Exploring the Balance between Utilitarian and Hedonic Values of Wearable Products

Hassan Iftikhar, Parth Shah, Yan Luximon*

School of Design, The Hong Kong Polytechnic University, Hung Hom, Hong Kong SAR.
hassan.iftikhar@connect.polyu.hk, parth.shah@connect.polyu.hk,
*yan.luximon@polyu.edu.hk

Abstract. It has been a matter of great interest for designers and researchers to investigate the potential balance between product's aesthetics and functionality. This study will try to explore the concept of hedonics, utilitarian value and their balance by incorporating some case studies from design literature. In this research paper, the tradeoffs between hedonics and utilitarian values will discussed by having the wearable products as a core. The discussion in this study would help designers in understanding the metrics of balance in attributes of product design process for smart wearables and helping them to design wearable products by enhancing user experience.

Keywords: Utilitarian values · Hedonic product values · Hedonic-utilitarian balance · Smart wearable products · Smart watches

1 Introduction

Product utilitarian value is one of the key criteria considered by the designers while designing products to address user needs [1–3]. However, various studies related to the holistic nature of product design have helped in identifying additional parameters responsible for user satisfaction and judgments like elegance [4], functionality [5] and social importance [6]. Products have both utilitarian and symbolic purposes and not only bought for aesthetics [7]. A study [8] by Hollins and Pugh identified the hedonic nature of products, as one of the influential attributes involved in product design process. Product hedonic value is influenced by elements of product aesthetics like form, texture, experience and presence [9]. Studies [10, 11] have suggested that in addition to functionality, aesthetics experience has its own personalized value and is majorly used as the form of objects [12, 13]. Products always appreciated holistically in the field of product design. It should have functionality and hedonic tradeoffs to attract the costumer intention before buying and to attract the customer satisfaction and pleasure while using it [14]. These tradeoffs play quite an important role in achieving the ultimate goal of designing good products. There is no absolute definition of good design however, "Good design" can be described as an optimal balance in functionality and aesthetics [15]. Functionality is considered to be an extrinsic value of product perception and pleasure can be considered as intrinsic product values [16]. A study conducted by Rogers [17] also insisted on the important role of products' intrinsic and extrinsic values on consumers' perceptions and behavioral inten-

tions. The potential balance in product design bears a significant importance in consumers' buying intentions and usage behaviour.

In recent years, usage of wearable devices has increased tremendously. With the advancement in technology, smart wearable products have provided users with an extensive range of added utilities. Wearable products are not just for interaction, we are living with them. With the change in understanding of aesthetics and user perceptions, designers have a huge challenge of satisfying the users with an optimal product experience, which has a balance between utilitarian and hedonic values.

2 Parameters for Wearable Products' Classification

In the field of smart wearables, the development is considerable in off-body products in comparison to the wearable ones. The wearables need to be more mature in order to find it attractive and accepted in consumers' perception [18, 19]. Many studies like Bodine and Gemperle [20] have considered functionality and wearing comfort as the main features for accepting it. While in the other studies [21, 22] it is quite evident that functionality, comfort, ease of use and maximum usefulness are considered as the important factors. These pragmatic qualities are very important however for a smart wearable, hedonic qualities are as important as pragmatic qualities [14]. In another investigation [23] for the adoption of smart wearables it has been established that users' care about the styling most following by the price and functionality of the smart wearable. In addition to that, a study [24] conducted by yang incorporated the brand image as a parameter of consumer buying intention and it has a direct impact on the benefit values. Wearable products have their role not as a useful product but also as a fashion product or considered as jewelry. The basic parameters for wearable product classification contain utilitarian, hedonic and fashion values as a prime importance.

