

Affective Engineering in Services: a Way to More Human-Centric Approach

Markus Hartono

Department of Industrial Engineering

University of Surabaya

Jalan Raya Kalirungkut, Tenggilis, Surabaya 60293, Indonesia

markus@staff.ubaya.ac.id

Abstract

Affective Engineering (AE) or Kansei Engineering (KE) in services proposes a new approach in designing service excellence taking into account human emotional needs and satisfaction. It highlights that affect or emotion or known as Kansei will complement another side of human characteristic (called as cognition) in experiencing service offerings and giving feedback of them. Recent study shows that affect is found to be more dominant than cognition. Through both cognition and affect, the perception of service offerings will be complete. Some examples are provided, such as, Dunkin's Donuts flavor radio – chain releases coffee scent when ads play in South Korea, Kansei-based design for Mazda Miata (Jinba Ittai) and luxury hotel services incorporating cultural differences. All case studies promote how emotional needs (Kansei) are incorporated and manifested in both product and service design. Apart from cognition with full of functionality and usability, affect will lead to quicker decision and customer loyalty. This article highlights the role of affect in human-service engineering area.

Keywords

Affective Engineering, Kansei Engineering, Emotions, Services

1. Affect in Engineering Discipline

Affect is a part of human manifestation when the people interact with product or service, and it is likewise the cognition of people to expect the product functionality and usability. Affect is not only belonging to psychology or medical domains, but also it has an intersection with engineering discipline. More surprisingly, recent research shows that affect has been found to be more dominant in determining the final decision, than that of cognition. Regarding system thinking and more complex problem understanding, the engineering discipline should accommodate and investigate more on the understanding of coupling mechanism of affect and cognition. Affect refers to emotions or known as Kansei (in Japanese).

2. Affective Human Factors Engineering (AHFE) in Services

Affective Engineering (AE) is also known as affect or emotional design. In Japan, it is well known as Kansei Engineering (KE) pioneered by Mitsuo Nagamachi. The KE prominent milestone is that its application on designing a sport car called as Mazda Miata (Nagamachi, 2002; Schütte et al., 2004). Its Kansei concept for Mazda Miata was known as jinba ittai. It has a meaning of ultimate bond between a rider and his/her beloved horse. When a person drives a sport car, he or she will feel like riding a controllable horse. Afterwards, its success has been adopted to design housewares, electronic products, automotive, and manufacturing products. In KE methodology, in general, the emotional needs (known as Kansei) will be captured, finalized, and translated into physical design characteristics. The illustration of how Kansei is captured by the user or customer is shown in Figure 1.



Figure 1. Experiential Kansei and user/customer (adopted from Nagamachi & Lokman, 2011)

Emotional satisfaction is concerned once all the determinant needs have been fulfilled. It reminds us to the concept of human hierarchy of needs by Maslow. Once the lower level of needs is fulfilled, the upper level of needs (such as social and self-esteem needs) will be more important. The highest one is that self-actualization. It is quite related to emotions/affect/Kansei. Another similar theory called as the motivator-hygiene two-factor theory by Frederick Herzberg. People are mostly motivated by the achievement, recognition, responsibility, rather than company policy, supervision, relation with colleagues. It seems that they have similar pattern. Once the cognitive need is satisfied, it drives the emotional need and satisfaction. In other words, emotions/affect/Kansei is a function of the perception of product/service/working condition or other human-system interaction.

The application of KE has been extended, ranging from physical products to non-physical services. Once a system is built with human roles inside, the perception and expectation of humans should be embedded. In services, human-system interaction will put human perception and expectation into a concern. Humans here can be customer and designer. Their expectation will be covering some service attributes such as a friendly staff, a reliable schedule, a correct payment system, etc. The challenge is that how to understand the emotional-based customer expectation, provide it, so that his/her perception is fully fulfilled.

3. An Example of Emotional-Based Ads?

The first impression is so tempting. This is it. It is a matter of how emotional satisfaction of customer will be engaged. Hence, it is a true calling for designer and engineer to deeply understand their customer needs, especially emotional needs. The driver for customer emotional needs refers to human senses. They consist of sight, touch, hearing, taste, and smell. There is an interesting example of emotional-indulgence ads in South Korea, called Dunkin' Donut's coffee flavor radio. There is something splashing in the air, and it is waking up commuters in the public bus. An auditory-mode ads accompanied by coffee aroma released in the atmosphere will drive commuters to be more aware of "something fresh" is ready to consume just in front of you. The spray of coffee aroma was set off by the audio of company promotional ads (i.e., a jingle) when it played on the speakers. All passengers were surprised, they smelled the coffee aroma, heard the message, and finally they expected to look for the coffee shop nearby. When the bus stopped, all passengers alighted, saw the coffee shop next to bus stop, crossed the street, and went to the coffee shop. This ads' system reached more than 350,000 commuters per day. It puts technology in the marketing effort incorporating human characteristics. This process is illustrated in the Figure 2.

