

The Relationship between User Personality Traits and Perceived Product Characteristics: An Exploratory Study

Chajoong Kim

School of Design and Human Engineering, UNIST, Ulsan, South Korea

Abstract

Background Due to current market globalization, a single electronic product such as the iPhone is used by many users worldwide. However, the ways that consumers perceive products cannot be necessarily the same because consumers belong to their own inherent culture and individual characteristics. Recently, the electronics industry has realized the importance of local and personal influences of product perception. Nonetheless, there have been very few studies on how individual characteristics may influence perceived product characteristics. Personality has been recognized as a representative variable of individual characteristics. Therefore, this exploratory study investigates how user personality can make a difference in the perception of product characteristics.

Methods The iPhone was selected among various popular electronic products as a target product. A questionnaire survey and interview were conducted to discover the correlation between user personality traits and perceived product characteristics. Twenty Dutch iPhone users participated in the study.

Results The overall results indicate that there is a relationship between user personality traits and perceived product characteristics. Each personality trait showed a significant correlation with the perception of particular product characteristics. However, function did not show a significant correlation.

Conclusion The personality traits of the user influenced the perception of product characteristics. Therefore, it is imperative to figure out how the personality of the user correlates with particular product characteristics while increasing user satisfaction. These findings can provide designers a better understanding of how product characteristics are differently perceived, depending on particular user personality traits, and help designers map the design direction of their target user group.

Keywords User experience, User characteristics, Product characteristics, Personality

This work was supported by the National Research Foundation of Korea Grant funded by the Korean Government(NRF-2014S1A5A8019577)

Citation: Kim, C. (2014). The Relationship between User Personality Traits and Perceived Product Characteristics: An Exploratory Study. *Archives of Design Research*, 27(4), 91-101.

<http://dx.doi.org/10.15187/adr.2014.11.112.4.91>

Received Aug. 13. 2014 **Reviewed** Sep. 17. 2014 **Accepted** Oct. 06. 2014

pISSN 1226-8046 **eISSN** 2288-2987

Copyright : This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0/>), which permits unrestricted educational and non-commercial use, provided the original work is properly cited.

1. Introduction

Since the consumer electronics market was expanded to the worldwide, consumer electronic products such as iPhone have been used by many consumers all over the world. However, the ways that people perceive the products cannot be necessarily the same between them considering they belong to their own inherent characteristics in terms of culture and individual quality. Nonetheless, the electronic industry has focused on similarities rather than differences between people. This diversifying of users may explain why consumer dissatisfaction with electronic products is increasing although the products technically work well (Lu et al., 2007; Koca et al., 2009): such consumer dissatisfaction has been defined as No Fault Found (NFF) or No Trouble Found problems (Geudens et al., 2005; Khan et al., 2014). This kind of non-technical consumer complaints has been more and more increased since the mid 90s (Figure 1). The problems have become a serious threat to the industry because it influences brand loyalty and this leads to product return. NFF cases have first been recognized explicitly within modern high-volume consumer electronics industry and more recently within the mobile phone industry (Koca, 2010). In 2006, NFF returns cost the global mobile industry \$4.5 billion (Overton, 2006). In 2007, NFF processing costs, only in Europe and USA, were about \$5 billion in the consumer electronics industry (Accenture, 2008).

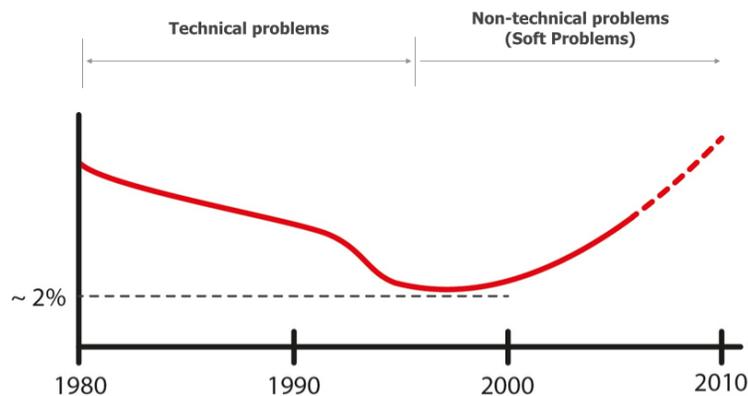


Figure 1 Increasing consumer complaints on new products (den Ouden et al., 2006)