2.1 Product Utilitarian Value

Product utilitarian value or product function serve as an important role in product perceived values. Utilitarian value often termed as the potential purpose of the product and its reliability in terms of repeating the same task. This purpose of the product is defined by the customer needs and termed as functional requirement of a product in the product design parameters [1]. Utility and core functions comes first according to many researchers depending upon the product type. Once the issues of utility has been satisfied then the emphasis may shift towards other product values like decorative, symbolic and emotional values [25]. Customer perception about product and its usage is primarily related to the core function offered by the product utility values. As a general concept, costumers give higher priority to the utilitarian benefits [26, 27]. This is also verified in the study conducted by Kivetz and Simonson [3] that consumer attach greater weight to the utilitarian benefits of product. The consumption nature of these benefits is quite different than those associated with hedonic benefits [28, 29]. The nature of utilitarian benefits in product design is considered as the must meet nature of human necessities. This must meet nature focus the customers intentions towards the product's utilitarian value because it is considered to be closer

to human necessities and needs [27, 28]. By utilitarian benefits, the fulfilment of prevention goals develop the sense of confidence and security [30]. In terms of wearable technology, we need to acknowledge the fact about user's needs other than functionality. Although a little research is available on the wearable technology because it is on the very early stage of commercialization [24]. For this reason, wearable technology is behaving more than a mere functional product arising other needs than functionality as well. These needs may refer to style, expression [31], fashion, trend and personal satisfaction in terms of user experience.

2.2 Product Hedonic Value

Hedonic values are concerned about the pleasure, joy, cheerfulness [32, 33] and fun aspects of a product. The presence of hedonic value in usable products makes it more appealing to customers as it demeans the monotony in product usage experience. Conventional design process considers product aesthetic as an integral part, but is generally given importance after functionality cut-off has been achieved [26, 34]. The functionality cut off represents the primary function of the wearable product. Hence, product styling is a major factor, which can enhance user's living experience after meeting the product's base utilitarian purpose. Researchers [26, 34, 35] like Chitturi and Hoegg have investigated the trade-offs between product styling and functionality to enhance user experience. Once the functionality requirement is met, users tend to attract towards more aesthetical products as it satisfy the sense of delight [26]. The sense of delight may refer to benefits in product's experience as a plus. This sense bears an important role in critical user's responses regarding consumer experience. User's critical responses about the product helps the designers to attain a good balance between usability and styling. Chitturi et al. suggested that user's aesthetical expectations are directly related to user satisfaction, while lack of functional expectations are related to sense of irritation [30]. Irritation and satisfaction refers to the two states of consumers' experience similar to needs and wants. Wants can be compromised up to some extent but needs are not dealt in the same way. However studies [36] suggest that in case of appropriate styling minor issues in functionality could be disregarded. These minor issues can evoke the state of dissatisfaction, but product's hedonic motivation can be balance that.

Smart wearable products, are the type of wearable products used external to the body [37] and more like a fashion jewelry [38] to the user. These smart wearable products contain smart watches, smart rings, smart eyeglasses, health bands, smart clothing, smart head mounted displays and smart jewelry etc. These are the latest IT products after smart phone and tablets [24]. As investigated by Gartner [39] many smart phone brands entered into the field of smart wearable products. As wearables are considered to be the collective or collaborative technology with mobile phone and cloud services, because of this it captured the interest of many smart phone companies to enter this niche. The share of smart wearables is increasing day-by-day and will reach to 112 million units in [40]. Therefore, these wearable create a new gap of user behaviour understanding as being new and demanding in terms of user's perception. Wearable devices mostly seen as the fashion products as they are exposed to people in various forms so people can enjoy them as a fashion items [24]. Therefore, In the

recent study conducted by Jeong et al. [41], it is demonstrated that aesthetics and style has a evident role in the adoption of wearable devices.

2.3 Product Fashion Value

Fashion is a style of product designing, which satisfies the specific trends or manners concerning users' feelings [42, 43] and social status. It is also contributing as a strong attribute in wearable products. A strong attribute of smart wearable devices is that they considered as a fashion product because of their potential exposure to the people [24]. Fashion products have the sense of style, luxury along with the comfort. Since smart wearable devices have a possible exposure to the people, therefore they demand a high level of social presence and style. These products evaluated as a sense of joy and pleasure along with the functionality and comfort [44, 45]. Since these products require a good balance in terms of fashion and technology, Rauschnabel & Ro [46] coined a term of "fashionology" for the smart wearable devices. Devices are generally considered as a useful piece of technology but in the case of smart wearable devices, it is different [47]. Particularly, smart watches in the category of wearable devices is seen as fashion accessory by most of the users [48]. Now considering it as a fashion statement, it demands a high value of aesthetics and styling [49]. This styling significantly increases the perceived value of smart watches. Sundar et al. [50] have investigated the perception of smart watches in consumer perception and acknowledged that smart watches are viewed both as utilitarian and fashion products. Now the introduction of smart watches in consumer market led the concept of form follows function in new direction. In today's market, product design and fashion trends are significantly affecting the consumers' feelings and emotions as well as their buying intentions [42, 43]. According to the previous studies, product hedonic values were considered the added benefits after the functionality cutoff. However, the introduction of smart wearable devices in consumer product markets merging the trend of useable products and fashion. Users are more concern about the product hedonics and the level of comfortability on the body [51]. This new trend demands a thorough research on the new consumer trends in product expectation and its impact on smart wearable device design process. These trends will require a good amount of balance in product hedonics and product utility depending upon the wearable product types. However, this balance between utilitarian and hedonic values in field of wearable product design has not explored extensively.