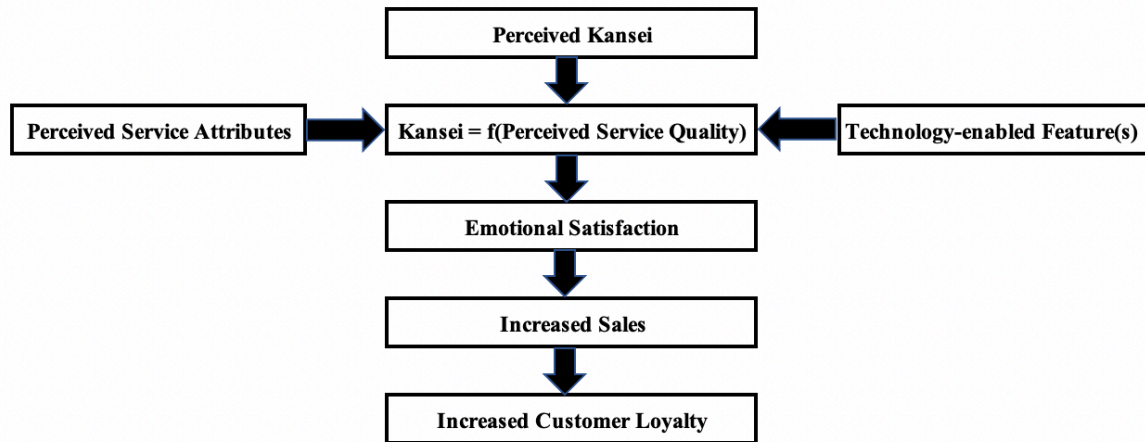


Figure 2. How the technology-enabled features enhance the perceived Kansei

The result obtained is an increase in sales of 29 percent during the campaign. People now were thinking of the company when they think of their daily morning coffee. It is such a great branding campaign. They have seen a 16 percent spike in visitors around the bus stops where the buses have been equipped with the “coffee aroma” technology. The commuters experienced positive emotions with the scent of coffee. It may have generated the good mood of people when they were on the way home riding on bus. The ads demonstrated the impact of physical stimuli to human senses supported by the technology. An audio message of jingle accompanied by sprayed coffee aroma boosted the positive mood of bus passengers. Afterward, another audio message has come over to inform the location of coffee shop, which is just in front of the bus stop. It shows that the expectation of commuters has been met with their perception.

4. Human Affect System Interaction

According to Riener (2017), through system thinking approach, there is a close relationship between human and technology. It needs a holistic point of view. Referring to the case study discussed previously, a combination of thought, cognitive process, affective process, and physiological conditions can make significant difference in terms of system performance and efficiency. Both conscious and unconscious awareness in real-world settings are perceived by humans and they influence their emotional states.

The user interface connects the technical system to human senses as the receptor. The output of this interaction will be perceived by human information system, such as tactile (palpable), electromagnetic (visible light, infrared radiation), chemical (odour, scent), and acoustic (noise, sound, music). It leads to interpersonal and physiology responses. They comprise facial expression, gestures, sensation, or even emotional state, remembrance, and attitude towards life. In addition, it will influence the perception of behavioural intention.

One additional example is that the use of augmented reality in logistics of a warehouse. It is called innovation at work through vision picking in logistics. It promotes efficiency, error reduction, less fatigue, and productivity. Human physical and emotion-based responses are involved. This system offers a clear cognition to operators in the warehouse which leads to emotional satisfaction. Again, the emotion-based design is found to be the secret to successful communication and storytelling.

According to Norman (2005), when it comes to human-system interaction for product or service, there are three levels of abstraction defined. First, it is dealt with functionality and usability. It is the first step that a product or service must perform the basic function as its core identity. Taking an example of a car, it is a must that a car will function in taking someone from one point to another point. Second, it is referred to affect or emotion. The exploration and fulfilment of customer needs and satisfaction is happening here. For instance, feelings of trusted and secured are expected when using an ATM (Automated Teller Machine). Third, the final step is called persona or social factors. By owning or using a product or service will tell something. It is a special personification or representative of a thing. For instance, recalling Maslow’s hierarchy of need “self-actualization”, it can be fulfilled by owning the latest model and most expensive of a smart phone.

