to produce a successful CISIS-2020 technical program and conference proceedings. First, we would like to thank all the authors for submitting their papers, the Program Committee Members, and the reviewers who carried out the most difficult work by carefully evaluating the submitted papers. We are grateful to Honorary Co-chairs Prof. Makoto Takizawa, Hosei University, Japan, and Prof. Sławomir Wiak, Lodz University of Technology, Poland, for their guidance and advices.

Finally, we would like to thank Web Administrator Co-chairs and Local Arrangement Co-chairs for their excellent and timely work.

We hope you will enjoy the conference and have a great time in Lodz, Poland.

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CISIS-2020 Keynote Talks

Semantics, Patterns and Compiler Techniques for Portable App Development in Multiple Cloud and Big Data Platforms

Beniamino Di Martino

University of Campania “Luigi Vanvitelli,” Aversa, Italy

Abstract. Cloud vendor lock-in and interoperability gaps arise (among many reasons) when semantics of resources and services, and of application programming interfaces is not shared. The same issue arises with Big Data platforms: different programming, deployment and execution models, many different machine learning libraries and related APIs. Standards and techniques borrowed from SOA and semantic web services areas might help in gaining shared, machine readable description of Cloud and Big Data offerings (resources, services at platform and application level, libraries and their API groundings), thus allowing automatic discovery, matchmaking, and thus selection, brokering, interoperability end composition of Cloud services among multiple Clouds, and seamless programming of analytics on multiple Big Data platforms. This talk will illustrate in particular the outcomes of the EU funded projects mOSAIC (<http://www.mosaic-cloud.eu>) and TOREADOR (<http://www.toreador-project.eu>).

Distributed Systems of the Day for Efficient Digital Data Exchange and Sharing: A System Transition from Peer-to-Peer to Cloud-Fog-Edge Computing

Shinji Sugawara

Chiba Institute of Technology, Chiba, Japan

Abstract. With the recent increase of bandwidth for communication networks, the major improvement of computing processors and the spread of cloud computing, the exchanges or sharing of various types and huge amount of data or digital contents has become very active among a great many users on a large-scale network represented by the Internet. For this, various distributed systems have been used so far and major system architecture has been continuously changing according to the functions and purposes required at each time period. In this talk, we describe the historical changes and classifications of distributed systems used for searching, exchanging, storing and sharing data deployed on networks and their respective advantages. We introduce examples of actually implemented systems. Furthermore, we discuss the possibility of future development of distributed systems for data sharing.

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The Role of Organizational Communication and Organizational Learning to Human Resources Performance Through Knowledge Sharing

Siti Sumiati(✉) and Khoirun Nikmah

Sultan Agung Islamic Hospital,
Semarang, Central Java, Indonesia

sitisumiati@unissula.ac.id, khoirunnaimah22@gmail.com

Abstract. The problem in this study is the inaccuracy of nurses' performance at Sultan Agung Islamic Hospital, Semarang. The purpose of this study is to describe and analyze the influence of organizational communication and organizational learning on the performance of human resources by sharing knowledge as an intervening variable. The population of this study used 100 nurses as samples who used the Purposive Random Sampling technique assisted by SPSS 16.0 software. Research ratio data obtained from questionnaires and interviews. The results of this study are organizational communication and organizational learning have a positive and significant effect on knowledge sharing. Organizational communication and organizational learning have a positive and significant influence on the performance of human resources. Knowledge sharing is not able to be an intervening variable between organizational communication and nurse performance. However, Knowledge Sharing is able to be an intervening variable between organizational learning and nurse performance.

Keywords: Organizational communication · Organizational learning · Knowledge sharing · Human resource performance

1 Introduction

The AFTA (Asian Free Trade Area) issues and globalization are related to high competitiveness in providing superior services in exploiting market opportunities for the hospital industry in Indonesia. The performance of nurses is not an easy task, it requires expertise in accordance with the competency standards of Indonesian nurses. Performance is a combination of behaviour and work results of employees in completing their duties and responsibilities in a job [14]. Efforts to improve human resource performance must be based on a pattern of human resource behaviour that is directed towards achieving established corporate goals [18].

