

# Value Co-Creation by Customer-to-Customer Communication: Social Media and Face-to-Face for Case of Airline Service Selection

Santi Novani, Kyoichi Kijima

Department of Value and Decision Science, Tokyo Institute of Technology, Tokyo, Japan.

Email: {santi, kijima}@valdes.titech.ac.jp

Received January 11<sup>th</sup>, 2012; revised February 11<sup>th</sup>, 2012; accepted February 28<sup>th</sup>, 2012

## ABSTRACT

One of the foundational of service science and of study of value-creation in service systems is service-dominant logic (S-D logic). S-D logic especially emphasizes the role of customers; that is, each customer is recognized as an active co-creator of knowledge and service value. Most studies on the value co-creation process have concentrated on the interaction between customers and providers. In contrast, this research is investigating co-creation of value and the notion of “value in use” that is central to the service-dominant logic by focusing on value co-creation from the customer perspective, especially in terms of how customers are engaging in experiences by clarifying what different influences are produced by their exchange of information about the providers. The basic framework of the present research is a process model of value co-creation of service system, *i.e.*, co-experience and co-definition. The main purpose is to investigate how new value is co-created by mutual interaction among customers by using Airline service selection as a typical case to clarify influences on the value co-creation process produced by different ways of customer-to-customer communication: social media and face-to-face communication. By agent-based simulation we compare learning efficiency and learning performance of the two communication styles of the customers. Learning efficiency is measured by the distance between the average payoff of the customers and that of the provider, while learning performance is measured by the average payoff obtained from Nash Equilibrium by the game played with the provider. The simulation results found that communication style influences the learning efficiency by customers as well as the learning performance. Social media is a good way when few customers know the provider correctly or have limited knowledge of the community, while face-to-face is a good way when quite a many customers know the provider correctly or trust on reputation of the provider in the community. The research results indicate that it is crucial for the provider, to establish trust with the customers.

**Keywords:** Value Co-Creation; Co-Experience; Co-Definition; Customer-to-Customer Communication; Social Media; Face-to-Face; Agent-Based Simulation

## 1. Introduction

Nowadays the economies of the world are shifting from agriculture and manufacturing to services. Service can be defined as the application of competences for the benefit of another, meaning that service is a kind of action, performance, or promise that is exchanged for value between customer and provider [1]. Because of growth of service activity across industries is widely recognized, the concept of service is increasingly important to many fields [2]. The field of service research now covers a wide range of subjects. Indeed, a more integrated approach is needed.

Service science, Management and Engineering (SSME), or, in short, Service Science is emerging as a distinct field to look for a deeper level of knowledge integration

[3]. Ten foundational concepts of service science [4,5] state that service science begins with description of entities, interaction, outcomes and aims to illuminate mechanism that explains the evolution of value co-creation interaction.

Service science is the study of service systems and value co-creation within complex constellations of integrated resources [6,7]. Therefore, value and value co-creation are critical to understanding the dynamics of service systems and to furthering service science [8].

Value is co-created by reciprocal and mutually beneficial relationship. One of the foundational of service science and of the study of value-creation in service systems is service-dominant logic (S-D logic) [5,7]. Service-dominant logic especially emphasizes the role of customers;

that is, each customer is recognized as an active co-creator of knowledge and service value [7].

A deep understanding of customer needs (including the customer's own business model and allied processes) will be required [9].

So far, most studies on the value co-creation process have concentrated on the interaction between customers and providers. In contrast, this research is investigating the co-creation of value and the notion of "value-in-use" that is central to the service-dominant logic by focusing on value co-creation from the customer perspective, especially in terms of how customers are engaging in experiences by clarifying what different influences are produced on the value co-creation process by different ways of customer-to-customer (C2C) communication and their exchange of information about the providers.

The basic framework of the present research is a process model of value co-creation of service system [10] as portrayed by **Figure 1**.

The model identifies four phases in the value co-creation process. In order to create new service value, customers and providers first co-experience the service process and then co-define a shared internal model through mutual understanding among them. In order to improve and/or innovate service value, its co-elevation and co-development by the both sides is critical.

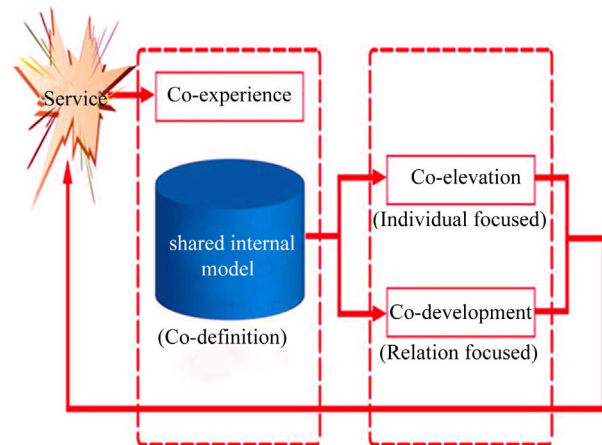
Co-experience and co-definition is carried out in a relatively short time, while co-elevation and co-development takes relatively longer time. The present research in particular focuses on the first two phases of this model.

