An integrative fuzzy Kansei engineering and Kano model for logistics services

To cite this article: M Hartono et al 2017 IOP Conf. Ser.: Mater. Sci. Eng. 273 012027

View the article online for updates and enhancements.

Related content
- Logistics Management: New trends in the Reverse Logistics
  A Antonyová, P Antony and B Soewito
- Preliminary Study on Kano Model in the Conceptual Design Activities for Product Lifecycle Improvement
  Mohd Fahrul Hassan, M.R.A. Rahman, A.M.T. Arifin et al.
- Developing Baby Bag Design by Using Kansei Engineering Method
  D Janari and A Rakhmawati
An integrative fuzzy Kansei engineering and Kano model for logistics services

M Hartono¹, T K Chuan², D N Prayogo¹ and A Santoso¹

¹Department of Industrial Engineering, University of Surabaya, Raya Kalirungkut, Surabaya 60293, Indonesia
²Department of Industrial & Systems Engineering, National University of Singapore

E-mail: markus@staff.ubaya.ac.id

Abstract. Nowadays, customer emotional needs (known as Kansei) in product and especially in services become a major concern. One of the emerging services is the logistics services. In obtaining a global competitive advantage, logistics services should understand and satisfy their customer affective impressions (Kansei). How to capture, model and analyze the customer emotions has been well structured by Kansei Engineering, equipped with Kano model to strengthen its methodology. However, its methodology lacks of the dynamics of customer perception. More specifically, there is a criticism of perceived scores on user preferences, in both perceived service quality and Kansei response, whether they represent an exact numerical value. Thus, this paper is proposed to discuss an approach of fuzzy Kansei in logistics service experiences. A case study in IT-based logistics services involving 100 subjects has been conducted. Its findings including the service gaps accompanied with prioritized improvement initiatives are discussed.

Keywords: Kansei engineering; fuzzy; logistics services

1. Introduction

Research on Kansei Engineering (KE) is of high interest due to the increase of customer expectation in terms of emotional needs and satisfaction. Its application in services becomes more and more critical since many service companies provide offerings with almost the same quality, price and delivery service. Surely, it makes confusion to customers in deciding which product or service they need to choose and buy. Hence, it needs something to differentiate and superior among all provided criteria. One of the most prominent considerations in making successful transaction is the emotional satisfaction and impression (known as Kansei, in Japanese) [1]. According to Hartono & Raharjo [2], both cognitive and affective satisfaction (known as Kansei and Chisei) are important in service-related encounters. In other words, it can be said that cognitive requirement should be fulfilled first, and then it moves to the realization of Kansei.

KE has been proven as one of the most powerful ergonomics-based products and also development methodologies, incorporating emotional needs. According to Hartono [3, 4], with regard to service application, it covers but not limited to general KE methodology, SERVQUAL and Kano model embedded [1–3, 5, 6], cultures [3, 6], TRIZ (TeoriyaResheniyaIzobretatelskikhZadach) methodology [3, 4], and sustainability approach [4, 7].
In judging whether a particular service is emotionally appealing or not, customer delight is regarded as the most prominent criterion. It refers to customer experience and interaction, rather than just service offering without any interventions. It starts with the gap between what has been expected and perceived by the customer. It is a measure of customer satisfaction based on the service quality. However, quality itself is not enough. Service quality should be strengthened by total customer satisfaction and delight [8]. Recent studies of KE show that Kano model has been successfully integrated into KE methodology, in order to achieve more efficient improvement strategies (see [1] for details). Furthermore, it has been extended by incorporating the issue of sustainability and TRIZ methodology [3,4]. Its objective is to contribute to the solution for today’s issue, yet to maintain the efficiency of proposed methodology. For instance, the use of TRIZ is to provide problem-solving principles to resolve any contradictions. More specifically, according to Hartono [3,4], TRIZ is used to generate ideas for improvement with the possible lowest contradiction among them.

Inherently, the attention on the reliable and valid perceived service quality and Kansei has been raised. With respect to customer emotional satisfaction, KE has shown its superiority against some similar methodologies. However, it might have missed its capability in modeling exact values of perceived customer impression. A criticism of perceived scores on user preferences has been occurred [9]. In this study, it may refer to both perceived service quality and Kansei responses. In other words, it lacks of the attention on customer dynamics. Hence, this paper discusses an approach of fuzzy Kansei in logistics service quality, accompanied by an empirical study on IT-based supporting logistics services. The Kano model is engaged in order to strengthen KE methodology in focusing more on delighting service attributes (see [1] for details).

This paper consists of 5 main parts. After the introduction section, a short literature review on fuzzy in Kansei and SERVQUAL, and Kano model in logistics services is provided. Afterwards, research methodology and an empirical study on IT-based supporting logistics services, followed by analysis and discussion are presented. The last section will be conclusion and future recommendation.

