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Leonard Barolli
Hiroyoshi Miwa *Editors*

Advances in Intelligent Networking and Collaborative Systems

The 14th International Conference on Intelligent Networking and Collaborative Systems (INCoS-2022)

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Editors

Advances in Intelligent Networking and Collaborative Systems

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Welcome Message from the INCoS-2022 Organizing Committee

Welcome to the 14th International Conference on Intelligent Networking and Collaborative Systems (INCoS-2022), which is held from September 7 to September 9, 2022.

INCoS is a multidisciplinary conference that covers the latest advances in intelligent social networks and collaborative systems, intelligent networking systems, mobile collaborative systems, secure intelligent cloud systems, etc. Additionally, the conference addresses security, authentication, privacy, data trust and user trustworthiness behavior, which have become crosscutting features of intelligent collaborative systems. With the fast development of the Internet, we are experiencing a shift from the traditional sharing of information and applications as the main purpose of the networking systems to an emergent paradigm, which locates people at the very center of networks and exploits the value of people's connections, relations and collaborations. Social networks are playing a major role as one of the drivers in the dynamics and structure of intelligent networking and collaborative systems.

Virtual campuses, virtual communities and organizations strongly leverage intelligent networking and collaborative systems by a great variety of formal and informal electronic relations, such as business-to-business, peer-to-peer and many types of online collaborative learning interactions, including the virtual campuses and eLearning systems. Altogether, this has resulted in entangled systems that need to be managed efficiently and in an autonomous way. In addition, the conjunction of the latest and powerful technologies based on Cloud, mobile and wireless infrastructures is currently bringing new dimensions of collaborative and networking applications a great deal by facing new issues and challenges.

The aim of this conference is to stimulate research that will lead to the creation of responsive environments for networking and the development of adaptive, secure, mobile and intuitive intelligent systems for collaborative work and learning.

The successful organization of the conference is achieved thanks to the great collaboration and hard work of many people and conference supporters. First, we would like to thank all the authors for their continued support to the conference by submitting their research work to the conference, for their presentations and

discussions during the conference days. We would like to thank PC Co-Chairs, Track Co-chairs, TPC Members and External Reviewers for their work by carefully evaluating the submissions and providing constructive feedback to authors.

We would like to acknowledge the excellent work and support by the International Advisory Committee and our gratitude and acknowledgment for the conference keynotes for their interesting and inspiring keynote speeches.

We greatly appreciate the support by Web Administrator Co-Chairs. We are very grateful to Springer as well as several academic institutions for their endorsement and assistance.

Finally, we hope that you will find these proceedings to be a valuable resource in your professional, research and educational activities.

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INCoS-2022 Keynote Talks

Fundamental Model of Online User Dynamics Based on a Causal Framework

Masaki Aida

Tokyo Metropolitan University, Tokyo, Japan

User dynamics in online social networks have come to have a great impact not only on online society but also on real life. Therefore, understanding online user dynamics is an important issue. Of course, it is difficult to understand all of the complex online user dynamics, but it may be possible to describe their characteristics in a particular way. This talk introduces an attempt to give a mathematical model of online user dynamics based on a causal framework in which the mutual influences working between users are propagated at finite speeds via an online social network. This model can theoretically explain various phenomena including the intensity of user dynamics diverges, such as online flaming phenomena, and the phenomenon that information propagation is restricted only within a specific community, such as polarization.

Big Data Analytics on COVID-19 Epidemiological Data

Carson K. Leung

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In the current era of big data, high volume of big data can be generated and collected from a wide variety of rich data sources at a rapid rate. Embedded in these big data are useful information and valuable knowledge. Examples include healthcare and epidemiological data such as data related to patients who suffered from viral diseases like the coronavirus disease 2019 (COVID-19). Knowledge discovered from these epidemiological data via data science helps researchers, epidemiologists, and policymakers to get a better understanding of the disease, which may inspire them to come up with ways to detect, control and combat the disease. This talk presents big data analytics solutions for analyzing COVID-19 epidemiological data. The solutions help users to get a better understanding of information about COVID-19 cases. Evaluation on real-life COVID-19 data across Canadian provinces shows the benefits of big data analytics in discovering useful knowledge from COVID-19 epidemiological data.

Contents

Partnership Quality as a Strategy to Improve Partnership Performance: A Case Study of BPJS Healthcare in Indonesia

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Abstract. The main aim of this study is to investigate and examine the role of partnership quality in mediating the relationship between communication quality and partnership performance in Islamic hospital industry partnering with *BPJS* healthcare (*Badan Penyelenggara Jaminan Sosial Kesehatan*). The sample consists of 88 leaders from 45 Islamic hospitals in Central Java. Data was obtained by distributing questionnaires to the respondents, which were then analyzed using PLS-SEM assisted with the Smart PLS software. The results demonstrate that communication quality has an effect on partnership quality but has no effect on partnership performance. This study also demonstrates that partnership quality has an effect on partnership performance and mediates the relationship between communication quality and partnership performance. Islamic hospitals can enhance the role of partnership quality as a mediator in that relationship. It means for Islamic hospitals to increase partnership performance, the improvement in communication quality must first produce partnership quality.

