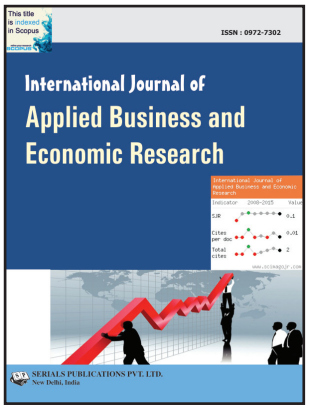

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A Study of Extended Perspective on Consumer Value for Smart Wearable Devices

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ABSTRACT

A wearable device attracts attention as a medium to provide continuous connection between people and objects in the Internet of Things (IoT) industry. However, as opposed to expectation, the wearable device market has not been vitalized yet. Price, quality, and technical limit are deemed as causes of such stagnant market but this research tried to access the essential value the consumers perceive. This research conducted an AHP analysis, setting a research model hierarchized into four dimensions through the previous researches related to the consumer value and implemented discussion to vitalize the wearable devices based on major consumer values deducted through analysis.

Keywords: Wearable Device, Consumer Value, Analytic Hierarchy Process (AHP).

1. INTRODUCTION

The smart device market, which had repeated explosive growth based on innovative products and services, is now reaching market saturation after a growth period (Kim, Lee & Park, 2010). Wearable device attracts attention as one of the next-generation mobile technologies which may break through such market situation, with leading companies in the Information Communication Technologies (ICT) field, such as Apple, Google, Samsung, and LG, competing in launching various products in order to dominate the market in advance. The significance of the wearable device is stressed since it is a medium which continuously connects the user to the things in the hyper-connected society where environment, people, things, and spaces are connected (NIA, 2014). Most of the previous researches related to the wearable device have been carried out, focusing on the motive to use based on Technology Acceptance Model (TAM) or Unified Theory of

Acceptance and Use of Technology (UTAUT) (Son, Lee & Cho, 2014; Lee, Choi &Park, 2014). However, since wearable device is not simply a device having functional elements but a device which is wearable as a digitalized fashion item, it needs to consider esthetic, humane, and cultural elements collectively (DIGIECO, 2014). In order to perform such, it needs to approach a viewpoint on the consumer value instead of a viewpoint on existing functions. This research then tries to analyze the hierarchy of values on wearable devices which the consumers perceive based on their value concept since this has been overlooked in previous researches regarding wearable devices. This study also aims to deduce a plan to vitalize the wearable device.

2. THEORETICAL BACKGROUND

Wearable Device

The wearable device is defined as an electronic device which may be attached to the body (like glasses and watch) (DIGIECO, 2014). IoT utilizing wearable device enables intelligent objects to provide context-aware service through the network while IoT-based wearable device technology shall become a main device which may use new applications that will provide an interface to operate and obtain information according to the intuition of the user through expanded content service such as Augmented Reality (AR) and Virtual Reality (VR) (Kim, Lee & Lee, 2015). According to IDC prospects, the global wearable device market is expected to grow by 78% each year from 19 million units in 2014 to 112 million units in 2018. Business Intelligence estimated that the wearable device market shall reach approximately 15 trillion won in 2018. However, notwithstanding such positive prospects for the market, the actual sales quantity and expansion speed are significantly low and slow (Shin and Lee, 2016).

Consumer Values

As a new strategic element, companies have made an effort to establish the consumer value and reflect it on the products in order to assume competitiveness in the market.

The consumer purchases valuable products based on his/her personal standard, expresses his/her own values, and is satisfied with use of the product not only by simply selecting the functions in selecting the products out of various products. In this context, value is an important and continuous belief of the people and has a motivational aspect which leads the behavior and judgment of the individual. Consumer

Table 43.1
Definition for Value

S. No.	*Field*	*Definition*
1.	Psychology	A continuous belief which leads one's behavior and judgment in order to reach the final state of the ultimate existence beyond a specific status or prompt target
2.	Sociology	A concept for the behavior pattern shared by society's members
3.	Marketing	A belief that a certain situation is preferred over others
4.	Consumer behavior	A means to understand the attitude or behavior of the consumers with a more abstract and deep concept in addition to the base of perception and attitude of the consumers

value also plays a key role in forming a positive or negative attitude for the product or service provided to the consumer (Park & Kim, 2012).