Hence, it is of important to figure out whether user characteristics representing the user diversity (e.g. cultural background and individual characteristics of consumers) influence the perception of consumer electronic products and also in which way they do, if so.

Up to date, there have been several studies in which the influence of culture in product experience is identified. However, few studies have been done in relation to individual characteristics of users. In addition, their focus was on user-related variables rather than product-specific variables. Therefore, this study focuses on how user personality as a representative variable of individual differences is related to product attributes (Bolfing, 1989; Sheth et al, 1999). In order to effectively deal with consumer (dis)satisfaction, the electronic industry must know what product-specific variables exist in the perception of users, how they affect satisfaction or dissatisfaction of the user and what relationship the

product attributes have with user personality (Figure 2).

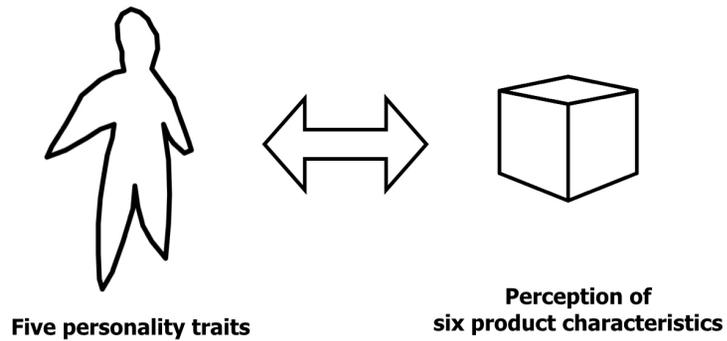


Figure 2 The Conceptual Framework of the Study

1. 1. Big Five Personality

Personality can be measured by making use of the 'Big Five Personality Test'. This test measures five broad domains (or dimensions) of personality, which is considered to be one of the most comprehensive, empirical, and data-driven research findings. The Big Five dimensions are neuroticism, extroversion, openness, agreeableness and conscientiousness, and the definitions and implications are described as follow (see also Figure 3 and 4):



Figure 3 Examples of Each Domain of The Big Five Personality Traits

Neuroticism is an enduring tendency to experience negative emotional states, such as anger and anxiety. This dimension is associated with low emotional intelligence, which involves emotional regulation, motivation, and interpersonal skills (Goleman, 1997).

- High score: individuals are more likely than the average to experience such feelings as anxiety, anger, guilt and depressed mood (Metthews & Deary, 1998). They respond more poorly to environmental stress, and are more likely to interpret ordinary situations as threatening, and minor frustrations as hopelessly difficult.

- Low score: individuals are more emotionally stable and less reactive to stress. They tend to be calm, even tempered, and less like to feel tense or rattled. Although they are low in negative emotion, they are not necessarily high on positive emotion.

Extroversion is characterized by positive emotions and the tendency to seek out stimulations and the company of others. Carl Jung (1971) and the authors of the Myers-Briggs Type Indicator (1980) suggest that everyone has both an extraverted side and an introverted side, with one being more dominant than the other.

- High score: extroverts enjoy being with people and are often perceived as full of energy. Extroverts tend to be gregarious, assertive, and interested in seeking out excitement.
- Low score: introverts lack the social exuberance and activity levels of extroverts. They tend to be more reserved, less outgoing, and less sociable. They are not necessarily loners but they tend to have smaller circles of friends and are less likely to thrive on making new social contacts.