Through co-experience, customers and providers, who may have different internal model at first, by mutual understanding about the service with each other, share and co-define a common internal model. Interaction among the customers is often effective to understand providers' internal model.

Customers also actively seek advice from other customers, using the latest technology social media or face-to-face, on what hotel to stay in, what music to download, what pub to frequent prior to a sporting event, etc. How many of us have decided against booking in a flight on the basis of previous guest comments in "Trip Advisor"? How many providers really know how to manage their service offer in the light of increased customer information via C2C communication?

Airline service selection is one of such typical examples. Selection would depend on your purpose, say, business trip, visit to family or backpack travel, as well as the price, service level, route and flexibility. You may try to understand reputation of Airlines by interacting with other people by, say, using the latest technology social media or face-to-face communication.

The purpose of the present research is to investigate



**Figure 1.** Process model of value co-creation of service system [10].

how new value is co-created by mutual interaction among customers by using Airline service selection as a typical case to clarify influences on the value co-creation process produced by different ways of customer-to-customer communication: social media and face-to-face communication.

We take Indonesian Airline (Garuda Indonesia) as a case and conduct an agent-based simulation by using qualitative and quantitative research. By agent-based simulation we compare learning efficiency and learning performance of the two communication styles of the customers.

The structure of this paper is as follows: in Section 2, we define customer-to-customer communication in Airline Service selection. In Section 3 we propose research question and methodology such as qualitative and quantitative approach by interviewing the Airline service provider in Indonesia. In Section 4 conducts agent-based simulation based on the previous preparation. Finally we discuss conclusion and further research in Section 5.

## 2. Customer-to-Customer Communication: Airline Service Selection

Our focus of this paper is on customer-to-customer communication, towards a greater understanding of the customer role in the co-creation of value which should have a significant impact on customer experience and indirectly on what customers learn about Airline service provider.

We classify customer-to-customer communication into two styles, *i.e.*, social media and face-to-face communication.

### 2.1. Social Media Communication

Social media communication is for social interaction, using highly accessible and scalable communication tech-

niques. Social media encompasses a wide range of online, word-of-mouth forums including blogs, company sponsored discussion boards and chat rooms, customer-to-customer e-mail, customer product or service ratings websites and forums, Internet discussion boards and forums, blogs (sites containing digital audio, images, movies, or photographs) and social networking websites [11].

Some Airlines are using social media sites such as Twitter, Facebook, YouTube and Flickr while others are blogging. These all are great ways to get the customers online community involved. Customers may get motivated to travel and to talk about the Airlines and what they love and what they hate.

Facebook is an excellent way to engage customers. For example, Garuda Indonesia is doing it well. Facebook makes it easy to build relationships not only with other customers, but also with the Airline themselves.

Many people are traveling with family or traveling to visit them. By using Flickr, customers are making memories and counting on every moment of their excursion to be part of it. JetBlue has a nice Flickr Group. In the group there are already 3777 items including photos and videos [12]. Members of this Flickr group can comment on photos each other and encourage each other to build relationship. The members appear to be customers, fans and employees of JetBlue.

Twitter has become a popular customer service social networking tool among airlines [13]. In fact, it has become so widely used that Eezeer's data lab (service that creates statistical sets of information about Twitter usage and travel brands) in partnership with Simpli Flying began publishing the "Airlines Monthly Twitter Report" info graphic in March 2011.

## 2.2. Face-to-Face Communication

Face-to-face communication is conversation on face-to-face basis via verbal communication. Face-to-face remains as the most powerful human interaction and never replaces intimacy and immediacy of people conversing in the same room [14-17].

Face-to-face communication is often faster, easier, more convenient and efficient than social media communication [14,18]. In Airline service, customers sometimes may need face-to-face communication to learn about Airlines even nowadays.

## 3. Research Question and Methodology

To clarify influences on the value co-creation process produced by different ways of customer-to-customer communication, we will propose the following two research questions.

RQ1: Comparing social media and face-to-face com-

munication, which communication is preferred by customers as an *efficient* way in Airline Service selection?

RQ2: Comparing social media and face-to-face communication, which communication is preferred by customers for *learning performance* of their knowledge?

We investigate RQ1 and RQ2 by validating hypothesis H1 and H2, and H3 and H4, respectively.

H1: Social media communication is an efficient way if customers have limited knowledge about the provider.

H2: Face-to-face communication is an efficient way if customers trust on reputation of the provider.

H3: Social media communication is more preferred for learning performance if customers have limited knowledge about the provider.

H4: Face-to-face communication is more preferred for learning performance if customers trust on reputation of the provider.

We implement the situation where customers have limited knowledge by setting that only one customer knows the provider correctly in your face-to-face community. We, on the other hand, say that customers trust on reputation of the provider, if quite a many customer know the provider correctly in your face-to-face community.