Sultan Agung Islamic Hospital Semarang is an Islamic hospital in the city of Semarang that becomes the first Islamic hospital in Indonesia. The results of field surveys related to the attitude of health services to patients are still not optimal. This was

indicated by the existence of patient complaints on the performance of nurses in Sultan Agung Islamic Hospital Semarang in 2016–2017. For example, the attitude of nurses who are less friendly, less responsive, less polite and less competent in serving patients. This shows that the service quality of the Sultan Agung Islamic Hospital Semarang is still not optimal.

There is another aspect that supports optimal performance of employees, namely organizational communication. Communication that is well-established and effective in the organization becomes a means to improve employee performance [5]. Knowledge becomes the main source in achieving competitive advantage in organizations [2]. The learning process becomes very important in knowledge management because through this process, it is hoped that ideas, innovations and new knowledge will emerge.

Another important factor in improving employee performance is knowledge sharing [17]. The knowledge sharing among employees will get new knowledge and also improve their knowledge. The goal is to support expertise that can make performance better. Organizational communication has an important role in improving knowledge sharing [5]. That is because through communication, human resource can share knowledge with co-workers in an organization [6]. An organization needs the ability to manage and develop knowledge to improve the quality of human resources in an organization [3, 10]. Knowledge management becomes appropriate support for organizations to increase competitiveness between organizations engaged in the same field.

2 Literature Review

2.1 Organizational Communication

Organizational communication is the process of delivering messages, increasing mutual relations of understanding among employees, encouraging work morale, increasing job satisfaction, and hoping to be able to improve HR performance [8, 9, 19]. Organizational communication is considered as sending messages and receiving members of the organization to achieve organizational goals. The purpose of organizational communication is operated through organizational communication networks [11]. There are four indicators that determine the existence of good organizational communication, namely clear instructions, openness in communication, frequency of communication, and the presence of feedback.

Thus, organizational communication is the process of exchanging information both externally and internally which is carried out between two or more people in it so that feedback occurs between them aims to achieve organizational goals. Employees can carry out their work properly if they receive the quantity and quality of information needed accordingly. Some previous researchers found a positive relationship between communication and human resource performance. Organizational communication, in this case, is needed as a means of developing understanding or knowledge with other people who might need it. The conducive communication climate in the organization is the most important condition for success in knowledge sharing. Therefore, the hypothesis proposed in this study is:

H1: The more effective organizational communication, the higher the human resources performance.

H3: The more effective organizational communication, the higher the level of knowledge sharing.

2.2 Organizational Learning

Organizational learning is a learning process that influences the relationship between a system and a rapidly changing environment in an organization [15]. Organizational learning is considered as intellectual enhancement and productive ability gained through commitment and opportunity for continuous improvement of an organization [7]. So, organizational learning is the learning process of all members of the organization in increasing intellectual and sustainable productive abilities in order to create organizational goals.

Organizational learning is where an organization supports learning activities related to various changes and new knowledge [12]. This is proof that organizational learning has a positive and significant influence on human resource performance. Organizational learning accompanied by knowledge sharing will produce new knowledge that is very useful in an organization. The existence of learning that is obtained in the form of knowledge or ideas in the individual then the knowledge and ideas are shared with others, it will produce innovations that are useful for the progress of the organization. Organizational learning has a significant effect on knowledge sharing. Some previous researchers that have researched organizational learning on knowledge sharing concluded that organizational learning has a positive effect on knowledge sharing, so the hypothesis in this study is:

H2: The better organizational learning, the higher the human resources performance.

H4: The better Organizational Learning, the higher the Knowledge Sharing.

2.3 Knowledge Sharing

Knowledge sharing is the individual behaviour in disseminating and sharing knowledge with others in an organization [15, 16]. The existence of knowledge sharing enables the creation of ideas or innovations that will support the sustainability of the organization and increase sales value so that people in organization can compete with other organizations. There are two indicators in Knowledge Sharing, namely knowledge donating and knowledge collecting. So, knowledge sharing is an activity of sharing information, knowledge, and skills that are useful for others in order to advance an organization.

Knowledge is very important for every human resource in carrying out the tasks assigned by an organization. These activities include sharing experiences and knowledge. It can actually help individuals in solving work problems based on existing experience [1]. Likewise, from knowledge sharing, individuals will get more knowledge on work to improve the effectiveness and efficiency of work processes. The increase in knowledge sharing activities will have an effect on increasing individual performance. This shows positive relationship between knowledge sharing and human resource performance, besides knowledge sharing has a significant influence on human resource performance. Therefore, the hypothesis proposed in this study is:

H5: The Higher Level of Knowledge Sharing, the Higher the Human Resources Performance.