Openness is one of the five major domains of personality discovered by psychologists (Golberg, 1993; McCrae & John, 1992). Openness involves active imagination, aesthetic sensitivity, attentiveness to inner feelings, preference for variety, and intellectual curiosity (Costa & McCrae, 1992). Openness to experience correlates with creativity (McCrae, 1987).

- High score: individuals are intellectually curious, appreciative of art and sensitive to beauty. In comparison with closed people, they are more creative and more aware of their feelings.
- Low score: individuals are considered to be closed to experience. They tend to be conventional and traditional in their outlook and behavior. They prefer familiar routines to new experiences, and generally have a narrower range of interests. They could be considered practical and down to earth.

Agreeableness is a tendency to be pleasant and accommodating in social situations. Agreeableness is one of the five major dimensions of personality structure, reflecting individual differences in concern for cooperation and social harmony (Graziano & Eisenberg, 1997).

- High score: individuals are empathetic, considerate, friendly, generous, and helpful. They also have an optimistic view of human nature. They tend to believe that most people are honest, docent, and trustworthy.
- Low score: individuals place self-interest above getting along with others. They are generally less concerned with others' well-being, report less empathy, and are therefore less likely to go out of their way to help others. Individual who score very low on agreeableness have a tendency to be manipulative in their social relationships. They are more likely to compete than to cooperate.

Conscientiousness is a tendency to show self-discipline, carefulness, thoroughness, organization, deliberation (the tendency to think carefully before acting), and need for

achievement (Thompson, 2008).

- High score: individuals are generally hard working and reliable. When taken to an extreme, they may also be workaholics, perfectionists, and compulsive in their behavior.
- Low score: individuals are not necessarily lazy or immoral, but they tend to be more laid back, less goal-oriented, and less driven by success.

High scores are ↑ ↓ Low scores are	Anxious Easily stressed	Imaginative Metaphysical	Disciplined	Empathetic	Outgoing Enthusiastic
	NEUROTICISM	OPENNESS	CONSCIENTIOUSNESS	AGREEABLENESS	EXTROVERSION
	Unflappable	Practical Concrete	Spontaneous	Unempathetic	Quiet Stoical

Figure 4 Big Five Personality Traits and Their Implications

1. 2. Product characteristics

Every product is built from many variable facets that ultimately give the product its personal and individual character (Govers, 2005). By stripping the product to its very core you can identify the specific attributes that constitute to the product character and thereby generating a schematic of basic design elements. According to Edwin (2006), a product can be characterized in terms of six dimensions and they help designers map design direction for a product: Function, Aesthetics, Signification, Sexuality, Experience, and Mediation (see also Figure 5).

Function: this dimension refers to the primary purpose of a product explaining why the product is created. By fulfilling certain needs of the user, a product should satisfy physiological requirements as well as emotional needs such as pleasure and belonging (Hsiao and Chen, 1997).

Aesthetics: product aesthetics refers to the physical appearance of a product, which consists of its form, material and colour. This dimension is also related to the perception of how well a product works in a way that aesthetically pleasing things are perceived to work better (Norman, 2004).

Signification: this refers to symbolism involving stereotype associations, graphical representation, and metaphoric implication of a product delivering meaningful values to the user (Crilly et al., 2004; Charteris-Black, 2004). This attribute is expressed through metaphor or product packaging and intensifies the aesthetic quality of the product as well.

Sexuality: this dimension is defined as the way in which the product appeals, arouses or signifies certain sexual identity or activity (Press and Copper, 2003). It is closely related to product personality, which creates a humane component of the product. Through marketing and advertisements this product attribute is intensified (Norman, 2004).

Experience: this refers to experience that a product is expected to deliver to the user. It includes the cognitive and emotional aspects of a product related to express the humanness within design (Alben, 1997). The emotional expression in design is the key motivator behind creating product experience.

