UNIVERSITY OF SOUTHAMPTON

FACULTY OF SOCIAL SCIENCES

Southampton Business School

Crowdsourcing of New Consumer Product Ideas in the Cultural Context

by

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Keywords

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ABSTRACT

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CROWDSOURCING OF NEW CONSUMER PRODUCT IDEAS IN THE CULTURAL CONTEXT

Dina Saleh AL-Ghamdi

The spread of Web 2.0 has had a significant effect on several of the models of business with changed or a new business model methodically integrating the customers in new product development. While there is recent recognition that the online crowdsourcing competitions are robust instruments to integrate users in new product development, there is an increasingly important need to understand the reasons that prevent users from taking part in crowdsourcing product design in terms of its aesthetic features. One important reason is that the users demand that certain needs are met by local solutions. This is particularly highlighted by examining the cultural differences among the crowdsourcing ideas generated by users (UGC) towards new product development between local users (Saudi) and international users (Non-Saudi) in Saudi Arabia. Where most of the previous study confirm that the different product design characteristics, such as colour, shape, taste and size can be explained across cultures differently.

This research used a cross-sectional design, consisting of three goals that all involve the use of an experimental questionnaire. The participants were recruited from universities' databases in Saudi Arabia via open call (mail survey). The experimental questionnaires were collected and analysed to compare, investigate and interpret the ideas of users in two steps. The first step investigated whether differences in product aesthetics characteristics could

influence product-related beliefs in the crowdsourcing ideas of control and experimental groups. The sample consisted of 221participants (Control users n=121, Treatment users n=100). The second step had two purposes; to examine the crowdsourcing ideas of international users' UGC compared with crowdsourcing ideas of local users' UGC towards product design. And the next purpose to interpret the differences between the international users' ideas and local users' ideas in the light of culture. This involved 221participants (Local users n=125, International users n=96).

The findings show that the essential differences between the local and international users (UGC) in looking at the world of product aesthetics confirm that the cultural background influences the users' ideas about the product design. The local users were also open to and flexible in sharing their ideas and opinions when developing the product through online crowdsourcing platforms. The findings of this research broadly propose that Saudi Arabia is the most conservative culture in the world. However, such discrepancies in the current study could be explained by perceiving the online crowdsourcing as a platform that transcends several social and cultural limitations, and the international users seem to be more conservative considering that such involvement incurs risks and uncertainty.

The results of this research constitute a significant contribution to the body of knowledge relating to crowdsourcing ideas of UGC and product design. It provides a more comprehensive understanding of how new product development takes place in multicultural countries, particularly in Saudi Arabia. Moreover, this research could offers a strong contribution to the body of knowledge as, to the best of the author's knowledge, this is the first study to investigate and compare UCG in the context of multi-cultures in one region. However, this research has limitations along with suggestions for future work. Such as the research data were collected only through an experimental survey. Thus, future work can use other strategies like interviews to gain a deeper understanding of the users' ideas and perspectives about how they shaped their ideas towards product design development. The research data also were covered the past experiences of the users and has only interpreted if the past experiences could influenced the ideas and perspective of the users. Thus, future work can extend this data through the longitudinal study to get adequately data and interpretation then generalized it.

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Research Thesis: Declaration of Authorship

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I declare that this thesis and the work presented in it is my own and has been generated by me as the result of my own original research.

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Dedication

I dedicate this thesis to the soul of my father, who left this world without having the chance to see his dream come true, as he always wanted me to obtain a postgraduate qualification from the UK. To my father's soul, I dedicate this work.

List of Abbreviations

CG Control Group
CI Crowdsourcing idea
eWOM Electronic Word of Mouth
IC Individualism and Collectivism
IU International Users
LU Local Users
NPD New Product Development
OCI Online Crowdsourcing idea
PA Product Aesthetics
PAC Product Aesthetics in terms of Colour
PAS Product Aesthetics in terms of Shape
PAZ Product Aesthetics in terms of Size
R&D Research Development`
TG Treatment Group
UGC User Generated Content

Chapter 1: Introduction

1.1 Overview

It is quite clear that the relations between User Generated Content (UGC), Electronic Word of Mouth (e-Wom), crowdsourcing ideas (CI) and new product development (NPD) are robust. A product's aesthetic features are usually associated with positive reactions and a pleasant experience. Such relation is a result of the increasing role of technology in product design and innovation. Thus, product and service users' perspectives cannot be neglected.

Recently, there has been a notable trend in marketing studies and management in the recognition that users' ideas are the main organisational assets. Faullant et al. (2016) found that, recently, crowdsourcing competitions have recognised as robust instruments to integrate users with new product development. Many companies around the world have increasingly made use of crowdsourcing in an attempt to gain direct access to the crowd's knowledge in terms of users' needs, in order to generate tangible ideas for new products. Thus, the companies can employ the users' needs and expertise to solve emerging problems (cf. Bonabeau, 2009; Haller et al., 2011).
This growing awareness of the significance of users' ideas is a reason to redefine competitive advantage in the market, and for a theoretical change in management and marketing. Despite extensive examination of the role of crowdsourcing in generating ideas and related aspects there is still a paucity of research concerning the factors or reasons that prevent users from taking part in crowdsourcing product design in terms of its aesthetic features. One important reason is that the users demand that certain needs are met by local solutions (Aula et al., 2003). According to Chen (1995), communication is the behaviour that is influenced by the culture; however, Baxter (1999) indicated that the designers have not, so far, been able to integrate cultural factors into product design due to insufficient research in the field.

Hofstede (1983) defines culture is defined as "the collective programming of the mind which distinguishes the members of one human group from another" (p. 25). The users are a very important axis in new product development as they are aware of their needs and the extent to which culture impacts on their ideas, attitudes and lifestyle towards new product development. However, Kwon and Suh (2000) indicated that customers from different cultures have different values, attitudes and preferences, and remain reluctant to purchase foreign products, despite globalisation. Therefore, differences of national culture could

influence customer behaviour in e-commerce cases. For example, international business studies have indicated that several American retailers have failed in countries with narrow cultures, such as China and South Korea, partly due to the fact that their products or business style conflict with local cultures (Bianchi, 2008; Gandolfi and Strach, 2009; Gao, 2010). In this overall perspective, this research used a cross-sectional design to investigate the online crowdsourcing ideas of Saudi UGC and the online crowdsourcing ideas of non-Saudi UGC towards new product development.

1.2 Research Problems and Gaps

Important research efforts have focused on the crowdsourcing ideas of the users and the possibility of the influence of some cultural, technological and social factors on their thinking and opinions. Despite that, the main problem for conducting such a research is the observable paucity of existing research drawing comparisons between the online views of local users about new product ideas with the online views of international users regarding the same product, in terms of the aesthetic features of the product. According to Tripathi, Tahmasbi and de Vreede (2017) the concept of crowdsourcing does not use the *national culture theory* or *product quality theory*. This means that, to date, no study has suggested merging culture with crowdsourcing when developing the product. There is also a lack of research to help companies to integrate culture with product design (Aula et al., 2003).

The second gap that this research addresses is that international companies need to integrate the technology and product design with culture. Hossain (2012) confirmed that despite the fact that small- and medium-sized companies (SMEs) are generally more dependent on their suppliers and local customers, this is less characteristic of the larger innovative companies. Jin (2008) also suggested that there is a need for further research to investigate the product aesthetics that affect different cultures. The third gap is that users are demanding that their particular needs are met by local solutions. Most of the current studies on the relationship between culture and product design were conducted in Asia, America and Europe. There is a lack of in-depth research about multicultural countries (Moalosi et al., 2005a), such as the United Arab Emirates (UAE) and the UK.

As indicated by Schoormans and Creusen (2005), different product design characteristics, such as colour, shape, taste and size can be explained across cultures differently. Such studies

would be fruitful because the potential factors that affect the cognitive responses of the local and international users might be different; for example, culture, religion, technological development, habits, race and cost. Accordingly, this research provides a promising way to explore the extent to which such factors influence new attractive product ideas in terms of the product related-beliefs in the users. It is worth stating that increased international exchanges and communication have led to the adoption of increased defensive positions by regional and national identities in product development (Baxter, 1999; De Souza and Dejean, 1999).

1.3 Research Aim

The purpose of this research is to investigate the cultural differences between online crowdsourcing ideas of local UGC and online crowdsourcing ideas of international UGC of those who live in Saudi Arabia regarding new product development. This is achieved through the interpretation of the users' cognitive responses in terms of product-related beliefs in the users' ideas and through their preferences, hence categorised as preferences and judgements. Culture is considered a mediator in this research and will enable the interpretation of the results in the light of the cultural differences. That means that the culture will help the researcher to interpret how the external physical events affect the internal psychological values. In this context, the effect of the product aesthetics explains the product-related beliefs in the crowdsourcing ideas of the local and international users. In the same context, this argument is supported by the consideration that moderators should not be correlated with the independent variable statistically, but the mediators should (Baron and Kenny, 1987).

1.4 Research Objectives

The objectives of the current research are as follows:

- To investigate whether the differences in product aesthetics characteristics could influence product-related beliefs in crowdsourcing ideas of UGC

- To examine product-related beliefs in the crowdsourcing ideas of local UGC compared to the crowdsourcing ideas of international UGC

- To investigate cultural differences that affect product-related beliefs in crowdsourcing ideas of local UGC and the crowdsourcing ideas of international UGC

1.5 Research Questions

The primary questions that the current research sets out to address are as follows:

- Do differences in product aesthetics characteristic influence product-related beliefs in crowdsourcing ideas of the control and treatment of UGC?
- What are the differences between product-related beliefs in crowdsourcing ideas of local UGC compared to the crowdsourcing ideas of international UGC?
- How do cultural differences affect product-related beliefs in crowdsourcing ideas of local UGC and the crowdsourcing ideas of international UGC?

1.6 Research Framework

The research framework employed in this thesis is based on an extensive literature review of many different research studies drawing from the Hofstede Model, the Psychological consumer reactions to product design Model, and crowdsourcing ideas of the UGC. The literature review was conducted through a search in seminars, books, Internet sources, conference proceedings, academic journals and workshops. The review seeks to investigate the crowdsourcing ideas of the users towards product design in the cultural context. From this, a conceptual model combining the theories is constructed.

This research examines the cultural differences on the users' idea generation towards new product development between local (Saudi) and international (Non-Saudi) users. Razzaghi and Ramirez (2008) found clear subconscious cultural manifestations as the result of the inherent cultural values and preferences of the users in new product development, particularly in the early stage of idea generation. Birren (2006) also confirmed that product design can impact on the cognitive processes of the users. According to Chen (1995) the communications considered as the behaviour that is influenced by the culture. From this perspective, it is necessary to investigates users' cognitive reaction differences in terms product-related beliefs towards product design in the online crowdsourcing ideas of local and international UGC, as culture is considered to be a mediator in this study that will allow the

researcher to interpret the results in the light of the cultural differences. Theoretically, the moderator has more potential in the case when examining the trait–culture relationship at the individual level, while the mediator has greater potential when examining it at the national level (Rossberger and Krause, 2013). Thus, this research requires a framework to interpret the differences between users' ideas in the light of culture.

Researchers have started to investigate those properties that evoke certain reactions in consumers' minds and try to figure out what kind of psychological and behavioural responses design may affect (Bloch 1995; van Wieringen, Hekkert and Snelders, 2003; Blijlevens et al., 2009). Hence, the researchers divided the product aesthetics based on the Psychophysical Properties to Colour, Size and Shape (Block, 1995; Novak, 1997). Moreover, Kreuzbauer and Malter (2005) indicated that just small configurations in product shape elements may lead to significant changes of how consumers perceive the product. Berkowitz (1987) also investigated how people respond to product shapes; that is, how they form an opinion about the product and its quality or belonging in a certain category. At the same time, Crilly, Moultrie and Clarkson (2004, p. 10) defined cognitive response as "the judgements that the user or consumer makes about the product based on the information perceived by the senses".

This research uses two models: *consumer response to product design* and *Hofstede's cultural dimensions*. The first model examines the users' cognitive responses in terms of product-related beliefs in the users' crowdsourcing ideas and through their preferences. Thus, it is categorised as users' preferences and judgments, employing the psychophysical properties for product aesthetics as stimuli including colour, shape and size. The second model provides a structure to organise, compare and interpret the results in the light of the cultural values of societies. It also proved to be useful to achieve a better understanding, justification and interpretation of the findings in the light of the cultural differences emerging about the effect of a product's aesthetics on the users' idea. Employing these models, this thesis will be able to answer the research question: '*Investigate the cultural differences that affect the online crowdsourcing ideas of the international and local users' UGC in new product development in Saudi Arabia'*.

In this case, the researcher constructed a framework to compare and interpret the differences among the product-related beliefs in the local and international users' crowdsourcing ideas in the light of culture. Based on this, the Hofstede model about cultural differences offers a

window for looking at cross-cultural differences as a mediator (Barkai, 2005). Hofstede and McCrae (2004) mentioned that the national-level cultural practices have to work as a mediator because people's characters are influenced by national orientations. In contrast, on the individual level, the cultural practices moderate the relationship between individual character factors and innovative behaviour, because the individual only has a very limited impact on national cultural practices. Moreover, a single mediator model (individualism /collectivism) provided valuable inspiration for this paper. The Individualism-Collectivism cultural dimension is the most frequently used one to compare the different cultural groups and has been discussed and researched frequently, except in the crowdsourcing ideas context. Therefore, the researcher has decided to examine one of Hofstede's dimensions – individualism vs. collectivism – due to the effectiveness of this dimension in interpreting the cultural differences in crowdsourcing ideas towards new product development work; this dimension has also generated significant insights in the psychological operations (Oyserman, et al., 2002). The research framework is presented in Figure 10.

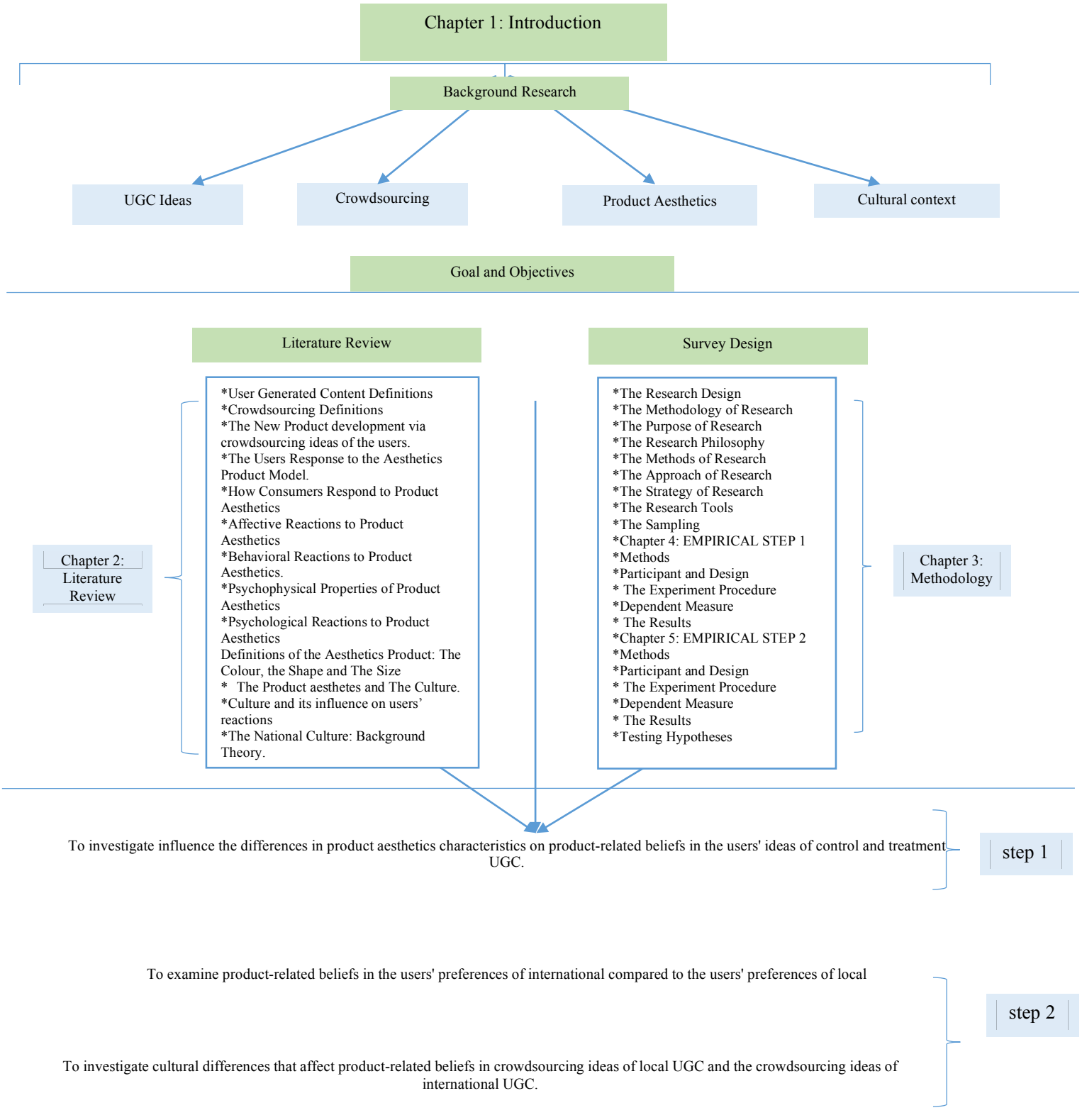


Figure 1: The Research Process

1.7 Contribution of the Research

This research contributes to the existing body of literature on new product development in Saudi Arabia by shedding light on the way in which ideas generated by local users are grounded in cultural differences with international users. The research will offer a more comprehensive understanding of how new product development in multicultural countries, particularly in Saudi Arabia, can be improved. The research will also contribute to the wider literature on the impact of cultural difference on generating ideas. Additionally, it will help international companies to classify users' ideas based on their nationalities when developing a product to meet local users' needs. Once these issues are settled, companies can take into consideration any cultural issues when generating new products.

Chapter 2: Literature Review

This chapter comprises nine sections relevant to User Generated Content (UGC), crowdsourcing, new product development via the crowdsourcing ideas of users, how consumers respond to product aesthetics, psychophysical properties of product aesthetics, national culture: Background Theory, and its influence on the users' reactions also the hypotheses and research framework.

2.1 User Generated Content (UGC)

This section of the literature review examines literature relating to the topic of new product development (NPD) via users' ideas to ensure the inclusion of relevant important studies relating to the use of User Generated Content (UGC) in new product development. Because the UGC concept is a recent construct, so far there is no official definition for this term. This research uses the definition given by Vickery and Wunsch-Vincent (2006) in terms of using UGC to make the content available to the public online that reflects the creative efforts by a certain people generated outside of the practices' professional routines. This means that anyone can share his or her ideas and opinions on any online topic for the world to see, without expectation of reward and regardless of his or her knowledge and level of skill or experience on the subject. Where current study focuses on the fact that cultural differences between users also have a role in their views towards NPD, other researchers (Saha, 1998; Kersten et al., 2000; Onibere et al., 2001; Hugo, 2002; Aykin 2005; Vasiliki, 2016) the researchers observed that there is a significant paucity in the cultural studies between users' ideas.

This indicates that the companies have had to evaluate and change their product development strategies to meet changing expectations and incorporate UGC in the design process. Although that many studies have been carried out regarding the usefulness, sentiments, motivation, gender and behaviour and etc, but there is still no study has considered how the users' thinking in terms of cultural aspect.George and Colin (2011) discussed Word of Mouth (WOM) and UGC and showed that UGC may be a rich source of information and data regarding the preferences and attitudes of customers. In the same context, Lilien et al. (2002) and Nisar and Prabhakar (2018) considered customer content as a resource for information and data to "measure innovation" on the social media networks, because the customer is in direct contact via social media networking. The study of George and Colin (2011) and

Amabile et al. (2005) also addressed consumer creativity and brand relationships from the point of view of marketing. However, Robert, Mark, Jennib and Chris (2014) argued that consumer researchers must study the decay in the output of WOM if its effect is to be properly measured and modelled.

Most of the Companies employ UGC because it is an important factor in product design and because it is a free resource that is easy to exploit. The first use discussed here is that of journalists and newspapers. Hermida and Thurman (2008) stated that national UK newspaper sites have integrated UGC and their study showed that the adoption of UGC by news agencies resulted in a significant increase in opportunities gained from reader suggestions. In addition, Ebbesson and Eriksson (2013) presented a user-based approach to setting up UGC services with newspapers' agents and researchers in the Living Lab setting. However, newspaper agents also found it rewarding to adopt readers' ideas and opinions. As Hermida and Thurman (2008) found that news agencies are striving to achieve a balance between the commercial potential of media users and the resources needed for UGC initiatives. Williams (2007) indicated that news agencies believe, or a few hope, that UGC could save money. In addition, the majority of the users' media initiatives are a large contribution because of editorial intervention "rather than because of payments to contributors" (Hermida and Thurman, 2008). The cost of those processes is one of the reasons why smaller news agencies such as Independent.co.uk "have held back from adopting tools for user interaction" (p. 11).

In the other hand, UGC is widely used in the travel industry. And UGC can have a marked positive impact on users choosing their holiday destinations (Connor, 2008; Pan and Zhang, 2011; Hermida and Thurman, 2008). The researchers focused on TripAdvisor.com, the biggest digital travel and tourism company. They collected a sample of reviews displaying detailed data relating to London hotels. Results shows that the system can be manipulated by void comments posted to enhance or tarnish a hotel's reputation, but little evidence of this was found from features that represent erroneous comments. The development of sites such as TripAdvisor.com was a great technological achievement, giving rise to major changes in digital media. Customers were therefore able to access information provided by UGC before deciding to purchase a particular product. There is also a research conducted in China to discover the effect of Electronic Word Of Mouth (eWOM) on the intention of tourists visiting foreign destinations using a double process that involved the terminal approach of source credibility (SC) and the main approach of argument quality (AQ) (Ping, 2015). The results

show that the "tourists' attitude toward a destination was positively influenced by AQ of eWOM, and intention to recommend the destination before travel was positively influenced by attitude toward destination and SC of destination-related eWOM" (p. 25-34). It was positively determined via AQ that attitude towards WOM had an effect on tourists' intention to visit a destination in conjunction with the double process effect delineated. However, it is necessary to clarify individuals' decisions in respect to complicated information sources. This thesis contributes to understanding how individuals make decisions via a double process.

Furthermore, the investigate the perceptions of various sets of customers for and "against the disintermediation" in the tourism companies in relation to UGC was investigation. In order to examine the relative strength of the effect of UGC on the tourists' selections, a web survey conducted in Spain attracted 961 participants (Giacomoa, Carlotab and Efthymiosc, 2014). The results indicated that there are big differences among the groups on the basis of demographic and social features, and the ways in which the Internet is used to find data, information or purchase goods (Giacomoa, Carlotab and Efthymiosc, 2014). Furthermore, Connor (2008) and Pan and Zhang (2011) indicated that hotel marketers must use various types of online distribution channels according to the various properties of the products customers need. Regarding another aspect on online platform, some studies linked the product development and customers through social media. Amonrat (2014) proposed that the companies can use the tools for innovative marketing to take advantage of technologies of advanced communication which can be adapted to a new lifestyle. Jansenet al. (2009) found that microblogging is an online instrument for users' WOM connections and discussed its influence on the companies that use microblogging as an aspect of their overall marketing strategy. In addition, Moyle and Wasserman (2012) found that, based on participants' responses, Aboriginal and Torres Strait Islander art centres in 2010 made use of UGC platforms, (Facebook in particular). In addition, these results support previous research by Tanya et al. (2014); Nisar and Prabhakar (2018) and Zhang et al. (2012) indicating that the value of social media platforms which have evolved since 1999 lies in exposure and marketing rather than in direct revenues.

In the contrary, Hestad (2013) argued that social networking platforms have the potential to generate sales following consistent customer engagement with the organisation; however, it is challenging for SMEs to identify the outcomes of social networking platforms (Bendor, 2014). On the other hand, the use of internet User Generated Content has become an

indispensable instrument with which to present the product to consumers and retailers to persuade, attract and retain customers and User Generated Content is also a part of the consumer's decision making process when purchasing (Connor, 2008; Pan and Zhang, 2011). The researchers found that UGC played an important role where it has a positive overall influence on product development activities (Damanpour and Gopalakrishnan, 2001). In addition, Lin, and Chen (2013) reported that the volume, quality and the sender's experience of eWOM have a positive impact on intention to purchase.

Several studies are focused on the users who liked to use UGC (customers' feedback) before purchase of a product, because it is more truthful than retailers (Balasubramaniam, 2009). And advocated the importance of users' involvement in every step of product design, which would enhance customer satisfaction and importance of UGC in product design (Nisar, Prabhakar., Strakova and Al-Ghamdi, 2016). It is important for the product designer to include UGC in their designs; for example parents are more knowledgeable around the pram design topic (Balasubramaniam, 2009). In addition, several reserchers discussed WOM and UGC and consumer creativity and brand relationships from the point of view of marketing (George and Colin, 2011; Ying and Chung, 2007). Conversely, Dennis and Fowler (2005) indicated that the effect of online UGC is not positive at all, but differs for each type of UGC beside the metric of product innovation. Moldovana, Goldenberg and Chattopadhyayc (2011) posited that the originality of products must be carefully managed when positioning and developing a new product as it may have a negative effect on WOM valence when the usefulness of product is perceived to be lower. Furthermore, Tanya, Eric and Wang (2014) stated that the impact of neutral UGC on product sales is not neutral in fact rather it is subject to bias on the basis of the distribution of negative and positive UGC and kind of UGC. According to Helge, Paul, Jonathan and Micael (2015) that social functions of attitude and the ego-defensive had the greatest influence. From this they inferred that "Future-framed marketing is highly effective in generating positive product-related word of mouth (WOM) for new products" (P. 11). Helge et al. (2015) also revealed a marked increase in customers' product interest, which was linked to WOM behaviour. Also an increase in the incidence of messaging regarding the available products prior to advertisement supports the idea of the elaborateness of WOM. In addition, an important part of product design is the customers or users who use WOM. Where identified a relationship between the behaviour and attitude of customers and use and creation of UGC (O'Hern et al., 2011).

On the other side, the author suggested that the online consumers evaluate search goods and traditional experience goods in much the same way, as they are able to make an informed decision using reviews posted by others (Balasubramaniam, 2009). At other initiative of the online communication about the study of traditional idea generation, Lilien, Morrison, Searls and Sonnack (2001) suggested that traditional idea generation techniques are usually based on customers' contribution to information gathering regarding the need for a new product from a typical or random group of customers. The Lead User (LU) process uses various methods of information and information collection to take into account the solutions and needs generated by users in other markets who face similar problems but in different forms. In contrast, continued research on the reluctance with which "users post customer reviews and then create UGC themselves" (Gangi et al., 2010 and Rahat, et al., 2015). In addition, Rahat, Naveen, Wonjoon and Hyunjong (2015) stated that online WOM such as customer reviews has received considerable attention prompting study by both practitioners and academics. Previous literature used factors such as frequency or overall rating/valence information of WOM in order to increase understanding of the topic, but more research is still needed into the benefits of online WOM. According to Lopez and Sicilia (2013) that communications strategy is a very important element in the adoption of a new product. The decision to adopt a new product is determined by success in two steps; product adoption and product awareness.

The results of the moderating impact on product participation and brand image and the relationship between intention to purchase and eWOM study revealed that the viewing of opinions and reviews online is useful for consumers as it makes them feel more confident to buy the product. However, the results indicated that the volume and quality of eWOM and the sender's experience have a positive impact on intention to purchase. More importantly, brand image and product design participation have a moderating impact on the relationship between intention to purchase and eWOM (Lin, Wu and Chen, 2013). In addition, the study of (Kristensson, et al., 2004 and Gangi et al., 2010) mention that organisations and users created value from using UGC, and that this value could enhance the advantages and benefits of UGC by impacting positively on users' experience. Lin and Chen (2013) and Gangi and Wasko (2009) assumed that the quality of UGC is linked with its value which will in turn impact its benefits. Another study by Lckler and Baumöl (2012) found several business models established on the web for harnessing collective intelligence through merging the

customers and users in the process of the adding value. The shared network applications between users also mean that they have an opportunity to be important providers of the content and could commit themselves to achieve it. Today most companies are realising the commercial potential of UGC.

Henrik (2010) found that the spread of Web 2.0 has had a significant effect on several of the models of business with changed or a new business model methodically integrating the customers in the value-added process. Lopez and Sicilia (2013) noted that customers are not only consumers of services and products, but should be considered as part of the production process either directly or indirectly, and called this phenomenon "collective intelligence". In this context (Toubia and Floors, 2007; Dahan et al., 2010) "collective intelligence" could be used as a general description for user involvement and moreover the resulting added value, and potential to present these business models, such as the marketplace of the open innovation, InnoCentive or the retailer of the T-Shirt, Threadless. However, traditional methods or techniques for the visual representation from business models it's not yet considered this new approach. Balasubramaniam (2009) and Kim et al. (2012) stated that the users find UGC to be more reliable than manufacturer and retailer promotional items. Hestad (2013) asserted that the users must be consulted to measure gaps that exist in the market and the kinds of products that have previously been rejected. Furthermore, Dahan et al. (2010) stated that UGC is an outcome to increase the ordinary users to participate in the digital age. Thus, it was found that transparency between user and developer creates a positive reaction between adoption of products and product development as transparency improves collaboration and learning in activities between the users and developers through digital communications like crowdsourcing ideas, lead users, ideas generation and user-generated content (Bott and Young, 2012). As a result, found that there is a strong relationship between UGC and NPD. The next part of the review considers the importance of crowdsourcing ideas in new product development.

2.2. Crowdsourcing

This section introduces important definitions of crowdsourcing and the crowdsourcing ideas studies, and its relationship with New Product Development.

2.2.1 Crowdsourcing concept

The crowdsourcing process has received enormous attention from both practitioners and researchers. Undoubtedly, the notion of the crowdsourcing process has become a hot topic between the companies around the world over a short period of time (Richard, 2013). Surveying the related literature, one observes that there are several definitions advanced for crowdsourcing. Although these definitions agree on how crowdsourcing is distinguished from other related phenomena, there is no consensual agreement among researchers on how it is viewed with respect to how it is implemented. There is, however, agreement over its importance in product development (Von Hippel 1988, 2005; Griffin and Hauser, 1993; Barnard and Wallace, 1994; Desouza et al., 2008). Many researchers wrote regarding the users' involvement in the product development. Given the fact that customers, potential customers and product users now have the technological capability to research and comment on products and services (Bott and Young, 2012), many companies seek to involve users in the product development process in order to maximise the potential for innovation via crowdsourcing. Table 2.1 below sets out the prominent definitions of Crowdsourcing.

Authors	**The aspects**
Howe (2006, 2008)	Outsourcing – collective intelligence – method to obtain the ideas – online idea – an open call – the ideas from the professionals
Van Wingerden and Ryan (2014)	Create the content – distribute work – outsourcing
Brabham (2008, 2012)	Theory of crowd wisdom – collective intelligence – web technology – public involvement – web-based model – crowdsourcing classification for problem solving that is based on four main functions
Estellés-Arolas and González-Ladrón-De-Guevara (2012)	In a wide range of areas – Internet - user-innovation – co-creation – open call – participative online activity
Zhao and Zhu (2014)	Crowdsourcing benefits

Bott and Young (2012)	Evaluation tool for several programmes like the humanitarian programmes – monitoring elections – accessible to all people
Malone et al. (2010)	Presented crowdsourcing classification around four main aims which are formulated as questions
Thuan et al. (2013)	Categorise crowdsourcing activities – makes two dimensions
Whitla (2009)	Categorise the crowdsourcing in marketing onto three main areas

Table 2.1: Outline of the crowdsourcing definitions

According to Howe (2006b, P. 43), online idea crowdsourcing for NPD is defined as "the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call". An example of this definition of 'crowdsourcing' in use can be traced back to the sixteenth century when sailors dealt with navigation errors as they sailed across the Atlantic and Indian oceans, a problem that was too expensive for merchants and the British government (Howe, 2006b). This can be a first project in crowdsourcing via outsourcing or distributing work in order to reach an innovative solution (Van Wingerden and Ryan, 2014). The crowds consist of the consumers who can create the content through actively adding more jobs and merit to the service, product or project (Van Wingerden and Ryan, 2014). From another side, crowdsourcing is a method to obtain ideas, feedback, concepts and decisions, so that the project can make decision regarding the strategies, and achieve specific objectives with less time and resources (Howe, 2008; Kleemann et al., 2008; Bayus, 2013). Furthermore, Howe (2008) explained the importance of involving a range of intelligence instead of just the thinking group. A group of the voting system or collective intelligence tends to do the work better with a wide-ranging creativity input.

Brabham (2008), however, constructed a synopsis of crowdsourcing and related aspects. This was conducted through providing several definitions for crowdsourcing as argued by scholars

who pioneered this concept. Additionally, this study provided several case examples so as to underpin what crowdsourcing refers to and how it can be utilised in a proper way. One main assumption made by Brabham's study is that crowdsourcing is strongly related to the so-called theory of *crowd wisdom*, which is defined as an exercise of collective intelligence.

For this study, crowdsourcing is a model that is capable of accumulating talent and making use of ingenuity on the one hand, and reducing the costs and time on the other hand. Hence, crowdsourcing is able to provide an efficient way to solve problems. Along these lines, this study assumed that crowdsourcing can only be enabled through the technology of the web, which is, in turn, seen as an efficient as well as a creative mode of users' interactivity.

In view of this, Brabham (2008) concluded that crowdsourcing would be regarded as a challenge of communication studies, science and technology studies that researchers must take into account. Richard (2013, pp. 5-11) asserted that Crowdsourcing has established itself as an effective method for outsourcing based on a confluence of several, only recently developed, facilitating factors. Crowdsourcing relies on the ability of a company to tap into an online community of individuals that are both capable and willing to spend their (mostly discretionary) time in order to develop solutions to the company's problems.

In a related vein, Brabham (2009) himself investigated the crowdsourcing as the public participation process for planning projects; he argued that public involvement is a very important factor in making any project a great success. However, this involvement is at the same time a real concern facing urban planners. That is because, for planners, it is difficult to determine how best to implement programmes that involve the public because of the difficulties that are deeply inherent in the ultimate process of public involvement process. Against this background, Brabham (2009) assumed that what he calls *the medium of the Web* would be effective in controlling collective intellect between the public through certain methods which cannot be conducted if face-to-face planning meetings are adopted to perform. He accumulated evidence for the effectiveness of the model using crowdsourcing in achieving this task. That is because crowdsourcing is a web-based model that depends on distributed problem solving and production way for business; as such, it can provide the public-based participation process in public planning projects.