2.4 Need of Balance of Attributes

The tradeoffs of functionality and hedonic values in product design creates a sense of balance in order to appeal the consumer buying intentions. It is not necessary that increase in aesthetic and hedonic appeal necessarily decrease the functionality aspect to attain a perfect balance [36]. However, balance is considered to be the tangible and intangible perception of product's design. Aristotle, the philosopher suggested the sense of balance in all things. This suggested balance between aesthetics and functionality should preserve its core as overstyling in product design sometimes backfire. Norman [15] also acknowledged the sense of balance in beauty and usability as "good design". In addition to that, to achieve this good design, the parameters should be

constant across time and cultures to maximize the goals of life [52]. As a basic principle of design, balance is useful in every stage of product design process in the consideration of functionality and hedonics. Gombrich [53] defined delight somewhere in between bore and confusing states of consumer perception and Berlyne [54] also acknowledged that hedonic values are associated with stimulus peak of psychological arousal. These studies suggesting the balance itself possess a great importance in hedonic values of product design. Many researchers tried to investigate the sense of optimal balance in product hedonics and usability. This cannot defined in percentages or some preset values due to the subject nature of design process, consumer demands, consumer behaviors and consumer perception. This optimal balance is principally

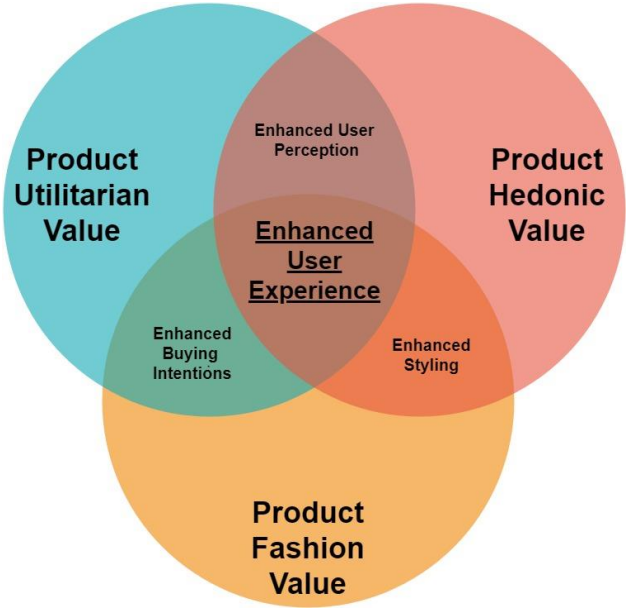

Fig. 1 Balance of attributes for enhanced user experience

based on types of products and its basic functionality. The literature studied in this research proposed an optimal balance in the attributes in wearable smart products. A relationship diagram (Fig. 1) has been developed to represent the balance of attributes and potential benefits by having enhanced product user experience. The concentration of these values in combination enhance user perception, buying intentions and styling. Wearable products bears a different consumer approach being a fashionology product and its premature existence in consumer markets. There is a strong need of research for consumer perception, buying intention, social status and consumer behaviour based on different wearable products.