Mediation: this dimension refers to how well a product as medium can enhance communication (relations) between people (Press and Copper, 2003). Product semantics also guides us how to use the function of a product. Product character plays a role in mediating between product and user and association of product is closely related to forming a product character.

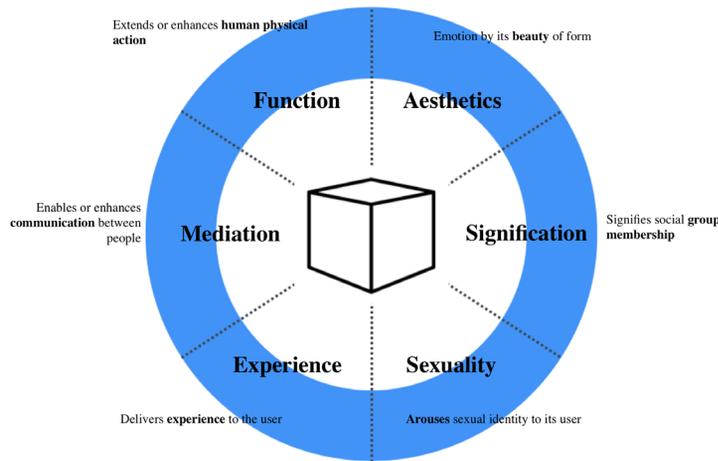


Figure 5 Product Character Attributes Empirical Model (adapted from Edwin, 2006)

2. Method

To identify the relationships between user personality traits and perceived product characteristics, iPhone 5 was chosen as a target product in the survey, which provides rich interaction and also is popularly used among many consumer products.

2.1. Sample

The study was executed in the Netherlands as an exploratory study. A sample of 20 Dutch iPhone users who were satisfied with using the product at the time of the survey was selected. The sample consisted of 10 male and 10 female and they were all students who were studying other than industrial design. Their ages range from 17 to 25 years old.

2.2. Instruments

To measure big five personality traits NEO Five Factor Inventory (NEO-FFI) was used (see Figure 6). The NEO-FFI is a shortened version of the revised NEO personality Inventory (NEO-PI-R). It was designed for exploratory research as a brief instrument that would provide reasonable estimates of the big five personality traits. However, it has shown itself to be reliable, valid, and useful in a variety of contexts and cultures (McCrae & Costa, 2004).

It is very useful especially in experiments in which user personality is used in relation to another factors and such so requiring much time to participants: it only takes 10-15 minutes with 60 questions (12 questions per personality domain) while the NEO-PI-R takes 45-60 minutes with 240 items. Relying on self-report questionnaire this test was to define the personality of the respondents on five different domains, namely neuroticism, extroversion, openness, agreeableness and conscientiousness. Besides the personality trait test, another questionnaire was developed by the authors and a psychologist to measure the perception of the product characteristics described in the Product Character Attributes empirical model (see Table 1).

Table 1 The Questions To Measure Each Product Character Attributes

Product character attributes	Questions to measure the trait
Function	<ul style="list-style-type: none"> This product extends my physical and cognitive limits. I like this product because it is very functional
Function	<ul style="list-style-type: none"> This product evokes positive emotions because of its beauty of form. I like the appearance of this product
Signification	<ul style="list-style-type: none"> This product signifies a membership of particular social groups. I like the product because it represents a social group membership.
Sexuality	<ul style="list-style-type: none"> I think this product looks pretty feminine. The product has a masculine look.
Experience	<ul style="list-style-type: none"> This product delivers many unique experiences to me. I have had many novel experiences with the product.
Mediation	<ul style="list-style-type: none"> This product enhances the communication between people and me. I like the product because it enables me to communicate with others.