Estellés-Arolas and González-Ladrón-De-Guevara (2012) investigated the crowdsourcing, arguing for the notion that it involves several many practices that can benefita wide range of

areas. They investigated such diversity in the practices utilising crowdsourcing, and argued that this diversity is attributed to the assumption that it has no clear limits. They assumed that its limits are 'blurred' in the sense that it is difficult to think of a clear line that restricts the practices of crowdsourcing. For this, they assert that – given crowdsourcing is repeatedly affiliated with any type of Internet-based collaborative activity, including user-innovation as well as co-creation – it is hard to confine crowdsourcing to specific practices.

The authors also pointed out that it is even harder to provide a clear definition for crowdsourcing, given its nature and interrelationships with other practices. Overall, they assumed that several definitions have been furnished to crowdsourcing; anyway, most of these definitions are grounded with specific examples of crowdsourcing as paradigmatic, while others present the same examples as the opposite. Investigating the main definitions suggested in the related literature and looking at the characteristic properties, Estellés-Arolas and González-Ladrón-De-Guevara (2012, P. 32) provided the following definition of crowdsourcing, attempting to capture the basic properties of this concepts and its interrelationships with other similar practices: Crowdsourcing is a type of participative online activity in which an individual, organization, or company with enough means proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The undertaking of the task, of variable complexity and modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit. The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills, while the crowdsourcer will obtain and utilize to their advantage that what the user has brought to the venture, whose form will depend on the type of activity undertaken.

In a related work, Zhao and Zhu (2014) investigated to what extent the research on crowdsourcing shapes current understanding towards this concept and its practices. Specifically, this work attempted to provide a critical investigation as well as examination of the substrate of research conducted on crowdsourcing by reviewing current related literature with an eye on the theoretical foundations of this phenomenon and the research methods pursued to achieve its goal. The authors argued that practitioners and scholars alike have paid much attention to the crowdsourcing as a web-based phenomenon. The major reason for this attention is related to crowdsourcing benefits in facilitating the connectivity and cooperation

of people, organisations, and societies. Drawing on the literature, the authors reached the assumption that researchers working on the information systems can add significantly to crowdsourcing, which proves to be a fruitful destination in the future.

Furthermore, Bott and Young (2012) mentioned that one of the advantages of using crowdsourcing is that it provides us with an opportunity of being accessible to all people who have a link on the mobile phone; so using crowdsourcing might lead to unbiased sampling. Along similar lines, Bott and Young (2012) argued that the importance and effectiveness of crowdsourcing emerges from the fact that organisations often need to have situational awareness. Such awareness drives the organisations to depend on some sources that can effectively cross-check the objectivity, credibility, and accuracy of the information supplied to them. With this in mind, crowdsourcing platforms become important, because they have installed methodologies to scrutinise the information. As such, such platforms minimise the chance of errors or any occasional or intentional abuse.

Observing the need to explore the factors that influence decision makers to crowdsource, Thuan et al (2013) mentioned that the related literature on crowdsourcing has identified numerous methods to classify and categorise crowdsourcing. They argued that there is a line of research where the dimension chosen by the researchers is to categorise crowdsourcing activities, while another line of research adopted a multi-dimensional categorisation. As for the former line of research – i.e. categorise crowdsourcing activities – Schemmann et al. (2016) referred to Whitla (2009) who categorised crowdsourcing which is applied to marketing into three main areas, drawing on the main objective of the given activity. These activities are product development, marketing research, and advertising and promotion. In the related vein, Brabham (2012) advanced a crowdsourcing classification (i.e. typology) for problem solving based on four main functions. These functions are knowledge discovery and management, broadcast search, peer-vetted creative production, and distributed human intelligence tasking.

2.2.2 History of crowdsourcing

In June 2006, Mark Robinson and Jeff Howe introduced the crowdsourcing approach in an article in *Wired Magazine*, and the crowdsourcing process has since received enormous attention from the practitioners and researchers as well. Undoubtedly, the notion of the crowdsourcing process has become a hot topic among companies around the world over a

short period of time. The formal definition of this approach regarding the online idea crowdsourcing for NPD was set out above. Later, the condition was added that getting help from external sources involves some form of payment "to differentiate crowdsourcing from the better-known 'wikinomics' (Tapscott and Williams, 2006) or "commons-based peer production" Benkler (2006, PP. 10-22). Both of these involve big uncorrelated categories working with each other in joint enterprises like Wikipedia online and the program Linux software with no dependence on any managerial direction managerial or market signals (ibid).

Also it indicates the importance of the user's participation in order to address the problem regardless of who is participating- an external or internal professional (Brabham, 2008). Brabham (2008) considers crowdsourcing "as a distributed problem-solving paradigm". Within this paradigm, the problem is transmitted by open calls between unknown users – the *crowd*. However, the crowds have advocated to address the problems, implement design, improve previous information, and develop the technological creativity (Brabham, 2008). In addition, by increasing the Internet appearance alongside with cutting-edge technology, but the crowdsourcing the idea (offline crowdsourcing) dates back centuries. From the year 2000, the idea of the platform was started on the Internet (Hossain, 2012). There are many examples of crowdsourcing that have taken place long before the emergence of the Internet. Figure 2 illustrates the history of crowdsourcing.

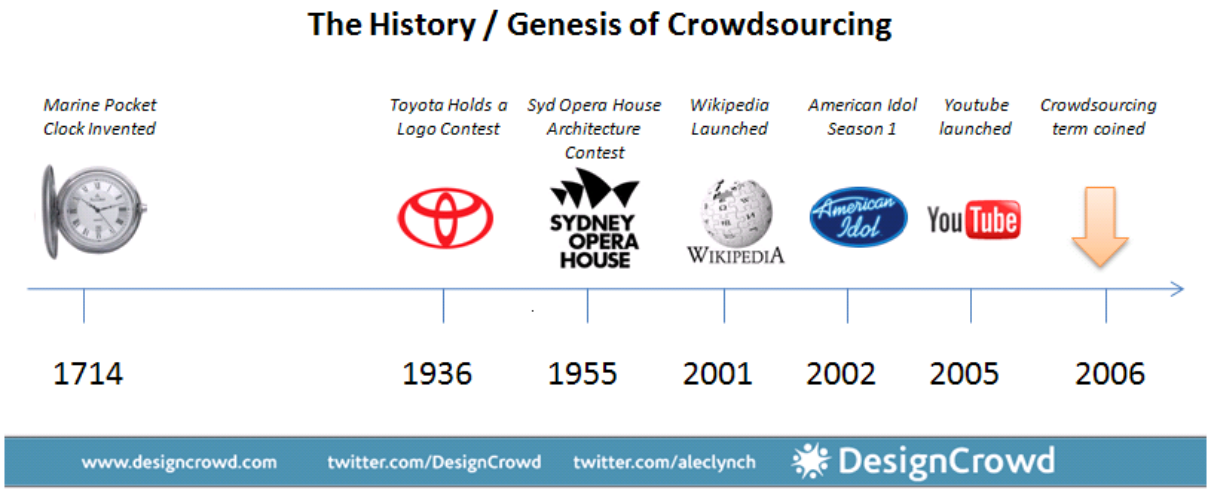


Figure 2. The history of crowdsourcing

In addition, these events were established before the concept of crowdsourcing which was drafted in 2006. "Santa Maria del Fiore" in 1418 at the new cathedral office in Florence declared a competition to resolve the puzzle about "a 50-year-old architectural with an open invitation for anyone to participate" King (2000, P. 75). Beside, goldsmith and clockmaker Filippo Brunelleschi received more than 10 designs and chose one from an unknown source. Again, in 1715, a competition, the “Longitude prize” was offered to address the navigation problem in the United Kingdom. In the past, the people were able to calculate latitude but did not know how to calculate longitude. The result was that unknown people gave extraordinary solutions to calculate longitude in navigation. Furthermore, another example, eighteenth century Oxford Dictionary crowdsourced by volunteers who offered the definitions for the word "in paper slips" King (2000, PP. 34-65). Modern Internet technologies have assisted companies and institutions to engage in good communication with crowdsourcing platforms online with ease.

2.3 Background

Although the crowdsourcing concept is relatively new, it has proved its importance in many different industries such as education, newspapers, libraries and marketing. This section provides some examples of some fields which used the crowdsourcing in developed their products or strategies or resolving problems, among other initiatives.

Amrollahi et al. (2014) investigated how tools based on crowdsourcing would be used in open strategy, taking education as a case study. They mentioned that the traditional methods of strategic planning have been questioned by several researchers. The authors described the current orientation in relevant research centres on the effect of more participation on the success of strategy process; this gives rise to the new concept of open strategy which has been recently introduced to the literature. With the assumption that this concept is related to two main principles of inclusiveness and transparency, this study investigated the use of the crowdsourcing method in the open strategy concept at one Australian university. In particular, the study investigated to what extent the crowdsourcing model is efficient in evaluating this method. This was conducted through drawing a comparison with the quality of the resultant plan in achieving its stated goals and aims. The study showed that crowdsourcing is efficient in evaluating this strategy. The study advocates the use of crowdsourcing-based methods in any project using the same strategy.

Oomen and Aroyo (2011) stated that in the newspaper field, a best example of the crowdsourcing corrections type is an initiative of the Australian Newspaper from the National Library in Australia. This Library oversees on the comprehensive digitising the newspaper pages dating back to 1803 and which number 830.000 thousand. Where the pages of newspapers are electronically translated, they can be searched about text via "Optical Character Recognition (OCR)". However, historically, using this technology for newspapers has delivered inaccurate and poor results. The world's first service library was launched which permitted to users to correct "the OCR'ed text", as shown in in Figure 3. Without a great deal of effective promotion, in 2008 there was a subsequent call for users to participate and they were greeted by the end users enthusiastically (Rose, 2010). The officials noted that during October 2009 over 6000 members of the public had already enhanced the data significantly by correcting over 7 million lines of text in 320,000 articles and adding 200,000 tags and 4,600 comments to articles. One exceptional user has corrected over 285,000 lines of text in over 7,000 articles.

Figure 3: Australian Newsletters

Another similar example was the project of the transcribe Bentham 4 in the University College London (UCL) working with a group of the end users to finish the transcription of the manuscripts of the philosopher and jurist Jeremy Bentham which numbered 12,400 (Moyle et al, 2011). The alliance of the citizen science and museum of the national maritime association launched its initiative old weather 5 in October 2010 to collect the information and data from the records of historical ships regarding the temperatures. Such detailed records were kept by the British royal ships which sailed between 1905 and 1929 around the

world. However, every four hours, the sailors recorded the climate data and wind under the temperature (Moyle et al, 2011). In addition, there is a similar task that is the project of the Australian Newspapers in Figure 4, where the progress in this work is amazing. By December 2010, they had transcribed 202,904 of the pages –25% of the total. With this information and data, Niller and Eric (2016) stated that researchers will be able to examine how oceans transport heat and water around the globe and try to determine how this affects temperature. The 'old weather' project is the newest project about citizen-based science undertaken by the Citizen Science Alliance community, where 349,000 volunteers have come together to address the images of the galaxies, stars and other astrological formations(Niiler and Eric, 2016).

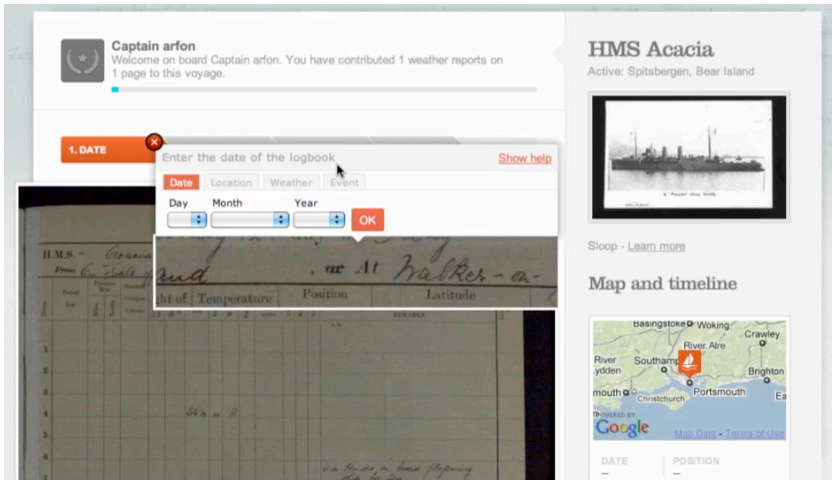


Figure 4: Old Weather: transcribing ship logs

According to Daugherty et al., (2013) and Hossain (2012) this study discussed the main activities in platforms of crowdsourcing, companies that present the incentives, and the users' motivations to become involved in crowdsourcing process platforms. To date, many studies have been conducted, but, to the best of the author's knowledge, most of them have based on several case studies or a single case study. According to a comprehensive literature review, over 400 crowdsourcing platforms were identified, and these data were analysed to find out the motivational styles, the incentives and activities in this process. The results indicated that this is a first study in the crowdsourcing platforms field to consider the activities, geographical location and firms' incentives, among other factors, and links well with "online crowdsourcing platforms. Thus, this a phenomenal perspective in global context where the activities were distributed among four classes – labour, content, creativity and knowledge via

platforms of the online crowdsourcing.

2.3.1 The Crowdsourcing Types

There are many different classifications for the crowdsourcing González-Ladrón-de-Guevara and Estellés-Areolas (2012b) propose the crowdsourcing classifications based on five types; these are Crowdcasting, Crowdcollaboration, Crowdcontent, Crowdfunding and Crowdopinion. Each type is different from the other in the function and the task which the crowd has to apply to it. Has been developed these classifications and integrating the crowdsourcing classifications others based on the task which formulated previously by (Burger-Helmchen and Penin, 2010; Howe, 2006; Greets, 2008; Reichwald and Piller,2008; Kleeman et al., 2008 and Brabham, 2008). The aim of creating the general task-based classification was that it can be used in any task, so this classification is suitable for this research because this project looking at the cultural differences between users who also have a role in their views towards NPD. This research builds on the emerging literature on the online idea of crowdsourcing. Despite the fact that the crowdsourcing approach has attracted media attention and big business, there are still very limited academic research on the crowdsourcing approach. Following the researcher's review of the literature, she found that this research is the first to investigate the cultural differences as well as experiences of Saudi and non-Saudi users who live in Saudi Arabia based on online crowdsourcing data. As a result, finding that there is a relationship between crowdsourcing ideas of UGC and new product development, the following section presents the relevant studies with regard to developing new products via crowdsourcing ideas.

2.4 The new product development via crowdsourcing ideas of the users

Crowdsourcing has attracted growing interest in recent times where the organisations use many methods, such as crowdsourcing, co-creation and netnography to utilise users' knowing and their creativity. Crowdsourcing is one of the main topics in the users and organisational studies. More specifically, the crowdsourcing process is trying to outsource in the idea generation stage to a great number of unknown users (Prahalad and Ramaswamy, 2004; Sawhney et al., 2005; Fuller et al., 2007; Kozinets et al., 2008).

Cooper (2001) and Piller and Ogawa (2006)suggested the first insights that the users' ideas which are generated in the crowdsourcing process (via self-selection) may also hold commercial potential. They stated that Muji, a consumer goods manufacturer in Japan, has developed some new products based on crowdsourcing ideas of users such as the portable lamp, the innovative bookshelf, and the beanbag sofa. Also, in the context of sales, the researchers found that some of these products outperform the products which were traditionally developed. (Lakhani et al., 2011) The new studies reference that the self-selection approaches help to determine potential lead users and then to t develop the new product concepts commercially. Generally, some researchers (e.g., Crawford and Di Benedetto, 2006; von Hippel, Pötz and Hienerth, 2007) indicated that some new product ideas which are generated via users in the contests of idea generation may compete with new product ideas which are generated via company professionals.

In some cases, users may generate ideas which at first glance are attractive but are impracticable in terms of cost. From reviewing previous research findings, it would appear that a balance between user-generated ideas and the involvement of professional designers is the most effective method of NPD (Arash, Jari and Helinä, 2014). Some researchers discussed the various factors in depth regarding the ideas, including the motivation and design of crowdsourcing as well as user capabilities. Regarding the first factor, the ability of users to create ideas for new products may depend on the industry involved or the product category. In contrast, firms might be better able to identify expected innovations, as they have more knowledge of the core technology, as stated by Riggs and von Hippel (1994) and von Hippel (2005).

Hassan et al. (2008) mentioned that NPD needs to followed and understood to expand the opportunities for product success, and all users wishing to participate in the NPD process must understand each element and its role in that process. Furthermore, it is essential to integrate product users' knowledge within the process, combining it with the knowledge of designers to produce a good product that will meet customers' needs. Their study found that user participation NPD is not often practiced. Several product developers conducted a study based on data and information relating to previous product performance. In many cases the researchers obtained their information "from user complaints, manufacturing defect report and market or lifestyle survey" (Hassan et al., 2008). Nevertheless, these data and information are insufficient to secure a successful product; in addition, the designers must be

involved in the early stages of a product's development and their responsibility is principally to identify the appearance and features of the product (Seung and Stappers, 2000). Griffin (2003) identified a need to integrate several demands when designing a product, and indicated that users should also take multiple demands into account. Subsequently, the companies encountered difficulties in terms of customers' acceptance of the product without user involvement in the early stages of NPD. In addition, they found that it is "not only technical and objective demands that are important, but also aesthetic, emotional, and other experiential factors, some of which are hard or impossible to express objectively" Seung and Stappers (2000, P. 5-18). However, to facilitate the work of product designers in creating the best products for users, several researchers recommend user involvement in the early stages of product development in order to create quality products, ensure continuous improvement of the process, and devise a plan to develop the project and facilitate cooperation between team members (Taha, Alli and Abdul Rashid, 2011).

However, generally, there are two user participation types such as co-creation product design and the design of user-centered product. The design of user-centered includes the consultation of end-users at each phase in design operations (Kujala, 2003 and Kwark, 2013). Kujala (2003) looked at the different approaches to user involvement in the product design process. The company should emphasise the usability of the product to the customer. The reliability of the product is an important feature to the customer as it will need to last if it is going to please them. One of the ways in which the company can manage this is to use task analysis and usability evaluations. Another approach companies may use in product design by the use of customer involvement is user participation through prototype reviews and workshops where customers may come and give their opinions on the different aspects of the product (Kwark, 2013). In addition, user involvement in product design has benefits because aspects of the product such as quality will be improved (Kwark, 2013). The main aim of having product design is so that companies have a chance of looking at the best ways in which to improve the product to make it appealing to the customer, and quality is one of the areas that is important to the end user. Another benefit of user involvement is improved levels of reception and acceptance by the market (Kujala, 2003). The use of users' information and involvement in product design provides a company with a way in which to ensure the customer will be satisfied with the products, which will lead to the customer having better reception levels leading to more sales (Kwark, 2013). Other benefits may come to the company in that the use of the information given by the customer in the creation of a

product may lead to the company putting in place cost-effective measures related to the product that will lead to savings in production costs (Yu, 2009). The cost of production in the system will be reduced by preventing the use of unnecessary materials in the product. Likewise, the removal of costly unnecessary features is also a way of reducing costs incurred by the company; the company will have a better understanding of the customer's taste in the products they use which will be beneficial to the company as listening to customer reviews will result in better design in future products (Eriksen, 2011).

Bott and Young (2012) asserted that innovation is important because an innovative product may potentially attract more customers, and researchers have investigated to what extent users should be involved in this process, as the quality of ideas needs to be monitored and assessed. Brabham (2012) cautioned that involving users via UGC may result in an unmanageable number of ideas being generated, where there are many elements involved in the product design process, and it is necessary for companies to consider whether ideas generated by users are likely to lead to the development of an innovative, attractive and commercially viable product.

There is a basic process for the purpose of exploration of product development to service new markets, but that exploration experience has yet to be empirically tested (Hoang and Ener, 2015). Only increasing breadth of experience and knowledge gained during the expansion of NP markets – for example, the exploration experience – might in the future enhance their capacity to innovate. This study considers how firms' ability to learn from their exploration experience may depend on the choice of whether to employ new versus existing technology to develop new products, and lead to different results. The aim of their study was to "address endogeneity by accounting for the behavioural learning process that leads managers to explore new markets following periods of poor firm performance" (P. 251). They employed a model based on detailed data about NPD projects started by 52 pharmaceutical firms between 1979 and 2000 and found empirical support. The findings of this study indicated a relationship between exploration experience in new product markets and subsequent innovation.

For example, Dell Computer firm launched the Idea Storm crowdsourcing site, a strategy of the company's chief, and Idea Storm allows the company to communicate with a customer directly but they received too many user ideas, and faced the problem of inability to select

and filter the most promising ideas; or could only do so with significant effort. In 2007 the Dell Computer Company received more than 16,000 crowdsourced ideas, and implemented 500 of these (Toubia and Floors, 2007; Dahan, Sukhorukova and Spann, 2010). In short, it could be said that these factors are related to the users' motivation and capabilities, as well as the crowdsourcing process design. Also the newer web in the dell computer company is Ideastorm, which enables users to freely debate and suggest some solutions to particular topics. In 2012, "the idea Extensions options were offered, promoting collaboration through comments on contributors' original ideas. Idea Storm transparency and generally rapid response-time spurs open innovation through crowd sourced collaboration" (Poetz and Schreier, 2012). In addition, Poetz and Schreier (2012) made it clear that users have only recently been regarded as a source of new product ideas. They indicated that both professionals and users may generate concrete ideas which can be used to solve a respective dilemma, related to the consumer goods market. Moreover, the study found out that the crowdsourcing process helped generate user ideas with significant values which are even higher than professionals' views concerning novelty as well as customer's benefit but lower regarding feasibility.

Studies have been conducted which investigate the roles of professionals and users in terms of the innovative and NPD processes in different fields. Griffin (2003, P. 429–458) stated that perhaps product development professionals have a sense that there is always "yet another buzzword or magic bullet always lurking just around the corner". With that in mind, the researchers made great efforts to help practitioners to identify the techniques, methods and tools that offer a competitive advantage. Indeed, more than 30 years ago, research efforts aimed to understand NPD practices and determine best practices. Over the last five years, many reports have been produced from research efforts sponsored both by the Prescription Drug Marketing Act (PDMA) and privately. Griffin (2003) summarised the outcomes of research efforts conducted over the lastfvie5 years and the results of the latest PDMA survey on NPD best practices. This study, undertaken more than five years in the US – the PDMA first best-practices survey – updates trends in organisations, outcomes and processes for NPD and also identifies the best practices which are most successful in developing new products between companies. This study seeks to identify the current situation of performance and practices NPD, understand how PD has changed from five years ago, identify if the practice and performance of NPD vary in industry sectors, and investigate the process of product development and tools that differentiate product development success (Veryzer, 2003).

Motivated by the facts that online idea crowdsourcing is increasingly used to collect new product ideas from ordinary users and that this crowdsourcing can generate many ideas, Schemmann et al. (2016) investigated which ideator (Ideator A person who creates productive ideas) and idea-related properties could determine whether an idea for NPD is implemented by a crowdsourcing company (Petruzzelli, et al., 2015). According to Urban and Hauser (1993) and Vanhaverbeke and Du (2010 Some of the participants can involves with the large crowds in the crowdsourcing platforms, while others not be granted significant contributions. The crowds involved in the crowdsourcing platforms are considered the lead users. Many researchers have investigated the characteristics and details of the lead users. The crowds who suffer from general peoples' ideas who still do not know their needs, and sometime the companies are considered that as lead users (von Hippel, 1986). However, "The role of the lead users in innovation" was examined on a large scale (Morrison, Roberts and von Hippel, 2000), and there is evidence for several essential innovations from the ideas of lead users (von Hippel, 1986).

Franke and Piller (2006) analysed the value created by toolkits for users' innovation and design, a new way to engage customers in design and new product development. The toolkits allow customers to create their own product, which is then produced by the manufacturer. Although design consultancies have been widely portrayed as "creativity experts" and clients outsourced to get "an original perspective and had lower satisfaction than the outsourcing for other reasons", the design consultancies were found to be more effective at developing ideas than creating them, and were tested by Wang et al. (2011). Furthermore, Hargadon and Sutton (1997) conducted their study on IDEO in innovative product development before the crowdsourcing process was created, was creates new products that are original combinations of existing knowledge from disparate industries (PP. 716-749). However, their designers exploited "technological solutions with organisational" procedures to store knowledge in company archives through drawing analogies between past solutions and the current design problems, and then created "new solutions to design problems in other industries".

The most successful crowdsourcing examples, however, are Amazon, Dell and Istock in their use of crowdsourcing for different industries and fields. According to Amrollahi (2015), the crowdsourcing method was used to address several different problems up to the present day. Tarrell et al. (2013) checked 24 crowdsourcing platforms for different types of application like policy development, business, awareness and city planning (Seltzer and Mahmoudi,

2013). Also Crowdsourcing.org has included around 2670 websitse in 45 different languages, a growth of 100% between 2011 and 2013. The Amazon website. “mechanical turk”, was the most famous website in the world in April 2014 has around 571,000 of the actions and tasks. It hosts a large number of what Amazon called Human Intelligence Tasks – or HIT's. Most have to pay only a small amount for each completed HIT. Any users can participate to set tasks also, and any users can participate to achieve the tasks which are listed.

Another example, IStock company, is a successful platform that was constructed for the photography industry (Howe, 2006a). In 2006, Getty Images purchased this platform for US$50 million (Pickerell, 2012) and, in 2008, the revenues were approximately US$163 million. However, several company and businesses have used the paradigm to develop their services and products (Stieger et al., 2012; Amrollahi et al., 2014). Dell used the *Ideastorm* process to provide the ideas regarding the new products, and has already included more than 20,000 ideas. Recently the company has used this approach to make decisions and carry out strategic planning (Poetz and Schreier, 2012).

The internet has enabled the business world and companies an ease interacts with users and merge the users' ideas together in the product development process (PDP) (Janzik, 2010). Members on any electronic platforms have multiple motivations, different abilities and diversities for their involvement in electronic platforms (Nambisan, 2002; Lüthje, 2004). However, any success in the electronic crowdsourcing platform depends to a large extent on interactions level, integrating people’s ideas and the innovative members’ motivations to become involved in the process of innovation which could bring many important advantages for the firms (Füller, Jawecki and Mühlbacher, 2007). Such actions included: facilitate information and data exchange; reduce the risk for newly launched products; shorten the invention cycle; reduce the marketing costs; get more loyal customers; achieve more innovative product design; reduce the costs of the production, and facilitate access to a large number of customers, among others (Hossain, 2012). It is clear that the members of the society are willing to address the problems that companies’ internal research and development (R&D) people may not solve. Figure 5 illustrate the crowdsourcing process.

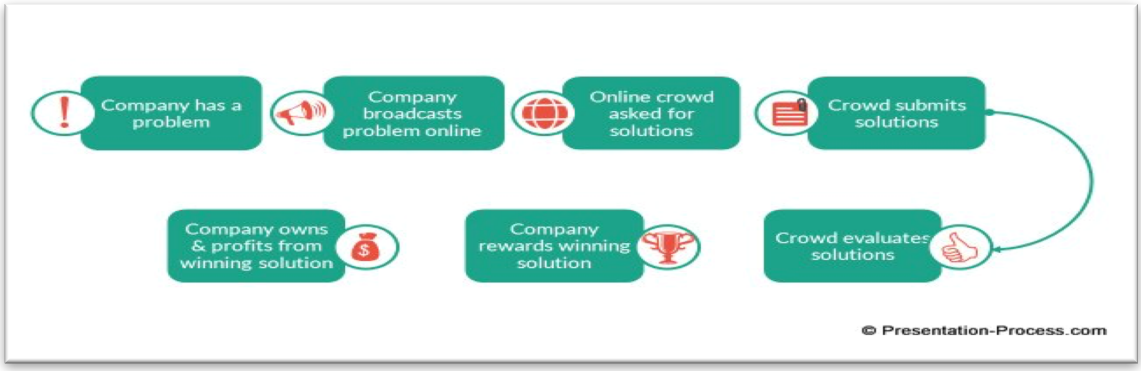


Figure 5: The crowdsourcing process (Muhdi et al., 2011).

There are many companies working in the highly technological innovative industries to enable product developers to take advantage of specialised knowledge from different fields to build new products which will have an impact on these industries (Bhawe and Tyler, 2015). The specialised knowledge required might be outside the scope of the companies; therefore companies must determine the skills and talent required, and what they need globally to recruit in a short time for NPD. On other hand, Frank and Kim (2015) found that the basic principles for marketing indicate that best results and more effectiveness are to be seen when a product is designed and positioned in the market so as to "attract a particular targeted market segment", but some firms "want their product to appeal to more than one consumer segment at the same time" (PP. 61-65). While, Gloria and Liliana (2015) advocated cooperation with users who prefer participation in product innovation and development. However, they found that the greater the intensity of the continued relationship with the user, the greater likelihood there is of radical innovation, which is more attractive to develop than incremental innovation. On the other side, the positive influences of cooperation on the development of innovations are very important for small companies and Schweitzer et al. (2014) found that small companies prefer to involve users in the development of new products to understand the uses of the proposed new product.

Hossain (2012) confirmed that that the small and medium companies tend to be more dependent on the suppliers and local customers, while this is less characteristic of the innovative big companies. Hossain also found that small companies are at the forefront of commercial use of the internet. The IEE (1994) noted that product design should “provide ALL customers with continuously improving products and services that consistently satisfy their changing expectations”. Taking this into account, it could be reasonable to suppose that

those who use the end product would help in the design process in order to achieve maximum customer satisfaction. Meanwhile, Leahy (2013) proposed that to develop an effective product – whether by designers or users – it is necessary to fill all roles in the process of product design in order to maximise end user satisfaction. This view is supported by the study by Meybaum (2014), who believes that users' participation is important at each stage of the design process, specifically in indicating methods of creating virtual models that can help in the process of product design.

Moreover, there are several different types of users such as (i) those with high technical innovativeness, (ii) those with high trend awareness, (iii) those demonstrating high ethical reflectiveness, and (iv) those with high technical skills. It was found that users who have high technical skills are more likely to production the ideas, and have a positive effect on the community from an ethical stance (Fiona et al., 2014). Taha et al. (2009) also stated that users have become a precious source of support for the development of new products, because they know their actual needs. Also von Hippel (2005) believed that a successful strategy for the development of new products involves users in that process. Despite users not always being able to express their needs, they will know what their needs are and how they can make the product suitable for them. Furthermore, Lynna and Akgüna (2015) who believe that innovation is very important, but risky. In particular, there are uncertain markets in terms of services or products which use new and uncertain technologies. In these circumstances, the NP professional must rely on a range of techniques and tools to provide innovations which are more effective and which have a greater likelihood of success. These tools are based on one or more of six strategies such as technology, learning, speed, process, quantity, and market.

Calantone, Vickery and Dröge (2003), however, evaluated the activities of NPD in terms of their effect on a firm's performance relating to original product development, product technological innovation, new product introduction, design innovation, product improvement, product development cycle time, new product development, and customisation. Comparison with competitors showed that the best performers always place greater strategic emphasis on each of these activities (Calantone et al., 2003), and that all these activities have a significant positive impact on return on investment (ROI) and ROI growth (Calantone et al., 2003). The authors further found that most of the activities also clearly relate to market share growth, stronger market share, ROS growth and return on sales (ROS). The vision and focus should

start with CEOs who understand the value of strategy in these essential activities of (NPD). Staff should have necessary guidance and sufficient technical resources to perform the necessary activities as directed by leaders. The results showed that firms should have enough flexibility to accept the changes in responsibilities (Calantone et al., 2003) for leadership and coordination which take place at various stages in the new product development process. Furthermore, creating a flexible product is important when competing in numerous market segments; best performers require more leadership and input from engineering, manufacturing and design.

Palm (2014) noted that product design consulting has been promoted as a strategy of open innovation, but the results of this project differ widely. Because customer satisfaction may be viewed as holistic, the overarching procedure leading to the success of a consulting project is an understudied one, and his study employs a template examining project value and performance, customer experience with design consulting, outsourcing of the project, and relationship quality. George and Thomas (1990) attested that fast innovation means that a company involves all its departments in the innovation process; for example, the strategy of fast innovation that has achieved popularity in the last few years, particularly in Japan, deals with two confirmations. First, the fast cycle innovation can be more effective when used in conjunction with a strategy of quality, and second, an organisational infrastructure offers an environment that helps and supports achieving a high-quality and rapid-cycle innovation (Flynn, 1994). In addition, Evmorfia, George and Nina (2012) undertook cross-national study of China and the USA investigate the changes in purchase intentions of Chinese and UK consumers after exposure to sequential comments of Electronic Word Of Mouth (eWOM) in the format of negative and positive user reviews for experience versus search products. And theyfound that UK customers anchor on negative data and information regardless of the way in which it is acquired, while Chinese customers are likely to concentrate on latest eWOM comments in any case of the valence. This applies in particular to experience products.

According to Jeppesen and Lakhani (2010) the *ability* of users to generate ideas for new products does not depend only on the problem but also on the way in which it is communicated. A second factor, *motivation* of the users, could be "closely linked to their willingness to share such ideas with firms and to invest in generating new product ideas. Previous research found that users tend to exchange ideas with friends in the community (Franke and Shah, 2003; Harhoff, Henkel and von Hippel, 2003), and the circumstances in

which they would be willing to share their ideas with companies are not clear. Until now, it has been found that the motivational factor for some users sharing their ideas with some companies was largely recognition (Jeppesen and Frederiksen, 2006; Füller et al., 2007).

In the same vein, Ulrich and Eppinger (2008) observed that the company should react to experience of the environment from the perspectives of the product and the customer. Without direct communication and experience, the innovative solutions for a customer's needs might never be discovered. In addition, Gemser and Leenders, (2003) and Füller et al. (2007)mentioned that the company should emphasise the usability of the product to the customer. The reliability of the product is an important feature to the customer as it will need to last if it is going to please them. For example, the work of Dahan and Hauser (2002) and Griffin and Hauser (1993) confirmed the importance of and requirement for users' description of the benefits of a new product in their own words, as the engineers require more details regarding customers' needs which are provided by typical marketing surveys.

In addition, Toubia and Florès (2007) and Dahan et al. (2010) highlighted the importance of attracting qualified people to the success of any crowdsourcing efforts Ulrich and Eppinger (2008) mentioned that NPD needs to followed and understood to expand the opportunities for product success and all users wishing to participate in the NPD process must understand each element and its role in that process. Hildebrand et al. (2013) further mentioned another approach that the companies may use in product design by the use of customer involvement is user participation through prototype reviews and workshops where customers may come and give their opinions on the different aspects of the product.