3 A Striking Challenge for Wearable Devices

Raskovic [37] formulated a definition of wearable devices. According to his study, the wearable devices are being used as an external device attached as an accessory or clothes' attachment. By wearing it as an accessory, it is exposed to the people

and making it a product needs to be stylized. The term fashionology as described before is ideal for wearable devices by holding fashion and technology together. By the introduction of smart watches, bone conduction and Bluetooth headphones for mobile technology, it opened up the doorways for a strong need of research on product design. Conventionally, product's functionality and ease of use were considered as an ultimate goal of satisfaction. However, as the products grew smaller and technologically smarter, they produced a special place in everyday life being part of it [55]. Especially in terms of smart watches, they have become the indispensable tool in daily life also having the potential of helping users in dangerous situations [56]. In the present day smart watches being used as daily life style and health indicators by capturing body stats and giving user suggestions [57]. In this study, planners also prioritized the design value of smart watches to meet consumer expectations.

Wearable devices bears an important place in the today's consumer market being an emerging techno-fashion product. It also possess an added striking challenge for the product design process and empathetic problem solving methodology. Especially taking the examples of smartwatch and its development in the previous years. Starting from a simple technology piece to indispensable product, smartwatch gains an important role of people's daily life style. According to the studies [24] [58], watches are considered to be a jewelry piece for men and commonly worn as adornment, so its pleasing and hedonic approaches will attract more customers. A recent study [59] estimated that smartwatch sales would grow significantly in 2020 by reaching $17.8 billion. This growth in buying and consumers growing dependence created a strong need to rethink the product design process considering hedonics as a stronger value than before in wearable devices.

4 Conclusions and Future Research

Product design and its empathetic methodology in design process evokes a strong demand to rethink. Rethinking may involve the whole contribution of design attribute on a different scale. According to the previous studies discussed in this research paper, as functionality cutoff is essential, the strong arguments whether leaning more towards functionality or hedonics in product design ended. The discussion is about to create the perfect balance in both approaches to attract the customer attention. In case of wearable devices, the design process would be much different. The existence of wearables is clear in the consumer market as fashion and styling product and as a new emerging trend in product design. The wearable product would demand a good sense of balance in techno-style to attract the customers. Mobile phone brands have joined hands with sports brands in order to make the wearables more acceptable and useful product. However, there is a strong need of the collaborations of different style brands and jewelry brands to shake hands together and form a contributive design process to satisfy the needs of this niche. A piece of jewelry and a piece of useful technological product merged into one could be the new realm in future product design. This trend would need a strong contribution from the tech giants and luxury fashion brands to evolve the existing problem solving methodologies.

This research contribute for the new niche of product design process for wearable products. By considering wearables as fashion wares and fashion wares as

techno wares, the idea is to demean the gap of these product lines. This research can open the doorways for future research based on the consumer adaptive models of smart wearables and their application in design process. Process design is based on the needs defined, therefore this research defines the new needs for existing product design process and hence to provide a new baseline for improvement. Future research could involve the case studies by having the different smart wearables (one by one) and their market trends based on the consumers' requirements. Smartwatches, smart glasses, Bluetooth and bone conduction headphones, smart clothing, medical exterior body products, smart bracelets, smart pendants, smart rings and smart body stats indicators could be the potential wearables for the future consumer and designer research. The balance of hedonic and utility values can be studied from different case studies of the above-mentioned products to form a creative product design process. The metrics of essential elements for each smart wearable product can be identified. These metrics can help the designers and marketers to evaluate the needs for new emerging potential consumer market of enhanced product-user experience.

Acknowledgments. This study was supported by the UGC Funding Scheme from The Hong Kong Polytechnic University.

References

1. Khalid, H.M., Helander, M.G.: A framework for affective customer needs in product design. Theor. Issues Ergon. Sci. (2004).
2. Suh, N.: The Principles of Design. (Oxford Oxford Univ. Press. (1990).
3. Kivetz, R., Simonson, I.: Earning the Right to Indulge: Effort as a Determinant of Customer Preferences Toward Frequency Program Rewards. J. Mark. Res. 39, 155–170 (2002).
4. Coates, D.: Watches tell more than time: product design, information and the quest for elegance. McGraw-Hill, London, UK. (2003).
5. Mono, R.: Design for product understanding. Lib. Stock. Sweden. (1997).
6. Dittmar, H.: The social psychology of material possessions: to have is to be. St Martin's Press. New York, NY. (1992).
7. Creusen, M.E.H., Schoormans, J.P.L.: The different roles of product appearance in consumer choice. J. Prod. Innov. Manag. 22, 63–81 (2005).
8. Hollins, B., Pugh, S.: Successful Product Design. (London: Butterworths). (1990).
9. Hallnäs, L., Redström, J.: From use to presence: on the expressions and aesthetics of everyday computational things. ACM Trans. Comput. Interact. (2002).
10. Averill, J.R., Stanat, P., More, T.A.: Aesthetics and the environment. Rev. Gen. Psychol. 2, 153–174 (1998).
11. Hirschman, E.C.: Aesthetics, ideologies and the limits of the marketing concept. J. Mark. 47, 45–55 (1983).
12. Hoegg, J., Alba, J.W.: A role for aesthetics in consumer psychology. F. Kardes, C. Haugtvedt, P. Herr (Eds.), Handb. Consum. Psychol. New York Lawrence Erlbaum Assoc. 733–754 (2008).