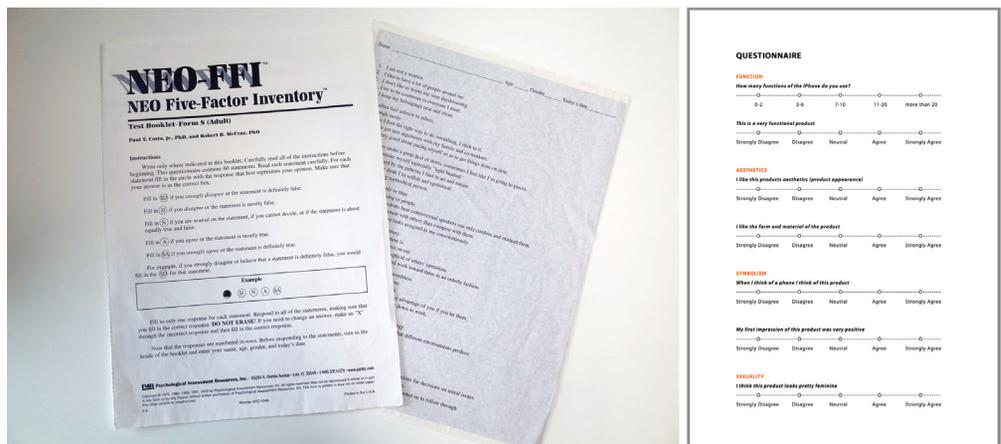


Figure 6 NEO Five-Factor Inventory (left) and the Questionnaire for measuring perceived product characteristics (right)

All the questions were answered on a five-point scale, from strongly disagree to strongly agree. All the questions regarding the product characteristics were asked twice in order to increase the reliability of the answers. As two answers were inconsistent, it was asked again to determine the exact answers during a retrospective interview.

2. 3. Procedure

The participants were invited to the observation room at the faculty of Industrial Design Engineering, Delft University of Technology in the Netherlands. An instruction was given about the survey before the questionnaire session. Then, they were first asked to fill in the 'Big Five Personality Test' and then in the questionnaire for measuring the perceived product characteristics regarding their iPhone 5. This was followed by a retrospective interview (Figure 7). All answers were input into SPSS data sheet and statistically analyzed.



Figure 7 Target Product iPhone 5 (left) and A Participant Filling in the Questionnaire (right).

3. Results

In order to test the significance of the relation between the user personality domains and particular product characteristics, a Pearson correlation analysis was done. The statistically significant correlations between the personality domains and the perceived product characteristics are presented in Table 2. According to the statistical analysis, perceived product characteristics closely interact with particular personality traits.

Table 2 The Correlations Between Personality Traits and Perceived Product Characteristics

Personality	Function	Aesthetics	Signification	Sexuality	Experience	Mediation
Neuroticism				.478*		
Extroversion		-.519**				
Openness				-.500**		-.525**
Agreeableness						
Conscientiousness			-.486*	-.506*	-.535**	

The personality domain neuroticism (the tendency to experience negative emotions) had a positive correlation with the perception of product sexuality. Participants who had a high score in neuroticism perceived their iPhone as having more masculine than feminine look.

The personality domain extroversion (characterized by positive emotions and the tendency to seek out stimulations) was significantly but negatively correlated with the perceived aesthetics of the product. Namely, the more extrovert participants were the less they appreciated the aesthetics of their iPhone.

The personality domain openness (involves active imagination, aesthetic sensitivity,

attentiveness to inner feelings, preference for variety and intellectual curiosity) is also significantly correlated with perceived sexuality of iPhone. Individuals with a high score on openness perceived iPhone as having a feminine look. On the contrary, Participants who were less open are more likely to view their iPhone as feminine look.

The personality domain agreeableness (the tendency to be pleasant and accommodating in social situations) showed a strong correlation with mediation. Individuals with a high score on agreeableness perceived their iPhone to be communicable more with other people than those who have a lower score.

The personality domain conscientiousness (the tendency to show self-discipline, carefulness, thoroughness, organization, deliberation and need for achievement) is related to signification, sexuality and experience. Participants with a high score on this personality trait perceived their iPhone to be less stereotypical, have more feminine appearance, and more express emotions.