2. Literature review

2.1. Fuzzy in Kansei and SERVQUAL

According to Hartono & Tan [1], KE in services is defined as the methodology which takes into account the customer emotional needs (known as Kansei) and translates them into service design and development. Since Kansei is a function of design characteristics/attributes [10], the spanning followed by selection and evaluation of service attributes is critical. More specifically, what service attributes affect most to many Kansei will be of high interest, and followed up by either continuous improvement or enhancement.

KE as the backbone of this recent study has been considered to be superior against other similar method. This method provides some remarkable advantages [5], such as ability to translate emotional needs into concrete design parameters, ability to build mathematical model to minimize subjectivity, ability to optimize the intangible properties which are dealing with significant feelings, and to showcase the relationship model of cognitive and affective process.

The generic model of service attributes which is deemed to be the predictor for Kansei refers to SERVQUAL dimensions [1]. In the future Kansei type, it may refer to Kansei quality management. It is defined as KE methodology taking into account customer emotional needs in service design and development to maximize total customer satisfaction. It is expected to serve consistent Kansei at all interaction-based service processes (e.g., reception, offering, and post-purchase) [8]. In achieving that consistency, service quality control is needed. It starts with the identification of service gap, and the magnitude of service satisfaction.

The challenge for Kansei research is its dynamics. How to make Kansei consistent or to judge whether it is still relevant in any particular service encounters over time is so challenging. A study on the evaluation of perceived Kansei and service performance in the steady state has been conducted by Hartono et al. [5]. It showed, for example, some Kansei words were deemed to be important since they
had a very little gap between their perceived value in the current and future state. Therefore, in practical point of view, these potential Kansei words should be maintained over time, and more importantly, to what extent they were connected to particular service attributes. Given a very limited resources, this study was hoped to provide practical contribution in terms of prioritized improvement strategies. However, an intensive attention on this research field is less explored. Another concern occurs, that is, a critic on how to get the exact values of Kansei and perceived services. Once the user says a particular attribute performance is good, then a question is raised “How good it is? Is it applied to all actual users? Does it show a score of 4, or 4.5 or 5?” Hence, it comes to the concept of fuzzy taken into account in evaluating both Kansei and service performance.

2.2. Kano model as a catalyst
Kano model has simplified the service or product performance into three main categories, namely, basic/must-be (M), linear/one-dimensional (O), and delighting/attractive (A). Kano’s M category is a must, a provision of basic features of product or service in which not give any significant satisfaction once it is improved dramatically [11]. In KE studies, especially in services, Kano is utilized to strengthen the KE methodology by shorten its prioritized improvement steps [1]. Thus, Kano’s O and A are regarded as the prominent categories dealt with Kansei. More than the better performance, the higher the customer satisfaction is. It discusses more on delighter, which is beyond expectation. Since most customers have not realized their attractive needs, it is so relevant to engage Kano’s a category into Kansei-based service design or development. Schütte [12] mentioned that Kano’s attractive feature is closely connected to affect.

Kano model shows its flexibility and capability to be engaged with other quality-based tools/methods for product and service designs. The idea of considering fuzzy mode on Kano categorization, for instance, related to QFD on product management has been developed by Lee et al. [13]. Kano has been treated to be more objective in the course of weighing. Another study by Lopez and Jeronimo [14] proposed a Kano model incorporated fuzzy distances and 2-tuple fuzzy-linguistic model to manage a more efficient and effective logistics services.

With respect to Kansei-based service improvement strategies, Kano serves as a catalyst. Referring to the definition of catalyst, the involvement of Kano in KE methodology increases the efficiency and effectiveness of the formulized improvement strategies. In logistics services, as one of the emerging services nowadays, the contribution of Kano model in KE methodology is expected to be promising.

3. Research methodology
Survey method through personal interview and face-to-face questionnaire were used for data collection, considering the effectiveness of interaction between respondents and the interviewer. Also, this type of method promotes clarification on ambiguous questions and doubts effectively and efficiently. Purposive sampling (known as judgment sampling) was utilized to select subjects or respondents. Those respondents were chosen by the judgment of the researcher [15].

A questionnaire has been prepared and tested through a pilot study. Only one copy of the questionnaires was targeted for one group of participants. One group can be one single respondent or one family. Approximately, it took about 15 minutes to complete one questionnaire [1].