13. Patrick, V., Hagtvedt, H.: Aesthetic incongruity resolution. J. Mark. Res. 48, 393–402 (2011).
14. Karahanoğlu, A., Erbuğ, Ç.: Perceived qualities of smart wearables. In: Proceedings of the 2011 Conference on Designing Pleasurable Products and Interfaces - DPPI '11 (2011).
15. Norman, D.A.: Emotion and design. Attract. things Work better,Interactions , July August,. 36–42 (2002).
16. Holbrook, B.M.: Consumer Value: A Framework for Analysis and Research. New York Routledge. (1999).
17. Rogers, E.M.: Diffusion of Innovations. fourth ed. Free Press. New York, NY. (1995).
18. Dvorak, J.L.: Moving Wearables into the Mainstream: Taming the Borg. Springer, Newyork, USA,. (2008).
19. Roy, L.A., Agrawal, D.P.: Next-Generation Wearable Networks. City. (2003).
20. Bodine, K., Gemperle, F.: Effects of Functionality on Perceived Comfort of Wearables. IEEE Comput. Soc. City,. (2003).
21. Lin, R., Kreifeldt, J.G.: Ergonomics in wearable computer design. Int. J. Ind. Ergon. 27, 259–269 (2001).
22. Knight, J.F., Baber, C.A.: Tool to Assess the Comfort of Wearable Computers. Hum. Factors,. 47, 77–91 (2005).
23. Anderson, G., Lee, G.: Why Consumers (Don't) Adopt Smart Wearable Electronics. City. (2008).
24. Yang, H., Yu, J., Zo, H., Choi, M.: User acceptance of wearable devices: An extended perspective of perceived value. Telemat. Informatics. (2016).
25. Crilly, N., Moultrie, J., Clarkson, P.J.: Seeing things: Consumer response to the visual domain in product design, (2004).
26. Chitturi, R., Raghunathan, R., Mahajan, V.: Form Versus Function:How the Intensities of Specific Emotions Evoked in Functional Versus Hedonic Trade-Offs Mediate Product Preferences. J. Mark. Res. (2007).
27. Higgins, E.T.: Beyond Pleasure and Pain. Am. Psychol. 52, 1280–1300 (1997).
28. Chernev, A.: Goal-Attribute Compatibility in Consumer Choice. J. Consum. Psychol. 14, 141–150 (2004).
29. Higgins, E.T.: Promotion and Prevention Experiences: Relating Emotions to Non emotional Motivational States. Handb. Affect Soc. Cogn. Joseph P. Forgas, ed. London Lawrence Erlbaum Assoc. 186–211 (2001).
30. Chitturi, R., Raghunathan, R., Mahajan, V.: Delight by Design: The Role of Hedonic Versus Utilitarian Benefits. J. Mark. (2008).
31. Miner, C.S., Chan, D.M., Campbell, C.: Digital Jewelry: Wearable Technology for Everyday Life. CHI, Des. Expo. 31 March - 5 April. (2001).
32. Lazarus, R.S.: Emotion and Adaptation. New York Oxford Univ. Press. (1991).
33. Roseman, I.J.: Appraisal Determinants of Discrete Emotions. Cogn. Emot. 5, 161–200 (1991).
34. Hoegg, J., Alba, J.W., Dahl, D.W.: The good, the bad, and the ugly: Influence of aesthetics on product feature judgments. J. Consum. Psychol. 20, 419–430 (2010).