4. Discussion and Conclusions

Why is a product perceived differently between the users? One of the assumptions explaining this discrepancy between users is that the perception of product characteristics could differ depending on the personal characteristics of individual users. User personality is one of the representative factors that characterize individual users. The research question for this study was: Does the personality of user make difference in the perceived product characteristics? If so, in which way the personality traits are related to the perception of product characteristics? For this, five personality dimensions (neuroticism, extroversion, openness, agreeableness, and conscientiousness) and six product characteristics (function, aesthetics, signification, sexuality, experience, and mediation) were adopted based on literature review. This empirical study reveals the relationship between user personality and perceived product characteristics. The perceived characteristics of iPhone are closely related to particular personality traits. The overall conclusion is that the personality traits of user influence the perception of product characteristics. This implies that there would be the gap between expected perception of product characteristics intended by designers and actual perception of product characteristics experienced by the user depending on the personality traits of the user. Therefore, it is imperative to figure out how the personality of user correlates with particular product characteristics to increase the user satisfaction. These findings can provide designers a better understanding of how product characteristics are differently perceived depending on particular user personality traits, and help them map the design direction of their target user group. They can also contribute to the customization and personalization of the user interface of consumer electronic products because user personality can help characterize what type of user interface an individual user prefers. Nevertheless, this study might be biased considering that the sample size was small and the participants were all students. More reliable results would be gained if the research can be carried out with a bigger sample size having diverse backgrounds enough to increase statistical reliability.

References

- 1 Steger, T., Sprague, B., & Douthit, D. (2007). Big Trouble with No Trouble Found: How Consumer Electronics Firms Confront the High Cost of Customer Returns. *Accenture Communications & High tech, Accenture*.
- 2 Ainslie, A., & Rossie, P. E. (1998). Similarities in choice behavior across product categories. *Marketing Science, 17*(2), 91–106.
- 3 Babbar, S., Behara, R., & White, E. (2002). Mapping product usability. *International Journal of Operations & Production Management, 22*(10), 1071–1089.
- 4 Bolting, C. P. (1989). How do customers express dissatisfaction and what can service marketers do about it?. *Journal of Services Marketing, 3*(2), 5–23.
- 5 Broadbridge, A., & Marshall, J. (1995). Consumer complaint behaviour: the case of electrical goods. *International Journal of Retail & Distribution Management, 23*(9), 8–18.
- 6 Charteris-Black, J. (2004). *Approaches to Critical Metaphor Analysis*. New York: Palgrave Macmillan.
- 7 Costa Jr, P. T., & McCrae, R. R. (1992). Neo personality inventory–revised (neo-pi-r) and neo five-factor inventory (neo-ffi) professional manual. *Odessa, FL: Psychological Assessment Resources*.
- 8 Crilly, N., Moultrie, J., & Clarkson, P. J. (2004). Seeing things: consumer response to the visual domain in product design. *Design studies, 25*(6), 547–577.
- 9 Donoghue, S., & De Klerk, H. M. (2006). Dissatisfied consumers' complaint behaviour concerning product failure of major electrical household appliances—a conceptual framework. *Journal of Family Ecology and Consumer Sciences/Tydskrif vir Gesinsekologie en Verbruikerswetenskappe, 34*(1), 41–55.
- 10 den Ouden, E., Yuan, L., Sonnemans, P. J., & Brombacher, A. C. (2006). Quality and reliability problems from a consumer's perspective: an increasing problem overlooked by businesses?. *Quality and Reliability Engineering International, 22*(7), 821–838.
- 11 Edwin, C. S. L. (2006, November). Designing Product Character: Strategy to evaluate product preference and map design direction. In *International conference in Lisbon, IADE. Design research society* (pp. 1–4).
- 12 Geudens, W. H. J. M., Sonnemans, P. J. M., Petkova, V. T., & Brombacher, A. C. (2005, January). Soft reliability, a new class of problems for innovative products: "how to approach them". In *Reliability and Maintainability Symposium, 2005. Proceedings. Annual* (pp. 374–378). IEEE.
- 13 Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American psychologist, 48*(1), 26–34.
- 14 Goleman, D. (1997). *Emotional Intelligence*. New York: Bantam.
- 15 Govers, P. C., & Schoormans, J. P. (2005). Product personality and its influence on consumer preference. *Journal of Consumer Marketing, 22*(4), 189–197.
- 16 Graziano, W. G. & Eisenberg, N. (1997). *Agreeableness: A dimension of personality*. Handbook of Personality Psychology.
- 17 Hsiao, S. W., & Chen, C. H. (1997). A semantic and shape grammar based approach for product design. *Design Studies, 18*(3), 275–296.
- 18 Khalid, H. M., & Helander, M. G. (2004). A framework for affective customer needs in product design. *Theoretical Issues in Ergonomics Science, 5*(1), 27–42.
- 19 Khalid, H. M., & Helander, M. G. (2006). Customer emotional needs in product design. *Concurrent Engineering, 14*(3), 197–206.
- 20 Khalid, H. M. (2006). Embracing diversity in user needs for affective design. *Applied Ergonomics, 37*(4), 409–418.
- 21 Khan, S., Phillips, P., Jennions, I., & Hockley, C. (2014). No Fault Found events in maintenance engineering Part 1: Current trends, implications and organizational practices. *Reliability Engineering & System Safety, 123*, 183–195.
- 22 Kima, C., & Christiaansb, H. H. The Correlation Between Soft Problems and User Characteristics.
- 23 Kim, C., & Christiaans, H. (2009). Usability and 'soft problems' : a conceptual framework tested

