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-RESEARCH ARTICLE-

INFLUENCE OF DESIGN AESTHETICS AND BRAND NAME ON GENERATION Y STUDENTS' INTENTION TO USE WEARABLE ACTIVITY-TRACKING DEVICES

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─Abstract─

Wearable activity-tracking devices such as pedometers, fitness bands and watches, heart-rate monitoring chest straps and armbands, various types of activity-sensing clothing and the like, are increasing in popularity amongst consumers on a global scale. Among all wearable technology, fitness trackers remain the biggest wearables category by unit sales in 2019, with an estimated revenue potential of 2.66 billion US dollars. However, despite this significant global interest, the adoption rate of these devices is slow amongst South African consumers. The consumer segment most likely to adopt a wearable activity tracker is young, high-income individuals, which are epitomised by Generation Y consumers, especially the student portion of this market segment since they are characterised by high future earning probability. With the lack of research regarding the adoption of wearable activity trackers, this study explores the influence of device design aesthetics and brand name on Generation Y consumers' intention to use wearable activity trackers. A self-administered questionnaire was used to survey a non-probability convenience sample of 480 students registered at three public South African higher education institutions (HEIs) within the Gauteng province. A descriptive research design and a quantitative research approach was followed,

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where the captured data were analysed using descriptive statistics, correlation analysis, reliability and validity measures and structural equation modelling. The findings indicate that design aesthetics and brand name significantly influence Generation Y students' intention to use wearable activity-tracking devices. A device's design aesthetics as well as brand name are significant in determining Generation Y students' intention to use such tracking devices. As such, retailers and marketers should focus on enhancing design aesthetics and brand awareness of wearable activity-tracking devices when targeting the lucrative Generation Y student market segment.

Key Words: Wearable activity-tracking devices, Generation Y students, Intention to use, South Africa

JEL Classification: M31, M37, O30

1. INTRODUCTION

A wearable activity-tracking device, also referred to as a fitness tracker, is an electronic device that can be worn on the body to measure one's fitness-related movement and metrics in real time, whilst being able to connect to a computer or a smart phone through wireless connectivity mediums for the purpose of displaying and tracking the recorded information (Techopedia, 2018). Typically, these devices make use of accelerometers, altimeters, sensors and algorithms to track the number of steps taken, distance travelled, calories burnt (Beckham, 2012), record different sport sessions (Hong, 2015), static or optical heart-rate data (Rettner, 2014), as well as patterns and quality of sleep (Haslam, 2016). Wearable activity-tracking devices pose important health and fitness benefits for the user. The recorded information may be used to enhance lifestyle behaviours, such as becoming more active, as well as adjusting one's diet- and sleep regimen (Maher, Ryan, Ambrosi, & Edney, 2017). Another advantage for users is to share the data with friends by means of text-messaging or on social platforms, such as Endomondo, Strava, Facebook or WhatsApp, where a competitive instinct impels better performance and results in an ego boost, particularly when the device constantly commends the user for achieving daily goals (Nield, 2017). In addition to promoting healthier lifestyles, fitness trackers are used by consumers to make a fashion statement, which drives the significant need for fashionable fitness trackers (Weingus, 2015).

Globally, activity-tracking devices are increasing in popularity amongst consumers, which is evident in the significant size of the global fitness tracker market (Loomba & Khairnar, 2018). Among all wearable technology, fitness trackers remain the biggest wearables category by unit sales in 2019, with an estimated revenue

potential of 2.66 billion US dollars (CCS Insight, 2019), expected to reach 48.2 billion US dollars by 2023 (P&S Market Research, 2018). The continuous rise in technological innovation, in addition to the increased health consciousness among consumers, is likely to provide even more future growth opportunity for the fitness tracker market (Loomba & Khairnar, 2018). In South Africa, the adoption rate of these devices is slow amongst consumers. Less than 13 percent of South African households owned some form of wearable technology in 2018. However, this number is expected to increase as this technology becomes more widespread and affordable (Business Tech, 2018). The recorded market penetration rate of 3.81 percent for wearable activity-tracking devices in 2017 is expected to increase to 4.83 percent by 2020 (Statista, 2018). Notably, the size and growth of the fitness trackers market, both globally (Loomba & Khairnar, 2018), as well as in South Africa (Business Tech, 2018) is dominated and driven by the youth, labelled as Generation Y (Markert, 2004).