Measuring methods such as Rokeach Value Survey (RVS), List of Values (LOV), and Value and Styles (VALS) have been designed in order to establish and measure the consumer value. Despite being useful for measuring individual value orientation, these methods are limited to being abstract to understand the connective relation between the consumer and product. They also include the items not related to consumption as there is a limit in research from the consumer's viewpoint. Holbrook claimed a tool which may measure both utility value and pleasant value for a more sophisticated research for the consumer value, classifying the value which the consumer perceives into eight values through a detailed and actual viewpoint (Holbrook, 1999).

Table 43.2
Holbrool's Typology of Customer Value

S. No.	*Extrinsic*	*Intrinsic*		
1.	Efficiency (Convenience)	Play (Fun)	Active (Economic)	Self-oriented
2.	Excellence (Quality)	Aesthetics (Beauty)	Reactive (Hedonic)	
3.	Status (Impression Management)	Ethics (Virtue, Justice, Morality)	Active (Social)	Other-oriented
4.	Esteem (Reputation, Possessions)	Spirituality (Faith, Ecstasy, Sacredness)	Reactive (Aesthetics)	

Upon investigating and classifying the value standard into self-oriented value and other-person-oriented value, the self-oriented value appears as a value which assesses consumption based on one's own reaction while other-person-oriented value is a value which assesses consumption based on how other persons shall react.

The intrinsic value is assessed as the consumption experience itself while the extrinsic value is a value assessed as a tool to achieve other purposes by consumption.

The consumer value could be also classified into active value and reactive value according to the activeness of the consumer's behavior. The active value is a value assessed by the outcome resulting from the interaction between the consumer and marketing, while the reactive value is a value assessed by the emotion, simple understanding, and assessment of the consumer for the product.

The values are classified into three dimensions including Efficiency, Play, Excellence, Aesthetics, Status, Ethics, and Esteem and Spirituality (Table 43.2).

Since the consumer values above are perceived by the consumer in relation to the use and context of the product and service where they can be perceived differently according to the characteristics of the product (further, the properties, functions, and qualities of the products are various), the common characteristics of the product need to be selected.

3. THEORETICAL BACKGROUND

This research proposed an assessment model consisting of a total of four dimensions presented by Holbrook, 38 items referring to 8 consumer values presented by Holbrook, and a research carried out by Park and Kim (2012) in order to deduce the hierarchy in consumer values as regards wearable devices (Figure 43.1).