5. Cultural Issues in Emotional Design

Coca Cola company launched a campaign of “open happiness – taste the feeling”. This company supports the feeling of happiness among people with various cultural backgrounds. Everyone deserves to be happy and fun. Another example is the iPod by Apple Inc. This product was not the pioneer, however it created a significant contribution on the success of MP3 player and has been a market leader. What has made a significant different? Basically, iPod promoted both perceived usability, function, and hedonic attributes as well. Though it was promoted late, it was more expensive than the competing models, and it reached the best of MP3 player. Through the emotional satisfaction exposure, the iPod was found to be easier to use and more aesthetically appealing. The users found it cool and felt good.

Related to cultural differences, for instance, to turn on the light, it is to flip the switch up. It is different from what happens in Asia and Europe, where the switch will be going down. Asian people tend to expect high-context cultures than that of European societies. For instance, taking a case of mobile phone, Japanese and Korean people highlighted more on visual objects and symbols. The European people expected more on explicit information. Another example is that the application of Kansei Engineering (KE) on service incorporating cultural differences. KE shows the relationship between perceived service attributes and Kansei. Kansei is a function of perceived service attributes. A study by Hartono et al. (2012) and Hartono & Tan (2011) shows that different cultures had different Kansei. Taking into account 3 different cultures (i.e., Indonesian, Singaporean, and Japanese) in luxury hotel services, it was found that Japanese was more Kansei oriented. Japanese had more and diverse Kansei. Not only interaction-based and servicescape-based Kansei, but Japanese also experienced passion, quietness, and convenience when they stayed in luxury hotels. While Indonesian and Singaporean tended to experience the same emotional satisfaction. Indonesia had a unique experience of passion, whereas Singaporean felt peacefulness-based Kansei.

6. Conclusion

This article discusses the important role of affective engineering (known as a human-side emotional engineering) in engineering discipline. It highlights a more holistic and human-centric approach in understanding human-service experience system. The use of technology-enabled marketing effort has proven more efficient and effective perception on customer values. Moreover, it supported the overall company performance in terms of sales and market growth. Here, recalling the human factors engineering (known as ergonomics) that emphasizes a concept of fitting the task to the man, affective engineering complements an entire human-based interaction system. In addition, affect will lead to quicker decision and customer trust.

References

- Hartono, M. and Tan, K.C., How the Kano model contributes to Kansei engineering in services, *Ergonomics*, vol. 54 no. 11, pp. 987–1004, 2011.
- Hartono, M., Tan, K.C., Ishihara, S., and Peacock, J.B., Incorporating Markov chain modelling and QFD into Kansei engineering applied to services, *International Journal of Human Factors and Ergonomics*, vol. 1, no. 1, pp. 74 – 97, 2012.
- Nagamachi, M., Kansei Engineering as a powerful consumer-oriented technology for product development, *Applied Ergonomics*, vol. 33, pp. 289–294, 2002.
- Nagamachi, M. and Lokman, A.M., *Innovations of Kansei Engineering*, Boca Raton: CRC Press, 2011.
- Normal, D., *Emotional Design: Why We Love (or Hate) Everyday Things*, Basic Books, 1st Edition, 2005.
- Riener, A., Subliminal Perception or “Can We Perceive and Be Influenced by Stimuli That Do Not Reach Us on a Conscious Level?” in Jeon M. (Ed.), *Emotions and Affect in Human Factors and Human-Computer Interaction*, Elsevier Academic Press, pp. 503 – 538, 2017.
- Schütte, S., Eklund, J., Axelsson, J.R.C., and Nagamachi, M., Concepts, methods, and tools in Kansei engineering, *Theoretical Issues of Ergonomics Science*, vol. 5, pp. 214–232, 2004.

Biography

Markus Hartono is an Associate Professor in Industrial Engineering at the University of Surabaya, Indonesia, and the Dean of Faculty of Creative Industries at the University of Surabaya, Indonesia. He earned M.Sc. and Ph.D. with full scholarships in Industrial and Systems Engineering from National University of Singapore, Singapore. He has published journal and conference papers in the areas of Ergonomics/Human Factors Engineering, Industrial and Systems Engineering, Kansei Engineering, and Product Design. He is also a Certified Human Factors Professional (CHFP) by Board of Certification in Professional Ergonomics (BCPE), a Professional Engineer of Indonesian Engineers Association (PII), ASEAN Engineer, Indonesian Accreditation Board for Engineering Education (IABEE) Evaluator, and Vice President of Indonesian Ergonomics Association (PEI) for Educational and Certification Affairs.