4. Empirical study and discussion
According to Hartono & Tan [1], this study followed the steps as discussed and shown in Figure 1. It started with the choice of logistics services domain. It is, then, followed by the measurement of perceived Kansei and SERVQUAL, and the incorporation of fuzziness as the basic contribution. A membership function of triangular fuzzy number (TFN) will be used. Kano categorization will take place to enhance the efficiency of perceived SERVQUAL which is more focused on Kano’s A and O category. Afterwards, the gap between perceived and expected services will be measured, and followed by customer satisfaction score for determining prioritized improvement strategies.
A case study on logistics services of company named “ABC” has been conducted. Those who were experienced services (i.e., there were 23 logistics service items; these were services aiming to deliver goods or documents to particular destinations) from this company at least once in a month within January to December 2016 were targeted and selected as the potential subjects. In total, there were 100 subjects collected (43% male, 57% female; 45% ranged 21-25 years old; 54% working in private sector).

Figure 1. Application framework of fuzzy KE and Kano model in logistics services.

5. Results and discussion
According to Stefano et al. [9], the assessment of customer satisfaction in services is derived from what has been expected and perceived by customer. It is when conventional ordinal scales applied. Due to criticism on the appropriateness of scales used [9], by taking into account exact preference judgment shown in an exact numerical value, fuzziness factor has been applied. Taking a case study on IT-based logistics services, this study used linguistic variables in rating perceived and expected service quality and perceived Kansei scores, consisted of “very low, low, fair, high, very high” for expectation, and “very poor, poor, fair, good, very good” for perception. Afterwards, those linguistic variables were converted into triangular fuzzy numbers (as shown in Table 1).

Table 1. Linguistic variables and triangular fuzzy numbers.

| Scale | Linguistic variable (expectation) | Linguistic variable (perception) | Triangular fuzzy numbers     |
|-------|----------------------------------|----------------------------------|-------------------------------|
| 1     | Very low                         | Very poor                        | \{1.19; 1.56; 2.16\}         |
| 2     | Low                              | Poor                             | \{2.97; 3.86; 4.63\}         |
| 3     | Fair                             | Fair                             | \{5.66; 6.54; 7.27\}         |
| 4     | High                             | Good                             | \{8.16; 9.00; 9.67\}         |
| 5     | Very high                        | Very good                        | \{10.37; 11.20; 11.96\}      |

Considering the fuzzy numbers, the mean of expected and perceived scores of service quality and also the service gap have been calculated, and provided in Table 2. It shows that the attribute “office waiting room” had the highest gap. Afterwards, through linear mathematical modeling of Kansei as the function of perceived logistics attributes with Kano’s O and A category, it has been found that (see [1] for the details of weighting process of Kano and Kansei scores into particular service attributes) the
attribute “politeness of staffs” showed the greatest importance weight (Table 3). Given a very limited resource in terms of budget, time and effort, this company “ABC” should put more concern on the improvement of the attribute “politeness of staffs”. In other words, the attribute of politeness of staffs was deemed to be a very sensitive to the customer emotional satisfaction.

**Table 2. Expected and perceived service gap.**

| Dimension   | Label  | Logistics service attributes | Expected | Perceived | Gap   |
|-------------|--------|-------------------------------|----------|-----------|-------|
| Tangible    | T₁     | Uniform for staffs            | 9.226    | 7.277     | -1.949|
|             | T₂     | Appearance of staffs          | 8.536    | 6.800     | -1.736|
|             | T₃     | ID for staffs                 | 9.588    | 6.961     | -2.627|
|             | T₄     | Cleanliness of office counter | 9.487    | 6.916     | -2.571|
|             | T₅     | Interior of office            | 8.498    | 6.302     | -2.196|
|             | T₆     | **Office waiting room**       | 9.621    | 6.787     | **-2.834***|
| Reliability | RL₇    | Condition of transportation vehicles | 8.892 | 7.527 | -1.365 |
|             | RL₈    | Promptness of service         | 10.391   | 7.966     | -2.425 |
|             | RL₉    | Accuracy of delivery          | 10.802   | 9.340     | -1.462 |
|             | RL₁₀   | Lead-time of delivery         | 10.440   | 8.261     | -2.179 |
|             | RL₁₁   | Tracking system               | 9.998    | 8.450     | -1.547 |
| Responsiveness | RP₁₂ | Accuracy of tariff            | 10.011   | 9.272     | -0.738 |
|             | RP₁₃   | Responsiveness to any problems| 10.070   | 8.069     | -2.001 |
|             | RP₁₄   | Availability of staffs        | 9.763    | 8.310     | -1.453 |
|             | RP₁₅   | Completeness of service given by staffs | 10.406 | 9.065 | -1.341 |
|             | RP₁₆   | Clarity of information given by staffs | 10.315 | 8.524 | -1.792 |
| Assurance   | A₁₇    | Security of parking lot       | 9.976    | 8.226     | -1.749 |
|             | A₁₈    | Discrepancy of packet/good delivered | 10.530 | 8.829 | -1.702 |
|             | A₁₉    | Readiness of transportation vehicles | 9.338 | 8.210 | -1.128 |
| Empathy     | E₁₀    | Hospitality of staffs         | 9.868    | 7.912     | -1.956 |
|             | E₁₁    | Politeness of staffs          | 9.964    | 8.389     | -1.575 |
|             | E₁₂    | Proactiveness of staffs       | 9.560    | 7.410     | -2.150 |
|             | E₁₃    | Apology raised by staffs      | 9.506    | 7.510     | -1.996 |