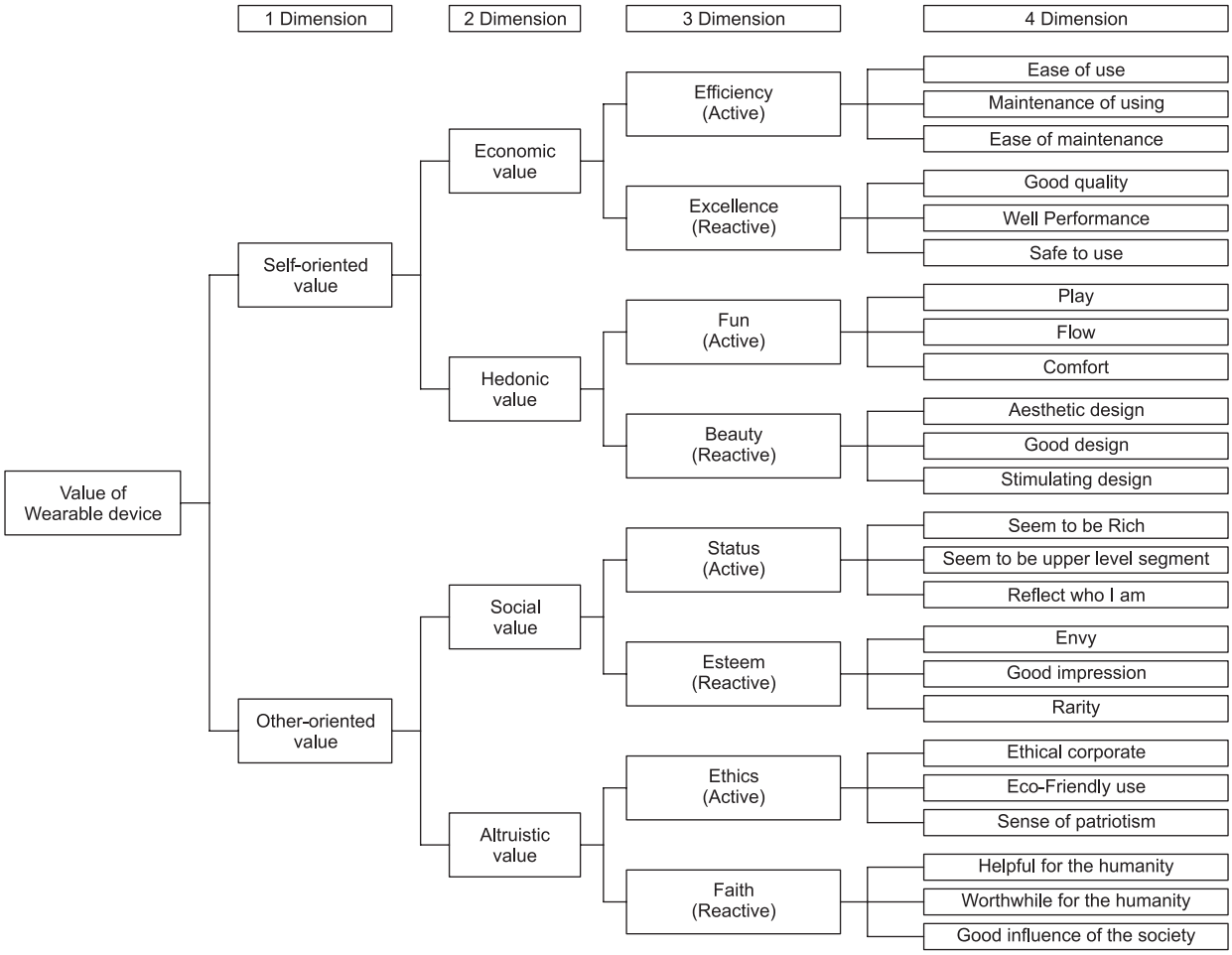

Figure 43.1: AHP Model

4. DATA ANALYSIS

AHP Analysis

Analytic Hierarchy Process (AHP) is a method to select the optimal alternative, understanding the significance of each property classifying multiple properties by hierarchy. This has been widely applied in several decision making fields due to its simplicity, clarity, convenience, and universality. Since the properties of the decision making elements and measuring scale are effectively applied to various standards decision making issues, it may set priorities systematically for several alternatives and deduce the weighted value of the alternative in a ratio scale (Saaty, 1990). AHP method measures the significance preparing a matrix through a paired comparison of the elements in the lower hierarchy. It grants the significance of the level contributing to the high hierarchy through a paired comparison by 9-point scale, with $n(n-1)/2$ times of comparisons

required if the direct low hierarchy is composed of $n \times$ elements. In addition, since the deviation of the analysis time interval does not increase to n but increases by n times, a new collective matrix shall be made, with the geometric mean of the same element values obtained from the paired comparison matrix and the weighted value of the element under assessment calculated using the characteristic root from this matrix. The questions on the questionnaires of the paired comparison between the items were designed by a 9-point scale proposed by Satty (1990) as Table 43.3 based on the proposed research model in Figure 43.1.

Table 43.3
Pair-wise Comparison Value

S. No.	*Value*	*Explain*
1.	1	A and B are equally important
2.	3	A is weakly more important than B
3.	5	A is strongly more important than B
4.	7	A is very strongly more important than B
5.	9	A is absolutely more important than B
6.	2, 4, 6, 8	The median value of each odd-numbered

Sample Selection (Innovation Adoption)

Age significantly influences the timing of new technology adoption, with younger people being faster in adopting innovations (Akhter, 2003). The elderly are relatively more reluctant to try new technologies (Gilly and Zeithaml, 1985; Phillips and Sternthal, 1997) and exhibit more negative perceptions toward them than younger people do (Pommer, Berkowitz & Walton, 1980). Moreover, many industry reports support the notion that younger people tend to replace their high-tech products earlier than older people (Huh & Kim, 2008). Therefore, it is considered that 20 samples will be suitable for the initial acceptors of innovative products like the wearable device. Thus, the questionnaire survey was conducted with 20S adults who experienced or wanted to experience using a wearable device. A total of 64 questionnaire responses were collected for analysis, excluding ones with unfaithful answers.