We examine the hypotheses by conducting agent-based simulation with different parameters. On the other hand, learning efficiency is measured by the distance between the average of internal models of the customers and the internal model of the provider. On the other hand, we measure the performance by the average payoff of the customers obtained from Nash Equilibrium of the game played with the provider.

### 3.1. Qualitative Research: In-Depth Interview

We take Garuda Indonesia as our case, since this Airline considers service is a key performance indicator for its operational activities. The concept of this Airline allows customers to experience Indonesia as its best.

We did in-depth interviews with the Vice President of Strategic Marketing of Garuda Indonesia Airline. The interviews were conducted with an average duration of 30 to 45 minutes per session. All conversations during the interview were recorded by a voice recorder and later transcribed for analysis.

They call their service "New Experience" and define it a new service concept for them. From the time of making flight reservation until arrival at a destination airport, they are pampered with a caring and friendly service based on Indonesian hospitality, as symbolized in our new standard greetings and touch points.

They have concept of Indonesian hospitality which is translated into service that delight the five senses, that is:

1) Sight: They combine natural colors and traditional motif of Indonesia to reflect the visual beauty of the coun-

try.

2) Scent: The smell of an exotic traditional scent from aromatic flowers and herb is appreciated.

3) Sound: Indonesian traditional music and musical instruments are used to reflect many diverse ethnic groups.

4) Taste: Taste of Indonesian traditional food and beverage known as the land of spices and veritable garden of tropical fruits is appreciated.

5) Touch: A warm gesture of welcome and a touch of the famous Indonesian hospitality is also a key.

Based on the interview, we recognize Garuda provide two types of service orientation, that is, *high-oriented service and price-oriented service*.

1) *High-oriented service*

It is defined as top class service (full service), which is provided by the Garuda to guarantee “just in time”, reliability, quality, frequent flyer programs and comfort.

2) *Price-oriented service*

It is defined as service offered by low fare and low cost Airlines, such as Citi link, that is, no entertainment, no flight meal, etc.

In the interview, the Vice President showed interest in how customers learn by sharing their experience from other customers through the interaction. Customer experience is a journey that a customer takes along a series of touch points: they become aware of a brand, consider what’s on offer, make enquiries, make a purchase and use the service.

**3.2. Quantitative Research: Model Construction**

Based on the interviews, we develop formal models for analyzing Airline Service selection problem. In this research we use adaptive learning of hypergame and simulation approach.

**3.2.1. Formulation of Mutual Understanding:**

**Hypergame**

We collect data of customer’s behavior based on questionnaires, assuming each customer has different value system; in other words, he/she has a subjective internal model (mental model). Then, we use hypergame [19] as a framework, where a subjective game is represented by an internal model to describe mutual understanding process of customers and providers very naturally.

For example, a customer who has low expectation, he/she thinks it is all right the Airline is just to be able to take off, fly to his/her destination and land safely. A customer who has middle expectation, he/she expects to be treated courteously by all Airline personnel. And for high expectation customer, the Airline should give customer superior services like superior food, Internet connection, and multimedia.

We represent customer *i*'s internal model by **Figure**

**2.** In **Figure 2**,  $S_i$  denotes the set of strategies for *i*, where *L*, *M* and *H* represent the level of customer’s expectation, *i.e.*, low, middle and high expectation, respectively.  $S_{ji}$  denotes the set of strategies that customer *i* believe provider *j*, Garuda Indonesia, possesses. *H* and *L* in  $S_{ji}$  express high-oriented and price-oriented service, respectively.

Based on the interviews results, we assume Garuda Indonesia is a high-oriented service provider and construct the internal model as **Figure 3**.

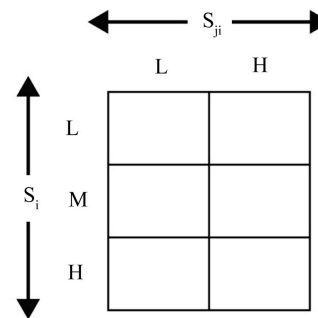
**Figure 3** shows the provider, Garuda Indonesia, believes that customers have three expectation levels, *i.e.*, low expectation (*L*), middle expectation (*M*) and high expectation (*H*). It also describes the provider has two strategies, *i.e.*, high-oriented service (*H*) and price-oriented service (*L*). The payoff of **Figure 3** shows that Garuda Indonesia is a high-oriented service provider.

**3.2.2. Adaptive Learning of Hypergame**

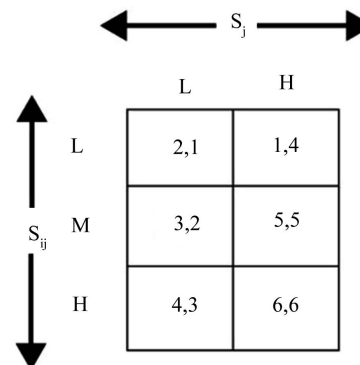
In this section, we introduce an adaptive learning model of hypergame to describe how customers are improving their knowledge through the interaction among them.