2.4 Human Resources Performance

Work performance refers to work of an employee during a certain time period [2, 13]. HR performance is the work performance or work results of employees based on their roles and responsibilities within the organization in certain fields [14, 16]. Employees must be able to meet the standards of organizational requirements and have agreed upon. There are three indicators that become references in determining employee performance, namely Work Quality, Work Quantity, and Timeliness.

2.5 Islamic Human Resource Performance

Simply, performance is a comparison between job performance and job standards. Islam is a religion that emphasizes trustworthiness and *mujahadah* (i.e. fight earnestly according to Islam) which certainly has great attention in terms of people performance. The Islamic human resources performance is an achievement obtained by someone in working and trying to follow Islamic principles. High performance must be in accordance with Islamic rules and values [4]. There are two indicators that are used in Islamic human resource performance variables, namely the intention to work because of Allah SWT and to apply Islamic rules in a proper manner at work. Therefore, Islamic human resource performance shows that HR performance is not only from the quantity or quality produced, but also there are dimensions that high performance must be in accordance with Islamic rules and values.

3 Methodology

The population of the study were 523 nurses at Sultan Agung Hospital in Semarang. Samples used in this study were 100 nurses, with the technique of determining the sample used was purposive sampling with predetermined criteria namely nurses who had worked for 5 years at Sultan Agung Hospital and at least had passed D3 level of education. In this study, data collection technique used 2 ways, namely by field research to obtain primary data and library research to obtain secondary data. Data analysis tool used to measure the influence of organizational communication and organizational learning on HR performance with knowledge sharing as an intervening variable by using SPSS 16.0 software.

Table 1. Nurse performance assessment in 2017

No	Assessment criteria	Value	Frequency	General performance (min 80%)	Frequency	Special performance (min 76%)	Frequency	Islamic performance (min 90%)
1	Very Good	91–100	517	98,85%	29	5,55%	121	23,14%
2	Good	76–90.99	6	1.15%	483	92,35%	146	27,91%
3	Moderate	60–75.99	0	0,00%	10	1,91%	130	24,86%
4	Deficient	<60	0	0,00%	1	0.19%	126	24,09%
	Total		523	100%	523	100%	523	100%

Source: Personnel of RSI Sultan Agung, 2018. Data processed and modified by Author.

4 Results

Based on the results of testing the field research data, it shows that the research data in this study was declared valid and reliable. The data in this study also showed that there were no symptoms of multicollinearity which meant that there was no high correlation in the three regression models of this study. The research data that also carried out heteroscedasticity testing showed that the three regression models of this study did not occur heteroscedasticity and normal so that the models were used for forecasting (estimation). This data also has passed the normality test so that the data of this study can be further tested. It is described in the table below (Table 2):

Table 2. The results of multiple linear regression

Dependent Variable	Independent Variable	Coef. of Beta	t-count	Sign.	Result
Model I					
Knowledge sharing (Y1)	Organizational Communication (X1)	0.219	2.114	0.037	H1: Positive and Sign.
	Organizational Learning (X2)	0.622	6.008	0.000	H2: Positive and Sign.
Regression I: X1, X2 → Y1		R Square : 0,659		Adj. R Square : 0,652	
Model II					
HR performance (Y2)	Organizational Communication (X1)	0.190	2.133	0.036	H3: Positive and Sign.
	Organizational Learning (X2)	0.222	2.181	0.032	H4: Positive and Sign.
	Knowledge sharing (Y1)	0.524	6.141	0.000	H5: Positive and Sign.
Regression II: X1, X2, Y1 → Y2		R Square : 0,761		Adj. R Square : 0,754	

Source: Primary data processed, 2019.