Hildebrand et al. (2013) also postulated that the use of users' information and involvement in product design provides a company with a way in which to ensure the customer will be satisfied with the products being produced and which will lead to the customer having better reception levels leading to more sales. Kulp et al. (2004) mentioned that other benefits may come to the company in that the use of the information given by the customer in the creation of a product may lead to the company having cost-effective measures related to the product that will lead to savings in production costs. Further, according to Holmlid (2009, pp 105-118) "user-centered design involves the consultation of end-users at each stage in design process". In addition, Holmlid (2009) asserted that user involvement in product design has benefits because aspects of the product such as quality will be improved; another benefit of

user involvement is improved levels of reception and acceptance by the market.

Ulrich and Eppinger (2008) reported that it is essential to integrate product users' knowledge within the NPD process, combining it with the knowledge of designers to produce a good product that will meet customers' needs (Taha et al., 2009). The designers must be involved in the early stages of a product's development and their responsibility is principally to identify the appearance and features of the product. In addition, Sanders and Stappers (2008) found that user participation in NOD is not often practiced, where several product developers conducted a study based on data and information relating to previous product performance. Ulrich and Eppinger (2008) and Sanders and Stappers (2008) found that in many cases the researchers obtained their information from customers' complaints, lifestyle surveys, reports of manufacturing defects, and the market.

Relatedly, Sanders and Stappers (2008) and Taha et al. (2009) identified a need to integrate several demands when designing a product. Subsequently Hildebrand et al. (2013) reported that companies found difficulty in terms of customers' acceptance of the product without user involvement in the early stages of NPD. In addition, researchers (i.e., Sanders and Stappers, 2008; Ulrich and Eppinger, 2008; Taha et al., 2009; Hildebrand et al., 2013). The researchers found that it is not just objective and technical requirements that are important, but also emotional, aesthetic and other empirical factors. However, (Taha et al., 2009) Several researchers recommend user involvement in the early stages of product development in order to create quality products, ensure continuous improvement of the process, and devise a plan to develop the project and facilitate cooperation between team members.

From this stance, user involvement is important from the first stage in the new product design, which is idea generation through crowdsourcing to identify the appearance and features of the product (Sanders and Stappers, 2008), those features of product characteristics which better match with the preferences of a particular user (Hildebrand et al., 2013). So, the aesthetics is considered one of the product features such as taste, colour, size, smell and shape and is one dimension of the overall product quality model. Also aesthetics is a most important dimension among the consumers because this dimension is closely related to the user-based approach (Garvin, 1983). Aesthetics features could influence on the crowdsourcing ideas of users in developing new products. The next part of the literature review explains how aesthetics like colour, size and shape impact on the users' responses to

NPD, and then investigates the cultural differences between users' preferences.

2.3 How consumers respond to product aesthetics

Several researchers linked the product aesthetics with the consumer reactions to different design features and external stimuli that trigger many negative and positive reactions of the consumer. Table 2.2 illustrates several definitions to understand the kinds of reactions and what sub-dimensions these can be categorised into order to know why the design of product mostly consists of the structure described in the model below (Ellis, 1950; Berlyne, 1970; McManus, 1980Malkewitz and Orth, 2008a; Kahn and Sevilla, 2014). Thus, the managers and designers need to understand better consumers' reaction to their designs and service quality to increase customer satisfaction (Prabhakar, Nguyen, Knox, and Nisar, 2018; Rath and Kotler, 1984; Sobek and Jain, 2006). According to Dumaine (1991), professional managers and designers know how to resolve the design problem that would lead to negative reactions instead of focusing on principles of design that would lead to positive reactions. Once the managers and designers knows how to deal with this phenomenon then they can design the product perfectly and better for the consumer (Chen and Hsiao, 2006; Au and Li, 2010). Bloch in 1995 and 2018 claimed that the perfect product design makes the consumers simply love it.

Ahearne et al. (2005) and Riza and Walter (2015) mentioned that good and beautiful products could trigger robust affective relationships that go beyond positive feelings, and the consumers get the emotional correlation to the product and improved feelings of "rightness" or also ignore the negative news or negative WOM regarding the product. In addition, Figure 6 shows consumers' responses to the product aesthetics model. (Bitner, 1992; Bloch, 1995; Qualls and Pluzinski, 1986; Bloch et al., 2003; Hagtvedt and Patrick, 2011) The researchers classified these responses into two dimensions which are behavioural reaction and psychological reaction. However, (Olson, 1972; Solomon, 1983; Swinyard and Smith, 1988; Bitner 1992; Desmet, Hekkert, and Jacobs, 2000; Bloch et al., 2003; Moultrie, Clarkson and Crilly, 2004; Garg and Kumar, 2010) the researchers developed this further and divided the psychological reaction into two additional dimensions; (i) cognitive reaction that includes product categorisation and product-related beliefs in the consumers' minds, and (ii) affective reaction that include emotional and aesthetic responses.

Moreover, several different influences such as the consumer product responses, social,

cultural and environmental influences and others mediate the consumer reactions to product aesthetics. The mediating influences could happen at any time whether on the cognitive, affective and behavioural reaction of the consumers towards product design (Bloch, 1995; Crilly et al., 2004). Hence, the designers need to examine each potential impact on the consumer when developing and designing a new product. That means the designers have to be aware about using the appropriate shapes, sizes, symbols and colours in order to gain the required reactions of the consumers. The next parts explain each consumer response to the product aesthetics in greater detail.

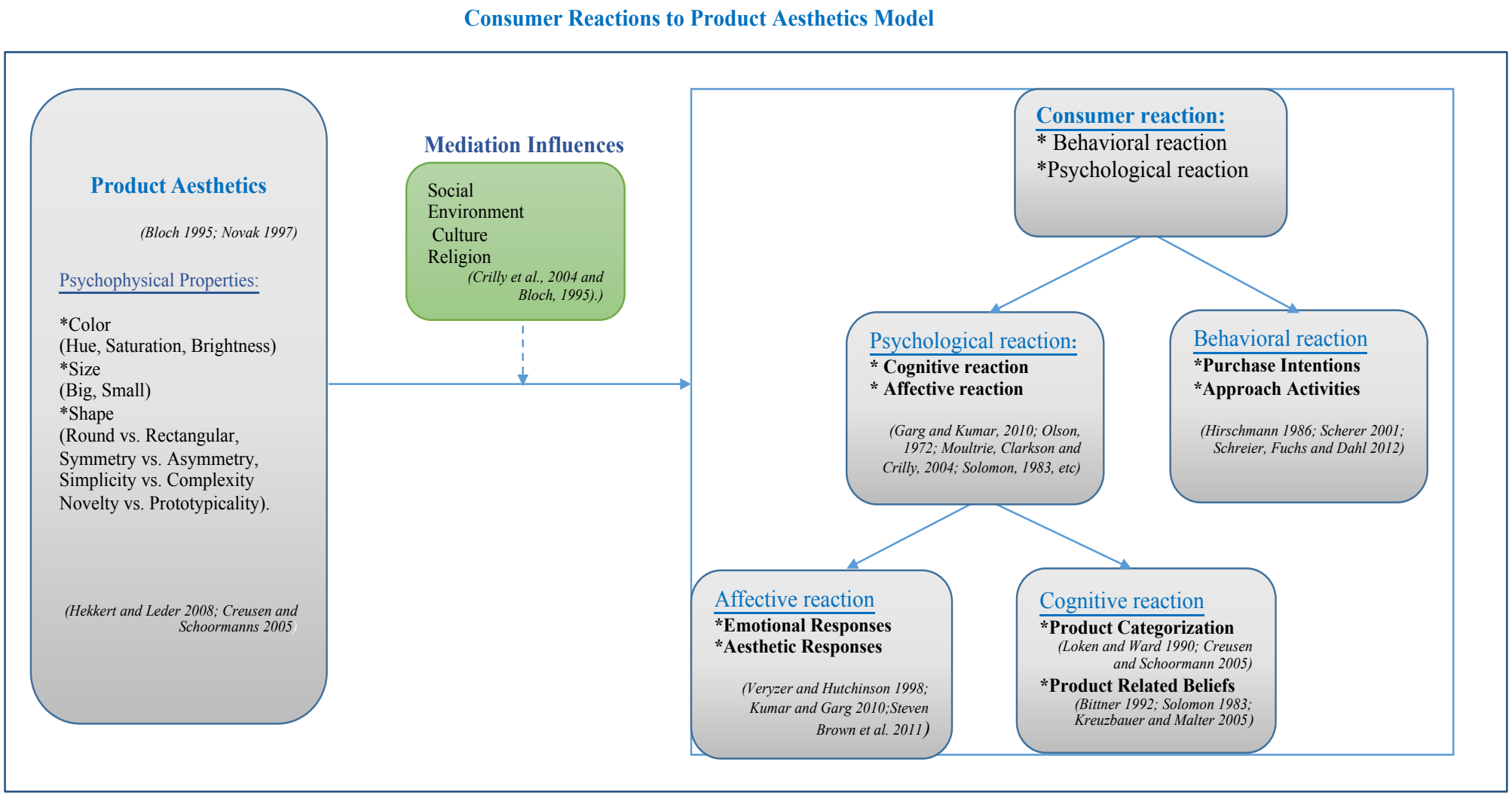


Figure 6: Consumer response to product aesthetics model

Area	Authors	**Definition**
Cognitive Response	Crilly, Clarkson and Moultrie (2004)	Indicates to the consumers or users' judgements towards the products based on information seen by the senses.
Product Exposure	Wentzel, Landwehr and Herrmann (2013)	The numbers of times that the consumer may be exposed to the product before issuing a judgment.
Behavioural Response	Bloch (1995)	'To design' may be characterized as avoidance or approach.
Aesthetic Reaction	Berlyne(1974) Robinson and Csikszentmihalyi (1990) Bloch (1995)	The reactions emerging from the interaction among the perceiver of the object and the object characteristics. An intensive enjoyment case distinguished by a sense of discovery, feelings about the personal wholeness and human connectedness. Derived from the product sensory attributes and the design instead of its functional traits or performance.
Intensity	Ellis (1993)	The saturation or purity of a certain colour is based on the dominant hue size.
Unity	Lauer (1979)	Indicates to a harmony and belonging between the design elements that beyond just coincidence that led them to meet together.
Aesthetic Experience	Hekkert (2006)	The entire set of impacts which is resulted by the interaction among the product and the user, including the degree to which all our senses are pleased.

Saturation	Milne and Labrecque (2012)	Indicates to the pigment amount in the colour.
Prototype	Leder and Hekkert (2008)	Is standard representations that allow us to elicit suitable reactions and summarize the information which all objects of that category have in concerted.
Product Design	Veryzer (1995) Rath and Kotler (1984)	That indicates to the product elements organization, and aesthetics elements are related to their nature because physical or the design shape of the product include the aesthetic aspects of the product. The seeking process to improve the firm profitability and the consumer satisfaction by the creative use of the key design elements which are performance, durability, quality, cost and appearance in relation with environments, companies identities, products and information.
Design	Bloch (2011)	The design indicates to the attributes of the product shape which provide hedonic, utilitarian and some benefits to the users.
Simplicity	Arnheim (1974)	The personal experience and judgment of a viewer who does not feel any difficulty in understanding what is being offered to him/her.
Colour	Ellis (1993)	Is the vision reactions at the wavelengths of apparent light reflected through an object in the eyes.
Visual Product Aesthetics	Brunel, Arnold and Bloch (2003)	Those attributes which create appearance of the product and have the ability to influence consumers and users.
Aesthetic	Reimann (2010)	Typically is original, beautiful and prototypical in a holistic manner.

Product		
Aesthetics	Baumgarten (1735) Cited by Reimann et al. (2010)	The word aesthetic in greek is mean the conception of the feeling, seeing, hearing and senses, the perfection of sensation perception. (p. 87)
Affect	Sener and Demirbilek (2003)	The psychological reactions in the users to the semiotic content of the object.
Emotional Response	Sener and Demirbilek (2003)	An automatic reactions towards a case, object or a thing is not just an automatic. But it is an automatic reactions in the depths of our mind to the thinking that we have linked with the object or with the case.

Table 2.2: Definitions of product aesthetics and consumer reactions

2.3.1. Psychological reactions to product aesthetics

Experimental researchers in the areas of psychology, consumer research and marketing indicate that external stimuli such as objects or products could address the physiological, cognitive and affective cases of the consumer (Hirschman, 1986; Robinson and Csikszentmihalyi, 1990; Lam, 2001). However, the researchers stated that the consumer psychological reactions include two basic dimensions (Bloch 1995; Barsalou, 1999; Chen and Hsiao, 2006; Neviarouskaya et al., 2010) which are *cognitive* reaction and *affective* reaction. The affective reaction is one of which deals with processing of the external stimuli such as product aesthetics and interprets it into emotional reactions.

Further, Crilly et al. (2004) and Marković (2012) explained the cognitive reaction as "the judgements that the user or consumer makes about the product based on the information perceived by the senses" (P. 547. That would mean that when the consumer sees the product aesthetics they experience intrinsic satisfaction, positive feeling or intrinsic pleasure resulting from the product appearance (Mariëlle, Creusen and Schoormans, 2004). In addition, the consumer first realises the external shape of the product, then gets emotionally influenced

and through this experiment the consumer creates a particular meaning regarding the product. By this experience the consumer is able to make judgments (Neviarouskaya et al., 2010).

2.3.1.1 Affective reactions to product aesthetics

To date there is no clear and common definition that properly describes 'affective reactions'. The marketing field supports this by saying that the affective reaction could lead to the positive reactions such as liking (Bloch, 1995). The managers and designers also need to understand the negative reactions. For example, the consumer who is selecting a piece of furniture might mock the poor design of a certain sofa, as is the same cases for clothing and cars (Mowen et al., 2010). However, affective reactions could elicit robust reactions such as those for art pieces. Moreover, several researchers use the aesthetic, emotional and affective reactions mutually. The recent literature review in marketing indicates that the affective reaction features arousal and enjoyment that could also be classified into two types, that are emotional and aesthetic reactions (Herrmann, Landwehr, and McGill, 2011). In addition, Bloch (1995) and Mowen et al. (2010) discussed that affective reactions could be responsible for the avoidance behaviour or approach to a product. Robinson and Csikszentmihalyi (1990) also referred to the reaction to aesthetics as a case of strong enjoyment that describes the person's feelings, the 'sense of human connectedness' and the sense of discovery. Furthermore, Bloch (1995) illustrated that the reactions to aesthetics came from the sensory attributes and design of the product instead of its functional characteristics or performance. According to Sener and Demirbilek (2003), the emotional reaction is not an automatic reaction to any situation or thing; rather, it is an automatic reaction from inside of the mind to the ideas that have linked with the objects or the situations.

2.3.1.2 Cognitive user reactions to product aesthetics

According to Moultrie et al. (2004, P. 558) the cognitive response is "the judgements that the user or consumer makes about the product based on the information perceived by the senses". This implies that the user first perceives (e.g., view) a product design while the style-building part of the brain clusters the structures (e.g., motor – dangerous – fast – ugly/beauty) and after this process remembers these structures, so that the user has the ability to make a decision or judgement. The users tend to explain and classify the external influences, such as

visual product aesthetics. Arkes and Blumer (1985) Cohen (1990) and Morris and Fritz (2011)) clarified cognition as 'mental processes' engaged in understanding and gaining knowledge, including problem-solving, remembering, thinking, judging and knowing.

In the studies undertaken by Leder et al. (2004) and Radford and Bloch (2011), the researchers described this method as 'cognitive processing'. Marković (2012) confirmed that this process comes after users experience affective cases, and before that the users can classify a product based on its 'visual design'. They first experience a type of 'wow-experience' (excitation) before heading to an 'aha-experience' (Eureka-experience), 'ah-experience' (appreciate art) or 'ha-ha-experience' (humour). Leder et al. (2004) are believed to have created the best model in the literature survey demonstrating the aesthetic experience and cognitive processing. Leder and colleagues also described the experience of aesthetics as, "a cognitive process accompanied by continuously upgrading affective states that vice versa are appraised, resulting in an (aesthetic) emotion". Figure 7 below illustrates the users' process of the aesthetic experience, first through communication with 'visual aesthetic influences' to the final communication where 'they are able to make aesthetic judgements'.

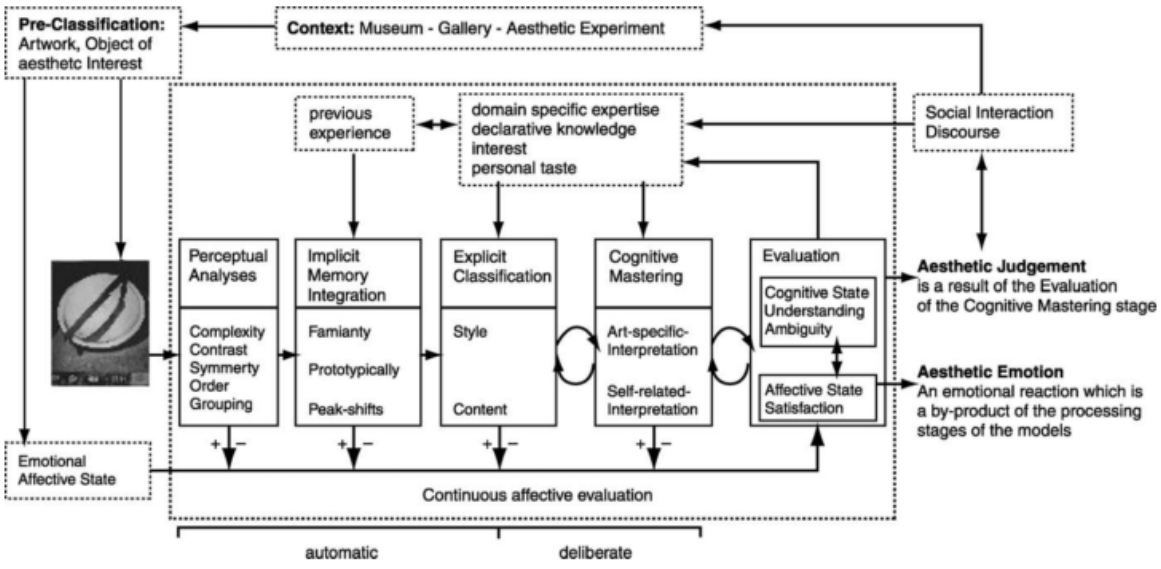


Figure 7: Leder et al. (2004): A model of aesthetic experience

According to McManus and Weatherby (1997), Hutchinson (1998), Markman et al. (2001), Palmer, Sammartino and Schloss (2011), Chen and Hung (2012), Blijlevens et al. (2013) and

Milne and Labrecque (2012) the first consumer experiences are an emotional affective process which looks at the visual aesthetic product. The system of a perceptual symbol in the users' brains then further analyses the psychophysical characteristics 'and abstract aesthetic dimensions of the object'. This automatically occurs without any thoughtful contribution from the users. "The perceptual system then informs the implicit memory system in the brain about the founded patterns" (P. 715). The system of implicit memory then takes the results and classifies the object's characteristics to category groups such as proto-typicality or familiarity that is connected with past experiences. The scientists argued that the more prototypical or familiar the consumer perceives the product, the more they appreciate it. An attribute, such as personal taste, certain expertise in a field or an interest then classifies the object and estimates it according to its content or style, for example. Currently, the user deliberately explains the target by using the information and data gained from the previous process that automatically created it. This is known as the *cognitive mastering state* (Markman et al., 2001). After explaining the target, the user experiences an affective or emotional state from which he or she feels *satisfaction , delight* (good styling) or *dissatisfaction, disgust* (bad styling) that is derived via a reward system in the user's mind.

Ultimately, the user combines the cognitive mastering state with the emotional state and assesses the process results, either negatively or positively (Chen and Hung, 2012). The outcomes of both cases are called an 'aesthetic emotion' and 'aesthetic judgement'. These experiences are saved in the implicit memory part of the brain and then recalled and utilised in the future. Radford and Bloch (2011, P. 210) stated that "the experienced objects get certain characteristic attributes in order that future categorization processes work efficiently". Therefore, the products of aesthetic cognition are labelled based on their attributes, such as *powerful* or *new* according to their classification. Radford and Bloch (2011) indicated that the design of the product that will elicit attributes or perceptions such as powerful or new in the users' minds must not only have powerful or new design features. This is identical to the opinions of psychologists who argue that people do not perceive the individual parts of the product, but they perceive the whole product. Bloch and Radford argued that the whole product needs to be designed to be powerful or new, so that users perceive the product as such. This opinion differs from scholars such as Durgee (1988) who argued that the users automatically perceived the products, which means the users perceived each part of the product's design in detail. However, several researchers classified cognitive reaction into two dimensions – Product Categorisation and Product-related Beliefs ((Solomon 1983; Bittner

1992; Loken and Ward, 1990; Creusen and Schoormann, 2005; Kreuzbauer and Malter 2005).

- Product-related Beliefs

The researchers in the psychology and marketing areas analysed the cognitive reaction of users in order to predict users' responsiveness to product-related content (Smith and Swinyard, 1988). For instance, the users' neurons are able to interpret the features of products formed in the mind. To do that, the neurons, which are in the sensory and motor zone of the brain, recall or reproduce the images experienced in the early steps of life (Barsalou, 1999; Loken et al., 2008). Moreover, the current shapes of the product are compared in the brain and also ranked as the design evaluation (Bettman et al., 1998). Thus, the design of the product is related to the known categories in the minds of users. In addition, Berkowitz (1987) examined the extent to which the users responded towards the shape of a product, in terms of how they formed their opinion of the product and its type, quality or belonging to a particular category. Berkowitz was the first academic in the area of marketing to investigate the role of product shape "as prior stimuli to consumer response". Other academics considered the product shape "rather as a post-hoc response". Berkowitz also indicated that the users attribute related product features, such as comfort or freshness, to the product shape. In addition, Berkowitz (1987) argued that designers deliberately produce specific product forms which lead to positive beliefs in the creation, such as desire.

This opinion is identical to those of Solomon (1983) and Bitner (1992), who illustrated that product forms may have an impact on users' beliefs about the product form. The researchers also indicated what type of product shape-related beliefs product shape that could remain in the mind of the consumers, for instance, gender role, technical maturity, situations and ease of use are only a few of users' characteristics that are related with products when the user sees a specific product form (Kreuzbauer and Malter, 2005). Twenty years later, Kreuzbauer and Malter (2005) showed that small formations in product form elements might lead to major changes in how users perceive and classify the product (Orth and Malkewitz, 2008a). Other researchers showed evidence of how aesthetic design and packaging could impact on the categorisation and perception process of users (Hirschman and Solomon, 1984; Bitner, 1992; Crilly et al., 2004). The design of products can impact on the users' product-related beliefs; this is an interpretation of how the users think of the product and how they build their judgements and preferences.

- Product Categorization:

As referenced in the section above, the consumer tends to categorise a particular type of stimulus such as product design. The psychology studies claim that whenever the external image corresponds with the current category in the consumer's mind, the consumer is more likely to appreciate the product. This influence is also recognised as the product familiarity. (Moreau, 2001). However, the forms of the current product are compared in the consumer's mind, then classed based on the design assessment; additionally, the design of product is related with known categories in the minds of consumers (Payne, Luce and Bettman, 1998). For example, the consumer who sees a car that is designed to the highest level of elegance, aesthetics and speed would classify it in the racing class because it is compatible with the sports cars in the category.

According to the psychology researchers Bar and Neta (2006), the consumers select meaningful designs that are easy to classify instead of novel and meaningless designs. Also the researchers stateed that the stimuli which consumers have seen previously are likely to be preferred. The researchers also summarised that a potential reason for this may be that the consumers are afraid of the unknown designs; they prefer familiar things that are known in the mind; as also, the consumer could distinctness the unknown designs and are likely to classify them as a threat. Moreover, Locander and Cox (1987) discussed that the external stimulus of the product that is familiar could be immediately classified in the consumer's mind. According to them, a new and unfamiliar stimulus for the consumer requires more mental time and effort; also those researchers claim that this impact of incongruence can trigger stronger emotions. Hutchinson and Veryzer(1998) and Bloch and Radford (2011) reported that the consumers prefer to compare the novel products taking into account the experience that is in their minds. The consumer classifies the novel known product in the mind and attempts to find a similar design directly. Then, products classified as different from the category prototype design are understood as new. These products receive greater attention from and have a greater effect on the cognitive and affective responses than the reaction caused by familiar products.

2.3.2 Behavioural reactions to product aesthetics

The behavioural reactions to design could be characterised as avoidance or approach (Bloch,

1995). Bloch (1995) stated that *approach* links to the consumer who is attracted to an attractive product design. Qualls and Pluzinski (1986), Bitner (1992) and Luce et al.(1998)) indicated that the consumers see the external stimuli such as product aesthetics and describes these after they have created emotions towards them. The recent literature in psychology stated that the behavioural reaction has a longer response choice and times (Reimann et al., 2010). Robinson and Csikszentmihalyi (1990) asserted that the behavioural approach belongs to the experience of aesthetics. For example, someone drives a car on the highway; this person then notices (visual perception) the deer that is crossing the road ('perceptual symbol systems'). This person is afraid (emotional case) and hence explains this visual 'thing' as a possible subject (cognitive case). As a result the person brakes (behavioural reaction) to avoid the deer.

2.4 Mediator effects on the Users' Reactions

The consumers' reactions towards the external product design are mediated by different stimuli such as social life, environment, culture, fashion and technology. The mediator influences may be take place at any time and affect any behavioural, cognitive, affective reactions of the consumer to the design of products (Bloch, 1995; Crilly et al., 2004). Hence, the designers need to examine each potential impact on the consumer when developing and designing a new product. That means the designers have to be aware about using the appropriate shapes, sizes, symbols and colours, among other aesthetics, in order to launch the required reactions of the consumers (Lewalski, 1988). If the designers misinterpret the effect of one or more of the designs characteristics, then the consumer could be react in an undesired way. For example, international business studies have indicated that several American retailers have failed in countries with narrow cultures, such as China and South Korea, partly due to the fact that their products or business style conflict with local cultures (Bianchi, 2008; Gandolfi and Strach, 2009; Gao, 2010). In order to stimulate the consumers' reactions effectively the designers must be aware of likely mediators or moderators. From this point, the current research has selected a mediator variable - i.e. *culture* – because this variable can mediate the relationship between the independent variable and the dependent variable and interprets the reason for such a relationship to exist. That means that this variable will help to interpret how the external physical events affect the internal psychological values; here, the effect of the product aesthetics is explaining the product-related beliefs in the crowdsourcing ideas of the local and international users through the

culture. In the same context, Hofstede and McCrae (2004) mentioned that the national-level cultural practices need to work as a mediator because the people's characters are influenced by national orientations. In contrast, finds that on the individual level the cultural practices moderate the relationship between individual character factors and innovative behaviour, because the individual can only have a limited impact on national cultural practices. Statistically, this argument is propped by the consideration that moderators should not be correlated with the independent variable, but mediators should (Baron and Kenny, 1987). Theoretically, the moderator is more potentially the case when examining the trait–culture relationship at the individual level while the mediator is the case when examining it on the national level (Rossberger and Krause, 2013). In addition, more studies need to examine the continuously changing environment such as multiculturalism, smartphones, social networks and other aspects (Crilly et al., 2004). The existing studies still ignore the mediating impacts.

2.5 Psychophysical Properties of Product Aesthetics

There are a great number of different definitions of product aesthetics in studies of neuroscience, design and psychology (Hung and Chen, 2012). Dating back to Fechner's (1876) landmark work and Berlyne's (1971) work on aesthetics, psychology has had a long tradition of experimentally studying the preferences, evaluations, and feelings related to aesthetics. However, there is an observable paucity of research defining product aesthetics in the area of marketing. Some researchers have extended their investigations to the studies of neuroscience as well as psychology, which are both relevant to marketing studies. They demonstrate the impact of the aesthetic features of a product on the user's response in terms of their psychophysical and behavioural reactions. Therefore, this section describes the influence of the aesthetics dimension of psychophysical characteristics on the user's response, particularly in terms of the product design's impact on the cognitive processes of the user (Birren, 1945).

However, there are many different explanations of product aesthetics. For instance, Philip and Rath (1984, p. 17) mentioned that it is "the process of seeking to optimize consumer satisfaction and company profitability through the creative use of major design elements (performance, quality, durability, appearance and cost)". Bloch (1995) indicated that the product is a part "of the classical marketing mix". He also stated that the external shape or

design is an important prominent feature of a product, while one of the recent notions of the aesthetics of a product was presented by Bloch et al. (2011). Their research integrated the present and past studies with regard to the aesthetics of products and indicated that the shape attributes of a product provide hedonic, semiotic and utilitarian aspects to the user.

Researchers such as Bloch (1995) mentioned that the design of a product and its shape are both covered by the characteristics of the aesthetics of the product, such as shape, texture and colour. Ergonomic requirements always directly impact on the product attributes, such as size, shape and texture. Newman (1957) mentioned that the product is a code formed by its colour, form, functions and size. Furthermore, Berkowitz (1987) found that in the eighteenth century, aesthetics features were linked with pleasure and delight. According to Osborne (1979), aesthetics is a "perfection of sensate cognition". Hence, Lawson (1983) indicated that the aesthetics of a product are those attributes that represent the appearance of the product and have the ability to have an impact on the customers and observers. Bloch (1995), Hekkert (2006) and Blijlevens et al. (2009) are researchers who have begun to study the attributes that inspire and evoke particular responses in the users' minds. Their research has attempted to establish which types of behavioural and psychological responses may lead to design.

Accordingly, other researchers divided the form of a product into many parts, based on the psychophysical characteristics of its size, colour and shape (; Ellis, 1993; Hutchinson and Veryzer, 1998; Schoormanns and Creusen, 2005; Leder, Schifferstein and Hekkert, 2008; Sevilla and Kahn, 2014). For example, size refers to big and small; colour to saturation, hue and brightness, and shape to round or rectangular. Additionally, Sevilla and Kahn (2014) proposed the categories of complete and incomplete, traditional, novel and timeless, balance, style, harmony and dynamics, complexity and simplicity. Veryzer and Hutchinson (1998), Hekkert et al. (2008), Hung and Chen (2012) and Blijlevens et al. (2013)all mentioned that the aesthetics characteristics have a certain impact on the users' responses. Gardner and Levy (1955) also mentioned that the aesthetics notion focuses on users' psychological or cognitive states, such as attitudes, expectations, feelings, mental constructs, understanding or ideas.

2.5.1 The colour

When considering the studies relevant to the impact of colour and its effect on the user's response, there is a paucity of marketing studies that examine the aesthetic design area and its

relationship with users' cognitive responses also how colour influences the consumer reactions (Doyle and Ottomley, 2006). In the mid-1940s, Birren (indicated how consumers offer preferences for particular hues relating to various seasons or months. For example the consumer prefers a deep blue colour in February, and sky blue in July as well as orange or gold in September. Thus, managers and designers in the marketing area should examine whether there has been an alteration in the consumers' perceptions. Despite the fact that his research took place 70 years ago, Birren (1945) took the significant step of integrating different sciences such as neuroscience and psychology with marketing to interpret how colour can impact on consumers' responses. Many other researchers in the marketing area reported that the aesthetic design has a positive impact on the competitive features (Bloch, 1995; Veryzer and Hutchinson, 1998; Kreuzbauer and Malter, 2005). According to Droulers (2005), colour helps us to better understand and memorise information when used appropriately and effectively.

On the other hand, Olazabal, Cava and Abril (2009) examined the differences in the influence of colours as well as how these affect the perceptions of consumers. Where various colours trigger different thoughts, emotions, mood cases and then are affective as cognitive reactions, consumers can distinguish among various colours and could develop preferences. Birren and Parson (1945) established the best definition of colour and its relationship with marketing in their early research: *Colour is a visual experience, but it is also an inside feeling and emotion which is linked with vision and represents the appearance of everything.* This refers to any colour, whether it is white, blue, black or red. Cheema and Bagchi (2013) suggested that colours could impact on the users' emotions, performance and perceptions, while much earlier on, Lüscher (1969) also showed that colours have an impact on the users' personality. In addition, Cottrell, McManus and Jones (1981) indicated that the consumers prefer colours as follow: blue, red or green and then yellow. Moreover, the light colours such as green, white and pink could positively affect the consumers' reactions such as 'satisfied' or 'excited'. On the other hand, the dark colours such as black and brown do not positively affect the consumers' reactions (Lüscher, 1969).

In the same vein, Milne and Labrecque (2012) attempted to integrate the studies of colour and psychology with the marketing area. Their study also indicated that the colour is the value, the saturation and the hue have a significant impact on the brand personality. (Ellis,1993) stated that the hue is the colour name and also its position in the shadow series or

the spectrum. In addition, Gorn (1997) classified colour into 10 equal basic hues; these are "red, yellow-red, yellow, green-yellow, green, green-blue, blue, blue-purple, purple and purple-red". Birren (1945) illustrated that the colour has emotional value, where the green-yellow is considered as more comfortable, yellow is considered as a joyful colour and the purplish-blue has a greater influence in calming the consumer. However, in their study of "an ecological valence theory of human color preference" Sammartino and Schloss (2011) looked to have a better understanding of consumers' preferences for colours. Thus, the researchers revealed that the consumer connects certain colours with certain objects, for instance, thinking about something in yellow may be that consumers think about corn or bananas. Thus, the preferences of consumers about the colour are subject to the affective reactions regarding the colour-related effective way with the object and the product shape. Therefore, Cheema and Bagchi (2013) advocated that the colour could affect the consumers' emotions, perceptions and performance.

Moreover, the colour participates significantly and aesthetically in the preferences and judgements of aesthetics (Ellis, 1993). However, Deng, Hutchinson and Hui (2010) conducted research regarding the users' colour preferences. They involved 142 participants to examine combinations of aesthetic colours, which the participants evaluated on a nine-point rating scale (9=dislike a lot; 1=like a lot). They found that the users preferred the colours that had a positive relationship with the things and the colours which were pure. This study corresponds with the study of Milne et al. (2012) where the theory indicated that consumers greatly prefer mixed colours with a clear variance. They also found that people prefer the hue and intensity of colours and they reduced the brightness element. In addition, Gorn (1972) discovered that the various hues trigger various levels of relaxation. Also this study agrees with Güvenz, Camgöz and Yener's (2002) study which found that most of the consumers prefers the blue hues.