By the repetitive revisions, the internal model is getting dominated by the internal model that has the highest performance in payoff. We adopt the learning procedures by using genetic algorithm [20].

Genetic algorithm is suitable because it provides a me-



**Figure 2. Internal model of customer.**



**Figure 3. Internal model of Garuda Indonesia.**

thod to reorganize knowledge according to the experience and to improve the performance [21]. In the adaptive learning model, customers use the learning procedure, in which they consider experiences so far, select actions and modify current population of internal models.

We describe the adaptation process of the customers as follows:

- For each customer  $i \in C$ , let us denote the subjective game (or internal model) at the  $t^{th}$  iteration by  $M_i^t$ .
- At the initial condition, customers' internal model will be generated randomly.
- At iteration, each customer  $i \in C$  uses his/her internal model to play with provider. Therefore, there are  $n$  interactions between the two parties at iteration; where  $n$  is the number of the customers.
- By considering the information, customer  $i$  evaluates and revises the internal model from  $M_i^t$  to  $M_i^{t+1}$  for the  $(t + 1)^{th}$  iteration.
- Customers interact among themselves to get some information about the provider.
- Each customer chooses an action based on his/her rule and his/her internal model or information about the others responses so far.
- By repeating interactions and revisions again and again, the population may be dominated by a better internal model.
- A better internal model is defined as one getting a higher performance for the customers when Nash equilibrium is implemented.
- As a result of learning, customers may share a common internal model.

Figure 4 illustrates a flowchart of the procedure.

#### 4. Agent-Based Simulation Analysis

We now conduct an agent-based simulation based on the preparation above. We call iteration of the simulation procedure as generation. The entire set of generations is called a run.

For the purpose of this research, we assume two types of communities in which all the customers communicate each other in the same style.

##### 1) Social media community

In this community, all the customers communicate each other randomly by social media. We may assume diversity of the communication partners is relatively high so that it is reasonable to suppose that all the internal models are heterogeneous. In this case, the population is so large (we assume 1000 customers) that we can reasonably assume at least one customer identifies the provider's reputation correctly.

##### 2) Face-to-face community

In this community, all the customers communicate on face-to-face basis with their family, relatives and/or fri-

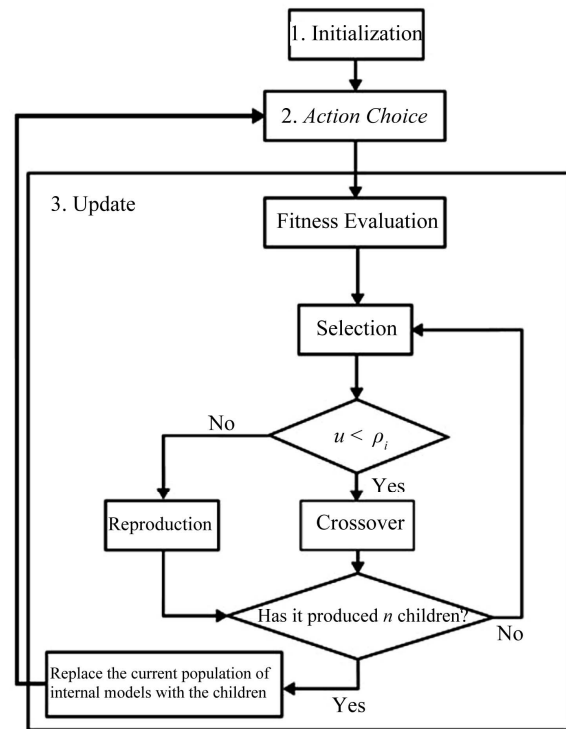


Figure 4. Activities of the learning procedure [22].

ends by verbal communication. We may assume diversity of the communication partners is relatively low so that it is reasonable to suppose that all the internal models are quite similar to each other.

We classify face-to-face community into two cases:

##### 1) Face-to-face 1;

At least one of the customers in the community knows correctly about the provider. The situations include two cases where only one customer knows the provider correctly and quite many customers know the provider.

##### 2) Face-to-face 2;

No customers in the community know the provider correctly.

#### 4.1. Parameters for the Simulation

The parameters for the simulations of the adaptation process are portrayed by Table 1, which is based on the results of pre-simulation.

We define the threshold as a limit point of distance between the internal model of customer and that of provider to measure similarity between them. That is, if the distance is less than the threshold, we may say these matrixes are similar.

#### 4.2. Simulation Results

##### 4.2.1. RQ1: Learning Efficiency

H1: Social media communication is an efficient way if cus-

**Table 1. Definition of parameters.**

Parameters	Numbers
Number of customers in social media community	1000
Number of customers in face-to-face 1 community	50
Number of customers in face-to-face 2 community	50
Maximum generations number	100
Maximum runs number	100
Probability of Crossover	0.7
Threshold	4 and 8

tomers have limited knowledge about the provider.