Keywords: Partnership quality · Communication quality · Partnership performance · *BPJS* healthcare

1 Introduction

Partnership theory describes many types of relationships in various circumstances and locations. In [2], the author defines partnerships as dynamic relationships between diverse actors which are based on mutually agreed goals and pursued through a common understanding of labor's division. Such partnerships are based on the comparative advantages of each partner. The benefits of partnerships include better availability of resources, increased organizational effectiveness and efficiency, and greater legitimacy [1]. For companies to develop their business, they cannot rely only on their own resources, but need to partner with other parties. Partnerships can involve various sectors such as community groups, government institutions, and private parties.

In [1], the author suggests that despites the advantages, there are also many disadvantages of working through partnerships. They include unclear goals, significant resource costs, unequal power, usurping power by groups, impacts on key services, different philosophies among partners, as well as organizational issues. Therefore, to build solid

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partnerships, communication among the partnering parties plays crucial role. This is in accordance with a study conducted by [3], which shows a positive relationship between communication quality and performance in virtual teams. It is also in line with research by [4] which argues that communication quality has a positive influence and significant impact on partnership performance. The results of both studies, however, are contrary to one conducted by [5], which suggests that the quality of communication has no effect on organizational performance. Moreover, conflicting results are also found in studies investigating the relationships between partnership and organizational performance. A study conducted by [6], for an example, concluded that the principle of partnership has a positive relationship with organizational performance. A study by [7], however, demonstrates that the practice of partnership does not have a significant relationship with organizational performance.

One of institutions that realizes the essential benefits of partnerships is *BPJS* healthcare. *BPJS* (Social Security Administering Body) for healthcare is an institution established by the Indonesian government to improve people's welfare. In running its business, *BPJS* healthcare cooperates with several partners, including Islamic hospitals. The partnership between *BPJS* healthcare and hospitals has been initiated since the launching of *BPJS* healthcare on January 1st, 2014. Despite many complaints from partnering hospitals, these partnerships are considered to bring many benefits. For example, *BPJS* healthcare has a system that can monitor the performance of doctors and hospitals. The system, however, can create a conflict of interest if the parties are not willing to implement the partnership rules. To achieve good partnership performance in the health care industry, therefore, each partner needs to involve in realizing the objectives of the partnership.

Based on the phenomenon in the health care industry's partnerships and the inconsistency of research findings on how to improve partnership performance, it is interesting to investigate how the partnership between hospitals and *BPJS* healthcare has been existing until recently. More specifically, this study proposes the partnership quality variable to overcome the research gap. It is expected that by improving partnership quality, the performance of partnership between *BPJS* healthcare and Islamic hospitals will increase, allowing the improvement of public health standards to be realized immediately.

Following introduction section, a review of previous literatures related to variables of interests: partnership quality, communication quality, and partnership performance, are discussed. For each variable, the review begins with explaining definitions proposed by scholars, followed by a discussion of prior studies which is also used as the basis to develop hypothesis. The next section is research method that will explain in more detail samples and procedures, instruments, and data analysis technique. After presenting the finding of this study, the discussion section is provided, followed by the conclusion section.

2 Literature Review

2.1 Partnership Quality

The sustainability of the partnership between the organization and its partners is largely determined by the quality of the partnership. This quality can be seen from the extent

to which the results of the partnership fulfill the partner's expectations. Partners can work together to make mutually beneficial joint decisions, share business benefits and risks, understand each other's business, and fulfill mutually agreed promises [8–10]. The quality of the partnership has an influence on the long-term stability of the relationship between clients and suppliers [11]. In accordance with this opinion, in [7], the author states that partnership quality is the extent to which the delivered results are in line with the expectations of the partners.

2.2 Communication Quality

Communication quality is defined as the degree to which members of a group perceive the flow of communication to be adequate, timely, accurate, complete, and credible [12]. Meanwhile, [13] suggests that the quality of communication is the extent to which the content of the communication is accepted and understood by other parties in that relationship. Consistent with the arguments, [3] defines communication quality as the extent to which communication content is transferred between actual teams.

In Islam, communication as marketing activity should always be based on the spirit of worshiping Allah. Marketing activities should be carried out as an effort to achieve mutual prosperity and not for temporary, group, or self-interests [14]. Communication between partnering parties, if carried out continuously, openly, two-way, honestly (*qaulan sadida*), and accurately, will create partnership quality.