Understanding the Generation Y cohort, which includes individuals born between 1986 and 2005 (Markert, 2004), is essential for marketers and retailers (Smith, 2011). Generation Y is considered the largest consumer segment in the world (Fry, 2015) and is positioned to become the most affluent generation thus far (Cox, Kilgore, Purdy & Sampath, 2008) with a high aggregate spending (Brown, 2015) standing at 20 trillion US dollars in 2014 (Barmann, 2014). Individuals of Generation Y, raised in a media- and information-saturated world, are regarded as the most tech- and internet-savvy generation to date, with significantly high technology adoption rates (Ferguson, 2008) and are viewed by marketers as being fashion conscious (Cassidy & Van Schijndel, 2011), sophisticated and consumption-orientated (Eastman & Liu, 2012). The significant size of the South African Generation Y market segment, which comprised approximately 36 percent of the country's population in 2018 (Statistics South Africa, 2018), makes them important to South African marketers and retailers, including those of activity-tracking devices (Valaei & Nikhashemi, 2017). Generation Y members who have engaged in tertiary education are important to marketers and retailers, since higher education is associated with higher future earning potential and higher social standing (Bevan-Dye & Surujlal, 2011). Typically, studies pertaining to university students include individuals between 18 and 24 years (Kumar & Lim, 2008).

Consumer intent is an important behavioural aspect in understanding consumers' behaviour (Ajzen, 1991). Described as the anticipated outcome that precedes planned behaviour (Al-Debei, Al-Lozi & Papazafeiropoulou, 2013), behavioural intention pertains to a consumer's willingness to perform a certain behaviour (Chan & Bishop, 2013). Importantly, an individual's intention to perform a specific

behaviour is dependent on the individual's favourable evaluation of performing the behaviour (Ajzen, 1991). Therefore, the higher a consumer's intention is towards using wearable activity-tracking devices, the more likely they will purchase such devices. Studies pertaining to consumers' attitudes and intention to use wearable activity tracking devices (Chin, Johnson, & Schwarz, 2008; Wang, Dacko, & Gad, 2008; Yang, Yu, Zo & Choi, 2016) are limited. Furthermore, while there are studies on the importance of design aesthetics (Jeong, Kim, Park & Choi, 2017) and brand name (Yang *et al*., 2016) and the role they play in influencing consumers' usage intentions of new technologies, there is a lack of research on the influence of these antecedents on Generation Y students' intention to use wearable activity trackers (Pateman, 2015). As such, the purpose of this study was to explore the influence of device design aesthetics and brand name on Generation Y students' intention to use wearable activity trackers.

2. FACTORS THAT INFLUENCE INTENTION TO USE WEARABLE ACTIVITY-TRACKING DEVICES

The marketing literature notes that both a product's design aesthetics (Pateman, 2015) and brand name (Nordquist, 2017) are important tools for differentiating a product from that of its competitors.

Design aesthetics is a key component influencing consumers' product preferences when making purchasing decisions (Schmitt & Simonson, 1997), including selecting wearable activity-tracking devices (Pateman, 2015). The aesthetic design of a product appeals to consumers' senses, which influence their product perceptions and decision-making. Therefore, design aesthetics is an essential component of a company's marketing strategy (Schmitt & Simonson, 1997). The word aesthetics relates to the perception by one's senses (Ford, 2009), as derived from the ancient Greek term for perception, namely *aisthesis* and refers to the principles that oversee the nature and appreciation of beauty (Encyclopedia of Art Education, 2017). In a modern view, aesthetics is used to characterise a specific style or design (Ford, 2009) and is an individual's understanding of what is beautiful (Pateman, 2015).

In this study, design aesthetics refers to how wearable activity-tracking devices are perceived to appear overall, with specific reference to the shape, colour and style, measuring the degree to which these devices are perceived to be attractive, stylish, trendy, sleek and sophisticated. A stylish design describes a device that has a high quality appearance (Cambridge Dictionary, 2017), whereas a trendy design is one that is modern and influenced by the most recent fashion or ideas. When referring to an item of clothing or accessory to one's attire, the word sleek is commonly used

and refers to the smoothness of the design as opposed to a more rugged, bulky and striped look and feel (Walter, 2009). A sophisticated design refers to clothes and accessories that are streamlined, refined and tailored, flawlessly fits the user, with clean-cut and invigorating colour combinations (Cox, 2008). Evidently, design aesthetics regarding technological devices, refers to the degree of perceived device attractiveness. For the purpose of this study, design aesthetics is theorised to influence consumers' intention to use wearable activity-tracking devices. It is believed that if the device design aesthetics are perceived to be high, it will have a positive influence on consumers' intention towards using wearable activity-tracking devices.