We now investigate which communication style is efficient for customers in Airline Service selection. The learning efficiency is measured by the distance between the average payoff of the customers and that of the provider.

To examine this hypothesis, we first consider the case only one customer knows the provider correctly in the face-to-face community. Then we generate randomly customers who know the provider correctly in social media community.

By analyzing distance between the average of customers' internal model and that of the provider, then social media communication can approaches to zero faster rather than face-to-face communication as portrayed by **Figure 5**.

**Figure 5** shows that social media communication is an efficient way; if only one customer knows the provider correctly in the face-to-face community, then random interaction by social media is a good way to learn from other customers.

By conducting a simulation setting the threshold as 8, then we have a similar result, *i.e.*, social media communication is an efficient way.

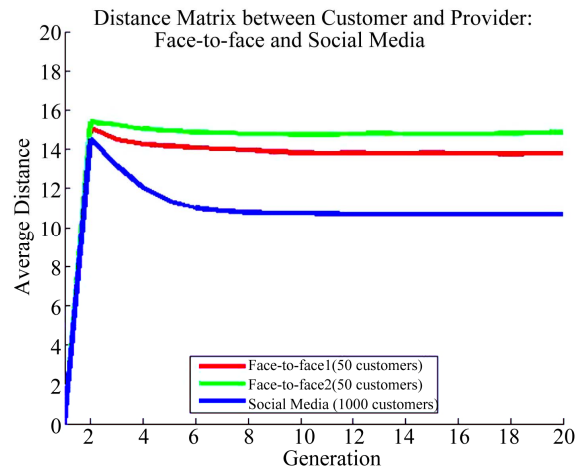
*H2: Face-to-face communication is an efficient way if customers trust on reputation of the provider.*

To examine this hypothesis, we consider a case where quite a many customers know the provider correctly depending on the percentage in the face-to-face community. In this simulation we set the percentage is 20%, 50% and 80%.

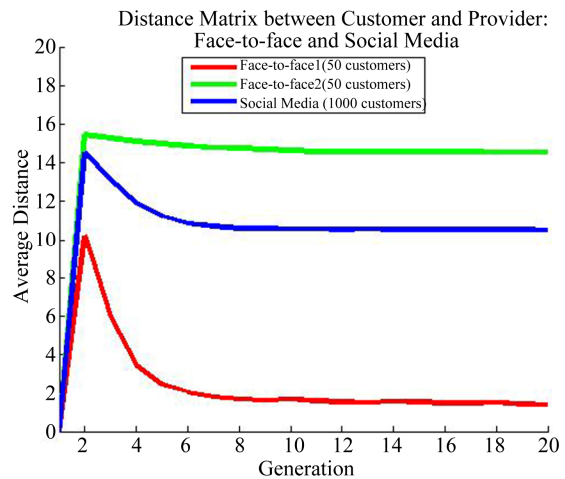
We also generate randomly customers who know the provider correctly in social media community.

Based on the simulation result, face-to-face communication can approaches to zero as portrayed, as **Figures 6-8** shows.

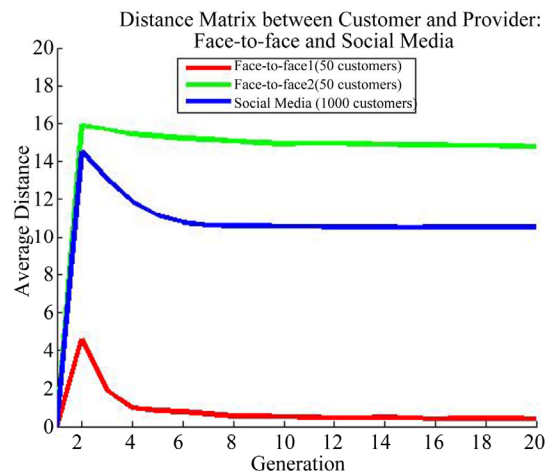
All the simulation results show that face-to-face communication is an efficient way when quite a many customers know the provider correctly in face-to-face community. The more customers know the provider correctly, the faster the distance can approach to zero. The simula-



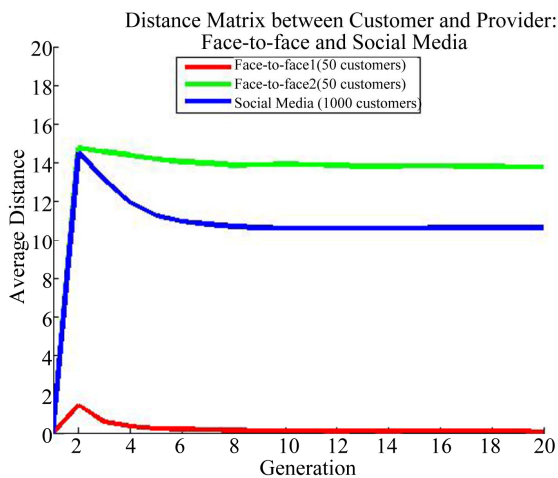
**Figure 5. Learning efficiency (only one customer knows the provider correctly and threshold is 4).**



**Figure 6. Learning efficiency (the number of customers know the provider correctly is 20% and threshold is 4).**



**Figure 7. Learning efficiency (the number of customers know the provider correctly is 50% and threshold is 4).**



**Figure 8. Learning efficiency (the number of customers know the provider correctly is 80% and threshold is 4).**

tion results (green line) show the worst if no customer know the provider correctly in face-to-face community.