In Gorn's (1997) research, 146 participants responded to a nine-point rating scale which asked whether the people felt calm, soothed or relaxed through the exposure to10 mixed colour and various hues. He found that the blue hues makes people feel relaxed. Gorn (1997) further examined how the people are influenced by various hues or different sets of hues; he also discovered that consumers tend to feel excited when looking at the red hue. His work corresponds with Robinson and Csikszentmihalyi's (1990) study which pointed out that this is an interesting result as the advertisement for instance could be tuned by excitement that

causes hues. Thus, ornamenting products and advertising are exciting with the red hues that could move consumers' sentimental cases so that they feel excited. Accordingly, Ellis (1993) documented that colours play a part aesthetically and are important with regard to aesthetic judgements and preferences. Hirschman (1986), Solomon (1983), Bitner (1992) and Crilly et al. (2004) investigated how the users think and also how they build their judgements and preferences with regard to the product. Hence, the meaning of colour has a wide variance across cultures. For instance, Ellis (1993) found that a Western oil company had changed the colour of its white service station in China, because Chinese society considers white as the symbol of mourning. Also Wang and Griskevicius (2013) indicated that the culture play an essential role to identify the types of properties women utilise such as coloured designer or a Dior handbag.

When looking to the previous studies of colour and its elements on the consumer reactions, it can be seen that value, lightness and brightness have the same meaning. Birren (1945) presented a definition of the lightness element where the value is the colour darkness and colour lightness as compared with the white to gray to black level. For example, if we put the red colour in the middle of the black and white scale then turning this colour to a high level of lightness will lead to the pink colour. But if one turns this colour to a low level of lightness this will lead to the maroon colour. In addition, Schloss and Palmer (2010) demonstrated that the consumers prefer yellow colour with high level of lightness. On the other hand some consumers prefer the red and green colours with medium level of lightness, while other consumers prefer low levels of lightness with blue and purple colours. However, researchers like Smith and Guilford (1959) stated that the Western consumers prefer the colours with high levels of lightness.

In the same vein, Gorn et al. (2004) illustrated that the high level of brightness in the colours could be lead to higher sensations of relaxation as compared with low levels of brightness in the colours. Also the researchers examined the influence of different brightness levels on the expected speed to download the website in an experiment carried out with 117 undergraduate students. The students had to wait 17.5 seconds after clicking on the homepage in the agency website to observe the screen background that was changed in terms of brightness levels. From this examination, the researchers indicated that the high brightness levels could influence expected speed by the positive meaning they conveyed. In another study, Milne and Labrecque (2012) showed that the positive expected speed leads to positive

evaluation for the website as well as influences on the desire to recommend the website to friends. From this point, the managers and designers should not depend on their feeling to design the website.

In addition, Milne and Labrecque (2012) defines the saturation as the amount of pigmentation in the colour. If the amount of pigmentation is high in the specific colour that means the saturation level is high. According to Yener, et al. (2002) the saturation could be have a big impact on the attractive and preferred colour compositions. Milne and Labrecque (2012) indicated that the consumers perceive the low level of saturation as the bleached colour. While if the consumers perceive the high level of saturation that means the colour is pleasant and bright. This result corresponds with the study of Gorn and Gerald (2004) which found that the consumers look at the rich colour in pure levels as a bright. In addition, Gorn and Gerald (2004) demonstrated that the rich colour in chroma levels could lead to cognitive and affective reactions in the minds of consumers. Through the previous description about the colours and its elements such as lightness, saturation and hue, it is clear that these have strong impacts on the reactions of consumers. Seven decades ago, Birren presented a fantastic act in the combination marketing with different fields in order to display how colour could influence the consumers, despite that still there is a big gap in the marketing studies about this phenomenon.

Colour usage in diverse cultures

Aslam (2006) stressed that different cultures have different aesthetic expressions since colours symbolize different meanings and aesthetic applications in different cultures. Just to illustrate this claim in practical terms, blue colour for instance is considered the American corporate colour and is “perceived as cold and evil in East Asia”, but “stands for warmth in The Netherlands, coldness in Sweden, death in Iran and purity in India.” Blue also “denotes femininity in The Netherlands, but masculinity in Sweden and the USA.” Blue also “means high quality, trustworthy and dependable in the USA, Japan, Korea and China” (Aslam 2006, p. 20). Moore et al. (2005) argued that different colour schemes in advertising are not equally attractive for customers in Europe and the Middle East. Therefore, international brands may experience considerable difficulties in their marketing activities all over the world. If yellow is associated with caution in the UK, the same colour is perceived more positively in Arabic countries (Augustin, 2009). Printed advertising using this colour may arouse different

feelings and psychological associations from potential customers (Moore et al., 2005).

It is interesting to note that Krishna (2009) outlined a clear difference between colour associations and colour preferences of different nations. Colour *associations* have been built for centuries, whereas colour *preferences* often have temporary meaning and may be interchangeable. Krishna (2009) described the 'blue phenomenon' that occurred during the late 1980s in nearly all cultural contexts. Blue was chosen by marketers in printed and out-door advertising more frequently than any other colour. Nevertheless, this fashionable colour was replaced by brighter and warmer colour sets at the beginning of the 1990s (Krishna, 2009). Another interesting outcome presented by Krishna (2009) was that the level of cultural development and education in a specific country is positively related to the choice of more complex and sophisticated colour schemes in advertising. Some colours, like the combination of black and gold, are used to increase the perceived status or cost of products. In many cases, mass consumption products use such colour schemes to be marketed as premium products (Moore et al., 2005). Krishna's (2009) view on colour preferences is consistent with the proposed research project since it will explore the marketers' motivation behind choosing colours for printed advertising of food products and clothing brands. Unfortunately, Krishna (2009) did not offer any hypotheses concerning colour preferences in the UK and the Middle Eastern countries.

McLachlan (2012) further explored the issue of colour preferences in advertising and product promotion. He outlined some differences between the Western and Eastern cultures in choosing colours for different products. For instance, advertising financial services should be associated with high credibility and trustworthiness. Therefore, most Western financial institutions use dark blue colour for advertising, logos and other branding attributes with brands such as Barclays and Royal Bank of Scotland being prime examples. This phenomenon may be explained by the fact that blue is associated with authority and stability in Europe. Alternatively, Arabic financial institutions prefer using green for the same purpose. Augustin (2009) mentioned that this colour is associated with strength in the Muslim world. One of the most critical limitations of McLachlan's (2012) research was that the scholar did not use any structured methodology to obtain these findings. It is rather challenging that all the three product types should arouse different associations to remain attractive for their target customers. If clothing communicates messages based on status associations and availability, financial services need to be marketed as credible and trustworthy (Jacobs and Hustmyer, 1974;

McLachlan, 2012).

Olsen et al. (2012) conducted an interesting study that observed the role of colour in printed advertising. According to the authors, many companies in developed countries, including the US and the UK, used blank space advertising in order to save on their marketing budget. Nevertheless, the latest tendencies reveal that colour advertising is becoming dominant in printed media. Olsen et al. (2012, P. 32) reported on"the effect of colour in gaining attention in Yellow Pages advertising and the contribution of colour and graphics in signalling quality and credibility in this particular genre of print advertising." These findings indicate that colour is a powerful instrument for transmitting marketing messages to customers regardless of their national or ethnic background. However, Olsen and colleagues failed to study the basic colour associations based on blank space versus colour advertising.

According to Augustin (2009) and Moore et al. (2005), different colour schemes in advertising are not equally attractive for customers in Europe and in the Middle East. Therefore, the colour that attracts an individual from Europe does not necessarily attract an individual from the Middle East due to the cultural differences between them on the one hand and due to how each perceives the same colour on the other hand. Moreover, Augustin (2009) highlighted the colour symbolism in different cultures that are quite distinct from one culture to another. For instance, red colour is perceived to connote danger in the UK and Europe whereas it is associated with death in the Middle East.

	UK, Europe	**Middle East**	**China**	**Japan**
Red	Danger	Death	Joy, happiness	Danger, anger
Blue	Authority, calmness	Faith, truth, security	Sky	Shame
Green	Safety, health	Strength, fertility	Royal, honour	Youth, energy
Yellow	Caution	Welfare, happiness	Birth, power	Dignity, grace
White	Purity	Joy	-	Death

Figure 8: Colour Symbolism in Different Cultures. Source: Augustin (2009**)**

The appealing power of colours with respect to different national contexts (Western and

Eastern) was investigated by Cyr et al. (2010). Their research reported that "color has the potential to elicit emotions or behaviours, yet there is little research in which colour treatments are systematically tested" (Cyr et al. 2010, p. 1). In other words, their investigation attempted to bridge the existing limitations and research gaps in the academic field. The researchers used complex methodology that integrated eye-tracking technologies, interviews and questionnaires. One of the key strengths of their research is that they approached the issue of colour attractiveness from the cultural perspective. Culture was selected as an appropriate prism though which the appeal of colours may be communicated. Another strength of Cyr et al.'s (2010) research was that they tested the impact of colours in advertising in terms of customer trust, loyalty and satisfaction. Culture was selected as a moderator variable.

2.5.2 The shape

Ellis (1993) reported that the form of the product is its visual shape and its internal structure. According to Leder and Hekkert (2008), it is still unclear as to what type of product shape is preferred by consumers, and also the types of product shapes which trigger the most behavioural, cognitive or affective reactions. The psychologists McManus and Weatherby (1997) and Aharon et al. (2001) confirmed that most cases of proto-typicality are a mark of the value. This is why the users' preferences appear in a product which has a high standard of proto-typicality. In contrast, Aharon et al. (2001) observed that consumers consider the 'novel' stimuli as a risk; thus, they tend to consider the known stimuli. On the other hand, Dahl et al. (2013) indicated that the simple shape may be more friendly but less attractive. Conversely, Kumar and Noble (2010) confirmed that complex shapes are more interesting for customers. However, Loken (2006) illustrated that the product classifications are an important aspect for the consumers and helps them to understand and perception the products. In addition, Scott (1969) and McConnell and Brown (2010) stated that the products' classification also reflects consumers' cognitive simplicity or complexity.

Eckmann and Wagner (1994) conducted an experimental study that included 168 topics about consumers' judgements of product attributes. The participants were presented with a dress that was tailor-made for a man. They were asked to evaluate on a continuous scale of 100 millimetre intervals from very attractive to very unattractive whether they found the clothes to be attractive. The results showed that the consumers greatly preferred a rectangular form over a square form in the products. In the asymmetry product study, Hagtvedt and Patrick

(2011) indicated that the asymmetry of a product could trigger a passive emotional reaction; for example, consumers felt depressed. Conversely, Rhodes et al. (1999) showed that asymmetry could be attractive if it was not overly distorted. Sevilla and Kahn (2014) provided another example of an experimental study in which 124 participants were asked to evaluate a product. They found that the consumers greatly preferred the product in a complete form over a product with an incomplete form. In contrast, another study by Gorn and Sengupta (2002) showed that the consumers are more attracted towards incomplete products.

Furthermore, Hutchinson and Veryzer (1998) attested that the consumers believe that the complete unit is greater in size than the incomplete unit regardless of the existing actual elements' sizes. Krishna and Raghubir (1999) and Krider et al. (2001) found that the products' forms link to perceptions about sizes and quantity. In addition, Skitka, Bauman and Mullen (2004) mentioned that the complete shape could depend on the previous expectations and experiences regarding the typical shape for an element within a given product class. Also the complete shape design could be a strong determinant of how the consumers perceive and choose the products (Beike, Beaumont and Adams, 2007). Furthermore, Krishna and Raghubir (1999) and Krider et al. (2001) confirmed that completed shape is an important element of enhanced size understanding. Meanwhile, other researchers (e.g., Savitsky,1997; Wirth-Beaumont and Beike, 2005; Beike, et al., 2007) stated that the product design and aesthetics prove that the consumers enjoy the complete stimuli. Also previous studies in this area show that the consumers prefer the product with the completed design (Drèze and Nunes, 2006; Kivetz et al., 2006).

According to a number of scholars (Bettman, et al., 1998; Moreau et al., 2001; Creusen, Schoormans and Veryzer, 2010; Brown et al., 2011; Palmer et al., 2011), the companies should design the product based on the consumers' preferences. Thence, the companies need to know more regarding the aesthetic preferences of consumers when designing the products. Based on the findings of neuropsychological researchers the nucleus accumbens system works when the consumers look at the symmetric and pretty shape (Aharon et al., 2001). However, McManus (2005) reported that the symmetry shapes are positively related with beauty. Also the consumers feel comfortable when they looking at the pretty and symmetric form (Dommett et al., 2005). Furthermore, consumers prefer the perfect symmetry shape (Keil and Beale, 1995). In contrast, the asymmetry shape could be acceptable and attractive if the shape is not deformed (Byatt, Sumich and Rhodes, 1999).

Marketing researchers started to investigate the influences of symmetric shape on the reactions of consumers; however, to date, there is only limited research dealing with symmetry of product (Crilly et al., 2004). Hagtvedt and Patrick (2011) found that if the consumer purchased a new product do that was not suitable with their expectations, they felt dissatisfaction. Also the researchers found that the incongruity product could trigger negative emotional reactions of the consumers. In the same context, Hutchinson and Veryzer (1998) conducted an experimental study to evaluate the harmony and incongruity product designs on a nine-point scale. The researchers found that the products designed with high levels of harmony could affect the consumers' reactions more positively than the products designed with low levels of incongruity. This study partly corresponds to one undertaken by Creusen et al. (2010) who examined the consumers' reactions towards eight images of videos cassette with various levels of symmetry and complexity in their shape; 422 participants evaluated their preferences on a seven-point scale for the various levels of symmetry and complexity stimuli. Furthermore, they found that the consumers prefer the product that has low levels of complexity and high levels of symmetric with respect to the product's aesthetic quality and values. Thus, from the previous studies it appears that unity like symmetric and incongruity are a very significant aesthetic principle; for example, managers and designers should organise and display their products in a symmetric way to trigger the consumers' reactions.

On the other hand, according to Hanna (2012) and Burke (2013), there is a large gap in the marketing studies regarding product aesthetics in terms of complexity and simplicity. Kumar and Noble (2010) defined the simplicity as the subjective judgment and preference where the consumer feels that there is no confusion in understanding what is being offered to them. Thus, the observed products could be easy to classify by the visual cortex and, if they are not complex products, they quickly be recalled. Leder and Hekkert, (2008) claimed that the product design with low levels of complexity is not attractive; neither is the product design with high levels of complexity. However, Zimring (1971) stated that the product with simple design is less attractive. Conversely, Kumar and Noble (2010) illustrated that the product with a complex design is more interesting for the consumers.

In addition, Cox and Cox (2002) conducted an experiment to investigate how various levels of complex product can influence consumers' preferences about the durable products. In this case, 381 respondents evaluated the various products distinguished by various levels of

complexity on a six seven-point scale. The researchers discovered that the consumers preferred the complex product design; in contrast, the consumers showed less preference towards the simple design. That means the consumers develop their preferences for the complex product design over a long period.

In the same vein, prototypicality and novelty are two of the product aesthetics elements. According to Leder and Hekkert (2008), the prototype is the standard shape that triggers suitable reactions and that summarise information which all products of that category have in common. Hutchinson and Veryzer (1998) also stated that the prototypicality shape is the level to which a product represents a specific class. However, researchers in the field of psychological studies (Rhodes et al., 1999; Winkielman, Piotr, Halberstadt, Tedra and Steve, 2006; Leder and Hekkert, 2008; Marcel and Hors, 2014) confirmed that the consumers significantly prefer the prototypical stimuli. That means the consumers prefer the products that have high levels of prototypicality. Barsalou (1985) also indicated that consumers significantly prefer highly prototypical design. On the contrary, the consumers perceived the novel stimuli as risk; hence, the consumers tend to get the known stimuli (Hekkert et al., 2003). Moreover, Aharon et al. (2001) and McManus and Weatherby (1997) indicated that the when the consumer looked at the product as standard, it was seen as a new product at some time in their life, but over time this product become a prototypical product.

The field of marketing has continued to examine the effects between consumers towards prototypical and novel products. Hutchinson and Veryzer (1998) examined how the prototypicality products influence on the consumers' reactions. Fifty participants of a marketing course evaluated the how prototypical they perceive the products to be by rating how much they liked different products on a100-point scale. The researchers found that, basically, the prototypicality products positively influence the consumers' reactions. In addition, the consumers do not prefer the medium levels of prototype product design. However, the consumers tend to have attractive products. Thus, the managers and designers should organise the prototypical products beside the identical products at the sale point so consumers can compare the designs; and they are more likely to select the more prototypical design.

Conversely, Cox and Cox (2002) found that the people prefer positively the novel product design after repeating the same design, while the results Herrmann et al. (2013) correspond with the results of Hutchinson and Veryzer (1998). The researchers applied the same process

as Landwehr, Wentzel and Herrmann on 254 participants. The researchers also found that the prototypical design has a significant positive influence on the consumers' reactions, but only at first sight. Subsequently, after a design was repeated, the consumers' preferences dropped significantly. Therefore, the managers and designers need to present their novel products through TV or exhibitions by eye-catching presentations to reduce the consumers' fear (Mugge and Dahl, 2013).

Some researchers like Locander and Cox (1987) indicated that some consumers find it difficult to classify a new product. Further, Dahl and Mudge (2013) illustrated how the consumers judge the new product design. In their study, 130 participants rated various incremental and radical innovations, regardless of whether the consumers-as-participants perceived the various stimuli as prototypical or novel design on two nine-point scales. Through this study, the researchers found that the consumers tended to acquire the products with low levels of novelty, while they probably do not appreciate designs with radical innovations Meanwhile the incremental innovations design does not offer any negative influence. In contrast, Herrmann et al. (2013) stated that the consumers prefer the radical innovations design embedded in the standard designed products; at the same time, some consumers do not like the radical innovations design embedded in the products with high levels of novelty. Therefore, the designers should be launch products that can be classified as typical designs into radical innovations.

2.5.3 The size

There is a large research gap in the marketing area examining how product size can impact on the users' behavioural, affective and cognitive reactions. Myaskovsky, Pelham and Sumarta (1994) suggested that the consumers depend to a large extent on the number of elements in that stimulus and tends to disregard some of the important elements like size. In contrast, Raghubir, Krishna and Krider (2001) mentioned that the consumers notice products that demand more attention to contain more size. Dubois et al. (2012) indicated that customers like to express their social life via product size. There is one example about product size provided by the research studies of Desmet (2003) and Hekkert (2007) who found that tourists in China feel satisfaction when they observe that the size of the coffee cups fits with their preferred size. However, Leder and Hekkert (2008) and Schoormanns and Creusen (2005) proposed two types of product size: *big* and *small.* They found that the

product size was closely linked with the social life status of the consumers. That means the consumers show their preference towards the product size based on the level of social status they perceive it confers.

Therefore, the fields of psychology and marketing need to study the users' reactions in terms of product size. There is also a lack of studies in the marketing and psychology areas integrating culture and social life with the aesthetics dimension to ascertain the different users' reactions. In addition, Schoormans and Creusen (2005) indicated that the different product design characteristics such as colour, shape, taste and size could be explained across cultures differently. This is an important topic to explore, in order to improve competitive advantage between companies and establish how cultures can impact on users' reaction – whether behavioural, affective or, particularly, cognitive – in relation to new product development. The following section presents the influence of product aesthetics on the culture and the influence of culture on the users' reactions when designing the product.

2.6 Product Aesthetics and Culture

All the culture definitions mention more or less the same features; that culture includes the shared behaviours, practices and values that lead the members of community in their reactions to a specific case. Fincham (1994) illustrated that culture comprises a set of practices, beliefs, rules and values that makes the group or community what it is. Also, the self-image of the society's members and their social traditions as well as the aspects that appear to be different about the other societies can shape their culture. Moreover, the culture has a substantial role in creating a framework through which meaning is transferred to the intended user of the product (Nair and Tarasewich, 2001). The products design could be considered as a mediator in that it can embody the aspects of a particular culture. Hence, the artefacts beside the norms and values provide a path to understand the culture (Brett et al., 1997; Razzaghi et al., 2009). This also confirms and revitalises the importance of cultural traditions.

However, managers had already started to integrate the cultural symbols and values into products, as directed by the International Council of Industrial Design Societies (ICSID) which considers that culture is an important issue in the design. The Council confirms that one of the design tasks is to support the cultural differences despite the potential impact of

globalisation or enhance cultural ethics (ICSID, 2002). Moreover, in 2008, 124 members of the International Association of Universities of Design, Media and Art committed to build sustainable societies. In their report they recognised design as a wider tool to enhance cultural, social, economic and environmental aspects for future and present generations (Nakate and Sivakumar, 1996; Cumulus, 2008). In addition, Van Patter and Whitney (2004) indicated that the companies' goal was to reduce the time of product development, and it is time for designers to merge the cultural characteristics into product designs. The researchers mentioned that the designers should be knowledge about the users' preferences, behaviours and satisfaction that are important in the product design and development (Van Patter and Whitney, 2004). At the same time, previous studies have already shown great interest in understanding how to integrate products with the users' preferences. On the other hand, the consumers need to have a notion about the cultural identity of the origin country people when companies exported the products (Zec, 2002; Palmer, 2016).

Nevertheless, there is a paucity of in-depth research in the marketing area to help companies establish how to integrate culture with product design (Onibere et al., 2001; Hugo, 2002; Kotro and Pantzar, 2002; Aykin, 2005). Research has established that developing a new product, in terms of the aesthetic features, varies across cultures, due to the differences in attitudes, norms, performance and beliefs between the users. Gardner and Levy (1955) mentioned that the notions of aesthetics focuses on users' psychological or cognitive states, such as attitudes, expectations, feelings, mental constructs, understanding and ideas. However, Lee (2004) referenced that culture is a common set of behaviours, norms, beliefs and values that are apparent in the behaviours of companies and systems. Schoormans and Creusen (2005) asserted that the different product design characteristics such as colour, shape, taste and size could be explained across cultures differently. In addition, Lee (2004) stated that the main themes in the cultural design and product design areas are still lacking and are limited to determining the stereotypes of aesthetics, such as a national colour or form. Also, Cooper and Press (2003) argued that the social practices and cultural norms generate and enhance meaningful frames which define ways related to the product design, and these frames could impact on the consumers' use of a certain product.

Popovic (2002) found that product design is an important connection method that expresses the system norms within which the product works. Furthermore, the users can explain the differences between their own culture and other cultures. Therefore, designers can benefit

from users in the development of the product features. Popovic (2002) also reported that the product design is a change element and it is significant for the designers to define how they could support the domestic cultural systems in the community. To support this study, Ono (2002) described how the firms Whirlpool, Nokia and Electrolux have shown an interest in certain cultural characteristics, which confirms an understanding of cultural diversity among global users. Some consider globalisation to be an imposition that must be opposed, as it leads to the unification of the users' culture via the product's standardisation (Dejean and De Souza, 1999; ICSID, 2002). Taylor et al. (1999) documented that the challenges which designers face when seeking an extensive understanding of the culture of the users in new product development is still under-studied and unclear.

However, the relationship between culture and social anthropology is clear. Research has evaluated civilisations and has then tracked the cultural properties which such civilisations imposed on the people (Baxter, 1999). Buchanan (2001) examined situations where the cultural rights were the subject of considerable controversy; for example, decolonisation after the Second World War. Moalosi et al. (2005a) confirmed that the relationship between culture and design has taken several twists and turns over the past centuries, and considered design as an agent of change. Chong (2004) meanwhile proposed that companies must take into account the anthropological, socio-cultural, technological and aesthetic factors when developing a new product for particular users.

Moalosi et al. (2005) found that the aim to respect a culture could be achieved by combining the aesthetic and historical values of the users. Furthermore, Cooper and Press (2003) mentioned that culture gives a meaning to the products, which is reflected in their shape and task. For example, in the design department at Samsung, Delaney et al. (2002, p. 46) noted that, "users around the world are no longer willing to simply settle for one-size-fits-all products with standardised designs". This study is consistent with the above. Aula et al. (2003) discussed the proposition that the individual consumer demands a wide range of colours, features, sizes, materials and shapes, and these have become significant factors in generating effective products. Consequently, customers are seeking appropriate products for their environmental and socio-cultural needs. However, product aesthetics is the appeal of a product for most of the customers in the market (Berlyne, 1971).

2.7 Culture and its Influence on users' Reactions

Definitions of culture differ vastly but the main commonality they share that indicated by Kluckhohn and Kroeber (1952): Culture consists of underlying and explicit patterns, and the gained behaviour and the ensuring behaviour that is transmitted by subliminal codes contained in these patterns. Such cultural patterns distinguish the communities from each other including artefacts where the substantial core of culture depends on traditional ideas and in particular the connected values of the community members. The culture system may be considered a product of work on the one hand, and as further works for conditioning elements on the other. In marketing, culture emerges as an outcome of the designer's substantial cultural preferences and values in the process of product design particularly in the early stages of ideas' generation (Muller 2001; Lee and Oyserman, 2008).

Psychological studies, however, found the users' reactions to be subject to their social, cultural and innate characteristics (Lewalski, 1988; Crozier, 1994; Bloch, 1995; Moultrie et al., 2004; Schoormans and Creusen, 2005). While seem that the innate's preferences are identical among consumers, but the socio-cultural impacts could vary between consumers (Bitner, 1992) whereby the culture characteristic is an important factor that affects the individual's response to product design. However, Schoormans and Creusen, (2005) indicated that the different product design characteristics, such as colour, shape, taste and size, could be explained across cultures differently. In addition, research has established that developing a new product, in terms of the aesthetic features, varies across cultures, due to the differences in attitudes, norms, performance and beliefs between the users (Bloch, 1995).

Thus, the white colour refers to *purity* in Western cultures, while the same colour refers to *sadness* in most Asian countries. In contrast, in the Western countries *sadness* is related to black (Birren, 1945). Therefore, if the designer intends to refer to the notion of purity with the product design of consumers, the designer must ensure they use different colours for different cultures to offer the appropriate meaning (Demirbilek and Sener 2003). Moreover, there is a gap in marketing studies that examine differences of cultural and social influences on the consumer reactions. Several researchers suggested that future research needs to investigate cultural and social differences. This is important in order to help designers and managers deal with this matter (Kwon and Suh, 2000). However, there is a gap in marketing studies in how the various characteristics of the product design influence the consumer's

response. The researchers usually examine only a part of the whole characteristic. This raises the following question: *How does the combination of each part of the product design such as shape, colour, symmetry and form, impact the consumers' reactions?* (Muller, 2001; Demirbilek and Sener, 2003).

Gardner and Levy (1955) mentioned that the notions of product aesthetics focuses on users' psychological or cognitive characteristics such as attitudes, expectations, feelings, mental constructs, understanding or ideas. Product form could also create beliefs related to product design features (Bloch 1995). Kwon and Suh (2000) indicated that users from various cultures have a variety of values, preferences and attitudes. Despite globalisation, many are still reluctant to buy foreign products. However, a few researchers have measured the users' cognitive reactions in the managerial practices of NPD in various countries (Kleinschmidt, 1987). Therefore, the national culture differences can influence users' behaviour in ecommerce situations. Also Solomon (1983) and Bitner (1992) illustrated that the product forms may have an impact on users' beliefs about them.

2.8 National Culture: Background Theory

Many researchers in the fields of communication, social psychology and anthropology mentioned that there are more than 400 definitions related to culture (Ferraro, 1990). Cannon and Doney (1998) drew attention to the significance of culture in the organisation of e life and construction of the social system as a norms and values system shared between the people and when they work together to shape a design of life. However, Tylor's (1871) definition of culture is one of the oldest that is widely mentioned in the studies. Tylor defined culture as the *complex whole that includes morals, capabilities, belief, custom, knowledge, habits, law and art gained by people as a member of the community*. Nollen and Newman (1996) described culture as a term that examined the learning of cultural criteria and norms as assumptions, values, beliefs and knowledge in early childhood that classify the people from each other. Furthermore, Hofstede (1980) asserted that culture is the unwritten principles that vary from one set of people to another, and that accepting and following these principles brings group membership and acceptance. Also Hofstede (1996, 2001) referred to the fact that people themselves present patterns of feelings, actions and thinking, which are gained during their lives.

This next section illustrates the role of the culture in influencing users' ideas. Nevertheless, to do this effectively, it's important to provide a brief cultural backgrounds of the users through use Hofstede theory as mediator to interpretation of the users' ideas in the how the users build their judgements and preferences towards product design.

2. 8.1 National Culture Model

Several surveys and research studies have developed theories that investigate cultural differences and similarities among countries. Hofstede's theory (McQuaid and Bhagat, 1982; Singh and Kogut, 1988; Burgmann et al., 2006) is one of the most effective and reliable instruments to study the comparison of the cultures. In 1980, Hofstede was the first scientist to attempt to identify the different aspects of culture and measure them. In 1994, he developed the cultural dimensions theory to examine culture differences, performance and cross-culture communication. He also examined the effect of the society's culture on people's values. Hofstede's theory has been used extensively by researchers in different industry fields as a research model, particularly in marketing, business, human resource management and psychology, to study cultural dimensions. There are countless definitions of culture. Generally, it includes the practices, behaviours and shared values that drive a group of people in the context of their responses to a specific case.

Hofstede (1996, 2001) referred to the fact that people themselves present patterns of feelings, actions and thinking, which are acquired during their lives. Hofstede (2001) classified culture into two types; first, *mind program* or *one culture* that distinguishes one group or member of a group from one in another category. The second category is *culture two* or *collective programming* that refers to the shared customs, values and beliefs that distinguish one group of people from another. Thus, the values are a core of culture and form the most important and deepest key aspects. These are located in the "innermost layer of a person's beliefs".

In the same context, Moore and Beck (1985) and Hofstede (1991) considered *national* culture as the assumptions, values, beliefs and knowledge in the early childhood that classify the people from each other. In addition, Allen and Newman (1996) mentioned that the culture is rooted widely in the people's everyday lives and is thus relatively difficult to change. On the managerial side, it is believed that the national culture has an influence on the control of the environment (Strodtbeck and Kluckholn, 1961; Nowotony, 1964; Hofstede,

1980; Schneider and Meyer, 1991) and also on the explanation for cultural responses to the strategy situations. However, Allen and Newman (1996) stated that it is important to recognise local culture situations and understand that this is important to realise high performance results. Thus, the comprehensive perceptions and communication among different cultures are important for the business process such as NPD. According to Chen (1995), communication is considered as the behaviour that is influenced by the culture. Therefore, there are many mediators that can influence users' thinking, such as culture.

In general, through thinking regarding the effect of culture on the people as mediated by the cognition that people use to make sense of their daily situations, in this case, there is the potential to employ social cognition studies as instruments to examine the preferences that are affected by what people have in mind. and explained it through the content (Wyer and Srull, 1979; Bargh et al., 1986; Bargh and Higgins, 1987). Several researchers examined the cultural differences using Hofstede's model to present tables and studies of variations (Kitayama and Markus, 1991). In addition, it is often considered that the collectivism and individualism dimension is a mediator to interpret the cultural variations (Triandis, 1995). Hofstede's work is applied as a mediation to explain the cross-cultural differences (Kitayama, Uchida and Duffy, 2007).

Hofstede invited 117,000 IBM employees from 50 different countries to participate in a survey on organisational behaviour. The use of this large research group was able to help the researcher empirically determine four dimensions of national cultures, and the work-related cultural dimensions in the different countries (Hofstede, 1996). The dimensions were indexed as follows: Power distance (PDI), Individualism (IDV), Masculinity (MAS), Uncertainty avoidance (UAI).

Power distance (PDI): This dimension indicates the division of power inside the communities or organisations; also, the manner in which people in various communities deal with incommensurate divisions of power. (Hofstede, 1980) The high power distance value in the cultures means that the regulation is centralised, and so incommensurate division of power and also decision- making follows those in power. The high power distance value is popular in countries such as Singapore, Saudi Arabia and Brazil while the low power distance value represents the United States and New Zealand culture.

Individualism (IDV): This is the dimension most often applied in the studies of cross-cultural differences and it concentrates on assessing loyalty of individuals to a certain group. The culture with individualistic values is connected with loose relationships and personal autonomy. Examples of individualistic countries are Australia, the UK and Canada. In contrast, collectivistic values are strong between group members, close relationships and interwoven societies (Heales and Cockcroft, 2005; Everard and Cao, 2008). Examples of collectivist countries are Pakistan, Taiwan and Saudi Arabia.

Masculinity (MAS): This dimension is related to the gender roles inside the organisation or communities. The culture of masculinity is connected with male principles and values such as competition, assertion, career progress and assertion (Hofstede, 1980). Example of countries which display this dimension are Australia and Japan. By contrast, the culture of feminine is connected with a quality lifestyle and creating a cooperative environment and warm social relationships (Goksel, 2008); example of such countries are Finland and Saudi Arabia.

Uncertainty avoidance (UAI): This dimension is the degree of concern and discomfort that people feel in unstructured or structured conditions (Hofstede, 1991; Wen et al., 2007). The people who feel uncertainty values believe that unstructured conditions involve ambiguity, surprise and some risks and those people are less attracted to the innovation. The countries with low uncertainly value for example include Japan, Saudi Arabia and Belgium. On the other hand, the people who have low uncertainty value are more forgiving and prefer to adapt to new conditions (Hofstede, 2001). Denmark, Finland and Sweden are high uncertainty value cultures.

2.8.2 Saudi Arabia and some of the other countries: Cultural Background

The results of this research are grounded in the cultural difference between ideas of the local users' UGC (Saudi' users) and ideas of the international users' UGC (different nationalities) towards NPD. It is important to have some knowledge about different national cultures in order to understand the results. The following part does not address all the cultural aspects; it just provides some details about the cultural aspects that relate to the results of this research.

The cultural characteristics of Saudi Arabians

Saudi Arabia is known as one of the cultures in the world that most depends on a mix of Islamic and Arabic tradition (Al-Meer and Bjerke, 1993; Goodman and Burkhart, 1998). Al-Saggaf (2012) stated that Islam plays a major role in the social practices, norms, beliefs, attitudes and behaviour of the people. In addition, in Saudi Arabia, the Hadith and the Quran are considered the essential sources for life practices. The formal language is the Arabic language and this is the only language that people use in school, at home and at work (World Trade, 2010 a). Further, the Saudis are a social people and they have important social practices such as regularly visiting friends and relatives. They tend to visit their families weekly and sometimes daily (Yamani, 1987). These visits to friends and relatives include gift giving, asking them about their needs, and helping them, as well as visiting those who are sick and attending social events (Sergany, 2010).

Nahas (1954), Othman (1974) and Long (2005) described how the tribal system is a culture that promotes Saudis to live closely with one another. Also most people share the same house with children, grandfathers and wives as well the sons. Therefore, personal reputation is significant between Saudis, and is the main dimension of self. It also influences the self-core of identity (Solove, 2007). Most significantly, if a member of the tribe is acting badly or engaging in socially unacceptable behaviour, this is a social stigma that reflects negatively on everyone related to the tribal group (Weckert and Al-Saggaf, 2011).