*it shows the highest service gap

**Table 3. Weighted importance score for logistics service attributes.**

| Logistics services attributes | Label | Satisfaction score* | Kano category and weight | Kansei word and score | Weighted importance score** |
|-------------------------------|-------|---------------------|--------------------------|-----------------------|-----------------------------|
| ID for staffs                 | T₃    | 23.828              | O 2                      | Friendly              | 6.323                       | 301.3                      |
| Cleanliness of office counter | T₄    | 22.574              | O 2                      | Prompt                | 6.900                       | 1,063.7                    |
| Promptness of service         | RL₈   | 25.224              | A 4                      | Secured               | 9.698                       | 635.7                      |
| Accuracy of                   | RL₉   | 15.684              | A 4                      | Tidy                  | 6.963                       | 829.6                      |
| Logistics services attributes | Label | Satisfaction score* | Kano category and weight | Kansei word and score | Weighted importance score** |
|-------------------------------|-------|----------------------|--------------------------|-----------------------|-----------------------------|
| **Clarity of information given by staffs** | **RP_{16}** | 18.497 | A 4 | Calm | 6.301 | 466.2 |
| **Security of parking lot** | **A_{17}** | 17.556 | A 4 | Secured | 9.698 | | |
| **Discrepancy of packet/good delivered** | **A_{18}** | 17.749 | A 4 | Comfortable | 6.465 | 2,621.0 |
| **Hospitality of staffs** | **E_{20}** | 19.188 | A 4 | Friendly | 6.323 | 485.3 |
| **Politeness of staffs** | **E_{21}** | 15.159 | A 4 | Secured | 9.698 | 2,626.4*** |
| **Proactiveness of staffs** | **E_{22}** | 20.285 | O 2 | Secured | 9.698 | 1,181.1 |
| **Apology raised by staffs** | **E_{23}** | 18.794 | A 4 | - | - | 75.2 |

*|Satisfaction score| = importance level x gap
**Weighted importance score = |Satisfaction score| x Kano weight x number of significant Kansei x Kansei score

***It shows the highest importance weight

Following up the critical service attribute of politeness of staffs, this company “ABC” can promote training for staffs regarding personality and teamwork building which always brings value on customer focus.

6. Conclusion, limitation and future recommendation
This study provides a grounded framework of how to fulfill customer emotional needs (known as Kansei) in logistics services by taking into account fuzzy-based KE methodology equipped with Kano model. Practically, given a very limited resource, this study provides guidance to service manager in improving prioritized logistics service attributes with higher degree of certainty.

Due to very limited sample size and only tested in IT-based logistics services, this model of fuzzy-based KE and Kano model should be applied into other logistics services. Involving more samples is also encouraged.
References

[1] Hartono M and Tan K C 2011 How Kano Model Contributes to Kansei Engineering in Services Ergonomics 54 pp 987–1004

[2] Hartono M and Raharjo H 2015 Exploring the mediating role of affective and cognitive satisfaction on the effect of service quality on loyalty Total Qual. Manag. Bus. 26 pp 971–985

[3] Hartono M 2016 The extended integrated model of Kansei engineering, Kano, and TRIZ incorporating cultural differences into services Int. J. Technol. 1 pp 97–104

[4] Hartono M 2016 A Conceptual Integrative Model of Kansei Engineering, Kano and TRIZ Towards Sustainability in Services Proc. 8th Widyatama Int. Seminar on Sustainability (Bandung) (Bandung: Widyatama University) pp 303–307

[5] Hartono M 2012 Incorporating service quality tools into Kansei engineering in services: A case study of Indonesian tourists Procedia Economics and Finance 4 pp 201–212

[6] Hartono M, Tan K C and Peacock J B 2013 Applying Kansei engineering, the Kano model and QFD to services Int. J. Services, Economics and Management 5 pp 256–274

[7] Rasamoelina F, Bouchard C and Aoussat A 2013 Towards a Kansei-based user modeling methodology for eco-design Int. J. Affective Engineering 12 pp 337–348