Several studies on partnership quality show that partnership quality is influenced by communication quality. In their research, [7] concludes that partnership quality is positively influenced by communication quality. It is believed that a higher quality of communication will improve the quality of the partnership. In addition, the results of research by [15] also succeeded in proving the positive effect of communication quality on partnership quality.

The quality of communication in relationships between customers and suppliers is a factor that affects the level of relationship between the two parties. A study by [16] further supports the positive relationship between communication quality and relationship quality. The better the quality of communication that occurs between partners, the greater the quality of the partnership. Based on this argument, the following hypothesis is proposed:

H1: The better the communication quality, the greater the partnership quality.

2.3 Partnership Performance

Partnership performance is related to the measurement and assessment of the actual achievements of partner management based on the agreed program and relationship objectives [17]. Meanwhile, according to [18], partnership performance is related to increasing the operational efficiency of companies that build partnerships. [19] describe the organizational performance as a management procedure through which employees are encouraged to work harder to achieve business operating goals, including financial performance (for example, total revenue, profit after tax, and return on investment) and non-financial performance (for example, market share, company image, customer satisfaction, and job satisfaction).

In [10], the authors conducted a study of the range of buyer-supplier partnership quality with supply chain performance. The results show that the buyer-supplier partnership quality has a positive and significant impact on supply chain performance. Meanwhile, [9] conducted a study on partnership quality and firm performance, with the results of the study showing that partnership quality was able to improve performance. Other study on partnership quality was conducted by [7] examining the partnership model between recipients and providers of information system outsourcing partnerships. The results of the study prove that there is a positive relationship between partnership quality and the success of outsourcing partnerships. In line with previous research, [20] conducted a study related to partnership quality and the continuity of partnership relationships. His study demonstrates that increasing partnership quality results in a significant increase in the continuity of partnership relationships. Meanwhile, [21] examined the determinants of outsourcing partnership quality in Chinese companies, and their research shows that partnership quality has a relationship with outsourcing success. Their study supports a research by [22]. Based on this description, it is concluded that the higher the quality of the partnership, the higher the performance of the company's partnership. Therefore, hypothesis 2 is proposed as follows:

H2: The higher partnership quality, the higher the partnership performance.

Partnership performance is the result obtained as a result of partnering with other parties. Apart from being influenced by partnership quality, partnership performance is also influenced by communication quality. A study conducted by [3] concludes that there is a positive relationship between communication quality and performance in virtual teams. This result is in line with the research of [4], which demonstrates that communication quality has a positive and significant influence on partnership performance. Communication between the two partnering parties will be able to improve partnership performance. On the basis of this, the following hypothesis is proposed:

H3: The better communication quality, the higher the partnership performance.

3 Research Method

3.1 Samples and Procedures

The sample in this study was the leaders of Islamic hospitals partnered with *BPJS* healthcare in Central Java. The number of respondents is 88 leaders from 45 Islamic hospitals. Data was collected by distributing questionnaires to selected respondents. The respondents come from Islamic hospitals with type B (11.1%), type C (31.1%), and type D (57.8%). The positions of most respondents are directors and managers (57.8%). Most of the respondents, i.e. 64%, came from Islamic hospitals, which have established a partnership with *BPJS* healthcare since 2014 (since the inception of *BPJS* healthcare).

3.2 Instruments

Three variables are used in this study, namely communication quality, partnership quality, and partnership performance.

Communication quality, as an independent variable, is communication between Islamic hospitals and *BPJS* healthcare, which implies the extent to which the content of the communication is received and understood. Communication quality consists of 5 (five) indicators, they are; continuous interaction, open communication, two-way communication/feedback, honesty of communication/*qaulan sadida,* and accuracy of information. These indicators are adapted from [5, 14, 23, 24].

Partnership quality is a coalition that implies the extent to which the partnership relationship between Islamic hospitals and *BPJS* healthcare has value. This study uses 4 (four) dimensions as indicators, namely: making decisions with partners; understanding partner activities; sharing business benefits/risks, and fulfilling promises to partners [8].

Partnership performance is the result obtained by Islamic hospitals as a result of partnering with *BPJS* healthcare. The indicators in this study consist of 6 (six) dimensions, including revenue level, sales growth, customer service, humanitarian benefits, creating partnership relationships, and partner managerial development [18, 23, 25].

3.3 Data Analysis Techniques

Data analysis in this study used Partial Least Squares-Structural Equation Modeling (PLS-SEM) assisted with the Smart PLS software package version 3.0.