The cultural characteristics of Australians

Australia is one of the most multi-cultural countries in the world with several norms and identities. These differences are due to the high numbers of immigrants (Clarke, 2002; Cobb-Clark, 2003). In addition, the culture of Australia is basically a Western culture and this impacts on the original people and migrants (Clarke, 2002). Where in 2008, 46% of the Australian people were either born outside of Australia, or both or one of their parents had been born inside of Australia (Citizenship and Immigration, 2008). This affected their identity and culture because some of the Australian people have relationships with their friends and families who live outside Australia. This means that the Australian community is an incoherent society. In addition, Australians attach great importance to personal privacy; they also take care of themselves and their direct family above others (Everard and Cao,

2008).

The people of Australia use the English language as formal language, although other different languages are also used particularly by the migrant families or the original societies (Parker, 2011). However, secularism plays a significant role in the traditional culture of Australia (Fien et al., 2002; Parker, 2011; Hoon and Parker, 2013). Although Australia does not have aformal religion, Christians form the biggest religious set (Clarke, 2002).

The cultural characteristics of Egyptians

In Egypt the culture and traditions are global, where the traditions, systems, culture and rules throughout the country are different. This is due to the tribal culture, ancient history, and the invaders (Mondal, 2004). However, Egypt has various ethnic customs and cultures that have created new notions of Egyptian life (Mousa, 2017). The different cultures have established a strong tapestry that can be used to drive sustainable development for communities and individuals (Mohamed and Galal, 2016). The Egyptian government also believes in the importance of living and working together (Dennis, Alajmi and Altayab, 2001). Egypt's population is 95 million; mostly Muslims and the rest are Coptic Christians (Mousa, 2017). The Egyptian people respect the religious traditions and regulations for both belief groups. Therefore, the head of family must take care of everyone in the family and this is a family responsibility. The Egyptian people hold exceptional respect for family relations and family values (Ahmed and Bindemann, 2017). In the Egyptian community the family is a very important unit, where each family consists of the extended family, and the individual is a member of the group, family or tribe. Kinship also plays a substantial role in all social relationships, and affects their opportunities and everyday life.

The cultural characteristics of South Africans

South Africa is considered a multicultural country. The South African community consists of various ethnic groups. South Africa is also called the rainbow country and this due to the variety of the geography, people, experience and weather (Hui and Marcelo, 1989). Immigration and colonialism have brought Indians, Europeans, Chinese and others (Sitas, 1997). Between 1806 and 1910, South Africa was under United Kingdom rule; thus several British social and tradition elements were introduced to the South African people such as

afternoon tea (Maller, 1987). The country consists of nine regions; there are 11 official languages, although the English language is popular. Based on that, the South Africa population consists of a wide set of different cultural backgrounds such as European, mixed African, and Asian (Lessem and Nussbaum, 1996). Thus, the culture of South African is not homogeneous; rather it is a set of various cultures, which has influenced the values of the urban and rural residents. Most of the white groups live in the rural regions (Sitas, 1997).

The South African community consists of the traditional African community and the white community, where the traditional African community is considered the family unit. This embodies the extended family or tribe, the long-term friendships, family links and social standing which are all important to family and tribe (Mapadimeng,1998). The tribe and family provide both financial and emotional security. Conversely, the white community only focuses on close family (Cross and Adams, 2007) There are main variations in how people connect depending on the individual's culture; most of the South African people prefer communication via telephone or email. Also in South Africa how people greet each other depends on the ethnic tradition of the people concerned.

The cultural characteristics of Americans

The United States of America is one of the biggest countries with diverse cultures. Almost each area in the world has affected and shaped the culture of Americans such as Latin American culture, Asian culture, Native American and African culture. In the 1600s in particular, the English colonised America (Trafimow and Smith,1998) and this had a great impact on American culture. In addition, in 1950, the American society has passed through many changes such as growing globalisation, rising ethnic awareness, gender roles and an aging population as well as changes in the growth rate of the middle classes. Therefore, the values connected with the social associations that constructed the culture of America became less greatly shared or expressed in new paths (Hogan, 1975). Through that time, the culture of America was seen as increasingly individualised (Stewart and Healy, 1989). Moreover, in the 1970s, many social researchers described changes in the identity of Americans. Reich (1970) claimed that the American community was freed from social limitations while others such as Hogan (1975), Lasch (1979), Madsen, Tipton, Sullivan, Bellah and Swidler (1985), and Sampson(1988) claimed that superficiality and selfishness are increasing among the

American people.

According to the United States Census office, America is the third biggest country in terms of population. The English language is the official language in America. Also more than 70% of the people in the United States are Christian (Kousha and Thelwall, 2016). On the other hand, Trafimow and Smith (1998) stated that usually the family unit is small with some exceptions among particular ethnic groups (Inglehart and Baker, 2000). In America, the family lives with each other but stays at a distance from each other, especially from their children. Additionally, most of American people do not like to have close communication with others and this is common within the society itself, sometimes even among family and friends. However, American society is proud and appreciative of individual success and achievement. Thus, the individuality is reflected in the unit of the family (Inglehart and Baker, 2000).

The cultural characteristics of the British

The United Kingdom (UK) combines four different countries that are Wales, Ireland, England and Scotland and located in Western Europe (Crowther, 2006). In addition, the UK is a permanent member in the United Nations Security Council (Curran, 2010). The official religion in the UK is the Christian Protestant, and a third of the people have no religion. Moreover, the UK can be described as a multi-religious community, following Buddhism, Judaism, Islam and others (Malik, 1996). The UK population is more than 63 million (Kousha and Thelwall, 2016) and the official language is English. The British people are punctual, and most of them prefer not to to use slang language in their communication (Roberts, 2010).

On the other hand, it is known that the British society has enjoyed the social interaction with regard to popular and traditional cultures over the centuries (Smith, 1992). The 1950s can be considered period of change in the culture of the United Kingdom. This period started with Labours' route by conservatives (Ann and Martin, 1982). Hence, this change that began in the 1950s was a shift from government domination to individual freedom (Yoshihisa et al., 1995). Therefore, the family life unit has changed reflected in some modern social norms and values and kinship links. In the mid-twentieth century, marriage was considered the norm for British families, which comprised both parents and the father was the acknowledged head of the family (Yoshihisa, Susumu, Choi, Michele and Masaki, 1995). In more recent times,

however, family life unit often contains a single parent and several couples are choosing to live together without marriage (Roberts, 2010). However, some of the families see their parents, friends and adult children once a week (Horn and Merritt, 2004). The British people are individualists, where the children learning from an early age how to think about themselves and how they can contribute to the community in different and unique ways.

2.8.3 Cultural differences in the crowdsourcing ideas of users to NPD

Based on the given cultural backgrounds and the culture definitions, we find that the culture plays an important role in customers' attitudes and behaviours (López and Betancourt, 1993; Wen et al., 2007). Thus, there is no aspect in our lives is excluded from the effects of culture, and this leads to the differences between societies (Hofstede, 1991). However, Hofstede (1980), Singelis (1995) and Triandis (1986) indicated that Individualism-Collectivism (IND-C) Lis the most appropriate dimension to compare the different cultural groups, and it has been discussed and researched frequently. Triandis et al. (1995) and Gudykunst et al. (2012) mentioned that IND-COL represents the *cultural syndromes* that reflect shared values, categorisations, attitudes, roles and beliefs that can be organised about a central subject, that exist between individuals who live in a particular geographical area, and who speak a specific language during a specific historical period.

Kitayama and Markus (1991) suggested that the distinction between collectivism and individualism, or selves and self-concepts, enabled the interpretation of the cultural differences in emotional, motivational and cognitive aspects of behaviour. Individualism in a society emphasises the individual role. In addition, collectivism versus individualism is the degree of the person's act or behaviour as a member of the group or as an individual (Hofstede, 1994). Triandis and Hui (1986) postulated that the individuals group shows preference for being unique, independent and keeping connections only when the interests exceed the costs; they follow personal purposes instead of social purposes. In contrast, members of the collective group show preferences for maintaining relationships with others, and accept the expected commitment to their family, friends and larger society.

Literature suggests that rising levels of collectivism will enhance a greater harmony, cooperation and communication in the organisation. In addition, a collectivist society would

prefer the matrix structures and a team to help with integration. The societal collectivism, thus, would be more successful in NPD work. In the early phase of the NPD process, it is important for those undertaking the tasks to work collaboratively, with a greater degree of closeness and communication to guarantee they achieve the NPD objectives. The current research has decided to examine one of Hofstede's dimensions – individualism vs. collectivism – due to the effectiveness of this dimension as a mediator to interpret the cultural differences in new product development work. The studied cultures are ranked according to this dimension.

Individualism indicates the connection between the collective and the individual that prevails in a certain community (Hofstede, 1980). The individualistic communities have loose relationships between members and everyone cares more about their own interests and the interests of the direct family; for example, Canada, the United States, France and Australia. In contrast, the collectivist communities have strong relationships, hold group beliefs and values, and looks after collective interests; for example, Taiwan, Japan, Colombia, Saudi Arabia and Egypt (Hofstede, 1980). Although social science scholars have widely studied this framework, they have significantly ignored its certain relationship to NPD (Strodbeck and KJuckhom, 1961; Mead, 1967; Cobb, 1976; Naro, 1983; Triandis and Hui, 1986; Triandis et al., 1986;).

Furthermore, the product developers are people who have placed themselves on the successful ideas path (Schon, 1963). In addition, literature indicates that the product developers are often connected with effective new products. Maidique (1980) suggested that the product developers who have a high individualism value could be linked with the success of NPD. Probably, the individualism values such as nonconformity and persistence lead to innovation through generating possibilities and removing obstacles (Chakrabarti, 1974; Rubenstein and Chakrabarti, 1976; Maidique, 1980; Tomatzky et al., 1980).

In the same vein, the current perceptions about the technical and business creators increases the potential link between individualism and the successful new product process (Goldhar. et al., 1976). Although the business innovators can be compared with the technical rivals in terms of the individualistic view, but not necessarily they able to apply knowing, or generate idea for the new product (Snelson and Johne, 1988). Furthermore, the technical innovators such as Tomas Edison depended on their personal vision in generating and implementing

new ideas (Snelson and Johne, 1988). The business innovators usually have an important role in effective innovations. However, people in senior management usually create successful new products (Utterback et al., 1976). Generally, the scholars argue that the development of a successful new product could occur along with high values of individualism (Shane, 1993).

Therefore, it seems that the culture with high individualism values has better outcomes on NPD. Conversely, the collectivism values appear to have positive power, and also collectivism values describe the NPD paths. The Japanese new product approach is considered a good example, particularly in the automotive and electronics areas, where the Japanese novel products have achieved great success in world markets. In addition, Kennard (1991) stated that the Japanese teams are administered by consensus, are guided by a wide range of it, are well-supported, and are committed to going the distance. These are positive factors for the success of Japanese teams. MacDowall (1984) observed that the *tribe culture* inspires a feel of belonging and commitment to contribution. Thus, the empirical studies in NPD report that, in general, the American designers and managers are individualistic in their perspectives and work, while the Japanese designers and managers are collectivist (Howard et al., 1983).

Following examination of many hundreds of projects in relation to the development of a new product, Gobeil and Larson (1988) summarizes that the projects' matrices and teams perform significantly well compared with the functional organisations. Subsequently, the collectivist paths appear to work well compared with the individualistic paths. Furthermore, harmony, connections and cooperation are high amongst R&D functions and marketing. This indicates the desire to work in harmony, sharing common views and purposes (Johne, 1984; Gupta et al., 1985; Souder, 1988; Wilemon and Gupta, 1988). In addition, supporting the group concept orientation facilitates the development of the new product as a result of matrix structures and teamwork, and the interface among R&D functions and marketing (Wilemon and Gupta, 1988). Overall, the results show that the influences of collectivism and individualism on the development of new product appear paradoxical.

From the cultural psychological view, Oyserman et al (2002) posited that collectivism and individualism are structures that conclude essential differences in how we interpret the relationship among societies and individuals and whether groups or individuals are considered the main unit of analysis. Therefore, this research focuses on the individualism

and collectivism dimension because the extant studies that focused on this dimension has generated significant insights into the psychological operations (Oyserman et al., 2002). Furthermore, such studies have identified several cultural factors that may be related empirically and conceptually with this dimension (Inoguchi and Blondel, 2006). In addition, the cross-national studies on culture showed that there is a relationship between psychological and collectivism and individualism outcomes of interest such as relationships, values and cognitive operations. Such studies also proposed that the culture affect content; for example, how a person thinks. Kemmelmeier, Coon and Oyserman (2002) stated that the several pieces of research have assessed the variations in relationships with others, cognitive patterns, and self-concept and also investigated whether these variations are systematically linked with collectivism and individualism. They found that collectivism and individualism are connected with systematic variations in the content of relationships with others, cognitive patterns, and self-concept.

Accordingly, Butler (2012) reported that individualism in Saudi Arabia ranks at 25% out of 100% (the same as Egypt), and this "translates into a collectivist society as compared to individualist culture and is manifested in a close long-term commitment to the member 'group', that being a family, extended family, or extended relationships" (P. 1). Thus, Saudi Arabia culture is highly collectivistic relative to some of the other countries. Many interrelated factors could have enhanced the high level of collectivism in Saudi Arabia (Cassell and Blake, 2012). Australia ranks at 90%, the United States at 91%, the UK at 98% and South Africa at 65%; these translate into individualistic communities. Also several factors could affect the high level of individualism in those countries such as the assertion of the freedom and individual rights, immigration, the economy and the political philosophies of American founding fathers.

Summary

On the basis of this literature review, it is quite clear that several aspects of crowdsourcing have come under close scrutiny. However, there is a paucity of research determining whether cultural factors can affect the ideas that users generate. As indicated above, recent literature argues for the assumption that crowdsourcing can constitute a promising method to gather user ideas, which add to those of the firm's professionals at the idea generation stage in NPD (Poetz and Schreier, 2012). However, it appears that there is no specific method to ensure a

proper implementation of new product design. This is due to a lack of in-depth research in the marketing field investigating the social and cultural differences through the users' cognitive responses to the development of the aesthetic properties of the product (Lewalski, 1988; Crozier, 1994; Bloch, 1995; Onibere et al., 2001; Hugo, 2002; Crilly et al., 2004; Aykin, 2005; Kotro and Pantzar, 2002; Creusen and Schoormans, 2005). However, cultural factors could pave the way to the diversity of design notions which will assist product innovation (Dejean, 1999). Therefore, this thesis investigates the cultural differences in the online crowdsourcing ideas of Saudi UGC and the online crowdsourcing ideas of Non-Saudi UGC towards NPD. Through the interpretation of the users' cognitive responses in terms of product-related beliefs in the users' ideas, through their preferences, hence categorized as preferences and judgements. Culture is considered a mediator in this research and will enable the interpretation of the results in the light of the cultural differences. For instance, in Saudi culture, people are still more reticent about giving feedback on products, because they are not interested in such interventions, although it is a multicultural country and this plays a role in the content of UGC and eWOM.

2.9 Hypotheses and The Research Framework

Based on these considerations and in line with previous research that investigated the cultural differences that affect the online crowdsourcing ideas of the international and local users' UGC in new product development, the research assumed that:

Consumers tend to address and explain external stimuli like product aesthetics. This has led academics to call this process *cognitive processing* (Leder et al., 2004; Radford, 2011). This is how users shape their opinion regarding the product aesthetics and its quality or belonging in a particular category (Birren, 1945). A product's design can essentially influence the consumer's cognitive processes. At the same time, Crilly et al. (2004, p. 10) defined cognitive reaction as "the judgements that the user or consumer makes about the product based on the information perceived by the senses". This led to hypothesis 1:

H1: The Product aesthetics positively affect crowdsourcing ideas of control and treatment users' UGC in New Product Development.

Ellis (1993) reported that the form of the product is its visual shape and its internal structure. According to Leder and Hekkert (2008), it is still unclear what type of product shape consumers prefer, and the types of product shapes that trigger the greatest behavioural, cognitive or affective reactions. In order to guide the consumers to this desired step, the companies must design the product based on the consumer preferences (Bettman, et al., 1998; Moreau et al., 2001 Schoormans et al., 2010; Brown et al., 2011; Schloss and Sammartino, 2011). This led to the following sub-hypothesis:

H1a: Shape positively affects crowdsourcing ideas of users' UGC in New Product Development**.**

Dubois et al. (2012) indicated that customers like to express their social life via product size. However, Leder and Hekkert (2008) found that the product size was closely linked with the social life status of the consumers. However, there is a large research gap in the marketing area examining how product size can affect the users' behavioural, affective and cognitive reactions. Therefore, the fields of psychology and marketing need to study the users' reactions in terms of product size. This led to the following sub-hypothesis:

H1b: Size positively affects crowdsourcing ideas of users' UGC in New Product Development.

Bagchi and Cheema (2013) stated that colour can influence consumers' perceptions, emotions and performance. Therefore, people can distinguish between different colours and can develop preferences. Additionally, Ellis (1993) stated that colour contributes aesthetically and significantly to aesthetic preferences and judgments. Furthermore, (McManus et al., 1981) posited that people prefer colours in the following order: blue, green or red, and yellow. However, there is still a lack in marketing literature that deals with the topic of how colour affects consumer response. This led to the following sub-hypothesis:

H1c: Colour positively affects crowdsourcing ideas of users' UGC in New Product Development.

Culture is classified into two types. The first is the *mind program* or *one culture* which distinguishes one group or member of a group from one in another category (Hofstede, 2001). The second category is *culture two* or *collective programming* which refers to the

shared customs, values and beliefs that distinguish one group of people from another. However, in psychological studies (Lewalski, 1988; Crozier, 1994; Bloch, 1995; Moultrie et al., 2004 Schoormans and Creusen, 2005), the users' reactions were found to be subject to their social, cultural and innate characteristics. In the same vein, the relationship between the culture and social anthropology is clear. Research has evaluated civilisations and has then tracked the cultural properties which were imposed on the people (Baxter, 1999). In addition, Orth and Malkewitz (2008b) indicated that the product's design can influence the consumers' product-related beliefs.

Research has established that developing a new product, in terms of the aesthetic features, varies across cultures, due to the differences in attitudes, norms, performance and beliefs between the users. Creusen and Schoormans (2005) posited that different product design characteristic can be interpreted differently across cultures. Cooper and Press (2003) mentioned that culture gives a meaning to the products, which is reflected in their shape and task. Birren (1945) stated that if the designer wants to signal purity with their design of a product they should definitely use different colours for different cultures in order to address the right meaning; for example, in Western cultures white as a colour signals "purity" whereas in most Asian countries white signals "sorrow". This led to hypothesis 2:

H2: There are differences between the crowdsourcing ideas of local users' UGC and the crowdsourcing ideas of international users' UGC in New Product Development**.**

Moalosi et al. (2005a) confirmed that the relationship between culture and design has taken several twists and turns over the past centuries, and considered design as an agent of change. Popovic (2002) found that product design is an important connection method that expresses the system norms within which the product works; furthermore, the users can explain the differences between their own culture and other cultures.

Hofstede (2001) however indicated that the values are a core of culture and form the most important and deepest key aspects. These are located in the "innermost layer of a person's beliefs" (P. 6). Bitner (1992) and Solomon (1983) showed that product design can have an influence on people's beliefs regarding that product shape. Hirschman and Solomon (1984) further confirmed that the design of products can affect the users' product-related beliefs; this is an interpretation of how the users think about the product and how they build their judgements and preferences. Berkowitz (1987) mentioned that create certain product shapes

lead to the creation of positive beliefs like desire for instance. Popovic (2002) meanwhile found that product design is an important connection method that expresses the system norms within which the product works. Furthermore, the users can explain the differences between their own culture and other cultures. Therefore, designers can benefit from users in the development of the product features. This led to hypothesis 3:

H3: Product Aesthetics has a positive effect on culture.

Gardner and Levy (1955) mentioned that the notions of product aesthetics focus on users' psychological or cognitive characteristics, such as attitudes, expectations, feelings, mental constructs, understanding or ideas. Product form could also create beliefs related to product design features (Bloch, 1995). Kwon and Suh (2000) indicated that users from various cultures have a variety of values, preferences and attitudes. Despite globalisation, many are still reluctant to buy foreign products. However, a few researchers have measured the users' cognitive reactions in the managerial practices of NPD in various countries (Kleinschmidt, 1987). Therefore, the national culture differences can influence users' behaviour in ecommerce situations. In this case, the Hofstede model about cultural differences offers a window for looking at cross-cultural differences as a mediator (Barkai, 2005). This led to hypothesis 4:

H4: Culture has a positive effect on the crowdsourcing ideas of users' UGC.

Individualism-Collectivism (IND-COL) is one of many dimensions of culture on which different culture groups can be compared and one which has been most frequently researched (Hofstede, 1980; Triandis, 1986; Singelis, 1995). IND- COL are "cultural syndromes" meaning they reflect shared attitudes, beliefs, categorisations, roles and values organised around a central theme. They are also found among individuals who speak a particular language, and live in a specific geographical region, during a specific historical period (Triandis et al., 1995). This led to hypothesis 5:

H5: Culture mediates the influence of product aesthetics on the crowdsourcing ideas of international users' UGC, as well as the crowdsourcing ideas of local users' UGC in New Product Development.

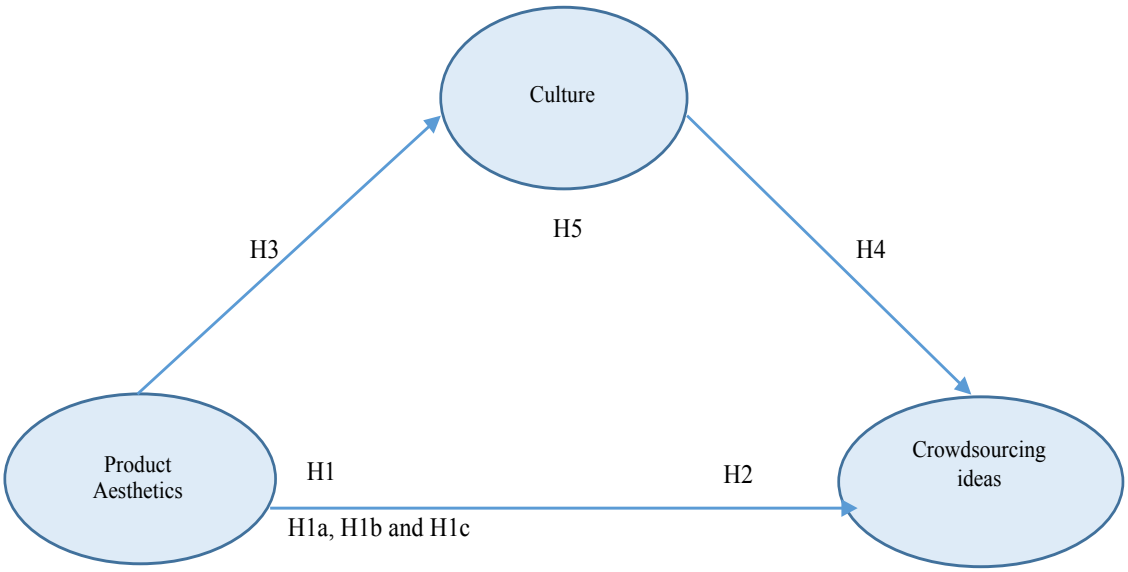


Figure 9: The Research Framwork

Chapter 3: Methodology and Research Design

3.1 Introduction

This section introduces the methodology that justifies and describes the research design and the methods related to this study. The chapter will also justify why this research paradigm was the most relevant to address the research questions. The later sections present the research philosophy, research purpose, research approach, methods used and research technique or strategy. The chapter also includes the data analysis and data collection method used in the distribution stage, and the pretesting and pilot study. In addition, this chapter shows a graph of the linear phases for this study.

3.2 The Research Design

Usually, the research design is considered to be close to the general plan of the study. It represents the guidelines and specific steps which will assist the researcher to answer the research questions. Robson (2002) proposed that those steps will transfer the research question to the research project. A valid research design will include the purpose, philosophy, approach, methodological choice, strategy and time horizon that all aim to achieve the research objective (Ghauri and Grønhaug, 2005; Bryman, 2012). Therefore, the chosen philosophy, approach, strategy, time horizon and technique must be suitable for the methodology selected and must be able to answer the project question. The current research design is presented together with selected elements in the graph below in Figure 10. Each element is discussed in the following sections.

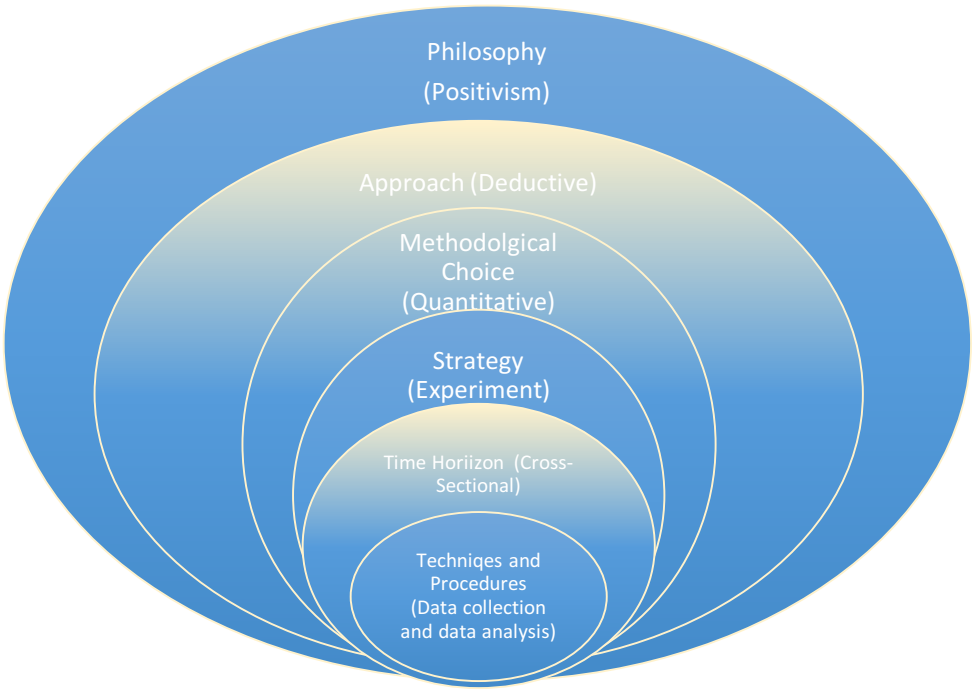


Figure 10: Research methodology of this study: (Saunders et al., 2012)

3.3 The Research Methodology

In any research study, the researcher must understand and justify the logic for the choice of study methods. However, the methodology is the plan which he or she follows to address the research problem. Thus, one of the first stages to address the study problem is to determine the research purpose or research nature. This will help to determine the relevant philosophy to assist in building the structure of the research methods and methodology. In addition, Harrison (2013) proposed that the researcher should choose a convenient research method that will provide the best path to realising the research goal. The next section outlines the research approach selected for this research survey.

3.4.1. Explanatory research

Creswell (2009, 2014) stated that explanatory research confirms the relationship between variables and connections that exist in the research problem or phenomenon under investigation. Gill and Johnson (2002) undertook research which interpreted and examined relationships among variables. This usually begins with a hypothesis that is supported or refuted by the experimental results. However, most business and management research uses

questionnaires to collect data in explanatory research. Data are also required to test the theory, and can be subject to statistical tests, such as correlation, in order to obtain a clear vision of the relationship (Jankowicz, 2005; Saunders et al., 2012).

To realise the research aim, the current paper conducted explanatory research to investigate the users' cognitive reactions in terms of product-related beliefs in the users' ideas towards to product aesthetics development through the online crowdsourcing ideas of local and international UGC. Culture is a mediator in this study that enables the interpretation of the results in the light of cultural differences. As illustrated in Figure 10, this research selected a mediator variable, *culture*, because this variable can mediate the relationship between the independent variable and the dependent variable, and interprets the reason for such a relationship to exist. In other words, this variable will help to interpret how the external physical events affect the internal psychological values. In the context of this research, the effect of the product aesthetics is explaining the product-related beliefs in the cognitive reactions through culture (Kristopher, Rucker and Hayes, 2007), and the beliefs are part of the culture. In addition, statistically, the mediation variable can be used if the relationship between the other variables is consistently significant. Moreover, the mediator variable carries an effect (MacKinnon, 2011). Practically, the relationships between the independent, mediator and dependent variables are not tested for causal relationships, but for a correlational relationship and also to test the effect between those variables, while the moderator variable is one that affects the direction or the strength of a relationship between the independent variable and the dependent variable (Cheung and Lau, 2008). The research also merged national culture theory with the model of consumer responses to product aesthetics to explain the relationship between the variables and interpretation of the relationship by statistical analysis. This helped the researcher to support or refute the common consensus in the literature survey, which indicated the existence of a positive relationship between the users' cognitive reaction and the product's aesthetics through the culture.

3.5 Research Philosophy

There are three main research philosophies related to the evolution and nature of human knowledge, which is epistemology, axiology and ontology (Saunders et al., 2012; Bryman and Bell, 2011).

3.5.1 Ontology

Ontology indicates to the nature of social phenomena as an entity. This philosophy also examines the nature of being or reality. Furthermore, ontology is means the study of the world we live in or the reality. This philosophy raises matter about the path the world works and how it works (Saunders et al., 2012). Ontology also has two different aspects, which is subjectivism and objectivism. Subjectivism supposes that the social actors are the ones shaping social phenomena and that social structures can not work externally of their impact. Contrary, objectivism believes that the fact of social entities works independently of the social actors that operate them (Bryman, 2012 and Cresswell, 2003).

In terms of the users' views, the subjectivist view would argue that the users' thinking is complex and is created from the social actors' actions and plays a role in its conception. Whereas the objectivist reasoning would discuss that users' thinking and views could be changed and manipulated, often addressed as a variable. In addition, objectivism is a rational individualism philosophy (rand, 1982). Objectivist ontology perspective adopted that the psychological phenomena such as perceptions, intelligence, developmental processes, emotions, memory, thinking, motivation are real and have particular reasons and properties (Bryman, 2012; David and Sutton, 2004; Cresswell, 2003 and Staiton-Rogers, 2006).

Moreover, it should be mentioned that most studies and research could probably contain both philosophies. However, for the current thesis, the most consistent philosophy to consumer responses to product aesthetics and national culture theories would be the objectivist reasoning. The objectivist ontological condition is considered as the most consistent, because the current thesis will suppose that the users' ideas are a variable that could be analyzed by the utilize of measurements and observations. Also because the reality is experienced through the realization and sense, "catalog by the mind" (p.76), and it can be measured either indirectly or directly. The researcher could involve the people in a value-neutral way (ie, objectively).

3.5.2 Epistemology

Epistemology considers how knowledge is achieved and what constitutes it; in fact, the accepted knowledge (Bryman and Bell, 2011). In addition, it is further categorised into three

main epistemologies: positivism, interpretivism and realism (Saunders et al., 2012).

Positivism: This philosophy considers the scientific method and the strength to determine experimental facts about the world. This philosophy also consider that the studies must include measurable and quantifiable variables. In addition, it believed that its outcomes should be effective and valid to allow the researcher to make generalizable inferences on the population (Bell, 2010).

Interpretivism : The distinction between the interpretivist and positivist philosophy is that the philosophy of interpretivism concerns the importance of meaning by experimenting with the research problem or phenomena under examination. This certain philosophy also indicates to the problem solution of the research by multitude of different ways (Bell, 2010). Therefore, this philosophy do not concern value on measurable variables, but also seek to recognize quantifiable sides of the research chosen research problem or phenomenon.

Realism : This philosophy is highly similar to positivism which addresses the scientific approach to achieving its goals. Moreover, the little differences can be found in the real respect for the role of multilevel study, social actors and the importance of social structures (Cohen et al., 2011).

3.5.3 Axiology

Axiology indicates to the judgments and opinions based on the values. Where the choices could be considered a direct reflection the researcher's own values during the research procedure (Saunders et al., 2012). The value judgments could be pervasive and that can influence the chosen research methods, subject and the ethical considerations.

3.5.4 The Present Study's Research Philosophy

Positivism investigates the social reality through reason as a way to fathom the human's behaviour (Easton, 2002). This approach attempts to bridge the gap between social sciences and naturalist sciences, through applying the methods of the latter to the former. That entails the concept of accepting the existing theory and objectively applying that into practice without any changes to test the relationship between variables. (Saunders et al., 2016).

Hence, within this approach, both observation and experiment are considered the main data collection methods (McNeill, 2005; Creswell, 2013, 2014).This gives rise to the assumption that positivism does not consider any subjective views expressed by the people involved. It is from this stance that much criticism has been directed to positivism as an approach to investigate social phenomena and people's attitudes. For instance, a line of research argued that if positivism is applied, people's behaviour is treated as passive and strictly controlled by the surrounding environment (cf. Vickers, 1999; Churchill and Iacobucci, 2006). However, Bell (2010) stated that the findings must be valid to allow the researcher to make generalisable conclusions about the entire population.

Therefore, the present research selected positivism as this was the best choice for this work. This was mainly because of the objectivity of this method and its suitability to the research questions, which needed a reliable objective mode of research to answer them properly. This research also included measurable variables, and tried to bridge the gap between social sciences and naturalist sciences. Thereby, the study investigated the users' cognitive reactions to product design in terms of the crowdsourcing ideas that are generated by local users, as opposed to the crowdsourcing ideas which are generated by international users. The researcher had to be independent of the local and international users' perspectives, because one feature of positivism is the researcher's independence. The researcher should neither affect, nor be affected by, the subject of the research (Saunders et al., 2012; Creswell, 2013). In order to create a research strategy to collect the data, the researcher used two existing theories: model of consumer responses to product aesthetics and national culture theory to develop the hypotheses of this work. These hypotheses were then tested, to be refuted or confirmed, and this led to the development of the theory for use in further research and experimental study.

3.6. The Research Methods

As referred to above, the underpinning philosophy for this research is positivism. This means that the quantitative approach is applied in the research, as the quantitative procedure indicates the data collection through numerical means like scores, Ratings, and scales. Also the researchers who want to use the quantitative procedure or method mostly look at the world and interpret their results via statistical analysis to solve their study problem (Cresswell, 2002; Dolowitz et al., 2008). So the quantitative research is interested in

investigating the complex interrelationships between different variables (Saunders et al., 1997; Jankowicz, 2005; Hanson and Grimmer, 2007), hence it is the suitable approach to investigate this topic given the fact that there are several factors and interrelationships that can affect users' perspectives towards new product development such as cultural differences. The quantitative research deals with the knowledge as discovered with respect to meanings and interpretations taken, and the influence of the researcher on the research outcomes is slim (unlike the case with qualitative research) (Franses and Paap, 2001; Creswell, 2009).