[8] Nagamachi M and Lokman A M 2011 Innovations of Kansei Engineering (Boca Raton: CRC Press)

[9] Stefano N M, Casarotto F N, Barichello R and Sohn A P 2015 A fuzzy SERVQUAL based method for evaluation of service quality in the hotel industry Procedia CIRP 30 pp 433–438

[10] Nagamachi M 1995 Kansei Engineering: A new ergonomic consumer-oriented technology for product development Int. J. Ind. Ergonom. 15 pp 3–11

[11] Kano N, Seraku N and Takahashi F 1984 Attractive quality and must be quality Quality 14 pp 39–44

[12] Schütte S 2005 Engineering Emotional Values in Product Design: Kansei Engineering in Development (Linköping: Linköping University)

[13] Lee Y-C, Sheu L-C and Tsou Y-G 2008 Quality Function Deployment implementation based on fuzzy Kano model: An application in PLM system Comput. Ind. Eng. 55 pp 48–63

[14] Lopez R F and Jeronimo J M R 2012 Managing logistics customer service under certainty: An integrative fuzzy Kano framework Inform. Sciences 202 pp 41–57

[15] Black K 2010 Business Statistics: Contemporary Decision Making (Danvers: Wiley)
International Conference on Informatics, Technology and Engineering 2017 (InCITE 2017)

To cite this article: 2017 IOP Conf. Ser.: Mater. Sci. Eng. 273 011001

View the article online for updates and enhancements.

You may also like

- Preface
- Preface
- High Performance Computing Symposium 2011

Suzanne Talon, Normand Mousseau, Gilles Peslherbe et al.

- Preface
- High Performance Computing Symposium 2011

Migaku Takahashi, Hitoshi Saito, Satoru Yoshimura et al.
International Conference on Informatics, Technology and Engineering 2017 (InCITE 2017)

Sustainable Technology and Innovation: Opportunities and Challenges

24-25 August 2017: Bali, Indonesia

http://incite.ubaya.ac.id

A collaborative activity jointly organized by:

Universitas Surabaya
INDONESIA

Suranaree University of Technology
THAILAND

National Taiwan University of Technology
TAIWAN

Solar Energy Research Center, Dalarna University
SWEDEN

University of Wollongong
AUSTRALIA

Supported by:

Discovery Kartika Plaza Hotel
Bali, INDONESIA
Scientific Committee (International Reviewers)

- Assoc. Prof. Azharul Karim, Ph.D. (Queensland University of Technology, AUSTRALIA)
- Prof. Dinesh Kant Kumar, Ph.D. (Royal Melbourne Institute of Technology, AUSTRALIA)
- Prof. Willy Susilo, Ph.D. (University of Wollongong, AUSTRALIA)
- Assoc. Prof. Yassierli, Ph.D. (Institut Teknologi Bandung, INDONESIA)
- Prof. Ali Altway, Ph.D. (Institut Teknologi Sepuluh Nopember, INDONESIA)
- Prof. Dr-Ing. I Made Londen Batan (Institut Teknologi Sepuluh Nopember, INDONESIA)
- Assoc. Prof. Setiyo Gunawan, Ph.D. (Institut Teknologi Sepuluh Nopember, INDONESIA)
- Prof. Renanto Handogo, Ph.D. (Institut Teknologi Sepuluh Nopember, INDONESIA)
- Prof. Mauridhi Hery Purnomo, Ph.D. (Institut Teknologi Sepuluh Nopember, INDONESIA)
- Prof. Nur Irwan, Ph.D. (Institut Teknologi Sepuluh Nopember, INDONESIA)
- Prof. I Nyoman Purwan, Ph.D. (Institut Teknologi Sepuluh Nopember, INDONESIA)
- Asst. Prof. Budi Hartono, Ph.D. (Universitas Gadjah Mada, INDONESIA)
- Asst. Prof. Hanung Adi Nugroho, Ph.D. (Universitas Gadjah Mada, INDONESIA)
- Asst. Prof. Dr rer nat. Lanny Sapei (Universitas Surabaya, INDONESIA)
- Asst. Prof. Nemuel Daniel Pah, Ph.D. (Universitas Surabaya, INDONESIA)
- Prof. Joniarto Parung, Ph.D. (Universitas Surabaya, INDONESIA)
- Prof. Lieke Riadi, Ph.D. (Universitas Surabaya, INDONESIA)
- Prof. Katsuhiko Takahashi, Ph.D. (Hiroshima University, JAPAN)
- Asst. Prof. Dr.Eng. Wahyudiono (Nagoya University, JAPAN)
- Prof. Anton Satria Prabuowo, Ph.D. (King Abdulaziz University, KINGDOM OF SAUDI ARABIA)
- Assoc. Prof. Oki Muraza, Ph.D. (King Fahd University of Petroleum & Minerals, KINGDOM OF SAUDI ARABIA)
- Assoc. Prof. Azizi Abdullah, Ph.D. (Universiti Kebangsaan Malaysia, MALAYSIA)
- Assoc. Prof. siti Norul Huda Sheikh Abdullah, Ph.D. (Universiti Kebangsaan Malaysia, MALAYSIA)
- Assoc. Prof. Md. Jan Nordin, Ph.D. (Universiti Kebangsaan Malaysia, MALAYSIA)
- Assoc. Prof. Mohammad Fadzul Nasrudiin, Ph.D. (Universiti Kebangsaan Malaysia, MALAYSIA)
- Assoc. Prof. Rosmadi Fauzi, Ph.D. (University of Malaya, MALAYSIA)
- Assoc. Prof. Md. Nasir Sulaiman, Ph.D. (Universiti Putra Malaysia, MALAYSIA)
- Prof. Ravindra S. Goonetilleke, Ph.D. (Hong Kong University of Science & Technology, PRC)
- Assoc. Prof. Tan Kay Chuan, Ph.D. (National University of Singapore, SINGAPORE)
- Asst. Prof. Aly Gunawan, Ph.D. (Singapore Management University, SINGAPORE)
- Asst. Prof. Hendry Rahajo, Ph.D. (Chalmers University of Technology, SWEDEN)
- Assoc. Prof. Waree Kongprawechnon, Ph.D. (Sirindhorn International Institute of Technology, THAILAND)
- Asst. Prof. Itthisek Nilkhamhang, Ph.D. (Sirindhorn International Institute of Technology, THAILAND)
- Assoc. Prof. Vatanavongs Ratanavaraha, Ph.D. (Suanlanaree University of Technology, THAILAND)
- Assoc. Prof. Yupaporn Ruksakulpiwat, Ph.D. (Suanlanaree University of Technology, THAILAND)
- Assoc. Prof. Peerapong Uthansakul, Ph.D. (Suanlanaree University of Technology, THAILAND)
Steering Committee