The name or title given to a specific product or service by the manufacturer or organisation is referred to as the brand name. Brand names help consumers to identify and differentiate one product from another and can be protected by a trademark (™) (Nordquist, 2017). According to Yang *et al*. (2016), brand name is a key element when selecting a wearable activity-tracking device, as it reflects the quality of a wearable activity-tracking device and reduces the possible risk often associated with purchasing new technology. Viewed as a social indicator, brand name is widely acknowledged as an important motivating factor in consumer decision-making (Hillenbrand, Alcauter, Cervantes, & Barrios, 2013) and provides a way to both express and increase one's self-image (Yang *et al*., 2016), as well as allow the consumer to identify themselves with the brand and express status and social identification (Del Río, Vázquez & Iglesias, 2001). When faced with uncertainty when evaluating products, brand name is the foremost extrinsic signal consumers use to assist with decision-making (Dawar & Parker, 1994). Moreover, brand name is a crucial determinant of a new products' success. When consumers lack experience with a product, prior experience with known brand names offers them a certain degree of familiarity (Grewal, Krishnan, Baker Borin, 1998). Owing to wearable activity-tracking devices being relatively new in the South African consumer market, it may be assumed that a well-known brand name is essential to the adoption of such devices. Previous research found brand name to be a significant influential factor on consumers' decision making and purchase intention (Grewal *et al*., 1998); hence, it is important to determine the influence of brand name on Generation Y students' intention to use wearable activity trackers.

3. METHODOLOGY

This study used a descriptive research design, following the single cross-sectional approach.

3.1. Sampling method

The target population for the study was defined as Generation Y university students aged between 18 and 24 years, registered at public South African higher education institutions (HEIs). From the initial sampling frame comprising the 26 registered South African public HEIs (Business Tech, 2015), three campuses located in the Gauteng province were selected, using judgement sampling. Thereafter, following the mall-intercept approach, a non-probability convenience sample of 600 students was drawn (200 per institution).

3.2. Research instrument and data collection

To collect the required data, a structured self-administered survey questionnaire was used. This survey questionnaire comprised a section requesting the completion of the sample participants' demographic information as well as a section to which participants had to respond to scaled questions based on previously published studies. Design aesthetics (five items) was measured using the attractiveness scale adapted from Nelson, Verhagen and Noordzij (2016); whereas, the three-item brand name scale was adapted from Yang *et al*. (2016). Generation Y students' intention to use wearable activity-tracking devices (three items) was measured by adapting the scale of Kim and Shin (2015). All scaled responses were measured on a six-point Likert scale, ranging from strongly disagree (1) to strongly agree (6). After permission was solicited from lecturers at each of the three HEI campuses, questionnaires were distributed to those lecturers' students for voluntary completion. The captured data were analysed using the IBM Statistical Package for Social Sciences (SPSS) and AMOS, Version 25 for Windows.

4. RESULTS

Of the 600 questionnaires distributed, 480 usable questionnaires were returned, resulting in a response rate of 80 percent. A description of the sample participants is outlined in Table 1.

Table 1: Sample description

Gender	%	Age	%	Province	%	Institution	%
Male	40.2	18	20.6	Eastern Cape	4.0	Traditional	37.5
Female	59.4	19	27.9	Free State	6.7	Technology	37.3
Missing	0.4	20	17.7	Gauteng	52.3	Comprehensive	25.2
		21	17.3	Kwazulu-Natal	4.4		
		22	9.0	Limpopo	17.5		
		23	5.0	Mpumalanga	7.7		
		24	2.5	North West	6.5		
				Northern Cape	0		
				Western Cape	0.6		
				Missing	0.4		

The sample included participants from eight of South Africa's nine provinces, with no participants that originated from the Northern Cape and participants from each of the seven age categories in the target population. The sample included more female than male participants. Descriptive statistics and reliability coefficients were computed, as well as Pearson's product-moment correlation coefficients for each pair of constructs. Table 2 presents these results.