3.7 The Research Approach

In addition to the use of the positivist philosophy and quantitative methods, such as experiment, this study also used the deductive approach for this research. The deductive approach was a logical choice, because this research is based on two existing theories: *consumer response to product aesthetics* and *Hofstede's theory*. However, Bell (2010) and Kristopher et al.(2007 indicated that the deductive approach (Figure 11) should be used to develop the research hypothesis from existing theories, and to test the hypothesis via data collection. This study's problem started from the existing theories and used quantitative methods and experiment to answer the research questions.

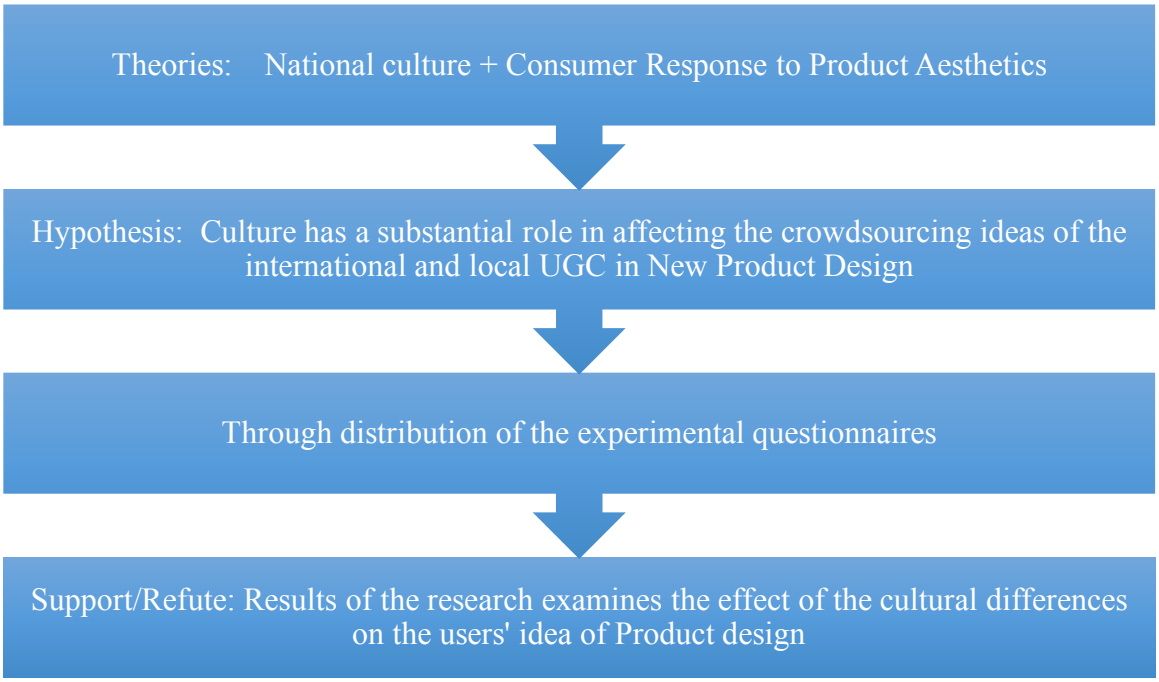


Figure 11: Deductive approach

3.8 The Research Strategy

To select a suitable strategy, previous studies provided a number of examples of suitable strategies that could be used in relation to the current research questions (Steven, Zanna and Fong, 2005). The goal of conducting an experiment test is to find a significant influence among the stimuli that are being tested. In this way, it was clear that the experimental questionnaire strategy would address the current research question and provide the best solution in generating valid initial quantitative data. Also, it was an appropriate way to collect a large amount of data from the sample population in an economic and simple way. Therefore, because the main precept of this study was to investigate the users' cognitive reactions through online crowdsourcing ideas of local and international UGC towards the development of product aesthetics, culture was employed as a mediator that would allow the interpretation of the results in the light of cultural differences. However, Highhouse (2009) and Kamil et al. (2001) suggested that a reasonably new and useful approach for administering research is the formative experimental questionnaire (Figure 12). Its purpose is to explain the relationships. If there is one change in the independent variable that means there is a direct change in one dependent variable as well (Hakim, 2000; Gaertner and Schokkaert, 2010). Experiments are defined as "studies involving intervention by the researcher beyond that required for measurement" (Cooper et al., 2003, p. 194; Reeves and Geiger, 1994). As for the intervention, several works assumed that such an intervention aims to play with one variable in the setting of the study and observe how it affects the subjects under investigation (e.g., in this context, the users' ideas). This gives rise to the researcher's role, which is to manipulate the independent or explanatory variable and then observe whether the hypothesised dependent variable is affected by the intervention.

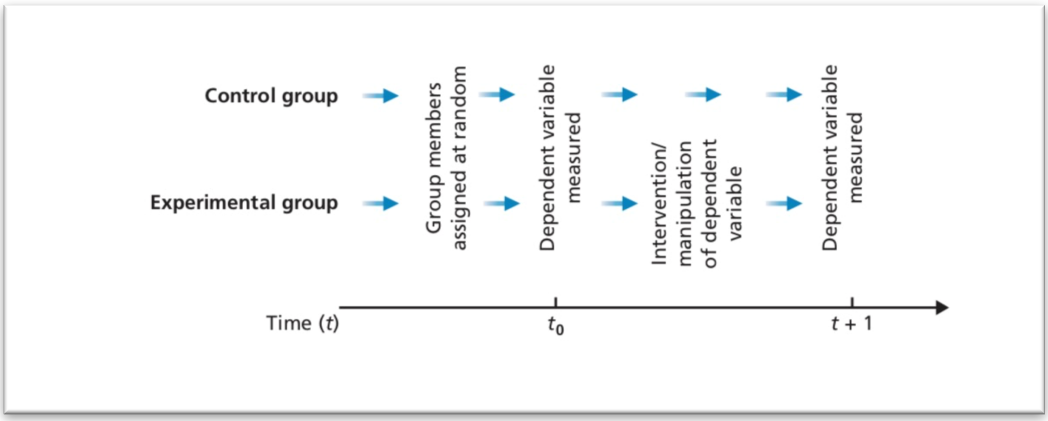


Figure 12: Experiment strategy

3.8.1 The tool design

The total experimental questionnaire consisted of 38 items. The format and structure of the questionnaire was developed based on the literature review and the questionnaires that addressed the product design context A number of researchers (Ellis, 1993; Hutchinson and Veryzer, 1998; Schoormanns and Creusen, 2005; Leder et al., 2008; Sevilla and Kahn, 2014). divided the product form based on its psychophysical characteristics into size, colour and shape. *Size* referred to aspects such as big and small. The *product shape* referred to features such as round and rectangular, complete and incomplete, harmony and dynamics, complexity and simplicity, and traditional and novel. The *colour* referred to high and low saturation levels, high and low hue levels and high and low brightness. In addition, to measure users' ideas through the product-related attitude and beliefs towards product design, attitude measurements used in other studies were adopted (Muehling 1986; Faircloth, Capella, and 2001). Also this questionnaire contains 14 questions to interpret the users' ideas and preferences towards product design based on their background in terms of the individualism and collectivism dimension. Further, users' ideas in culture measurements used in other studies were adopted in this study (Triandis and Gelfland, 1998). Consequently, the online experimental questionnaire was designed (Aguinis, and Bradley, 2014). The questionnaire included three sections: the first section contained five demographic-related questions (i.e. gender, ethnicity, nationality, have you previously had a life outside Saudi Arabia, and if so, for how long and where?) 'for Saudi users', and How long have you been in Saudi Arabia? 'for Non-Saudi users') and the second section contained four parts.

First: , The *product size variable* has five statements (PZ1: This size would look good and fit with the rest of the things in my home, PZ2: This product size is good to look at, PZ3: This product size is prestige, PZ4: I would recommend this size to my family or friends, and PZ5: This size is stylish and this size is practical) (derived from Batra and Ahtola, 1991) These items were measured via the seven-point Likert-type scale (i.e.1 = Strongly Disagree, 7 = Strongly Agree).

Second: The *product shape variable* has 10 statements (PS1: I prefer the symmetric product, i.e. aesthetic harmony between colour, shape or size, PS2: I prefer the unsymmetric product, i.e. aesthetic disharmony between colour, shape or size, PS3: I prefer the prototypicality product, i.e. standard design, PS4: I prefer the complex product, PS5: I prefer the simple product, PS6: I prefer the novelty product, i.e. Innovative designs, PS7: I prefer the

rectangular shaped product, PS8: I prefer the the square shaped product, PS9: I prefer the complete product, PS10: I prefer the incomplete product) (Sevilla and Kahn, 2014) (derived from Batra and Ahtola's (1991) study) These items were measured via the seven-point Likert-type scale (i.e.1 = Strongly Disagree, 7 = Strongly Agree).

Third. The *product colour variable* has six statements (PC1: I like to develop the product with the colour degree like green-yellow, PC2: I like to develop the product with the colour degree like purplish-blue, PC3: I like the product with high levels of brightness, PC4: I like the product with low levels of brightness, PC5: I like to develop the product with high pigment of saturation, PC6: I like to develop the product with low pigment of saturation) (Deng et al., 2010). These items were measured via a nine-point Likert-type scale (-4: Dislike a lot: 4: like a lot).

Fourth. The *users' ideas variable* has three statements (UP1: I like this design, UP2: I have positive feelings towards this design, and UP3: I have favourable feelings towards this design (Muehling, 1986; Faircloth and Capella, 2001). The attitudes to product design were measured via the seven-point Likert-type scale (i.e.1 = Strongly Disagree, 7 = Strongly Agree).

In terms of the Individualism and Collectivism dimension, the third section contains 14 questions about culture (IC1: I feel good about sharing my knowledge of product development with one or more people in my social network. IC2: In my society, I get support from my surrounding for my product design activities. IC3: My personal identity is important to me when I develop the product. IC4: I rely on myself most of the time; I rarely rely on others. IC5: I prefer to develop the product with different communities. IC6: Independently, I can develop any product based on my beliefs. IC7: It is important to me that I respect the decisions made by my groups. IC8: I'd rather depend on myself than on others. IC9: I often do "my own thing"). IC10: When another person does better than I do, I get tense and aroused. IC11: If a co-worker gets a prize, I would feel proud. IC12: To me, pleasure is working with others. IC13: Family members should stick together to develop the product. IC14: The well-being of my co-workers is important to me) (Triandis and Gelfand, 1998). These items were measured with via a six-point Likert-type scale (i.e. 1 = Strongly Disagree, 6 = Strongly Agree) because the closed-ended questions reflected the accurate levels of the participant’s attitudes, beliefs, and opinions (Biemer et al., 2004).

The differences in the scales (6 point and 7 point) is due to the nature of the study. In the current studies and practices, the psychological literature proposes that 7-point scales is better to increase the response quality and response rate. Statistically, the 7 point scales is more higher reliability (Bearden, Netmeyer and Mobley, 1993; Lissitz and Green, 1995). Also 6, 7 or 9 point scales seems to be more appropriate to online distribution. In addition, 7-point measures resulted in robust correlations with ANOVA and t-test outcomes (Finstad, 2010). In the same vein, several researchers discussed that the human mind has a full period of judgment that could characterize and attention about six or objects or seven response categories at a time, proposing that an increase in the number of answer categories more seven or six may be useless (Colman, Norris and Preston, 1997; Neuman and Neuman,1981).

The Instrument Measurement

Theoretical constructs that are described in the conceptual model are measured by adopted scales from the previous international literature. The measurement model is summarized in Figure 13.

i. Independent variables

The objective of the research is to investigate the cultural differences between online crowdsourcing ideas of Saudi and Non-Saudi UGC towards NPD through the interpretation of the users' cognitive reactions towards the development of the product aesthetics. The research involved an independent variable comprising product aesthetics in terms of colour, shape and size. The independent variable was measured by the scale of Hutchinson and Veryzer (1998) Ellis (1993), Schoormanns and Creusen (2005), Leder et al. (2008), Bloch et al. 2013; and Sevilla and Kahn (2014). The scale includes 22-Items of colour, shape and size dimensions of product aesthetics. The items of shape and size dimensions were measured with seven-point Likert-type scales (1 = Strongly Disagree, 7 = Strongly Agree) and the items of colour dimensions were measured with a nine-point rating scale to measure aesthetic preferences (- 4: Dislike a lot; 4: Like a lot).

ii. Dependent variables

The dependent variable of the research is cognitive response through product-related beliefs in the users' ideas towards product design. However, users' preferences represent the degree of their attitude and beliefs towards the product aesthetics. The product-related beliefs in the

users' ideas was measured by the attitude scale of Faircloth and Capella, (2001). The scale includes 3-items to measure the degree of consumer attitude and beliefs towards the product design. These items were measured with seven-point Likert-type scales (1 = Strongly Disagree, 7 = Strongly Agree).

iii. The Mediator Variable

The mediator variable in this research is the culture –Individualism and Collectivism – that helps interpret the results in the light of cultural differences. individualism and collectivism were measured by the scale devised by Triandis and Gelfland (1998). The scale comprises 14 items related to the collectivism and individualism dimensions. These items were measured with a 6-point, Likert-type scale (1 = Strongly Disagree, 6 = Strongly Agree) (Kristopher and Hayes, 2008).

Control Variables

The research involved control variables which comprises five demographic-related questions (i.e. Gender, Ethnicity, Nationality: Have you previously lived outside of Saudi Arabia, and if so, for how long and where? for Saudi Users and How long have you been in Saudi Arabia? for Non-Saudi Users).

iv. Stimuli

The current research used product aesthetics as stimuli in terms of colour, shape and size of product aesthetic; at the same time, these stimuli constitute the independent variable. The product (table lamp) was selected for three reasons. 1) These products have many different colours, sizes and shapes and can be characterised by different design attributes. 2) This product was well known by the people who were the respondents in this research. 3) The consumers consider the aesthetic features to be an important standard when making a buying decision – for example, it is more likely that a table lamp is purchased for an aesthetic reason by several consumers. On the other hand, furniture such as sofas or chairs tends to be ignored because selection of these products depends on the working environment. Consequently, as a stimulus, a table lamp product is found to be a better fit for this study.

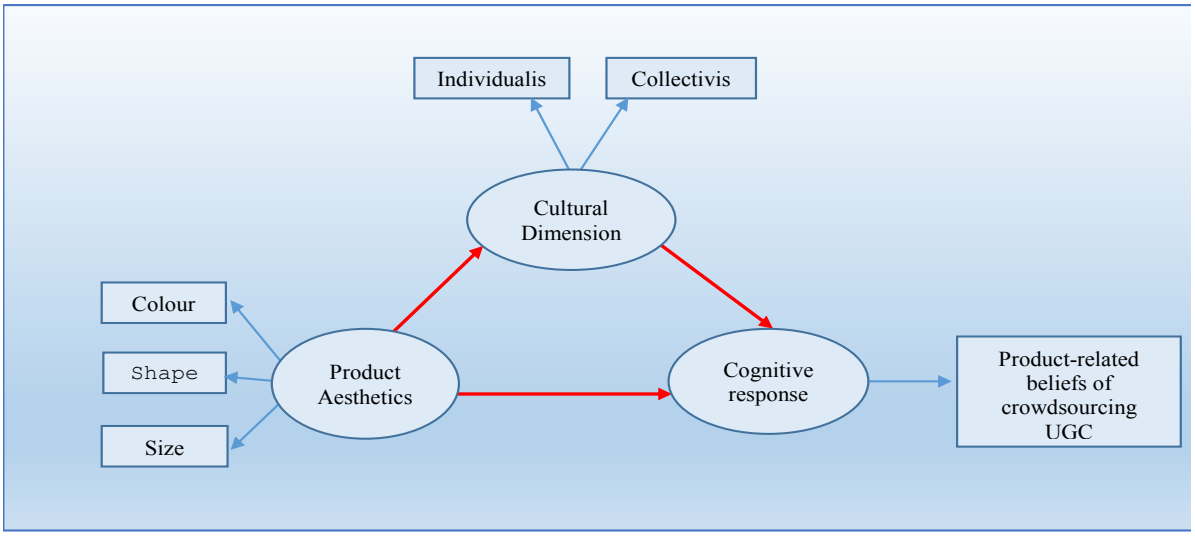


Figure 13: The summary of mesurment model

3.8.2 The validity of the experimental questionnaire

The researcher employed three procedures to ensure the validity of the design of the experimental questionnaire, items, test scores and the conclusions. In the first procedure, the questionnaire was presented to three academic experts in marketing and to two academics experts in the English language. The second and third procedures involved the use of two pilot studies to ensure validation of the research findings. However, the researcher employed factor to evaluate the validity of the underlying construct tools and also their relation with the variables which were collected. One of the core methods within factor analysis is confirmatory factor analysis (CFA). This analyses the factor structure of the data, and also tests the data to confirm the existing theory (Williams et al., 2010).

3.8.2.1 Baseline study

A baseline study was the first procedure (pilot study) to test the validity of the first experimental questionnaire. Unofficially, it was applied to a small sample. The primary goal of the procedure was to check whether the questionnaire items were sufficiently clear, check the coordinate issues such as font or text, to address any problems of understanding the questions, and to develop the researcher's skills (Bell, 2010). The questionnaire was distributed to some colleagues at the university and to some friends. During the procedure,

the participants were asked if they needed any further clarification, and to provide their feedback. They were also asked whether there were any ambiguous questions. This procedure was an important step for this research. Their responses enabled the researcher to improve the questionnaire quality was improved to ensure that all participants understood the questions.

3.8.2.2 The pilot study

The pilot study usually targets the main sample of the final study (Bell, 2010). In this study, 120 participants were recruited randomly from university databases in Saudi Arabia. The participants were asked to complete the questionnaire via open call (mail survey). Following completion of the pilot study any emerging issues were amended and the questionnaire was analysed to ensure the validity of the findings.

3.8.3 The reliability of the experimental questionnaire

The reliability indicates the consistency of the data when using the experimental questionnaire (Sekaran, 2003). In addition, reliability is the extent to which the procedures and the measurement tools give consistent findings in a certain population in different circumstances (e.g., participants, time, procedures, raters and test forms). Cronbach's alpha is the most widely used method for estimating the reliability of the constructs. Often, Cronbach's alpha is used to check the measurement of the construct in the questions properly (Trochim and Donnelly, 2007). Therefore, this research used Cronbach's alpha to measure the construct of the experimental questionnaire with all items and scales.

3.9 The Time Horizon

Arguably, the limited time available for this research could limit the range of its time structure. Therefore, it seemed that the cross-sectional design was the most sensible choice. Due to the limited time and number of participants, this approach could provide a suitable and sufficient snapshot of the issues this paper examined (Campbell, Moore, and Shrives, 2006). Furthermore, most previous studies, which are detailed in chapter two, have adopted the cross-sectional design. In addition, Saunders et al. (2012) showed that the cross-sectional design was appropriate for research that includes data collection from the population at a certain point in time.

3.10 The Sampling

The experimental research strategies are usually closely linked with probability sampling and this presents accurate results which are needed to make the inferences about a population sample and to answer the research question (Saunders et al., 2009). Probability sampling can be divided into three phases: 1) determine the appropriate sampling frame based on the research question; 2) determine the appropriate sample size; and 3) select the suitable sampling style or technique and select the sample. Henry (1990) argued that using sampling makes for a higher overall accuracy than a census does. The smaller number of cases for which data must be collected means that more time can be spent designing and piloting the means of collecting these data. Therefore, based on the above, the current research has chosen the final experimental survey sample to include only university students and academics of Saudi nationality and non-Saudi above the age of 18 from the Kingdom of Saudi Arabia (KSA).

A sample frame indicates the sampling technique that the researcher undertakes in choosing his sample (Algina and Keselman, 2000; Chan, 2002; Saunders et al., 2009). In this situation, the sampling frame was the population within Saudi Arabia. Thus, the sample came from students and academics of Saudi nationality and non-Saudi nationality above the age of 18 chosen from the above population. However, this study used the stratified random sampling technique because there are a number of different communities in Saudi Arabia, where the Saudi population is almost 21 million and the non-Saudi population is 11 million (General Authority for Statistics, 2016). The population was divided into two strata; Saudi strata (1) and non-Saudi strata (2) (Bernardo and Harrington, 2001; Algina et al., 2002) (see Figure 14). Subsequently, the online experimental survey for these strata in this study was distributed via open call (one crowdsourcing initiative). Open call was suitable for this research because it did not present any particular problem or task and was available for use at any time. Richard (2013) considered that presenting an open call to a large networked group of individuals is a unique form of outsourcing. Although Saudi Arabia is very large, none of the users was closely linked with the design, and this technique was used in order to find explanations for the cultural differences without bias. The use of random numbers enables selection of the sample without any bias (Saunders et al., 2009). As a result, 1000 experimental questionnaires were distributed via a mail survey (Google Drive). In order to generalise the study results, the sample size must be of a sufficient size. Hofstede and

Minkov (2013) recommended that a typical sample size for any research is 50 participants. This was a suitable measure to use in research related to the national culture theory (Hofstede and Minkov, 2013).

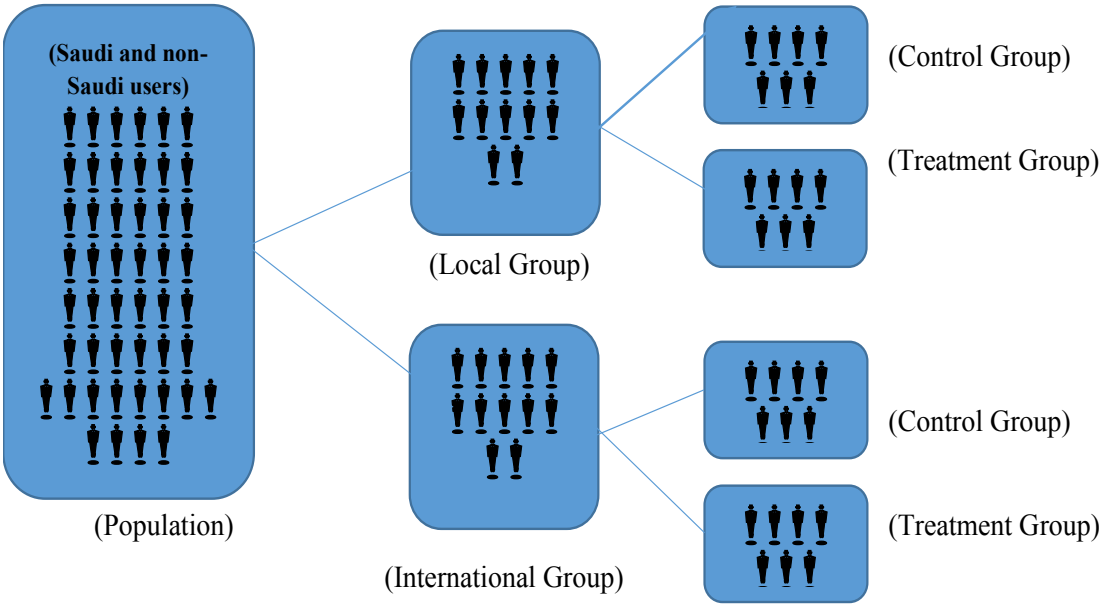


Figure14: The sample size plan

3.11 The Experimental Study

This research has three goals that all involve the use of experiment '*to investigate the cultural differences between online crowdsourcing ideas of local UGC and online crowdsourcing ideas of international UGC who are living in Saudi Arabia regarding new product development*' through a number of steps, each of which had a different hypothesis and purpose. Table 3.1 provides a summary of the experimental study steps. The first step verified whether differences in a product's aesthetic characteristics could influence product-related beliefs in the crowdsourcing ideas of control and experimental groups through the users' preferences towards product design aesthetics. The second step examined the differences between the local and international users' ideas, throughout product aesthetics dimensions, and interpreted the differences between the international users' ideas and local users' ideas in the light of culture. Third, the relationship between product aesthetic, users' ideas and the culture as a mediator were investigated using the different types of design

aesthetics.

It is important to investigate the essential hypothesis that the culture has a positive role in shaping crowdsourcing ideas of users' UGC in new product development. This is because the main paradigm of this research, which is the relationship among product aesthetic, culture and users' ideas, cannot be examined without the hypothesis. Therefore, the first step has examined whether differences in product aesthetics characteristics could influence product-related beliefs in the users' ideas of the control and treatment groups.

After verification of the positive effect of product aesthetics on the users' ideas, the second step was more in-depth because the second goal was to examine the differences in the crowdsourcing ideas of international users' UGC compared to crowdsourcing ideas of local users' UGC in terms of product aesthetics. Studies regarding product aesthetics and its measurement scale between two different communities are very limited. Thus, the main paradigm of this paper, which is to investigate the relationship among product aesthetic, culture and users' ideas, and then interpret the differences between the international users' ideas and local users' ideas in the light of culture, has been verified in this step.

3.11.1: The first step: Verifying whether differences in product aesthetics characteristic could influence product-related beliefs in the users' ideas of control and treatment groups.

The purpose of the first step is to verify whether a change in product aesthetics characteristic could affect product-related beliefs in the ideas of control and treatment. To reach this goal, an experiment was conducted, using six version of one product Table Lamp. The researcher intervened in the product characteristics stimuli – once with the element of colour, once with shape element, and once with size element. The researcher observed that such intervention in the product characteristics stimuli affected the users' preferences and their judgement between control and treatment groups. Thus, this observation confirmed that product aesthetics have a positively affects crowdsourcing ideas of users' UGC in New Product Development. In addition, product aesthetics characteristics in terms of shape, size and colour separately have a positively affects crowdsourcing ideas of users' UGC in New Product Development.

3.11.2: The second step: Finding the differences between the local and international users' ideas and Interpret the differences between of them in the light of culture.

After finding the significance effect of product aesthetics on users' ideas between control and experiment groups, the second step has two purposes. The first purpose is to examine crowdsourcing ideas of international users' UGC compared with crowdsourcing ideas of local users' UGC in New Product Development. The second purpose is to interpret the differences between the international users' ideas and local users' ideas in the light of culture in order to investigate the relationship among product aesthetics, culture and users' ideas. This step was conducted using six version of product Table Lamp. using six version of one product Table Lamp. The researcher intervened in the product characteristics stimuli – once with the element of colour, once with shape element, and once with size element. She noted that intervening in the product characteristics stimils led affected the preferences and judgement of both local and international users. This step also examined the users' attitudes towards product aesthetics to measure product-related beliefs in their ideas, and then interpreted the cultural differences between groups based on the collectivism and individualism dimension.

This experiment was conducted for six months (April 2017- January 2018), and data were collected via mail survey from the Saudi and Non-Saudi respondents into one of the control and treatment groups. The data were collected and analysed using different statistical programs such as SPSS, Amos and G*power. In addition, the data were subject to a range of tests such as ANOVA Test, confirmatory factor analysis, frequency, structural equation model and effect size analysis (Kristopher and Hayes, 2004).

3.12 Statistical Programs

The SPSS, G* Power and Amos programs were mainly used to analyse the data. The data generated by this study contained parametric statistics. The test of variance (ANOVA) is used to analyse the means for two or more populations. This test also enables investigating the differences in the mean of values in the dependent variable (e.g., users' ideas) linked with the effect of the independent variables (e.g., product aesthetics characteristics, colour, shape and size) (Malhotra, 1999). In addition, it is used because the sample distribution is normal and the observations are independent in each population. Moreover, the ANOVA test had more

freedom ('A Type I error is the answer because the more hypothesis tests you use the more you risk making a type I error and the less power a test has') (Kristopher et al., 2007). which helped the researcher to measure the variance of the mean in each group. While a T-test does not allow for more independence and is limited to comparing two groups. The ANOVA test uses a lot professionally when investigating the experimental results. Also the G*power to measure the effect size between populations was applied. Furthermore, structural equation modelling (SEM) was used to test relationships between dependent and independent variables as well as testing the influences in the hypotheses effectively (Mcquitty, 2004; Kristopher et al., 2007). These characteristics are important because the main goal of this study is not to only examine the *relationship* between product aesthetics, users' ideas and the culture but to test the *interaction* between those variables. This technique is based on the use of latent variables (i.e. factors defined by indicators), arising from psychological and social sciences where the researcher is trying to measure intangible concepts such as ideas and trust while the multiple regression analysis uses only observed measures and does not admit variable error. Statistically, SEM displays a goodness-of-fit indicator as to whether the model fit is strong or not (Gefen et al., 2000; Jeon, 2015).

Experimental study	Stimuli	Participants and Design	Purposes	Hypotheses	Analysis steps
First Step	PAC	A total of 221 participants were recruited from universities' databases in Saudi Arabia	Verifying whether the differences in product aesthetics characteristic could influence product-related beliefs in the users' ideas	H1:Product aesthetics characteristics positively affects crowdsourcing ideas of control and treatment UGC in New Product Development. H1a: The shape positively affects crowdsourcing ideas of UGC in New Product Development. H1b: The size positively affects crowdsourcing ideas of UGC in New Product Development. H1c: The colour positively affects crowdsourcing ideas of UGC in New Product Development.	**Two phases in this Step. First Phase:** *1. ANOVA procedure between Control and Experimental Cases: in two phases:* A. Examines the differences of crowdsourcing ideas in the control and treatment users for product aesthetics in general. B. examines the differences of crowdsourcing ideas in the control and treatment of users towards product aesthetics characteristics separately. *2- Structural Equation Modelling (SEM) in two phases:* * (KMO) test of sampling adequacy and the Bartlett test of sphericity were used. A. The assessment of the Measurement Model: A. 1. Confirmatory Factor Analysis Results. A.2. Test the Dimensions of product aesthetics, users' ideas and culture Validity and Reliability: Test through CFA + Correlation and Discriminant Validity + Reliability A.3. Measurement Invariance: through configural invariance B. The assessment of the Structural Model: through goodness-of-fit statistics in both groups. **Second phase has three steps:** More in-depth examination A. The differences in the crowdsourcing ideas between control and experimental cases in the local group: 1.1. Examines the differences of crowdsourcing ideas in the control and experimental cases in the Local Group to product aesthetics in general. 1.2. Examines the differences of crowdsourcing ideas in the control and experimental cases in the Local Group towards product aesthetics characteristics separately. B. The differences between control and experimental cases in the international group. 2.1 Examines the differences of crowdsourcing ideas in the control and experimental cases in the International Group to product aesthetics in general. 2.2 Examines the differences of crowdsourcing ideas in the control and experimental cases in the International Group towards product aesthetics characteristics separately. In addition, the G Power program was used to measure the effect size between variables. *C- Structural Equation Modelling (SEM) in two phases:* * (KMO) test of sampling adequacy and the Bartlett test of sphericity were used. A. The assessment of the Measurement Model: A. 1. Confirmatory Factor Analysis Results. A.2. Test the Dimensions of product aesthetics, users' ideas and culture Validity and Reliability: Test through CFA + Correlation and Discriminant Validity + Reliability A.3. Measurement Invariance: through configural invariance B. The assessment of the Structural Model: through goodness-of-fit statistics in both groups.

Second Step	PAC	A total of 221 participants were recruited from universities' databases in Saudi Arabia	1-Examine the differences between the local and international users' ideas. 2-Interpret the differences between the international users' ideas and local users' ideas in the light of culture.	H1. There is a difference between the local and international crowdsourcing ideas of users' UGC in New Product Development. H2. Product aesthetics positively affect the culture. H3. Culture positively affects the crowdsourcing ideas of users' UGC. H4-Individualism /collectivism mediates the influence of product aesthetics on the crowdsourcing ideas of international users' UGC, as well as the crowdsourcing ideas of local users' UGC in New Product Development.	**First step has two phases:** *A. The differences in the crowdsourcing ideas between International and Local Users in the control case* 1.1. Examines the differences of crowdsourcing ideas among the International and Local Users to product aesthetics in general in the control case. 1.2. Examines the differences of crowdsourcing ideas in the International and Local Users towards product aesthetics characteristics separately in the control case. *B. The differences in the crowdsourcing ideas between International and Local Users in the experimental case.* 2.1 Examines the differences of crowdsourcing ideas between International and Local Users to product aesthetics in general in the experimental cases. 2.2 Examines the differences of crowdsourcing ideas between International and Local Users towards product aesthetics characteristics separately in the experimental cases. **Second phase:** *ANOVA procedure Between Local and International Groups: in two phases:* A. Examines the differences of crowdsourcing ideas between Local and International users to product aesthetics in general. B. Examines the differences of crowdsourcing ideas between Local and International users towards product aesthetics characteristics separately. **Third phase:** ANOVA procedure to test effect of culture on the crowdsourcing ideas of local and international users' UGC. **Fourth phase:** *Structural Equation Modelling (SEM) in two phases:* * KMO test of sampling adequacy and the Bartlett test of sphericity were used. A. The Assessment of the Measurement Model: A. 1. Confirmatory Factor Analysis Results. A.2. Test the dimensions of product aesthetics, Users' ideas and culture validity and reliability: Test through CFA + Discriminant and convergent validities and Correlation + Reliability A.3. Measurement Invariance: through configural invariance + metric invariance B. The Assessment of the Structural Model: goodness-of-fit statistics in both groups +Testing Hypotheses +Mediator Analysis by (bootstrapping). In addition, the G Power program to measure the effect size between variables was used.

Table 3.1 Summary of the experimental study process

3.13 Preliminary Analysis and Results

This part of the analysis presents the sample characteristics description. Seven responses were excluded from the analysis because they were incompletes. Thus, the sample selected for this paper was 221 students and academics from the Saudi Arabia universities' databases. There are 125 Saudi participants and 96 Non-Saudi participants. The number of participants in the control case is 121 whereas in the experimental case is 100. However, the researcher described the sample characteristics based on five demographic-related questions; relating to gender

52.9% were males and 47.1% were females. With respect to ethnicities: 4.1% of white and black, 14.0% of mixed, 10.9% of black African, 10.0% of white African, 6.8% of European and 54.3% Asian. In terms of nationality 52.0% were Saudi, 21.7% were Australian, 10.9%were Egyptian, 7.2% were British, 3.6% were American and 4.5% were South African. Moreover, the researcher asked the Saudi participants whether they had previously lived outside the KSA, 76.6% answered 'yes', citing Canada, China and the United Kingdom. In The researcher asked the non- Saudi participants about how long they had been in the KSA; 57.5% of Non-Saudi participants lived in the KSA between six and 10 years while 32.5% have lived longer e than 10 years in the KSA (see Table 3.2).