Chair: Assoc. Prof. Ir. Markus Hartono, Ph.D., CHFP, IPM
Honorary Members: Prof. Joniarto Parung, Ph.D.
Prof. Suksun Horpibulsuk, Ph.D.
Prof. Nai-Wei Lo, Ph.D.
Prof. Mats Rönnelid, Ph.D.
Prof. Willy Susilo, Ph.D.
Members: Assoc. Prof. Amelia Santoso, Ph.D.
Asst. Prof. Djuwari, Ph.D.
Mr. Agung Prayitno
Assoc. Prof. Emma Savitri, Ph.D.
Assoc. Prof. Budi Hartanto, Ph.D.
Mr. Sunardi Tjandra
Asst. Prof. Nemuel Daniel Pah, Ph.D.
Assoc. Prof. Elieser Tarigan, Ph.D.
Assoc. Prof. Jaya Suteja, Ph.D.
Asst. Prof. Dr. rer. nat. Lanny Sapei
Assoc. Prof. Hudiyo Firmanto, Ph.D.
Assoc. Prof. Restu Kartiko Widi, Ph.D.

Organizing Committee

Chair: Assoc. Prof. Eric Wibisono, Ph.D.
Secretary: Assoc. Prof. Rudy Agustriyanto, Ph.D.
Treasurers: Ms. Dhiani Tresna Absari
Ms. Arum Soesanti
Secretariat: Mr. Rahman Dwi Wahyudi (Coordinator)
Ms. Yuana Elly Agustin
Ms. Akbarningrum Fatmawati
Ms. Yenny Sari
Mr. Njoto Benarkah
Program: Ms. Melissa Angga (Coordinator)
Assoc. Prof. Susila Chandra, Ph.D.
Mr. Susilo Wibowo
Mr. Yunus Fransiscus
Mr. Moh. Arbi Hadiyat
Ms. Indri Hapsari
Ms. Susana Limanto
Mr. I Made Ronyastra
Website: Mr. Daniel Soesanto
Mr. Marcellinus Ferdinand Suciadi
Design: Ms. Tyrza Adelia
Documentary: Mr. Henry Hermawan
Invited Speakers

Prof. Suksun Horpibulsuk, Ph.D.
Director
Center of Excellence in Innovation for Sustainable Infrastructure Development
Suranaree University of Technology
THAILAND

Prof. Nai-Wei Lo, Ph.D.
Director
Taiwan Information Security Center
National Taiwan University of Science and Technology
TAIWAN

Prof. Mats Rönnelid, Ph.D.
Energy and Environmental Technology
Solar Energy Research Center
Dalarna University
SWEDEN

Prof. Willy Susilo, Ph.D.
Director
Center for Computer and Information Security Research
University of Wollongong
AUSTRALIA
Welcome Remarks, Chair of the Steering Committee

Welcome to Bali! Welcome to our very first International Conference on Informatics, Technology and Engineering (InCITE) 2017 held by Faculty of Engineering Universitas Surabaya (Ubaya), in collaboration with University of Wollongong (Australia), Solar Energy Research Center – Dalarna University (Sweden), Suranaree University of Technology (Thailand), and National Taiwan University of Science and Technology (Taiwan).