- in practice. In *World Congress of Interntional Ergonomics Association, Beijing, China*.
- 24 Kincade, D. H., Giddings, V. L., & Chen-Yu, H. J. (1998). Impact of product-specific variables on consumers' post-consumption behaviour for apparel products: USA. *Journal of Consumer Studies & Home Economics*, 22(2), 81-90.
 - 25 Koca, A. (2010). Soft reliability in new product development: an ontological approach for utilizing field feedback to dynamically sense and adapt to evolving global markets.
 - 26 Lu, Y., den Ouden, E., Brombacher, A., Geudens, W., & Hartmann, H. (2007). Towards a more systematic analysis of uncertain user-product interactions in product development: an enhanced user-product interaction framework. *Quality and Reliability Engineering International*, 23(1), 19-29.
 - 27 Matthews, G., & Deary, I. J. (1998). *Personality traits*. Cambridge University Press.
 - 28 McCrae, R. R. (1987). Creativity, divergent thinking, and openness to experience. *Journal of personality and social psychology*, 52(6), 1258-1265.
 - 29 McCrae, R. R., & Costa Jr, P. T. (2004). A contemplated revision of the NEO Five-Factor Inventory. *Personality and Individual Differences*, 36(3), 587-596.
 - 30 McCrae, R. R., & John, O. P. (1992). An introduction to the five-factor model and its applications. *Journal of personality*, 60(2), 175-215.
 - 31 Mooradian, T. A., & Olver, J. M. (1997). "I can't get no satisfaction:" The impact of personality and emotion on postpurchase processes. *Psychology & Marketing*, 14(4), 379-393.
 - 32 Norman, D. A. (2004). *Emotional Design: Why we love (or hate) everyday things*. New York: Basic Books.
 - 33 Overton, D. (2006). No Fault Found' returns cost the mobile industry \$4.5 billion per year. *WDSGlobal, juillet*.
 - 34 Richins, M. L. (1983). Negative Word-of-Mouth by Dissatisfied Consumers: a pilot study. *Journal of Academy of Marketing Science*, 47(1), 68-78.