Description for sample characteristics

Variable N=221	Frequency	Per cent (%)
Gender		
Male	117	**52.9%**
Female	104	47.1%
Ethnicity		
White and Black	9	4.1%
Asian	120	**54.3%**
Mixed	31	14.0%
Black African	24	10.9%
White African	22	10.0%
European	15	6.8%
Nationality		
Saudi	115	**52.0%**
American	48	21.7%
Egyptian	24	10.9%
British	16	7.2%
Australian	8	3.6%
South African	10	4.5%
Previous life outside the KSA (For Saudi)		
Yes	76	**76.6%**
No	49	23.4%
Have been in the KSA (For Non-Saudi)		
Less than a year	5	2.3%
(1-5) years	17	7.7%
(6-10) years	49	**57.5%**
More than 10 years	25	32.5%
Group Name		
Saudi	125	**56.6%**
Non-Saudi	96	43.4%

Table 3.2: Description for sample characteristics

CHAPTER 4: EMPIRICAL STEP 1

The first experimental goal is to verify whether differences in product aesthetics characteristic could influence product-related beliefs in the crowdsourcing ideas of the control and treatment users through their preferences and judgements. HypothesisH1 ask whether product aesthetics have a positive effect on the crowdsourcing ideas of the control and treatment of users' UGC in NPD. A great deal of research has focused on the effect of product aesthetics characteristics on consumers' ideas overall. According to Birren (1945), a product's aesthetics can essentially influence the consumer cognitive processes Product-related beliefs in the crowdsourcing ideas of the users have been examined through product aesthetics characteristics.

Only limited research has examined the product aesthetics characteristics separately in terms of colour, shape and size. These features are addressed by the sub-hypothesis **H1a: The shape positively affects crowdsourcing ideas of users' UGC in New Product Development.** Dahl et al. (2013) indicated that the simple shape may be more friendly but less attractive. Conversely, Minu and Noble (2010) confirmed that complex shapes are more interesting for customers, leading to **H1b: The size positively affects crowdsourcing ideas of users' UGC in New Product Development**. Dubois, Rucker and Galinsky (2012) showed that customers tend to express their social status during consideration of the size of products purchased; thus**H1c: The colour positively affects crowdsourcing ideas of users' UGC in New Product Development** is generated. Cheema and Bagchi (2013) mentioned that the colour could affect consumers' emotions, performance and perceptions.

Thus, the product aesthetics characteristics could have a different and positive effect among the crowdsourcing ideas of the control and experimental cases, and between the crowdsourcing ideas of the control and experimental cases in the local group as well as the crowdsourcing ideas of the control and experimental cases in the international group. Two steps are needed to achieve this goal; the first step examines product aesthetics characteristics among the crowdsourcing ideas of the control and experimental groups towards NPD. Also the second step examines product aesthetics characteristics between the crowdsourcing ideas of the control and experimental cases in the local group as well as the crowdsourcing ideas of the control and experimental cases in the international group towards NPD.

4.1 Method

Participants and Design

In total, 221participants were recruited from universities' databases in Saudi Arabia via open call (mail survey). Participants were stratified randomly assigned into local or international groups: (1) an experimental group that received a questionnaire about a table lamp, w green in colour, and small-sized with its simple and creative product, and (2) a control group who received a questionnaire about a table lamp with a blue colour and large-size also with its complex and prototypical product. According to Jones et al., (1981) people prefer to choose colours as follows: blue, green or red, and yellow. Dahl et al. (2013) indicated that the simple shape may be more friendly but less attractive. Also Dubois et al. (2012) showed that customers tend to express their social status during consideration of the size of products purchased.

The Experiment Procedure

Everyone read a brief description of the product (table lamp). The descriptions were identical in both conditions, except that each one included a different description of the product's aesthetics feature (stimuli) in terms of size, shape and colour.

In the intervention group, the table lamp was described in terms of size as *The small lamp gives a soft light and creates a warm atmosphere*; in terms of colour as *A tube of steel, with a plated base with a green colour textile shade that provides a diffused and decorative light*; and in terms of shape as *The shiny aluminium-plated base with glass prism shade that provides a diffused and decorative light*. In the control group, the table lamp was described in terms of size as *The big lamp gives a soft mood light, and a cosy atmosphere in your room*; in terms of colour, it was described as *A tube of steel with a plated base with a blue colour textile shade that provides a diffused and decorative light*; and in terms of shape as *The shiny steel base, brush finish, nickel-plated with 100% polyester shade that provides a decorative light*.

This gives rise to the researcher's role that was to manipulate the independent or explanatory variable and then observe whether the hypothesised dependent variable was affected by the

intervention. The stimuli in this experiment were the size, shape and colour of the product aesthetics characteristics (these comprised the independent variable). The observation of how it affected the subjects who were being investigated – here the users' views – was the dependent variable. The researcher then interpreted the product-related beliefs revealed in the users' ideas of the control and experimental groups based on their preferences. However, note that if the intervention was in the product colour, the other features of the product – shape and size – were also directly controlled because those may be affected by the intervention and thus affect the results.

Dependent Measures

Everyone answered 21 questions about the aesthetics features of the table lamp, three questions about the users' attitude, and five demographic-related questions that were presented in the experimental questionnaire. The questionnaire was divided into two sections; the first section contained five demographic-related questions (i.e. fender, ethnicity, nationality, Have you previously lived outside of Saudi Arabia, for how long and where? 'for Saudi users', and How long have you been in Saudi Arabia? 'for Non-Saudi users') and the second section contained three parts.

In the first part, the questions were formulated as follow:

> 'You can see the photo of a table lamp. When you look at this photo please concentrate on the product design in terms of size. After looking at the size of the table lamp, take a few minutes to think about the development of the table lamp size based on your views.

This contained five statements *(PZ1: This size would look good and fit with the rest of the things in my home, PZ2: This product size is good to look at, PZ3: This product size is prestige, PZ4: I would recommend this size to my family or friends, PZ5: This size is stylish and This size is a practical).* These items were measured via the seven-point Likert-type scale (i.e.1 = Strongly Disagree, 7 = Strongly Agree).

In the second part, the questions were formulated as follow:

> ‘You can see the photo of a table lamp. When you look at this photo please concentrate on the product design in terms of shape. After looking at the shape of the table lamp, take a few minutes to think about the development of the table lamp shape based on your views.’

Those contained 10 statements *(PS1: I prefer the symmetric product, i.e. aesthetic harmony between colour, shape or size, PS2: I prefer the unsymmetric product, i.e. aesthetic disharmony between colour, shape or size, PS3: I prefer the prototypicality product, i.e. standard design, PS4: I prefer the complex product, PS5: I prefer the simple product, PS6: I prefer the novelty product, i.e. Innovative designs, PS7: I prefer the product of the rectangular shape, PS8: I prefer the product of the square shape, PS9: I prefer the complete product, PS10: I prefer the incomplete product).* These items were measured via a seven-point Likert-type scale (i.e.1 = Strongly Disagree, 7 = Strongly Agree) because the closed-ended questions reflected the accurate levels of the participant’s attitudes, beliefs, and opinions (Biemer et al., 2004).

In the third part, the questions were formulated as follow:

> ‘You can see the photo of a table lamp. When you look at this photo please concentrate on the product design in terms of colour. After looking at the colour of the table lamp, take a few minutes to think about the development of the table lamp colour based on your views.

This contained 10 statements *(PC1: I like to develop the product with the colour degree like Green-yellow, PC2: I like to develop the product with the colour degree like purplish-blue, PC3: I like the product with high levels of brightness, PC4: I like the product with low levels of brightness, PC5: I like to develop the product with high pigment of saturation, PC6: I like to develop the product with low pigment of saturation).* These items were measured via the nine-point scale (4- =Dislike a lot to 4+ = like a lot). This enabled the researcher to measure the product-related beliefs in the users' ideas in terms of preferences and judgments between the control and experimental cases in general and between the control and experimental cases in the local group as well as in the international group toward NPD.

In the last part, the questions about the users’ attitudes were formulated as follow: UP1– I

like this design; UP2 – I have positive feelings towards this design, and UP3 – I have favourable feelings towards this design (Muehling, 1986; Faircloth, Alford and Capella, 2001). The attitude to product design was measured via the seven-point Likert-type scale (i.e.1 = Strongly Disagree, 7 = Strongly Agree). This part represents the degree of beliefs and attitudes towards product design among local and international users' ideas.

4.2: The Results

4.2.1 ANOVA procedure between Control and Experimental Cases

This step has two parts; the first step examines the differences of crowdsourcing ideas in the control and treatment groups in general. The first ANOVA procedure indicates significant differences between the control and experimental groups' values for product aesthetics characteristics scale (F=92.567; P=.009). Broadly, this procedure demonstrates that there are significant differences between control and treatment groups' values in terms of product aesthetics characteristics – see Table 4.1.

Table 4.1: Results of ANOVA-test for the Influence of product aesthetics on the crowdsourcing ideas of control and experimental groups

Scale	**Control Group**			**Experimental Group**			Differences
	N	**M**	**S.D**	**N**	**M**	**S.D**	**(P-Value)**
PA	121	4.74	5 .948	100	4.23	3.509	**.009**

**P-Value >.5; PA, product aesthetic; M, mean; S.D, Standard Deviation; N, participants number.*

In addition, this step also examines the differences of crowdsourcing ideas in the control and treatment users towards product aesthetics characteristics separately that are colour, shape and size based on the Psychophysical Properties (Block, 1995; Novak, 1997). The second ANOVA procedure indicates significant differences between the control and experiment groups' values for colour scale (F=76.393; P=.012), size scale (F=58.550; P=.004) and shape scale (F = 22.027; P=.031). Generally, this procedure demonstrates that there are significant

differences between groups' values (Cramer and Howitt, 2004) see Table 4.2.

Table 4.2: Results of ANOVA-Test for the influence of product aesthetics characteristics on the crowdsourcing ideas of control and experimental groups

Scale	**Control Group**			**Experimental Group**			Differences **(P-Value)**
	N	**M**	**S.D**	**N**	**M**	**S.D**	
Colour	121	4.61	1.869	100	4.04	1.354	.012
Shape		5.96	2.842		4.34	2.147	.031
Size		4.75	2.051		3.96	1.934	**.004**

**P-Value >.5; PA, product aesthetic; M, mean; S.D, Standard Deviation; N, participants number.*

Therefore, there are statistically significant differences in crowdsourcing ideas between control and experimental groups generally (Cramer and Howitt, 2004). The results show that there was a variation between control and treatment groups in terms of developing product aesthetics as following; 69% of the control group would like to develop the product based on the degree of the hue of colour like green-yellow with high pigment colour and light colour. While 61% of the treatment group would like to develop the product based on the hue of colour purplish-blue with low pigment colour and dark colour. In addition, 72% of the control group prefer to develop the product based on the complexity, innovative and complete shape. On the contrary, 65% of the treatment group prefer to develop the product based on the simplicity, prototypicality and incomplete shape. However, 77% of the control group prefer to develop the product based on the big size and 72% of the treatment group prefer to develop the product based on the small size. It is worth mentioning that the outcomes of the control and treatment groups agreed with each other in terms of the symmetry, i.e. aesthetic harmony and rectangular' product shape.

4.2.2 Structural Equation Modelling (SEM)

Structural Equation Modelling (SEM) is one of the most widely used techniques for analysing multivariate data in the behavioural and social sciences. (SEM) was used to test the construct validity of the research model, and it is the most suitable method to study relationships between dependent and independent variables. Also test the influences in the hypotheses effectively (Mcquitty, 2004; Byrne, 2016). In this study, structural equation modelling (SEM) was used to test relationships between product-related beliefs in the crowdsourcing ideas of the users and product aesthetics characteristics, and to test the influences in the hypotheses effectively (Mcquitty 2004; Kristopher et al., 2007). These characteristics are important because the main goal of this step is not only to examine the relationship between product aesthetics characteristics and users' ideas but also to test the interaction between those variables. In addition, this technique is based on the use of latent variables, arising from psychological and social sciences where the research is trying to measure intangible concepts such as ideas and trust. While the multiple regression analysis uses only observed measures and does not admit variable error (Gefen et al., 2000; Jeon, 2015 and Byrne, 2010).

However, Hair et al. (2006) and Karimi et al. (2014)) mentioned that the SEM approach is suitable in the following two steps: 1) The assessment of the measurement model. In addition, it is appropriate to adopt this step which is the assessment of the measurement invariance to test the differences between groups (Gordon et al., 2009); and 2) The assessment of the structural model. However, Byrne (2016) and Hair et al. (2006) mentioned that it is suitable to adopt the SEM approach in two steps: 1) The assessment of the measurement model. In addition, it is appropriate to adopt this step which is the assessment of the measurement invariance to test the differences between groups (Gordon et al., 2009); and 2) the assessment of the structural model.

4.2.2.1 The assessment of the measurement model

Prior to data analysis by the confirmatory factor analysis (CFA), the Kaiser-Meyer-Olkin (KMO) test of sampling adequacy and the Bartlett test of sphericity were used to determine the appropriateness of factor analysis (Kaiser, 1974). The KMO level of .820 and the

significance of the Bartlett test indicate that the factor analysis is valid for this study (Hill, 2011).

(A) Confirmatory factor analysis results

The purpose of CFA is analyses the factor structure of the data, and also tests the data to confirm the existing theory (Williams et al., 2010). And determine the dimensions of a set of variables and to find the type of the factor loadings. It is also used to investigate whether the established dimensions and factor-loading type fits with the new sample. As well checking whether the data supports the component scales of the different measuring tools, and this was through the principal components analysis. Thus, CFA is an appropriate method to test the goodness-of-fit indices, and the validity and reliability of the suggested measurement model. The variables in the research model are product aesthetics and users' ideas.

The measurement model includes 24 items describing two latent constructs – which are product aesthetics (PA) and users' ideas (UI). In addition, 21 Items for the product aesthetics variable were built on the basis of the psychophysical characteristics such as colour, shape and size (Ellis, 1993; Bloch,1995; Hutchinson and Veryzer, 1998; Schoormanns and Creusen, 2005; Leder et al., 2008; Sevilla and Kahn, 2014) and 3 items were based on the users' ideas variable (Muehling, 1986; Faircloth and Capella, 2001).

Moreover, eight items were removed from the product aesthetics dimension. In the users' ideas dimension all the factors had a high loading (>. 40). Thus, the results of the test of CFA of this measure shows that goodness-of-fit indicators are strong in both cases (chi-square is 59.211; NFI .936; CFI= .969; CMIN/DF= 1.850; TLI = .956; GFI= 950; RMSEA =.022 and Pclose= .196) (see Table 4.3).

Latent construct	Item	Factor Loading
Product Aesthetics	*(Colour)*	
	Green-yellow Degree	.72
	High Pigment of Saturation	.42
	High Brightness	.57
	(Shape)	
	Complex	.45
	Simple	.70
	Innovative	.76
	Prototypicality	.48
	asymmetric	.52
	Completed	.60
	Uncompleted	.42
	(Size)	
	Prestige	.59
	Recommended size	.55
	Fit size	.43
Users' ideas	Favourable feelings	.80
	Positive feelings	.74
	They like this design	.71
Fit Indices		X2= 59.211 (d.f. = 32, p<. 05) NFI .936, CFI .969

Table 4.3: Confirmatory Factor Analysis Results

(B) Test the dimensions of product aesthetics, users' ideas and culture validity and reliability

** Test through CFA*

The construct validity is when a test model to measure a given construct is in fact measuring that construct. Discriminant and convergent validities are both considered sub-types for the construct validity. It is important to realise that both of them require to work together to establish construct validity (Henseler, Christian and Sarstedt, 2015). The convergent validity

is to test the constructs that are expected to be related and it is actually related (William, Kristopher and Mahzarin, 2001). Convergent validity of the constructs can be assessed through the measurement model. Fornell and Larcker (1981) indicated that the convergent validity of the measurement model is evaluated based on three standards which are: 1) The factor loadings; 2) The average variance extracted (AVE); and 3) The construct reliability (CR). Moreover, the findings showed that all factors' loadings are more than 0.40. Regarding all the constructs have a composite reliability (CR) value are above than the recommended level of 0.700. In addition, Table 4.4 demonstrates that the AVE (Average Variance Extracted) estimate of constructs is more than the recommended level of 0.50.

**The reliability test*

Cronbach's alpha used to assess reliability of each dimension of product aesthetics and users' ideas. Table 4.4 demonstrates that all of Cronbach's alpha values of these variables were more than 0.700, and the result indicates that the measured items are reliable (Nunnally, 1967; Tucker and Lewis, 1973; DeVon et al., 2007.).

Construct	No. of Items Before	Items Deletion	No. of Items	Cronbach's Alpha	AVE	Sample Items
Users' ideas	3	-	3	.901	0.751	I have favourable feelings towards this design
Product Aesthetics	21	8	13	.777	0.586	I prefer the novelty product, i.e. Innovative designs.

Table 4.4: Validity and reliability of the construct

The discriminant validity

Discriminant validity identifies whether the constructs in the model are correlated or not (Henseler, Ringle and Sarstedt, 2015). The discriminant validity was evaluated by comparing the square root of the AVE for the particular construct with the correlations between that construct and the other constructs. Therefore, the square roots of the AVE for the given construct and the Square Root of AVE value should be higher than the correlation value.

Table 4.5 shows that all exceed the correlation shared among the construct and the other constructs in the paradigm, referencing sufficient discriminant validity between each construct.

Variable	M	S.D	1	2	3	4	5	
1. Nationality	2.89	1.349	1					
2. Ethnicity	1.48	.500	.351*	1				
3. Gender	2.02	1.406	-0.015	-0.082	1			
4. Users' ideas	20.62	4.172	-.171*	-.276**	0.076	1	**(0.866)**	
5. Product Aesthetics	4.738	1.610	-.494**	-404**	-.106	.271**	1	**(0.881)**
***Square root AVE is in bold.**								

Table 4.5: Correlation and discriminant validity

To test the relationships between the control variables and the others product aesthetics and users' ideas, the researcher employed a correlation procedure. The results of correlation show that nationality, gender and ethnicity have negative correlations with the product aesthetics. In addition, ethnicity and nationality have a negative relationship with the users' ideas, whereas gender has a significant correlation with the users' ideas. It is worth stating that the product aesthetics have a positive relationship with the users' ideas.

(C)Measurement Invariance

Usually measurement invariance is used to test multi-group confirmatory factor analysis. This examines the goodness-of-fit index (GFI) of the measurement model between groups. One must conduct a measurement invariance test to ensure that the measurement model construct is equivalent among different groups (Schmitt and Kuljanin, 2008). Several researchers in the social sciences are concerned with the measurement invariance test, which is define whether the items used in the survey tool means the same things among the different groups (Meredith,1993; Steenkamp and Baumgartner, 1998; Vandenberg and Lance, 2000). The measurement invariance is very important when comparing groups. If the invariance of measurement cannot be created, this means that the finding of a difference between groups

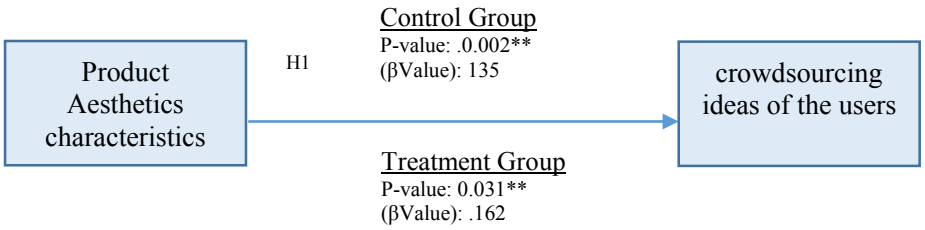
cannot be interpreted clearly. This could be due to different psychological reactions to the items' measurements or to different attitudes, particularly in the cross-cultural research area (Reise, Widaman and Pugh, 1993; Riordan and Vandenberg, 1994; Janssens, Brett and Smith, 1995; Steenkamp and Baumgartner, 1998; Karimi et al., 2014).

Therefore, this research used measurement invariance through configural invariance to test the model fit for both groups (Milfont and Fischer, 2010). Results display a good fit in the measurement models for the two groups, where CFI=.993 for the control group and CFI=.997 for the treatment group. Secondly, metric invariance was used to test the strength of relationships among basic constructs and items by comparing the goodness of fit between the constrained and unconstrained models, where the goodness-of-fit index for the control group was CFI=.993, and CFI=.997 for the treatment group models. In addition, a chi-square difference test between unconstrained and constrained measurement models tended to be significant (P-value= .000 > 0.05) which shows that there are differences between control and experimental groups in constructing the measurement models (Cheung and Rensvold, 2009).

4.2.2.2 The assessment of the structural model

All the constructs were used to measure the structural model after testing the construct reliability and validity measures established in the first step. In general, goodness-of-fit statistics display that the structural model is a strong fit for both the control and experimental groups using multi-group analysis. However, the results of the structural model for the control group show that chi-square is 5.799; NFI .985; CFI= .993; CMIN/DF= 1.833; TLI = .976; GFI= 981; RMSEA =.038 and Pclose= .216, and the experimental group data chi-square is 3.134; NFI .972; CFI= .997; CMIN/DF= 1.045; TLI = .996; GFI= 988; RMSEA =.051 and Pclose= .478. Thus, after evaluating the goodness-of-fit indices for the measurement models and structural models, the researcher examined the estimated coefficients of the influences between variables. In addition, the results showed that the product aesthetics positively affects crowdsourcing ideas of control and treatment UGC in New Product Development control (β: .135; p-value: 0.002*) and experiment (β = .162; p-value: 0.031*) (Figure 15), an effect which corresponds to H1*: Product aesthetics has a positive effect on crowdsourcing ideas of the control and treatment users' UGC in New Product Development*.

Furthermore, the results showed that some of the control variables affect the users' ideas; for example, the nationality has a positive effect on the crowdsourcing ideas of users' UGC in the experiment case (β = .760; p-value: 0.031*), but has a negative effect on the crowdsourcing ideas of users' UGC in the control case (β: -.258; p-value: 0.028*). Ethnicity has a negative effect on the crowdsourcing ideas of users' UGC in both groups (control, β: -.744; p-value: 0.000** and experiment, β = .0171; p-value: 0.005*). In this step, this research does not examine culture as a mediator variable in these groups because culture may be considered as a suppressor variable that reduces the power of the model. However, it will be theoretically unrealistic to ignore it as this mediator variable always exists in the cognitive mind (Ajzen, 1991; Cheung and Lau, 2008).



The Figure 15: The Structural results of the groups utilizing the product aesthetics characteristics in general.

After investigating the product-related beliefs in the crowdsourcing ideas of the users through product aesthetics characteristics generally, the results showed that the product aesthetics has a positive effect on crowdsourcing ideas of the control and treatment users' UGC in New Product Development. Therefore, the next step examines the product-related beliefs in the crowdsourcing ideas of the users in depth, through product aesthetics characteristics separately to know if the colour, shape and size could positively affect the users' ideas.

4.2.3 Structural Equation Modelling (SEM)

The structural equation modelling (SEM) was used to test the construct validity of the research model, and it is the most suitable method to study relationships between dependent and independent variables. Also test the influences in the hypotheses effectively (Mcquitty,

2004; Byrne, 2016). In this study, structural equation modelling (SEM) was used to test relationships between product-related beliefs in the crowdsourcing ideas of the users and product aesthetics characteristics, and to test the influences in the hypotheses effectively (Mcquitty 2004; Kristopher et al., 2007). These characteristics are important because the main goal of this step is not only to examine the relationship between product aesthetics characteristics and users' ideas but also to test the interaction between those variables. In addition, this technique is based on the use of latent variables, arising from psychological and social sciences where the research is trying to measure intangible concepts such as ideas and trust. While the multiple regression analysis uses only observed measures and does not admit variable error (Gefen et al., 2000; Jeon, 2015 and Byrne, 2010).

However, Hair et al. (2006) and Karimi et al. (2014)) mentioned that the SEM approach is suitable in the following two steps: 1) The assessment of the measurement model. In addition, it is appropriate to adopt this step which is the assessment of the measurement invariance to test the differences between groups (Gordon et al., 2009); and 2) The assessment of the structural model. However, Byrne (2016) and Hair et al. (2006) mentioned that it is suitable to adopt the SEM approach in two steps: 1) The assessment of the measurement model. In addition, it is appropriate to adopt this step which is the assessment of the measurement invariance to test the differences between groups (Gordon et al., 2009); and 2) the assessment of the structural model.

4.2.3.1 The assessment of the measurement model

(A) Confirmatory Factor Analysis Results

The purpose of CFA is analyses the factor structure of the data, and also tests the data to confirm the existing theory (Williams et al., 2010). And to determine the dimensions of a set of variables and to find the type of the factor loadings. It is also used to investigate whether the established dimensions and factor-loading type fits with the new sample. As well checking whether the data supports the component scales of the different measuring tools, and this was through the principal components analysis. Thus, CFA is an appropriate method to test the goodness-of-fit indices, and the validity and reliability of the suggested measurement model. The variables in the research model are product aesthetics and users' ideas.

In the first step, the measurement model includes 24 items describing four latent constructs which are colour (PAC), size (PAZ)and shape (PAS) of product aesthetics, and users' ideas (UI). In addition, 21items for the product aesthetics variable were built on the basis of the psychophysical characteristics such as colour, shape and size (Leder et al., 2008; Ellis, 1993; Bloch,1995; Hutchinson and Veryzer, 1998; Schoormanns and Creusen, 2005; Sevilla and Kahn, 2014). There were also three items for the users' ideas variable (Muehling, 1986; Faircloth and Capella, 2001).

Moreover, 10 items were removed from the product aesthetics dimension. As for the users' ideas dimension all the factors had a high loading (>. 40). Thus, the results of the test of CFA of this measure show that goodness-of-fit indicators are strong in both cases chi-square is 59.211; NFI .936; CFI= .969; CMIN/DF= 1.850; TLI = .956; GFI= 950; RMSEA =.042 and Pclose= .196. (See Table 4.6). Based on the results obtained, the proposed paradigm of four constructs is an appropriate measurement model for this step.

Latent construct	Item	Factor Loading
Product colour	Blue-purple degree	.82
	High Pigment of saturation	.62
	Low brightness	.63
Product Shape	Simplex	.54
	Innovative	.40
	Rectangular	.60
	Complete	.45
Product Size	Stylish and practical	.43
	Recommended size	.46
	Fit size	.63
Users' Ideas	Favourable feelings	.76
	Positive feelings	.92
	They like this design	.77
Fit Indices		X2= 144.46 (d.f. = 92, p<. 05) NFI .920, CFI .970

Table 4.6: Confirmatory factor analysis results

(B) Test the colour, size and shape dimensions of product and users' ideas validity and reliability

** Test through CFA:*

The findings showed that all factor loadings are more than 0.40. All the constructs have a composite reliability (CR) value that is above t the recommended level of 0.70, ranging from 0.742 to 0.910. In addition, Table 4.7 demonstrates that the AVE (Average Variance Extracted) estimate results show that the AVE estimate of constructs is more than the recommended level of 0.50 (Fornell and Larcker, 1981; William et al., 2001; Henseler et l., 2015). Furthermore, Cronbach's alpha was used to assess reliability of each dimension of product colour, shape, size and users' ideas. Table 4.7 demonstrates that all of Cronbach's alpha values of these variables were more than 0.700, and the result indicates that the measured items are reliable (Nunnally, 1967; Karimi et al., 2014).

Construct	No. of Items Before	Items Deletion	No. of Items	Cronbach's Alpha	AVE	Sample Items
Product shape	10	6	4	.757	0.601	I prefer the simple product
Product colour	6	3	3	.804	0.548	I like to develop the product with the colour degree like purplish-blue
Product size	5	2	3	.742	0.555	This product size is good to look at
Users' ideas	3	-	3	.910	0.765	I have favourable feelings towards this design

Table 4.7: Validity and reliability of the construct

The Discriminant validity

Discriminant validity identifies whether the constructs in the model are correlated or not (Henseler et al.,2015). The discriminant validity was evaluated by comparing the square root of the AVE for the particular construct with the correlations between that construct and the other constructs. Therefore, the square roots of the AVE for given construct, and the Square Root of AVE value should be higher than the correlation value. Table 4.8 shows that all exceed the correlations shared among the construct and the other constructs in the paradigm, referencing sufficient discriminant validity between each construct.

Variable	M	S.D	1	2	3	4	5	6	7	
1. Ethnicity	2.98	1.549	1							
2. Gender	1.47	.500	-.082	1						
3.Nationality	2.20	1.560	.351**	-.015	1					
4. Users' ideas	4.43	2.522	1.177**	.049	.626	1	**(0.847)**			
5. Product colour	5.23	2.670	.514**	.1.4	0.646	.260**	1	**(0.740)**		
6. Product shape	4.35	2.677	0.421**	.103	0.553	.330**	.651**	1	**(0.775)**	
7. Product size	4.39	2.033	.100	.866**	.753	.602**	.261**	.338**	1	**(0.944)**
***Square root AVE is in bold.**										

Table 4.8: Correlation and discriminant validity

To test the relationships between the control variables and the product shape, size and colour and the users' ideas, a correlation procedure was employed. The results of correlation show

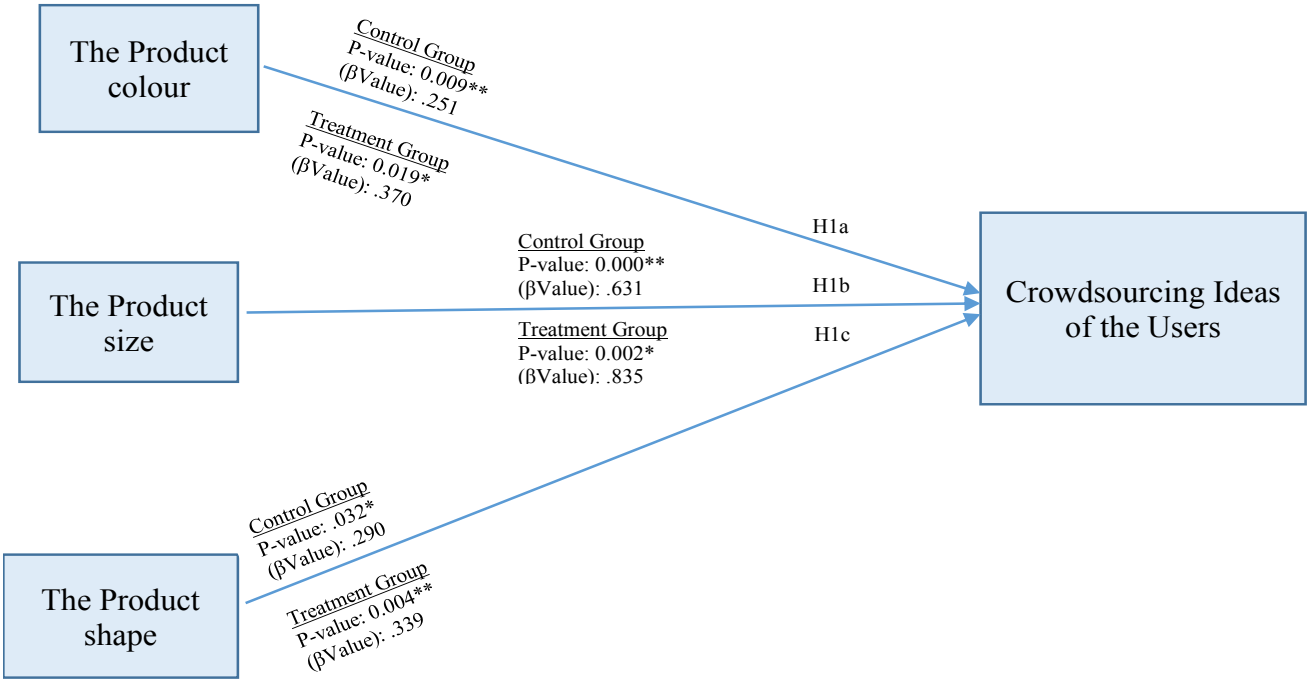
that ethnicity and nationality have significant correlations with the users' ideas. In addition, product size has a positive correlation with gender. It is worth stating that the users' ideas have positive correlations with product shape, size and colour. In addition, nationality has a positive relationship with product colour.

(C) Measurement Invariance

Usually measurement invariance is uses to test multi-group confirmatory factor analysis. This examines the goodness-of-fit index (GFI) of the measurement model between groups (Reise et al., 1993; Riordan and Vandenberg, 1994; Janssens et al., 1995; Steenkamp and Baumgartner, 1998). Therefore, this research used measurement invariance by configural invariance to test the model fit for both groups (Milfont and Fischer, 2010). Results display a good fit in the measurement models for the two groups, where CFI=.978 for the control and CFI=.971 for the treatment group. Secondly, metric invariance was used to test the strength of the relationships among basic constructs and items by comparing the goodness of fit between the constrained and unconstrained models, where the goodness-of-fit index, CFI=.978, for the control and CFI=.971 for the treatment group models were found. In addition, a chi-square difference test between unconstrained and constrained measurement models tends to be non-significant (P-value= .000 > 0.05) which shows that there are differences between control and experimental groups in constructing the measurement models (Cheung and Rensvold, 2009).

4.2.3.2 The assessment of the structural model

All the constructs were used to measure the structural model after testing the construct reliability and validity measures established in the first step. In general, goodness-of-fit statistics display that the structural model is a strong fit for both of the control and experimental groups using multi-group analysis. However, the results of the structural model for the control group show that chi-square is 375.180; NFI .972; CFI= .974; CMIN/DF= 2.101; TLI = .970; GFI= 970; RMSEA =.043 and Pclose= .0537, and the experimental group data are chi-square is 123.134; NFI .970; CFI= .979; CMIN/DF= 1.840; TLI = .976; GFI= 975; RMSEA =.051 and Pclose = .439. Thus, after evaluating the goodness-of-fit indices for the measurement models and structural models. the estimated coefficients of the influences between variables were examined (Figure 16).



The Figure 16: The Structural results of the groups utilizing the product aesthetics characteristics separately.

4.4 Testing Hypotheses

Hypotheses 1a, 1b and 1c were tested using the structural equation model with an examination of the structural coefficients (P-value and β-value). Table 4.9 demonstrates the structural model results, using multi-group analysis to test the direct effect between control and treatment groups. This model appears to have achieved a satisfactory level of construct validity, and it can be observed from this table that coefficients are significant.

The effect of product colour on the users' ideas (H1a): It was proposed that product colour would have a positive effect on the crowdsourcing ideas of users' UGC. The results indicate that control: β = .251, p-value: 0.009**; treatment: β = .370, p-value:0.019*. Therefore, there was a significant effect between product shape and users' ideas in both groups, and H1a is supported.