We conduct another simulation by assuming threshold is 8 and the result is similar, *i.e.*, face-to-face communication is efficient.

#### 4.2.2. RQ2: Learning Performance

Our second research question is which communication style is preferred by customers for learning performance of their knowledge.

*H3: Social media communication is more preferred for learning performance if customers have limited knowledge about the provider.*

To examine this hypothesis, we first consider the case where only one customer knows the provider correctly in face-to-face community. Then, we generate randomly customers who know the provider correctly in social media community.

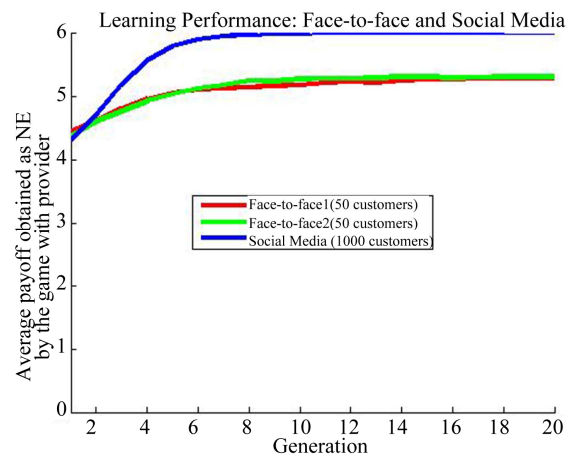
We measure the learning performance by the average payoff obtained from Nash Equilibrium by the game played with the provider.

When we assume customers have limited knowledge and the threshold is 4, then social media communication can achieve higher performance as portrayed **Figure 9**.

We conduct another simulation by setting the threshold as 8 and the result is similar, *i.e.*, social media communication is the best way.

*H4: Face-to-face communication is more preferred for learning performance if customers trust on reputation of the provider.*

To examine this hypothesis, we consider a case where quite a many customers know the provider correctly depending on the percentage in the face-to-face community. In this simulation we set the percentage is 20%, 50% and 80%.



**Figure 9. Learning performance (only one customer knows the provider correctly and threshold is 4).**

We also generate randomly number of customers knows the provider correctly in social media community. Face-to-face communication show higher performance especially in the early stage as **Figures 10-12** shows.

From all the simulation results indicate that face-to-face communication is better if quite a many of customers know the provider correctly. The more customers know the provider correctly in your community, the faster they achieve the highest payoff.

All the simulation results show the worst (the green line) if no customers know the provider correctly in face-to-face community. It means we need to adopt face-to-face communication under circumstance that at least one customer knows correctly the provider in our community.

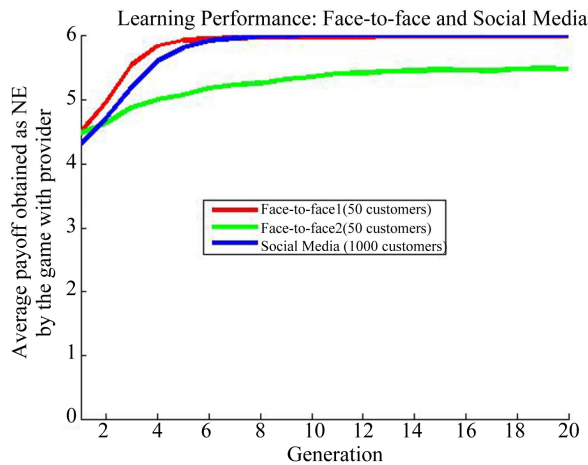
We conduct another simulation by assuming threshold is 8 and the result is similar, *i.e.*, face-to-face communication is better.

The simulations have verified the hypotheses H1 to H4. Many researchers have argued that interaction among customers may affect their evaluation of service experience [23]. Our results here certainly support the claim as far as the assumptions are valid.