35. Chitturi, R., Chitturi, P., Raghavarao, D.: Design for synergy with brand or price information. Psychol. Mark. 27, 679–697 (2010).
36. Hagtvedt, H., Patrick, V.M.: Consumer response to overstyling: Balancing aesthetics and functionality in product design. Psychol. Mark. (2014).
37. Raskovic, D., Martin, T., Jovanov, E.: Medical monitoring applications for wearable computing. Comput. J. 47, 495–504 (2004).
38. JP Associates: J.D. Power and Associates Reports: Wireless Customers are Keeping Their Mobile Phones Longer as Term Contracts Impact the Replacement Cycle. J.D. Power Assoc. (2007).
39. Gartner: Gartner Says Worldwide Smartwatch and Wristband Market is Poised for Take Off. (2014).
40. IDC: Worldwide Wearable Computing Market Gains Momentum with Shipments Reaching 19.2 Million in 2014 and Climbing to Nearly 112 Million in 2018,. Says IDC IDC. (2014).
41. Jeong, S.C., Kim, S.-H., Park, J.Y., Choi, B.: Domain-specific innovativeness and new product adoption: a case of wearable devices. Telemat. Inf. 34, 399–412 (2017).
42. Tunca, S., Fueller, J.: Impression formation in a world full of fake products. ACR North Am. Adv. (2009).
43. Duffy, T.M., Jonassen, D.H.: Constructivism and the technology of instruction: A conversation. Routledge. (2013).
44. Escobar-Rodríguez, T., Carvajal-Trujillo, E.: Online purchasing tickets for low cost carriers: an application of the unified theory of acceptance and use of technology (UTAUT) model. Tour. Manag. 43, 70–88 (2014).
45. Raman, A., Don, Y.: Preservice teachers' acceptance of learning management software: an application of the UTAUT2 model. Int. Educ. Stud. 6, (2013).
46. Rauschnabel, P.A., Ro, Y.K.: Augmented reality smart glasses: an investigation of technology acceptance drivers. Int. J. Technol. Mark. 11, 123–148 (2016).
47. Hein, D.W., Rauschnabel, P.A.: Augmented reality smart glasses and knowledge management: a conceptual framework for enterprise social networks. Enterp. Soc. Networks, Springer, Fachmedien Wiesbad. 83–109 (2016).
48. Chuah, S.H.W., Rauschnabel, P.A., Krey, N., Nguyen, B., Ramayah, T., Lade, S.: Wearable technologies: the role of usefulness and visibility in smartwatch adoption. Comput. Hum. Behav. . 65, 276–284 (2016).
49. Dehghani, M., Kim, K.J., Dangelico, R.M.: Will smartwatches last? factors contributing to intention to keep using smart wearable technology. Telemat. Informatics. (2018).
50. Sundar, S.S., Tamul, D.J., Wu, M.: Capturing "cool": measures for assessing coolness of technological products. Int. J. Human-Computer Stud. 72, 169–180 (2014).
51. Wright, R., Keith, L.: Wearable technology: if the tech fits, wear it. J. Electron. Resour. Med. Libr. 11, 204–216 (2014).
52. Csikszentmihalyi, M.: Design and order in everyday life. V. Margolin R. Buchanan (eds), Idea Des. (Cambridge, MA MIT Press. 118–126 (1995).
53. Gombrich, E.H.: The sense of order: a study in the psychology of decorative

art. Second ed., Phaidon, Oxford, UK. (1984).
54. Berlyne, D.E.: Studies in the new experimental aesthetics. Hemisph. Publ. Corp. Washington, DC. (1974).
55. Venkatesh, V., Thong, J.Y., Xu, X.: Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. (2012).
56. Cheng, J.W., Mitomo, H.: The underlying factors of the perceived usefulness of using smart wearable devices for disaster applications. Telemat. Inf. 34, 528–539 (2017).
57. Ho, W.C., Lee, A.W., Lee, S.J., Lin, G.T.: The Application of Quality Function Deployment to Smart Watches-The House of Quality for Improved Product Design. (2018).
58. Yu, J., Lee, H., Ha, I., Zo, H.: User acceptance of media tablets: an empirical examination of perceived value. Telemat. Inf. 34, 206–223 (2017).
59. Maddox, T.: Smartwatch sales to hit $17.8 billion in 2020, but business use lagging. www Doc. (2016).