5. RESULT

For the gender, 25 males and 39 females participated in the survey and "Expert Choice" was used as a program to carry out AHP analysis. Prior to the criticality analysis, the reliability for the answers was secured since the ratio of the consistency calculated by Expert Choice was below 0.1. As a result of the analysis in the first dimension, the criticality value appeared to be 0.825 for self-oriented value and 0.175 for other-oriented value. In the second dimension, the criticality in the same element as the self-oriented value was 0.744 (economic value) and the same for other-oriented value which was 0.790. In the third dimension, the efficiency value in the same element of the economic value was 0.788, the fun value of the same element of the hedonic value was 0.724, the status value of the same element was 0.884, and the esthetic value in the same element was 0.682. In the fourth dimension, ease of use was 0.430, good performance was 0.446, play was 0.458, good design was 0.523, seem to be upper level segment was 0.373, rarity was 0.542, ethical corporation was 0.485, and helpful for humanity was 0.536 (Figure 43.2; Table 43.4).

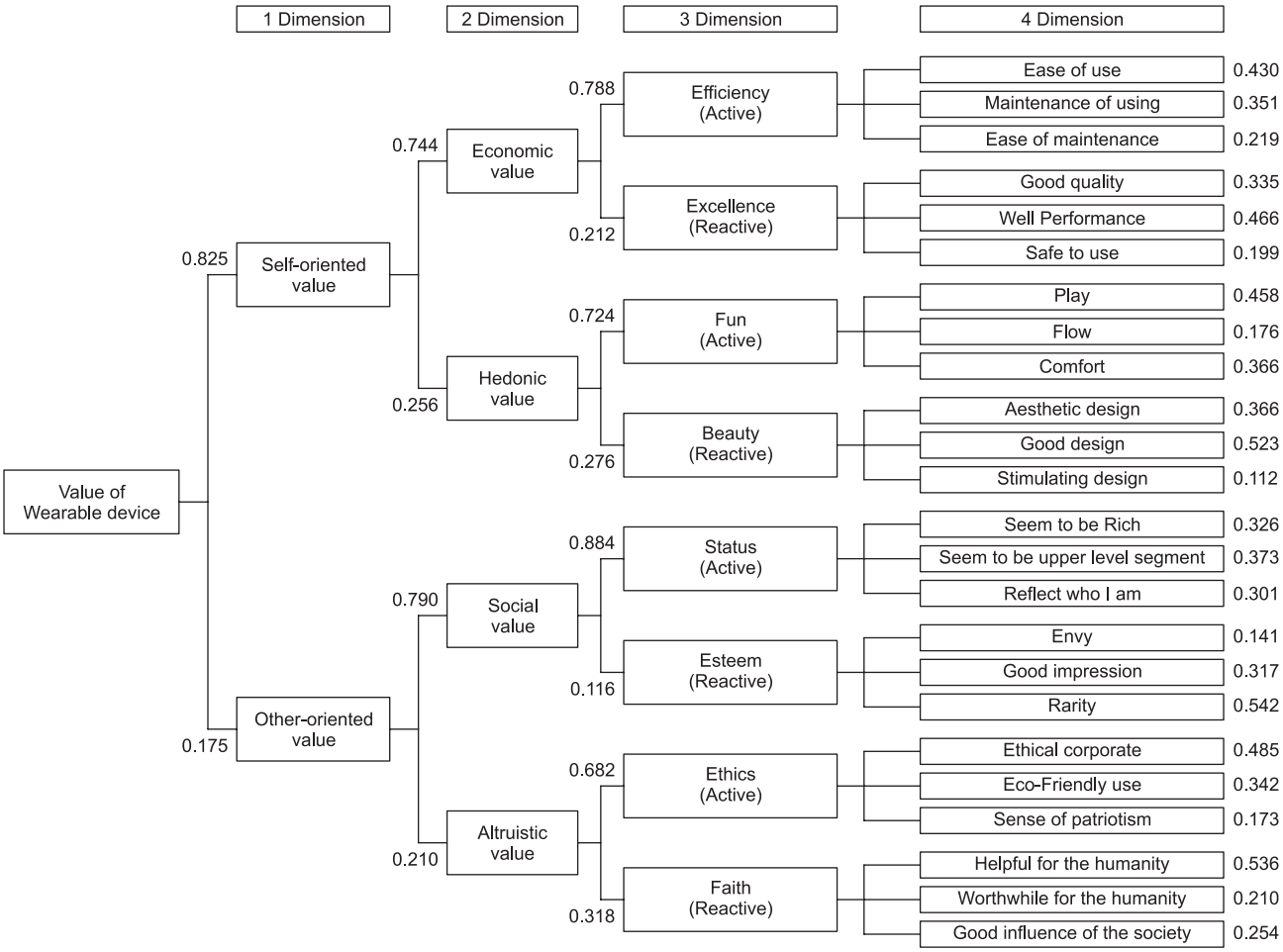

Figure 43.2: AHP Result

Table 43.4
AHP Result

S. No.	*1Dim & Weight*	*2Dim & Weight*	*3Dim & Weight*		*4Dim & Weight*	
1.	Self-oriented value 0.825	Economic value 0.744	Efficiency (Active)	0.788	Ease of use	0.430
					Maintenance of using	0.351
					Ease of maintenance	0.219
			Excellence (Reactive)	0.212	Good quality	0.335
					Well Performance	0.466
					Safe to use	0.199
		Hedonic value 0.256	Fun (Active)	0.724	Play	0.458
					Flow	0.176
					Comfort	0.366
			Beauty (Reactive)	0.276	Aesthetic design	0.366
					Good design	0.523
					Stimulating design	0.112

S. No.	*1Dim & Weight*	*2Dim & Weight*	*3Dim & Weight*		*4Dim & Weight*	
2.	Other-oriented value 0.175	Social value 0.790	Status (Active)	0.884	Seem to be Rich	0.326
					Seem to be upper level segment	0.373
					Reflect who I am	0.301
			Esteem (Reactive)	0.116	Envy	0.141
					Good impression	0.317
					Rarity	0.542
		Altruistic value 0.210	Ethics (Active)	0.682	Ethical corporate	0.485
					Eco-Friendly Use	0.342
					Sense of patriotism	0.173
			Faith (Reactive)	0.318	Helpful for the humanity	0.536
					Worthwhile for the humanity	0.210
					Good Influence on the Society	0.254

6. CONCLUSION