This international conference will be enlivened by a series of keynote speeches and parallel sessions delivered by scholars, researchers, practitioners and academicians who are coming from 5 different countries and more. More specifically, it is hoped that InCITE may link researchers and practitioners from various branches of engineering disciplines from around the world. This year’s conference theme of Sustainable Technology and Innovation – Opportunities and Challenges will bring you to the critical awareness of what we have done and what we should contribute to our sustainable environment, society and economy, through the applied technology and innovation. All participants will disseminate information on the relevant and recent research and practice in engineering-based sustainability.

We would like to say thank you to all keynote speakers, presenters, and reviewers/scientific committees for the generous supports. In addition, our thank you to the Ubaya Foundation, Rector of Ubaya, Dean of Faculty of Engineering Ubaya, OC Chairman and members, SC members, and all InCITE committees.

We wish you a very pleasant and memorable stay and research networking event in InCITE 2017 Bali. We are looking forward to seeing you again at the 2nd InCITE 2019! Thank you very much. Matur nuwun sanget.

Assoc. Prof. Ir. Markus Hartono, Ph.D., CHFP, IPM
Welcome Remarks, Chair of the Organizing Committee

Rector of University of Surabaya: Prof. Dr. Joniarto Parung,
Dean of Faculty of Engineering, University of Surabaya: Dr. Amelia Santoso,
Honorary Keynote Speakers: Prof. Dr. Suksun Horpibulsuk, Prof. Dr. Nai-Wei Lo, Prof. Dr. Mats Rönnelid, and Prof. Dr. Willy Susilo,
Fellow Participants, Distinguished Guests, Ladies and Gentlemen:

First of all, welcome to Bali, Indonesia, and welcome to the first International Conference on Informatics, Technology and Engineering (InCITE) 2017!

It is still vivid in my memory, one and a half year ago, when some colleagues and officials of our Faculty of Engineering discussed the possibility of organizing an international event, to substitute national seminars that some of our study programs held annually or bi-annually. The call for an international event is a necessity given 30 years of Faculty of Engineering’s existence, and the dawn of University of Surabaya’s Silver Anniversary next year. Such a level of maturity prompts us to contribute more to a larger scale. An international event will have greater exposure to international community, and consequently greater impact to us all.

The following process, however, was far from easy. We were inexperienced, but we were faithful to our mission. It took us some time until we were able to formulate the conference theme, found prominent scholars in the selected theme, and negotiated with them. We are very grateful that all four speakers whom we approached are here with us today, to deliver their insights on opportunities and challenges in sustainable technology and innovation. Let’s give our big hands to them!

Sessions beyond those with our invited speakers will deliver four sub-themes, namely: sustainable design & innovation, sustainable manufacturing & processes, sustainable energy & earth resources, and the role of IT in sustainable enterprise. We are glad to inform you that our conference has attracted 67 papers from the first round of acceptance. After careful selection by a panel that consists of high-profile international reviewers around the world, we passed 50 papers. We are thankful to our international reviewers who worked very hard providing feedback to the submitted papers. We are indebted to such great service that they have given.

I sincerely hope that the exchange of knowledge throughout this event, be it from within the substance of academic papers or during the conference time, will enhance our professional network and benefit us in the long run. Thank you to all our speakers, reviewers, participants, and most of all my committee members who have been hand-in-hand with me in this long journey! You all have made our dream come true!

We hope you will have a wonderful conference and memorable stay in Bali this week. We are looking forward to seeing you again in the next two years!

Assoc. Prof. Eric Wibisono, Ph.D.
Conference Photographs
This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our Privacy and Cookies policy.