Table 2: Descriptive statistics, reliability analysis and correlation coefficients

Constructs	Means	Standard deviations	Cronbach alpha values	F1	F2
Design aesthetics	4.34	0.96	0.831		
Brand name	4.69	1.10	0.841	0.178*	
Intention to use	4.77	1.18	0.934	0.322*	0.349*

*Statistically significant at $p \leq 0.01$ (two-tailed)

As evident from Table 2, all Cronbach's alpha values were above the satisfactory minimum level of 0.70 (Zikmund & Babin, 2013), thereby indicting acceptable internal consistency reliability. Mean values above 3.5 recorded on a six-point Likert-type scale indicate that Generation Y students intend to use wearable activity-tracking devices in the near future (mean = 4.77) and that the device's brand name (mean = 4.69) and design aesthetics (mean = 4.34) are both integral factors when selecting such devices. Furthermore, as presented in Table 2, the computed correlation coefficients indicate statistically significant ($p \leq 0.01$) and positive relationships between each of the pairs of constructs, suggesting nomological validity (Hair, Black, Babin & Anderson, 2019). Additionally, there were no multicollinearity concerns since the collinearity diagnostics delivered a tolerance value of 0.968 for both independent factors and an average variance inflation factor (VIF) of 1.03. This indicates no issues of multicollinearity since higher tolerance values (Hair *et al.*, 2019) and a VIF below 10 (Burns & Bush, 2014) indicate a small degree of multicollinearity. The lack of multicollinearity

concerns combined with the nomological validity of the measurement theory allowed for structural equation modelling to be performed.

A three-factor measurement model was specified for confirmatory factor analysis comprising design aesthetics (five items), brand name (three items) and intention to use wearable activity-tracking devices (three items). The first loading on each of the three factors was fixed at 1.0 for model identification purposes. As a result, there were 66 distinct sample moments and 25 distinct parameters to be estimated, leaving 41 degrees of freedom (df) based on an over-identified model. A chi-square value of 145.44 was produced with a probability level equivalent to 0.001. The model was inspected for any problematic estimates including standardised factor loadings either above 1.0 or below -1.0 as well as negative error variance values, construct reliability (CR) values, the average variance extracted (AVE) and the squared root of the AVE (√AVE) – all of which were calculated to assess the construct reliability and convergent validity of the measurement model (Hair *et al.*, 2019). These findings are illustrated in Table 3.

Table 3: Measurement model estimates

Constructs	**Standard loading estimates**	**Error variance estimates**	**CR**	**AVE**	**√AVE**
Design aesthetics (F1)	0.73	0.54	0.83	0.50	0.71
	0.82	0.68			
	0.70	0.49			
	0.66	0.44			
	0.59	0.35			
Brand name (F2)	0.83	0.69	0.85	0.65	081
	0.88	0.78			
	0.69	0.48			
Intention to use (F3)	0.90	0.80	0.93	0.82	0.91
	0.92	0.86			
	0.90	0.81			
Correlations	F1↔F2: 0.20	F1↔F3: 0.37	F2↔F3: 0.39		

As indicated in Table 3, there were no problematic estimates and statistically significant relationships ($p \leq 0.001$) were calculated between each of the pairs of factors. Moreover, the CR values above 0.70 demonstrate composite reliability (Malhotra, 2010). Standardised factor loadings above 0.50 and AVE values equal to or above 0.50 infer convergent validity, while the fact that the square root of each of the AVE values exceeds the correlation coefficients gives evidence of discriminant validity (Hair *et al.*, 2019). The model fit was determined by assessing the chi-square, the standardised root mean residual (SRMR), the root mean square of approximation (RMSEA), the goodness of fit index (GFI), the incremental fit

index (IFI), the Tucker-Lewis index (TLI) and the comparative fit index (CFI). A good fit is indicated by a non-significant chi-square value with GFI, IFI, TLI and CFI values exceeding 0.9 (preferably above 0.95) as well as a small SRMR and RMSEA values of 0.08 or less (Hooper, Coughlan, & Mullen, 2008). Despite a significant chi-square statistic [(145.44 (df = 41, p<0.000)], the measurement model returned acceptable fit indices of SRMR = 0.04, RMSEA = 0.073, GFI = 0.95, IFI = 0.96, TLI = 0.95 and CFI = 0.96. Based on this measurement model, a structural model was constructed and tested. Table 4 shows the estimated standardised regression coefficients.