4 Findings

4.1 Validity and Reliability Test

All the indicators used in the study have met convergent validity because each has a loading value above 0.6. All constructs have met the reliable requirements because they have an AVE value of more than 0.5, a Composite Reliability value of more than 0.70, and a Cronbach's Alpha value of more than 0.70.

Table 1. The results of hypothesis testing

	Original sample	T statistics	P values
Communication quality - > partnership quality	0.619	7,149	0.000
Partnership quality - > partnership performance	0.546	3,174	0.002
Communication quality - > partnership performance	0.248	1,294	0.196
Communication quality - > partnership quality - > partnership performance	0.338	3,287	0.001

Table 1 and Fig. 1, show the significant and positive direct effect between communication quality and partnership quality (original sample 0.619, p-value < 0.01), partnership quality and partnership performance (original sample 0.546, p-value < 0.01), and

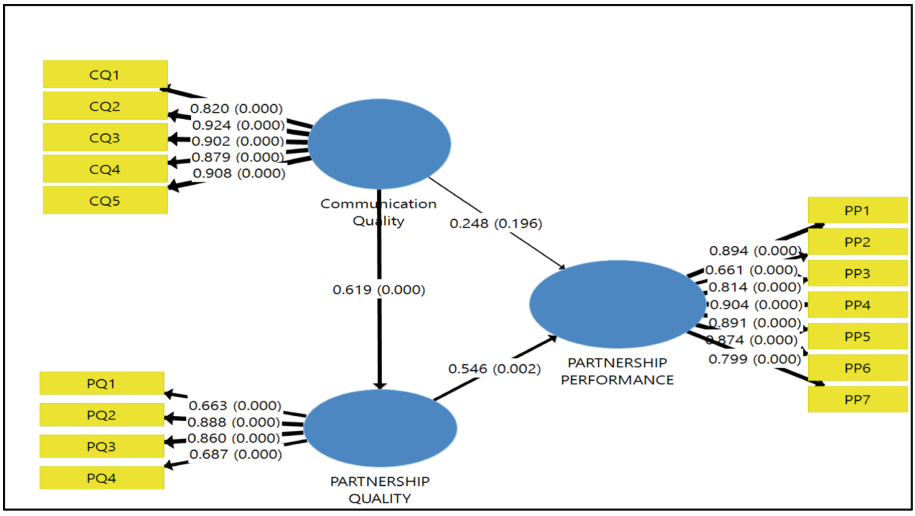

Fig. 1. The results of data analysis

communication quality and partnership performance (original sample 0.248, p-value > 0.01). Thus, H1 and H2 are accepted, while H3 is rejected.

Table 1 shows the role of partnership quality in the relationship between communication quality and partnership performance (original sample 0.338, p-value < 0.01). These results indicate that partnership quality is able to act as a mediating variable between communication quality and partnership performance.

5 Discussions

The first hypothesis in this study is that the better the communication quality, the greater the partnership quality. This hypothesis has been empirically tested and proven. Testing the first hypothesis, which accepts the argument that high communication quality will affect the level of partnership quality, indicates that communication quality, which is unique in Islamic hospitals, is one of the determining factors in enhancing partnership quality. The results of this study support a causal relationship between communication quality and partnership quality as stated by [7] that partnership quality is positively influenced by communication quality. It is also consistent with the results of Lin's research (2014), which successfully proves that communication quality has a positive effect on partnership quality and is in accordance with research by [26], which concludes that communication affects the outcome of public-nonprofit partnerships.

The second hypothesis in this study is that the higher the partnership quality, the higher the partnership performance. This hypothesis has been empirically tested and proven. This means that the increase in partnership performance can be built on partnership quality. These findings confirm the results of the research of [7, 9, 10, 20–22].

Companies partnering with other companies can improve partnership performance directly by increasing partnership quality. In partnership relationship between *BPJS*

healthcare and Islamic hospitals, partnership quality can be improved by both parties making joint decisions. The decision is not made unilaterally and top-down by *BPJS* healthcare, but it is made by *BPJS* healthcare together with the partnering Hospital providing mutual benefits. Partnership quality can also be improved through each partnering party understanding each other's activities and conditions, sharing benefits, and fulfilling each other's promises as stated in the partnership agreement.

6 Conclusions

Hospitals can increase the role of partnership quality as a mediator in the relationship between communication quality and partnership performance. To achieve better partnership performance, improvement in communication quality must first produce partnership quality. Then, through partnership quality, the hospitals can improve partnership performance. Improved partnership performance can be demonstrated by increased hospital admissions, an increase in the number of hospital patients, better quality of hospital services, improved humanitarian benefits, stronger partnership relationship with *BPJS* healthcare, increased obedience to God, and improved managerial development for hospitals partnering with *BPJS* healthcare.

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