Table of contents

Volume 273

2017

International Conference on Informatics, Technology and Engineering 2017 (InCITE 2017)
24–25 August 2017, Bali, Indonesia

Accepted papers received: 15 November 2017
Published online: 28 November 2017

Preface

OPEN ACCESS
International Conference on Informatics, Technology and Engineering 2017 (InCITE 2017)

View all abstracts

Papers

The Role of IT in Sustainable Enterprise

OPEN ACCESS
Text-based CAPTCHAs over the years

Y W Chow and W Susilo

http://iopscience.iop.org/issue/1757-899X/273/1
Computer vision system for egg volume prediction using backpropagation neural network
J Siswantoro, M Y Hilman and M Widiasri

A multi-hop relay path selection algorithm considering path channel quality and coordinating with bandwidth allocation
Y C Lai, R Jayadi and J N Lai

Leaf App: Leaf recognition with deep convolutional neural networks
T L I Sugata and C K Yang

Recycled asphalt pavement – fly ash geopolymer as a sustainable stabilized pavement material
S Horpibulsuk, M Hoy, P Witchayaphong, R Rachan and A Arulrajah

Effects of glass scraps powder and glass fiber on mechanical properties of polyester composites
K Sonsakul and W Boongsood

Phenol hydroxylation on Al-Fe modified-bentonite: Effect of Fe loading, temperature and reaction time
R K Widi, A Budhyantoro and A Christianto

Equilibrium study for ternary mixtures of biodiesel
S Doungsri, T Sookkumnerd, A Wongkoblap and A Nuchitprasittichai
| Title                                                                 | Authors                                      | View abstract | View article | PDF     |
|-----------------------------------------------------------------------|----------------------------------------------|---------------|--------------|---------|
| Sustainable Manufacturing & Processes                                  |                                               |               |              |         |
| Identification, measurement, and assessment of water cycle of unhusked rice agricultural phases: Case study at Tangerang paddy field, Indonesia | N Hartono, Laurence and H P Johannes          | +             |              | PDF     |
| Performance test of a grid-tied PV system to power a split air conditioner system in Surabaya | E Tarigan                                    | +             |              | PDF     |
| Hydrolysis of alkaline pretreated banana peel                          | A Fatmawati, K Y Gunawan and F A Hadiwijaya  | +             |              | PDF     |
| Closed-loop simulation of decentralized control using RGA for uncertain binary distillation column | R Agustriyanto and J Zhang                   | +             |              | PDF     |
| An efficiency improvement in warehouse operation using simulation analysis | N Samattapapong                              | +             |              | PDF     |
| Modeling of the minimum variable blank holder force based on forming limit diagram (FLD) in deep drawing process | S Candra, I M L Batan, W Berata and A S Pramono | +             |              | PDF     |
| Single-tier city logistics model for single product                   | N I Saragih, S Nur Bahagia, Suprayogi and I Syabri | +             |              | PDF     |
| Inventory model optimization for supplier-manufacturer-retailer system with rework and waste disposal |                                               |               |              |         |
A periodic review integrated inventory model with controllable setup cost, imperfect items, and inspection errors under service level constraint
R S Saga, W A Jauhari and P W Laksono

A joint economic lot-sizing problem with fuzzy demand, defective items and environmental impacts
W A Jauhari and P W Laksono

Development of coordination system model on single-supplier multi-buyer for multi-item supply chain with probabilistic demand
G Olivia, A Santoso and D N Prayogo

Using genetic algorithm to determine the optimal order quantities for multi-item multi-period under warehouse capacity constraints in kitchenware manufacturing
D Saraswati, D K Sari and V Johan

From ISO 9001:2008 to ISO 9001:2015: Significant changes and their impacts to aspiring organizations
Y Sari, E Wibisono, R D Wahyudi and Y Lio

Improving delivery routes using combined heuristic and optimization in a consumer goods distribution company
E Wibisono, A Santoso and M A Sunaryo

The effect of different concentrations of tween-20 combined with rice husk silica on the stability of o/w emulsion: A kinetic study
L Sapei, I G Y H Sandy, I M K D Suputra and M Ray
Constrained optimization via simulation models for new product innovation
Nugroho A Pujowidianto

Affective design identification on the development of batik convection product
H Prastawa and R Purwaningsih

Estimating life cycle cost for a product family design: The challenges
T J Suteja, A Karim, P K D V Yarlagadda and C Yan

An integrative fuzzy Kansei engineering and Kano model for logistics services
M Hartono, T K Chuan, D N Prayogo and A Santoso

The impact of expatriates directors on the Indonesian company’s performance
I M Ronyastra

Survival analysis for customer satisfaction: A case study
M A Hadiyat, R D Wahyudi and Y Sari

Pattern analysis of fraud case in Taiwan, China and Indonesia
A H Kusumo, C-F Chi and R S Dewi

Outdoor altitude stabilization of QuadRotor based on type-2 fuzzy and fuzzy PID
H Wicaksono, Y G Yusuf, C Kristanto and L Haryanto
Investigating the role of Fuzzy as confirmatory tool for service quality assessment (Case study: Comparison of Fuzzy SERVQUAL and SERVQUAL in hotel service evaluation)

R D Wahyudi