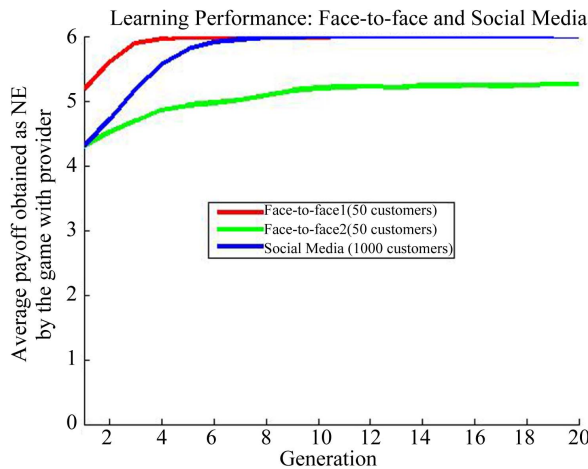
Our research found that communication style influences the learning efficiency by the customers as well as the learning performance. Social media and face-to-face communication is frequently used by customers to know about provider, and the research results indicate that it is crucial for the provider to establish trust with the customers.

## 5. Conclusions

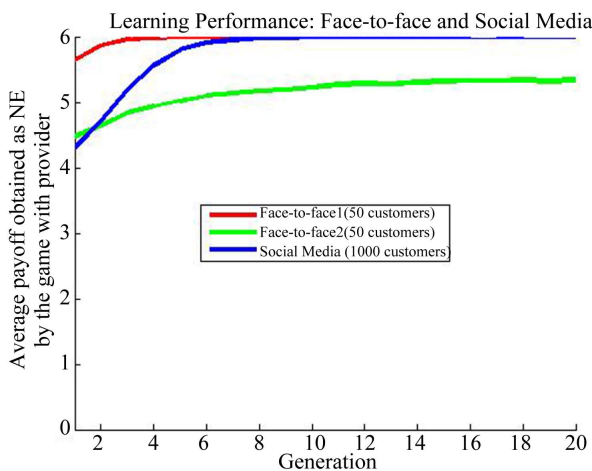
In this paper we investigated how new value is co-created by different ways of customer-to-customer communication, *i.e.*, social media and face-to-face. We took the Indo-



**Figure 10. Learning performance (the number of customers know the provider correctly is 20% and threshold is 4).**



**Figure 11. Learning performance (the number of customers know the provider correctly is 50% and threshold is 4).**



**Figure 12. Learning performance (the number of customers know the provider correctly is 80% and threshold is 4).**

nesian Airline (Garuda Indonesia) as a case and conducted an agent-based simulation for qualitative and quantitative research.

Most of the previous research of customer-to-customer communication has adopted statistical approach. A trans-disciplinary approach is required to understand customer perspectives of experiences in service systems.

This research conducts agent-based simulation to simulate a “would-be world” in which customers interact with each other, so that we can observe the process how customers interact with each other and identify C2C effects by proposing different ways of communication among them. Therefore this research creates a methodology to model of social interaction, *i.e.*, customer-to-customer communication in service system process.

Based on our findings, we discussed the communication styles of customer-to-customer communication from the view points of learning efficiency and learning performance. We measure the learning efficiency by the distance between the average payoff of the customers and that of the provider. While the learning performance is measured by the average payoff obtained from Nash Equilibrium by the game played with the provider.

Social media communication is a good way when few customers know the provider correctly or have limited knowledge about the provider in our community. We found that, when just only one customer knows the provider correctly in your community, *social media communication* is a good way to learn from other customers.

Through communication using social media, knowledge is accumulated from observation of partner behavior within the focal relationship and from reported reputation in other relationships [5].

On the other hand, face-to-face communication is a good way when quite a many customers know the provider correctly or trust on reputation of provider in our community.

If quite a many customers have similarity in your community then customers will be easier to communicate by verbal on face-to-face. The customers’ trust is needed for this communication. When reputation effects are strong, initial interactions may be merely an opportunity to confirm or disconfirm prior perceptions.

Our findings have produced moderate evidence in favor of conceptualizing styles of customer-to-customer communication. We believe that this work provides an impetus for more research on emotional aspects of customer-to-customer communication and mutual understanding between customer and provider.

The Indonesian Airline has introduced social media communication with their customers by using Facebook. The Airline can promote the travel fair, promo; introduce new service like “Garuda Indonesia Experience”, “Ga-



ruda Aromatic Fragrance” and “Sound of Indonesia” as a value co-creation with customers.