Table 4: Standardised regression coefficients for the structural paths

Paths	β	Unstandardised β	Estimates	p-values	Results
Design aesthetics → Intention to use	0.31	0.37	0.098	0.001	Significant
Brand name → Intention to use	0.32	0.34	0.106	0.001	Significant
β: beta coefficient; SE: standard error; *p*: two-tailed statisical significance					

Whilst the structural model returned a significant chi-square value [(145.44 (df=41, p<0.000)], the model returned acceptable fit indices. The values comprised SRMR = 0.04, RMSEA = 0.073, GFI = 0.95, IFI = 0.96, TLI = 0.95 and CFI = 0.96. Table 4 further indicates that both the paths tested were statistically significant (p≤0.01). Design aesthetics (β = 0.31, p<0.001) and brand name (β = 0.32, p<0.001) have a statistically significant positive influence on intention to use wearable activity-tracking devices. The squared multiple correlation coefficient for intention to use is 0.24, demonstrating that design aesthetics and brand name collectively explain 24 percent of the variance in Generation Y students' intention to use wearable activity trackers. There is a possibility that other factors might contribute in explaining Generation Y students' intention to use such devices.

5. DISCUSSION

This study aimed to determine the influence of design aesthetics and brand name on Generation Y students' intention to use wearable activity-tracking devices. Similar to previous studies that emphasise the importance of both variables (Dehghani, 2018; Hernández & Küster, 2012; Grewal *et al*., 1998), the findings of this study indicate that design aesthetics and brand name have a significant influence on consumer's intention towards wearable activity trackers. Despite the known importance of the influence of brand name and design aesthetics on consumer behaviour, this study is the first to link this importance to a largely under-researched industry, namely wearable activity-tracking devices. This study established that a device's brand name significantly influences this cohort's

intention to use wearable activity-tracking devices. This suggests that a reliable brand name is a key factor to consider when choosing a device and reflects the quality of a wearable activity-tracking device. Moreover, there appears to be less risk of being disappointed when purchasing a device with a reliable brand name. As such, a wearable activity-tracking device with a reliable brand name, that is attractive, stylish-looking, trendy, sleek and sophisticated in design, will influence Generation Y students' intention to use such devices in the near future.

To this end, wearable activity-tracking device manufacturers, especially well established and popular international companies, should note that the devices' design aesthetics and the brand name are vital to South African Generation Y students' intention to adopt such devices and they should consider the above design aesthetic factors when designing and manufacturing new devices to appeal to this lucrative segment. Both local and international device manufacturers, retail outlets and e-commerce sites, together with their marketing managers, should continuously monitor this cohorts' intention to use and subsequently purchase wearable activity-tracking devices. These entities should continue to influence this Generation's intention to use wearable activity-tracking devices by manufacturing a device that matches the needs of these consumers and constantly introducing new and innovative models. Further initiatives include offering these devices on a trial basis, implementing alternative payment methods and payment terms, such as on an interest-free basis and continuously advocating the benefits of using these devices. These efforts might encourage large-scale acquisition of wearable activity-tracking devices among the target population based on their proven intent.

Like most studies, several limitations can be identified in this study. First, non-probability convenience sampling was employed, therefore caution should be taken in generalising the results to the target population. Secondly, the study used a single cross-sectional research design, which merely provides a snapshot in time. Future research, in the form of a longitudinal study, would provide valuable information concerning any changes in Generation Y students' intentions towards using wearable activity-tracking devices.

6. CONCLUSION

Increasing the adoption rates of wearable activity-tracking devices among South African consumers, subsequently leading to an economical boost, depends largely on consumers' acceptance of these technologies as well as the continuous efforts of device manufacturers, retailers and e-commerce sites to market these devices to the target population. The model empirically tested in this study concludes that design aesthetics and brand name are crucial factors that influence Generation Y students'

intention to use wearable activity-tracking devices. The marketing managers of wearable activity-tracking device manufacturers, especially well established and popular international companies, retailers as well as e-commerce sites in South Africa and abroad, can use these findings to better comprehend Generation Y students' wearable activity-tracking device intent and subsequent usage and formulate efficient, targeted strategies to increase the usage of these devices amongst this lucrative target population.

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