This research tried to access the fundamental value of the product based on the consumer in order to vitalize the wearable device. Sub-factors of the wearable device were hierarchized into eight values and sub-factors proposed by Holbrook by collecting and analyzing the assessment elements for the consumers' value, deducing the following suggestions based on the calculation of criticality by AHP analysis.

First, the consumers put significance on self-oriented value in a wearable device. The consumers seek for economic value such as usefulness, performance, and excellence compared to wearable device that is expensive but fails to meet the consumer value due to short operation time and simple functions. Thus, it is important to improve the UI, affordability, business model, and contents of the wearable device so that the consumers may use it easily and continuously. Second, the consumers put premium to properties such as fun and play. Recently, large ICT companies such as Samsung, Sony, and LG have launched glass type VR devices departing from the watch type wearable device and it seems to be a good strategy for the vitalization of the wearable device if the contents and infra which give fun like a game are well-established. Third, social value appears to be essential in the sub-dimension of the other-oriented value. This is a value the consumer feels in order to be recognized by others using such wearable device (like premium, high-end, or so-called luxury products. Lastly, when items with high significance in the same factor dimension are aggregated, the important type of the consumer value in the wearable device proved to be extrinsic and active. The consumer consumes in relation to a self-oriented motive, assesses the value, and puts significance to value obtained from active interaction between the consumer and the device. Such values were observed in Google Glass Project which nearly reached the commercial phase but was suspended. Google Glass caused many problems since a social solution was not presented in accordance to privacy invasion. In the long run, Google Glass Project became a big issue over the world as the people who used Google Glass without minding other persons and those who did were in conflict with each other. Not only are technical developments necessary to vitalize the wearable device; discussions for social agreement are also important.

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