Based on Table 2, we find the following multiple linear regression equation:

Equation of model 1: $Y1 = 0,219 X1 + 0,622 X2 + e$

Equation of model 2: $Y2 = 0,190 X1 + 0,222 X2 + 0,524 Y1 + e$

Table 3. The results of path analysis

Effects of organizational communication (X1) towards nurse performance (Y2) through knowledge sharing (Y1)		Effect of organizational learning (X2) on nurse performance (Y2) through knowledge sharing (Y1)	
P1	$P3 \times P5$	P2	$P4 \times P5$
0,190	$0,219 \times 0,524 = 0,115$	0,222	$0,622 \times 0,524 = 0,326$
Total Influence: $P1 + (P3 \times P5) = 0,305$		Total Influence: $P2 + (P4 \times P5) = 0,548$	
$P1 > P2 \times P4$ <i>Knowledge Sharing (Y1) is not able to be an intervening variable</i>		$P2 < P3 \times P5$ <i>Knowledge Sharing (Y1) is able to be an Intervening variable</i>	

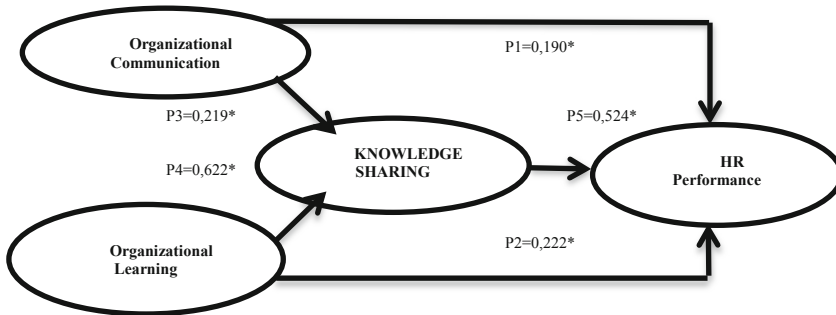


Fig. 1. Path analysis

5 Discussion

Based on the research results, organizational communication variable has a positive influence on HR Performance. It shows that if organizational communication is well established within the organization, it will improve HR performance. Good organizational communication will be achieved if the leader gives clear instructions about the implementation of tasks related to job description. For example, the job description for the Executing Nurse provides clinical action, plans for each patient’s action and monitors nurse’s performance. The research results, organizational learning variable has a positive influence on HR Performance. If organizational learning is more effective or better, HR performance will increase. Organizational learning will be achieved effectively if in the organization there are personal skills of nurses who can complete their tasks properly, such as the task related to service to patients and in increasing the knowledge or abilities of nurses at Sultan Agung Islamic Hospital. Organizations that support learning are able to achieve better performance improvements.

Based on the research results, organizational learning variable has a positive effect on knowledge sharing. This means that the higher the awareness of the company in

increasing learning capacity for HR, it will increase the high level of HR to share knowledge. HR will share knowledge if supported by the values that exist in the organization, such as the presence of personal expertise characterized by the individual skills of the members of the organization.

Based on the results of research, Organizational Communication variable has a positive influence on HR performance. This can be interpreted that the better organizational communication, it will improve HR performance. Organizational communication will be effective and good if there are clear instructions in communicating. It aims to facilitate HR in gathering knowledge or information through seminars or workshops. The results of research, knowledge sharing variable has a positive influence on HR performance. It can be interpreted that the higher the knowledge sharing of employees has a broad opportunity to express their opinions, ideas, criticisms, and comments to other members, so that it will improve HR performance. Knowledge sharing is not able to be an intervening variable between organizational communication and nurse performance. However, Knowledge Sharing is able to be an intervening variable between organizational learning and nurse performance.

6 Conclusion

Based on the results of research that has been done, it can be concluded that the five hypotheses that exist in this study stated that there is a positive and significant influence among variables. Knowledge sharing is not able to be an intervening variable in this research. The management of Sultan Agung Islamic Hospital needs to conduct an evaluation by inviting subordinates to have regular discussions with fellow teams in completing work so that good communication is established. In addition, the Sultan Agung Islamic Hospital must be more active in making human resources eager to learn about the organization and make HR more motivated to work at Sultan Agung Islamic Hospital. Preferably, the Sultan Agung Islamic Hospital would often invite HR to share or exchange experiences among fellow human resources so that they can provide good solutions in improving HR performance.

This study also experienced limitations regarding specific supporting journals related to the relationship between organizational learning on knowledge sharing. For future researchers, it is recommended to expand the population or even take different populations so that the sample used is more than the previous sample so that the results of the research can be more specific and more interesting. Research on the same topic, which is about organizational learning, requires careful research. Researchers must distinguish clearly between organizational learning and learning organization, because both have significant conceptual differences which used different research instruments.

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