## REFERENCES

- [1] R. F. Lusch and S. L. Vargo, “The Service-Dominant Logic of Marketing: Reactions, Reflections, and Refinements,” *Marketing Theory*, Vol. 6, No. 3, 2006, pp. 281-288. [doi:10.1177/1470593106066781](https://doi.org/10.1177/1470593106066781)
- [2] H. Chesbrough, “Toward a Science of Services,” *Harvard Business Review*, Vol. 83, No. 2, 2005, pp. 16-17.
- [3] IfM and IBM, “Succeeding through Service Innovation: A Service Perspective for Education, Research, Business and Government,” University of Cambridge Institute for Manufacturing, Cambridge, 2008.
- [4] P. P. Maglio and J. Spohrer, “Fundamentals of Service Science,” *Journal of the Academy of Marketing Science*, Vol. 36, No. 1, 2008, pp. 18-20. [doi:10.1007/s11747-007-0058-9](https://doi.org/10.1007/s11747-007-0058-9)
- [5] J. Spohrer and P. P. Maglio, “The Emergence of Service Science: Toward Systematic Service Innovations to Accelerate Co-Creation of Value,” *Production and Operations Management*, Vol. 17, No. 3, 2008, pp. 1-9. [doi:10.3401/poms.1080.0027](https://doi.org/10.3401/poms.1080.0027)
- [6] J. Spohrer, P. P. Maglio, J. Bailey and D. Gruhl, “Steps toward a Science of Service Systems,” *Computer*, Vol. 40, No. 1, 2007, pp. 71-77. [doi:10.1109/MC.2007.33](https://doi.org/10.1109/MC.2007.33)
- [7] J. Spohrer, S. L. Vargo, N. Caswell and P. P. Maglio, “The Service System Is the Basic Abstraction of Service Science,” *Proceedings of the 41st Annual Hawaii International Conference on System Science*, Hawaii, 7-10 January 2008, p. 104.
- [8] S. Vargo and R. Lusch, “Service-Dominant Logic: Continuing the Evolution,” *Journal of the Academic, Marketing and Science*, Vol. 36, No. 1, 2008, pp. 1-10. [doi:10.1007/s11747-007-0069-6](https://doi.org/10.1007/s11747-007-0069-6)
- [9] H. Chesbrough and J. Spohrer, “A Research Manifesto for Services Science,” *Communications of the ACM*, Vol. 49, No. 7, 2006, pp. 35-40. [doi:10.1145/1139922.1139945](https://doi.org/10.1145/1139922.1139945)
- [10] J. Galbrun and K. Kijima, “A Co-Evolutionary Perspective in Medical Technology: Clinical Innovation Systems in Europe and in Japan,” *Asian Journal of Technology Innovation*, Vol. 17, No. 2, 2009, pp. 195-216. [doi:10.1080/19761597.2009.9668679](https://doi.org/10.1080/19761597.2009.9668679)
- [11] L. Zailskaitė-Jakštė and R. Kuvykaitė, “Internet Based Communication with Target Audience: Case Study of Higher Education Institutions,” *Economic and Management, Ekonometrika*, 2010.
- [12] S. Albert, “How Airlines Are Using Social Media,” 2008. <http://www.dirjournal.com/articles/airlines-social-media/>
- [13] Michael, “Part 2: Airlines’ Social Media Success Stories,” 2011. <http://www.socialstrategy1.com/2011/04/28/part-2-airline-social-media-success-stories/>
- [14] R. Barkhi, V. Jacob and H. Pirkul, “An Experimental Analysis of Face to Face versus Computer Mediated Communication Channels,” *Group Decision and Negotiation*, Vol. 8, No. 4, 1999, pp. 325-347. [doi:10.1023/A:1008621423120](https://doi.org/10.1023/A:1008621423120)
- [15] K. A. Begley, “Face-to-Face Communication: Making Human Connections Intechology-Driven World,” Thompson Place, Boston, 2004.
- [16] SCM, “Building a Two-Way Dialogue at Deloitte,” *Strategic Communication Management*, Vol. 12, No. 2, 2008, p. 6.
- [17] H. Van der Meijden and S. Veenman, “Face-to-Face versus Computer-Mediated Communication in a Primary School Setting,” *Computers in Human Behavior*, Vol. 21, No. 5, 2005, pp. 831-859. [doi:10.1016/j.chb.2003.10.005](https://doi.org/10.1016/j.chb.2003.10.005)
- [18] Y.-J. An and T. Frick, “Student Perceptions of Asynchronous Computer-Mediated Communication in Face-to-Face Courses,” *Journal of Computer-Mediated Communication*, Vol. 11, No. 2, 2006, pp. 485-499. [doi:10.1111/j.1083-6101.2006.00023.x](https://doi.org/10.1111/j.1083-6101.2006.00023.x)
- [19] K. Kijima, “Intelligent Poly-Agent Learning Model and its Application,” *Information and Systems Engineering*, Vol. 2, No. 1, 1996, pp. 47-61.
- [20] D. E. Goldberg, “Genetic Algorithms in Search, Optimization and Machine Learning,” Addison-Wesley, New York, 1989
- [21] H. Dawid, “Genetic Algorithms as a Model of Adaptive Learning in Economic Systems,” Springer, Berlin, 1996
- [22] U. S. Putro, K. Kijima and S. Takahashi, “Adaptive Learning of Hypergame Situations by Using Genetic Algorithm,” *IEEE Transactions on Systems, Man, and Cybernetics*, Vol. 30, No. 5, 2000, pp. 562-572. [doi:10.1109/3468.867863](https://doi.org/10.1109/3468.867863)
- [23] S. J. Grove and R. P. Fisk, “The Impact of Other Customers on Service Experiences: A Critical Incident Examination of ‘Getting Along’,” *Journal of Retailing*, Vol. 73, No. 1, 1997, pp. 63-85.