The effect of product size on the users' ideas (H1b): It was proposed that product size has a positive effect on the crowdsourcing ideas of users' UGC. The results indicate that control: β = .631, p-value: .000***; treatment: β = .835, p-value: .002*. Therefore, there was a positive effect between product size and the crowdsourcing ideas of users' UGC in both groups, and H1b is supported.

The effect of product shape on the users' ideas (H1c): It was proposed that product shape has a positive effect on the crowdsourcing ideas of users' UGC. The results indicates that (control: β = .290, p-value: .032*; Treatment: β = .339, p-value: 0.004**). Therefore, there was a positive effect between the product shape and the crowdsourcing ideas of users' UGC in both groups, and H1c is supported.

Path	Control Group		Treatment Group	
	P-value	Estimate (βValue)	P-value	Estimate (βValue)
H1a: Product colour → Users' Ideas	0.009**	.251	0.019*	370
H1b: Product size → Users' Ideas	000***	631	.002*	.835
H1c: Product shape→ Users' Ideas	.032*	.290	0.004**	.339

**p<.05.; **p<.01.*

Table 4.9: Results of the Structural Equation Modelling

Furthermore, the results show that the control variables effect the other variables, where the nationality has a significant effect on the crowdsourcing ideas of users' UGC in the treatment and control groups (treatment: β = .658, p-value: 0.000**; control: β = .132, p-value: 0.071*).

Further investigation between control and experimental group: This step examines in greater depth the differences in the crowdsourcing ideas between control and experimental cases in the local group as well the differences between control and experimental cases in the international group.

4.5 ANOVA procedure Between Control and Experimental Cases in the Local and International Groups.

The first ANOVA procedure indicates significant differences between the control and experimental cases' values in the local group for product aesthetics scale (F=12.934; P=.001). Largely, this procedure demonstrates that there are significant differences between control and treatment cases' values in the local group in terms of product aesthetics (see Table 4.10).

Table 4.10: Results of ANOVA-Test for the influence of product aesthetics on the crowdsourcing ideas of control and experimental cases in the local group

Scale	**Control Group**			**Experimental Group**			Differences **(P-Value)**
	N	**M**	**S.D**	**N**	**M**	**S.D**	
PA	68	37.19	5.362	57	33.53	6.027	**.001**

**P-Value >.005; PA, product aesthetic; M, mean; S.D, Standard Deviation; N, participants number.*

Furthermore, this next step separately examines the differences of crowdsourcing ideas among the control and treatment users towards product aesthetics characteristics of colour, shape and size (Bloch, 1995; Novak, 1997). The ANOVA procedure indicates significant differences between the control and experimental cases' values in the local group for colour scale (F = 100.163; P=.001), size scale (F=146.64; P=.001) and shape scale (F=49.473; P=.003). Generally, this procedure demonstrates that there are significant differences between groups' values (Cramer and Howitt, 2004). (See table 4.11).

Table 4.11: Results of ANOVA-Test for the influence of product aesthetics characteristics on the crowdsourcing ideas of control and experimental cases in the local group.

Scale	Control Group			Experimental Group			Differences
	N	M	S.D	N	M	S.D	(P-Value)
Colour	68	8.21	1.229	57	5.84	2.147	.004
Shape		6.01	.971		4.65	1.190	.012
Size		6.11	1.587		2.75	1.492	**.001**

**P-Value >.5; PA, product aesthetic; M, mean; S.D, Standard Deviation; N, participants number.*

Therefore, there are statistically significant differences in the crowdsourcing ideas between control and experimental cases in the local group towards new product design generally (Cramer and Howitt, 2004). In the same context, the ANOVA procedure indicates significant differences between the control and experimental cases' values in the international group for product aesthetics scale (F=15.698; P=.003). Largely, this procedure demonstrates that there are significant differences between control and treatment cases' values in the international group in terms of product aesthetics (see Table 4.12).

Table 4.12: Results of ANOVA-Test for the influence of product aesthetics on the crowdsourcing ideas of control and experimental cases in the international group.

Scale	Control Group			Experimental Group			Differences
	N	M	S.D	N	M	S.D	(P-Value)
PA	53	26.77	5.92	43	22.26	5.067	**.003**

**P-Value >.005; PA, product aesthetic; M, mean; S.D, Standard Deviation; N, participants number.*

Furthermore, this next step separately examines the product aesthetics characteristics of colour, shape and size (Bloch, 1995; Novak, 1997). The ANOVA procedure indicates

significant differences between the control and experimental cases' values in the international group for colour scale (F = 68.575; P=.004), size scale (F=85.476; P=.001) and shape scale (F=14. 041; P=.047). Generally, this procedure demonstrates that there are significant differences between groups' values (Cramer and Howitt, 2004) (see Table 4.13).

Table 4.13: Results of ANOVA-Test for the influence of product aesthetics characteristics on the crowdsourcing ideas of control and experimental cases in international group

Scale	**Control Group**			**Experimental Group**			Differences **(P-Value)**
	N	**M**	**S.D**	**N**	**M**	**S.D**	
Colour	53	3.08	1.284	43	2.36	1.071	.007
Shape		2.80	.692		3.22	1.114	.047
Size		3.00	1 .265		5.56	1.312	**.001**

**P-Value >.5; PA, product aesthetic; M, mean; S.D, Standard Deviation; N, participants number.*

Furthermore, there are statistically significant differences in the crowdsourcing ideas between control and experimental cases in the international group towards new product design generally (Cramer and Howitt, 2004).

Additional analysis: G*Power is a statistical tool used to measure the effect size between groups. Many researchers define that an effect size (qs) of 0.1 is small, an effect size of 0.3 is medium and an effect of 0.5 is large (Cohen, 1988; McGrath and Meyer, 2006; Morris and Fritz, 2011). This research reported that (i) the effect size between experimental and control groups in terms of the product shape is .93; (ii) the effect size between the two groups in terms of the product colour is .64, and (iii) the effect size between groups in terms of product size is a large .86. That means there are big differences between groups' preferences.

Furthermore, the power B is the probability of discovering an effect; this indicates that the effect is really on (.08) or 08%, and this helps to define if there is enough power to discover the difference in a particular sample size (Vacha-Haase and Thompson, 2004; Maxwell,

Kelley and Rausch, 2008;). Also, the power B is exists in 08%, that means have sufficient sample size to determine the differences between the groups. Here, the estimated sample size is less than 50 which is sufficient to determine the differences between the groups in this research. In general, the estimated effect size difference between groups in terms of product aesthetics is .39, this means is more than being a medium effect size (McGrath and Meyer, 2006; Richler, Fritz and Morris, 2012) (see Figure 17).

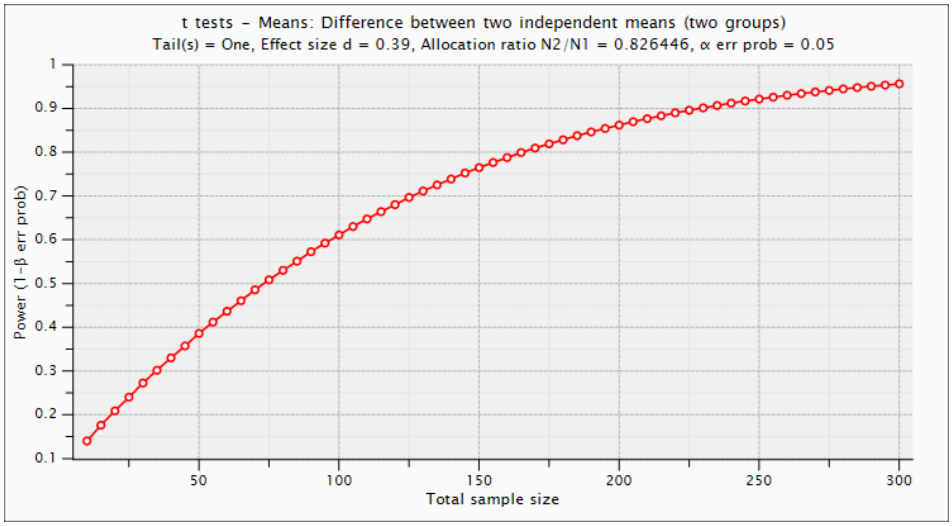


Figure 17: G*Power Result of the effect size difference between control and treatment groups towards the product aesthetics

In summary, the first empirical goal indicates that there are statistically significant differences between the crowdsourcing ideas of treatment and control cases generally, and between both cases in the local and international groups. The users' ideas have been examined through product aesthetics characteristics. That means that if there is any direct change in product aesthetics characteristics there is a change in product-related beliefs in the users' ideas, regardless of whether the change is in one characteristic or in all characteristics of the product aesthetic. From this perspective, one can observe that the differences in product aesthetics could influence the users' ideas, and this corresponds with H1 (Product aesthetics positively affects crowdsourcing ideas of treatment and control UGC in New Product Development). This is could be because some researchers connected cognitive consumer reaction to product aesthetics based on several external stimuli and design features that influence several positive (but also negative) reactions of the consumer (Ellis 1950; Berlyne 1970; McManus 1980; Malkewitz and Orth, 2008a; Kahn and Sevilla, 2014). H1a, H1b and H1c are also supported.

CHAPTER 5: EMPIRICAL STEP 2

The second experimental step have two purposes, the first purpose is to examine the crowdsourcing ideas of local UGC compared to the crowdsourcing ideas of international UGC, in terms of product-related beliefs in the users' ideas. This is assessed through their preferences and judgments towards product aesthetics features. The second purpose is to interpret the differences between the product-related beliefs in the international users' ideas and product-related beliefs in the local users' ideas in the light of culture. Razzaghi and Ramirez (2008) found clear subconscious cultural manifestations as the result of the inherent cultural values and preferences of the users in new product development, particularly in the early stage of idea generation. The product-related beliefs in the users' ideas are examined through the product aesthetics characteristics, the attitudes scale and the culture scale to investigate the differences between the crowdsourcing ideas of international and local UGC. To achieve those goals, the following hypotheses are tested.

Hypothesis H1: *There are differences between the local and international crowdsourcing ideas of users' UGC in New Product Development*. However, only few studies investigate the differences between consumers' backgrounds in terms of product aesthetics. Aykin (2005) and Onibere et al. (2001) established that developing a new product, in terms of the aesthetic features, varies across cultures, due to the differences in attitudes, norms, performance and beliefs among the users. Therefore, local and international users' ideas in the control and experimental cases were examined to find the differences between the local and international groups in both cases through product aesthetics.

Hypothesis H2: *Product aesthetics has a positive relationship with culture*. However, there is a paucity of in-depth research in the marketing area to help companies establish how to integrate culture with product design (Aykin, 2005; Hugo, 2002; Kotro and Pantzar, 2002; Onibere et al., 2001). However, Cooper and Press (2003) mentioned that culture gives a meaning to the products, which is reflected in their shape and task. Schoormans and Creusen (2005) also indicated that the different product design characteristics, such as colour, shape, taste and size, could be explained differently across cultures. Thus, an examination of product aesthetics characteristics overall and separately also would have a different effect on the crowdsourcing ideas of the local group compared with the crowdsourcing ideas of the

international group towards NPD, by reflecting their culture in their preferences and judgments.

Hypothesis H3: *Culture has a positive effect on the crowdsourcing ideas of users' UGC.* Kwon and Suh (2000) indicated that customers from different cultures have different values, attitudes, and preferences; and are still reluctant to purchase foreign products, despite globalisation. Therefore, differences of national culture could influence customer behaviour in e-commerce cases. Thus, users' attitudes towards product aesthetics are examined in this thesis to determine whether culture has a positive effect on the crowdsourcing ideas of users' UGC, because of the users' attitudes that represents the beliefs and attitudes in their ideas.

Hypothesis H4: *The culture (IND-COL) mediates the impact of product aesthetics on the crowdsourcing ideas of international users' UGC, as well as the crowdsourcing ideas of local users' UGC in New Product Development*. Triandis et al (1995) stated that IND-COL are "cultural syndromes" meaning they reflect shared attitudes, beliefs, categorisations, roles and values organised around a central theme. Therefore, Individualism-Collectivism (IND-COL) is examined as a mediator to interpret the differences between product-related beliefs in the online crowdsourcing ideas of local and international UGC in terms of product aesthetics features. Thus, product aesthetics characteristics could have a different and positive effect on the crowdsourcing ideas of the local group compared with the crowdsourcing ideas of the international group towards NPD. In addition, the research examines the attitudes scale that could determine whether culture have a positive effect, and differs between the crowdsourcing ideas of local and international UGC.

5.1 Method

Participants and Design

In total, 221participants were recruited from universities' databases in Saudi Arabia via open call (mail survey). Participants were stratified randomly assigned between local and international into one of the following groups: (1) an experimental group who received a questionnaire about table lamp with a green colour, small-size with its simple and creative product, and (2) a control group who received a questionnaire about a table lamp with a blue colour and large-size also with its complex and prototypical product. According to Jones, Cottrell and McManus (1981), people prefer to choose colours as follows: blue, green or red,

and yellow. Dahl et al. (2013) indicated that the simple shape may be more friendly but less attractive. Dubois et al. (2012) have also shown that customers tend to express their social status during consideration of the size of products purchased.

The Experiment Procedure

Everyone read a brief description of the product (table lamp). The descriptions were identical in both conditions, except that each one included a different description of the product's aesthetics features (stimuli) in terms of size, shape and colour.

In the intervention group the table lamp was described in terms of size as The small lamp gives a soft light and creates a warm atmosphere, in terms of colour as 'A tube of steel, with a plated base with a green colour textile shade tha*t provides a diffused and decorative light*, and in terms of shape as *The shiny aluminium-plated base with glass prism shade that provides a diffused and decorative ligh*t.

In the control group, the table lamp was described in terms of size as *The big lamp gives a soft mood light, cosy atmosphere in your room*; in terms of colour as *A tube of steel with a plated base with a blue colour textile shade that provides a diffused and decorative light;* and in terms of shape as *The shiny steel base, brush finish, nickel-plated with 100% polyester shade that provides a decorative light*.

This gives rise to the researcher's role that was to manipulate the independent or explanatory variable and then observe whether the hypothesised dependent variable was affected by the intervention. The stimuli in this experiment were the size, shape and colour of the product (which comprised the independent variable). The observation of how it affected the subjects who were being investigated – here the users' views – was the dependent variable. The researcher identified the product-related beliefs in the crowdsourcing ideas of the local compared product-related beliefs in the crowdsourcing ideas of the international groups then interpreted the differences between the local and international groups in the light of cultural differences.

The Dependent Measures

All participants answered 21 questions about the aesthetics features of the table lamp, five demographic-related questions, three questions about the users' attitude and 14 questions about culture in terms of Individualism and Collectivism communities that were presented in

the experimental questionnaire. Where divided the questionnaire into two sections, the first section contained five demographic-related questions (i.e. Gender, ethnicity, nationality, have you previously lived outside Saudi Arabia, and if so, for how long and where? 'For Saudi users', and How long have you been in Saudi Arabia? 'For Non-Saudi users') and the second section contained four parts. The third section investigated culture in terms of Individualism and Collectivism towards NPD.

In the first part, the questions were formulated as follows: You can see the photo of a table lamp. When you look at this photo please concentrate on the product design in terms of size. After looking at the size of the table lamp, take a few minutes to think about the development of the table lamp size based on your views, and it contained five statements *(PZ1: This size would look good and fit with the rest of the things in my home, PZ2: This product size is good to look at, PZ3: This product size is prestige, PZ4: I would recommend this size to my family or friends, PZ5: This size is stylish and This size is a practical).* These items were measured via the seven-point Likert-type scale (i.e.1 = Strongly Disagree, 7 = Strongly Agree).

In the second part, the questions were formulated as follows: You can see the photo of a table lamp. When you look at this photo please concentrate on the product design in terms of shape. After looking at the shape of the table lamp, take a few minutes to think about the development of the table lamp shape based on your views, and it contained ten statements *(PS1: I prefer the symmetric product, i.e. aesthetic harmony between colour, shape or size, PS2: I prefer the unsymmetric product, i.e. aesthetic disharmony between colour, shape or size, PS3: I prefer the prototypicality product, i.e. standard design, PS4: I prefer the complex product, PS5: I prefer the simple product, PS6: I prefer the novelty product, i.e. Innovative designs, PS7: I prefer the product of the rectangular shape, PS8: I prefer the product of the square shape, PS9: I prefer the complete product, PS10: I prefer the incomplete product).* These items were measured via the seven-point Likert-type scale (i.e.1 = Strongly Disagree, 7 = Strongly Agree) because the closed-ended questions reflected the accurate levels of the participant's attitudes, beliefs, and opinions (Biemer et al., 2004).

In addition, the questions were formulated as follows in the third part: You can see the photo of a table lamp. When you look at this photo please concentrate on the product design in terms of colour. After looking at the colour of the table lamp, take a few minutes to think about the development of the table lamp colour based on your views, and it contained ten statements *(PC1: I like to develop the product with the colour degree like Green-yellow,*

PC2: I like to develop the product with the colour degree like purplish-blue, PC3: I like the product with high levels of brightness, PC4: I like the product with low levels of brightness, PC5: I like to develop the product with high pigment of saturation, PC6: I like to develop the product with low pigment of saturation). These items were measured via the nine-point scale (4- =Dislike a lot to 4=like a lot).

In the last part, the questions about the users' attitudes were formulated as follows: (UP1- I like this design, UP2- I have positive feelings towards this design and UP3- I have favourable feelings towards this design (Muehling, 1986; Faircloth and Capella, 2001). The attitude to product design was measured via the seven-point Likert-type scale (i.e.1 = Strongly Disagree, 7 = Strongly Agree). This part would represent the degree of their beliefs and attitudes towards product design among local and international users' ideas.

The third section presented 14 questions about the culture in terms of Individualism and Collectivism communities (IC1: I feel good to share my knowledge of product development with one or more people in my social network. IC2: In my society, I get support from my surroundings for my product design activities. IC3: My personal identity is important to me when I develop the product. IC4: I rely on myself most of the time; I rarely rely on others. IC5: I prefer to develop the product with different communities. IC6: Independently, I can develop any product based on my beliefs. IC7: It is important to me that I respect the decisions made by my groups. IC8: I'd rather depend on myself than others. IC9: I often do "my own thing"). IC10: When another person does better than I do, I get tense and aroused. IC11: If a co-worker gets a prize, I would feel proud. IC12: To me, pleasure is working with others. IC13: Family members should stick together to develop the product. IC14: The well-being of my co-workers is important to me (Triandis and Gelfland, 1998). These items were measured with via a six-point Likert-type scale (i.e. 1= Strongly Disagree, 6 = Strongly Agree) because the closed-ended questions reflected the accurate levels of the participant's attitudes, beliefs, and opinions (Biemer et al., 2004). This enabled the researcher to compare the product-related beliefs in the users' ideas in terms of their preferences and judgments between the local and international groups and interpret the differences between the local and international groups based on their cultural background toward NPD.

5.2 The Results

5.2.1 ANOVA procedure between the local and international groups in the control and experimental cases

This step has two procedures. First, the ANOVA procedure indicates significant differences between the local (68) and international (53) groups' values in the control case for product aesthetics characteristics scales (F=631.019, p=.006). In general, this procedure demonstrates that there are significant differences between groups' values in the control case in terms of product aesthetics characteristics (see Table 5.1).

Table 5.1: Results of ANOVA test for product aesthetics differences between international and local users' crowdsourcing ideas in the control case

Scale	Local Group			International Group			Differences
	N	**M**	**S.D**	**N**	**M**	**S.D**	**(P-Value)**
PA	68	5.60	.350	53	3.84	.420	**.006**

**P-Value >.5; PA, product aesthetic; M, mean; S.D, Standard Deviation; N, participants number.*

Second, to extend this step, the researcher also examined the crowdsourcing ideas of groups towards product aesthetics characteristics separately in terms of colour, shape and size based on the Psychophysical Properties (Bloch, 1995; Novak, 1997). The ANOVA procedure indicates significant differences between the local and international groups' values in the control case for colour scale (F = 498.007, p=.037), size scale (F=157.611, p=.028) and shape scale (F=329.412, p=.014). In general, this procedure shows that there are significant difference between groups' values in the control case (Cramer and Howitt, 2004) (see Table 5.2).

Table 5.2: Results of ANOVA test for product aesthetics characteristics differences between international and local users' crowdsourcing ideas in the control case.

Scale	Local Group			International Group			Differences
	N	**M**	**S.D**	**N**	**M**	**S.D**	**(P-Value)**
Colour	68	8.21	1.229	53	3.08	.420	.037
Shape		6.01	.971		2.80	.962	**.014**
Size		6.11	1.587		3.00	.965	.028

**P-Value >.5; PA, product aesthetic; M, mean; S.D, Standard Deviation; N, participants number.*

Therefore, there are statistically significant differences in the crowdsourcing ideas between local and international groups in the control cases towards new product design generally. In the same context, the second ANOVA procedure indicates significant differences between the local and international groups' values in the experimental cases for product aesthetics scale (F=57.650; P=.004). Largely, this procedure demonstrates that there are significant differences between local and international groups' values in the treatment cases in terms of product aesthetics characteristics (see Table 5.3).

Table 5.3: Results of ANOVA test for product aesthetics differences between international and local users' crowdsourcing ideas in the experimental case

Scale	Local Group			International Group			Differences
	N	**M**	**S.D**	**N**	**M**	**S.D**	**(P-Value)**
PA	57	6.25	1.932	43	4.77	1.118	**.006**

**P-Value >.5; PA, product aesthetic; M, mean; S.D, Standard Deviation; N, participants number.*

Further, to extend this step, the researcher also examined the product aesthetics characteristics separately in terms of colour, shape and size based on the Psychophysical Properties (Bloch, 1995; Novak, 1997). The second ANOVA procedure indicates significant differences between the local and international groups' values in the experimental case for colour scale (F = 179.978, p=.001), size scale (F=107.326, p=.013) and shape scale (F=37.365, p=.022). In general, the results demonstrate that there are significant difference between groups' values in the experimental case (Cramer and Howitt, 2004). (see Table 5.4).

Table 5.4: Results of ANOVA test for product aesthetics characteristics differences between international and local users' crowdsourcing ideas in the experimental case

Scale	Local Group			International Group			Differences **(P-Value)**
	N	**M**	**S.D**	**N**	**M**	**S.D**	
Colour	68	5.89	1.419	53	2.36	1.071	**.001**
Shape		4.65	1.119		3.22	1.114	.022
Size		2.75	1.492		5.56	1.112	.013

**P-Value >.5; PA, product aesthetic; M, mean; S.D, Standard Deviation; N, participants number.*

Further, there are statistically significant differences in the crowdsourcing ideas between local and international groups in the experimental cases towards new product design generally. Thus, the results showed that there are statistically significant differences between product-related beliefs in the local users' ideas compared with product-related beliefs in the international users' ideas in both control and treatment cases of less than .05 (Cramer and Howitt, 2004). This indicates that there are significant differences between international and local groups' ideas and this supports H2. There are differences between the local and international crowdsourcing ideas of users' UGC in New Product Development. Kwon and Suh (2000) indicated that users from various cultures have a variety of values, preferences and attitudes. Despite globalisation, many are still reluctant to buy foreign products.

The first step showed the differences between local and international groups in both cases in terms of product aesthetics. Subsequently, the second step is more in depth, and more narrowly examines the differences in the crowdsourcing ideas of the international group as well as the crowdsourcing ideas of the local group generally in NPD.

The ANOVA procedure between local and international groups

This step includes two procedures. Firstly, the ANOVA procedure indicates significant differences between the local and international groups' values for product aesthetics scales (F=100.452, p=.016). In general, this procedure demonstrates that there are significant differences between groups' values in terms of product aesthetics characteristics (see Table 5.5).

Table 5.5: Results of ANOVA test for product aesthetics differences between international and local users' crowdsourcing ideas

Scale	Local Group			International Group			Differences
	N	**M**	**S.D**	**N**	**M**	**S.D**	**(P-Value)**
PA	125	4.91	.783	96	3.98	.517	**.016**

**P-Value >.5; PA, product aesthetic; M, mean; S.D, Standard Deviation; N, participants number.*

Secondly, to extend this step, the researcher also examined the crowdsourcing ideas of the users to product aesthetics characteristics separately in terms of colour, shape and size based on the Psychophysical Properties (Bloch, 1995; Novak, 1997). The second ANOVA procedure indicates significant differences between the local and international groups' values for colour scale (F = 424.207, p=.022), size scale (F=2.447, p=.119) and shape scale (F=225.963, p=.007). In general, this procedure demonstrates that there are significant differences between groups' values (Cramer and Howitt, 2004) (see Table 5.6).

Table 5.6: Results of ANOVA test for product aesthetics characteristics differences between international and local users' crowdsourcing ideas

Scale	Local Group			International Group			Differences
	N	**M**	**S.D**	**N**	**M**	**S.D**	**(P-Value)**
Colour	125	7.13	1.769	96	2.76	1.240	.022
Shape		5.39	2.278		2.99	1.049	**.007**
Size		4.58	2.278		4.15	1.641	.119

**P-Value >.5; PA, product aesthetic; M, mean; S.D, Standard Deviation; N, participants number.*

Further, there are statistically significant differences of less than .05 between product-related beliefs in the local users' ideas compared with product-related beliefs in the international users' ideas (Cramer and Howitt, 2004). The results show that there was a variation between local and international users' ideas in terms of developing product aesthetics as follows: 73% of the local users would like to develop the product based on the degree of colour hue like green-yellow with high pigment colour and light colour. While 61% of the international users would like to develop the product based on the hue of colour, purplish-blue, with low pigment colour and dark colour. In addition, 80% of local users prefer to develop the product based on the symmetry, i.e. aesthetic harmony, complexity, innovative and rectangular shape. On the contrary, 65% of international users prefer to develop the product based on the asymmetry, simplicity, prototypicality and square shape. However, 87% of the local users prefer to develop the product based on the large size, and 72% of the international users prefer to develop the product based on the small size. It is worth mentioning that both groups preferred the product with completed shape.

In the same vein, the researcher observed that the preferences of the local group and the international group were different. This means that the differences in design of products can affect the users' product-related beliefs; thus, this is an interpretation of how the users think about the product and how they build their judgements and preferences based on their background (Hirschman and Solomon, 1984).

The third ANOVA procedure indicates that there is a significant difference between the local and international groups' values for attitudes scales (F=504.780, p=.001). This means that there is an argument that the culture could affect the crowdsourcing ideas of local and international users' UGC. In general, this procedure demonstrates that there are differences between groups' values in terms of product-related beliefs in the users' ideas (see Table 5.7).

Table 5.7: Results of ANOVA test for differences between international and local users' crowdsourcing ideas in terms of the preferences

Scale	Local Group			International Group			Differences
	N	**M**	**S.D**	**N**	**M**	**S.D**	**(P-Value)**
UA	125	5.54	.709	96	2.98	2.98	**.016**

**P-Value >.5; PA, product aesthetic; M, mean; S.D, Standard Deviation; N, participants number; UA, users' attitudes.*

Based on the above results, the studies indicate that the users' reactions could be subject to their social, cultural and innate characteristics (Lewalski, 1988; Crozier, 1994; Bloch, 1995; Moultrie et al., 2004; Schoormans and Creusen, 2005). Therefore, the results indicate that there are differences among local and international product-related beliefs in the users' ideas towards product aesthetics, which reflects the role of culture and its intervention on their preferences and adjustments. The next step shows that SEM was employed not to only define the relationship between product aesthetics, users' ideas, and culture, but to test the affect between those variables and hypotheses.

5.2.2 Structural equation modelling (SEM)

The structural equation model (SEM) is one of the most widely used technique for analysing multivariate data in the behavioural and social sciences. In this study, SEM was used to test the construct validity of the research model, and it is the most suitable method to study relationships between dependent and independent variables. Also test the influences in the

hypotheses effectively (Mcquitty, 2004; Byrne, 2016). These characteristics are important because the main goal of this research is not to only examine the relationship between product aesthetics, users' ideas, and culture, but also to test the affect between those variables.

In addition, this technique is based on the use of latent variables, arising from psychological and social sciences where the research is trying to measure intangible concepts such as ideas and trust. While the multiple regression analysis uses only observed measures and does not admit variable error (Gefen et al., 2000; Jeon, 2015 and Byrne, 2010). However, Hair et al. (2006) and Karimi et al. (2014)) mentioned that the SEM approach is suitable in the following two steps: 1) The assessment of the measurement model. In addition, it is appropriate to adopt this step which is the assessment of the measurement invariance to test the differences between groups (Gordon et al., 2009); and 2) The assessment of the structural model.

5.2.2.1 The assessment of the measurement model

The first step in this section was confirmatory factor analysis (CFA). Prior to data analysis, the Kaiser-M eyer-Olkin (KMO) test of sampling adequacy and the Bartlett test of sphericity were used to determine the appropriateness of factor analysis (Kaiser, 1974). The KMO level of .820 and the significance of the Bartlett test indicated that factor analysis is valid (Kaiser, 1974).

(A) Confirmatory Factor Analysis Results

The purpose of CFA is analyses the factor structure of the data, and also tests the data to confirm the existing theory (Williams et al., 2010). And determine the dimensions of a set of variables and to find the type of the factor loadings. It is also used to investigate whether the established dimensions and factor-loading type fits with the new sample. As well checking whether the data supports the component scales of the different measuring tools, and this was through the principal components analysis. Thus, CFA is an appropriate method to test the goodness-of-fit indices, and the validity and reliability of the suggested measurement model. The variables in the research model are product aesthetics, culture, and users' ideas.

The measurement model includes 38 items describing three latent constructs which are

product aesthetics, users' ideas and culture. In addition, 21 items for the product aesthetics variable were built on the basis of the psychophysical characteristics such as colour, shape and size (; Ellis, 1993; Bloch, 1995; Hutchinson and Veryzer, 1998; Schoormanns and Creusen, 2005; Leder et al., 2008; Sevilla and Kahn, 2014). In addition, there were three items for the users' ideas variable constructed (; Muehling, 1986; Faircloth and Capella, 2001) and 14 items for the culture variable (Triandis and Gelfand, 1998).

The low factor loading was deleted from all dimensions (>. 40). In the product aesthetics dimension, eight items were removed and the factor analysis was re-run with 14 items that had a high loading (>. 40). As for the dimension of users' ideas, all the factors had a high loading (>. 40). However, the cultural dimension was not tested due to a technical problem in the AMOS program, so a binary variable was used instead of it. Therefore, the users were divided based on nationality, and then classified into the collectivism and individualism dimension. The results of the test of CFA of this measure shows that goodness-of-fit indicators were extremely fit with the suggested model (chi-square is 76.128; NFI .933; CFI= .975; CMIN/DF= 1.554; TLI = .966; GFI= 949; RMSEA =.057 and Pclose= .472) (see Table 5.8). Based on the results obtained, the hypothesised paradigm of two constructs is an appropriate measurement model for this research.

Latent construct	Item	Factor Loading
Product Aesthetics	*(Colour)*	
	Green-yellow degree	.77
	High pigment of saturation	.41
	High brightness	.52
	(Shape)	
	Complex	.49
	Simplex	.55
	Innovative	.76
	Prototypicality	.44
	Asymmetric	.81
	Symmetric	.72
	Completed	.71
	Uncompleted	.40
	(Size)	
	Prestige	.56
	Recommended size	.42
	Fit size	.65
Users' ideas	Favourable feelings	.85
	Positive feelings	.90
	The like this design	.84
Fit Indices		X2= 76.128 (d.f. = 79, p<. 05) NFI .933, CFI .975

Table 5.8: Confirmatory Factor Analysis Results

(B) Test the dimensions of product aesthetics, users' ideas and culture validity and reliability:

* *Test through CFA*

The construct validity is tests that a model employed to measure a given construct is in fact measuring that construct. Discriminant and convergent validities are both considered sub-

types for the construct validity. It is important to realise that both are required to work together to establishing construct validity (Henseler et al., 2015). The convergent validity is employed to test that the constructs that are expected to be related are actually related (William et al., 2001). Convergent validity of the constructs can be assessed through the measurement model. Fornell and Larcker (1981) indicated that the convergent validity of the measurement model is evaluated based on three standards: these are 1) The factor loadings; 2) The average variance extracted (AVE); and 3)-The construct reliability (CR). Moreover, the findings showed that all factors' loadings are more than 0.40. Regarding all the constructs have a composite reliability (CR) value are above than the recommended level of 0.70, where ranging from 0.723 to 0.900. In addition, Table 5.9 demonstrates that the AVE (Average Variance Extracted) estimate of constructs is more than the recommended level of 0.50.

**The reliability test*

Cronbach's alpha was used to assess he reliability of each dimension of product aesthetics, users' ideas and culture. Table 5.9 demonstrates that all of Cronbach's alpha values of these variables were more than 0.700, and the result indicates that the measured items are reliable (Nunnally, 1967; Karimi et al., 2014).

Construct	No. of Items Before	Items Deletion	No. of Items	Cronbach's Alpha	AVE	Sample Items
Culture	14	5	9	.801	-	In my society, I get support from my surrounding for my product design activities.
Users' ideas	3	-	3	.900	0.749	I have favourable feelings towards this design.
Product aesthetics	21	7	14	.753	0.582	I prefer the novelty product, i.e. innovative designs.

Table 5.9: Validity and reliability of the construct

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**The discriminant validity*

Discriminant validity identifies whether the constructs in the model are correlated or not (Henseler et al., 2015). The discriminant validity was evaluated by comparing the square root of the AVE for the particular construct with the correlations between that construct and the other constructs. Therefore, the square roots of the AVE for the given construct, and the square root of AVE value should be higher than the correlation value. With respect to Table 5.10, all exceed the correlation shared among the construct and the other constructs in the paradigm, referencing sufficient discriminant validity between each construct.

Variable	M	S.D	1	2	3	4	5	6
1. Ethnicity	2.2	.751	1					
2. Gender	1.48	.502	0.107	1				
3.Nationality	1.10	.346	-0.074	-0.175	1			
4. Users' ideas	4.75	1.700	0.12	-.230**	0.36	1	**(0.908)**	
5. Product Aesthetics	4.73	1.61	0.045	-0.082	0.076	.822**	1	**(0.834)**
6. Culture	3.88	1.77	0.673	-.205*	0.052	0.692	0.159	1
***Square root AVE is in bold.**								

Table 5.10: Correlation and discriminant validity

To test the relationships between the control variables and the other product aesthetics, users' ideas and the culture, a correlation procedure was employed. The results of correlation show that ethnicity and nationality have significant correlations with culture, but gender did not have a significant correlation with culture. However, product aesthetics has positive correlations with ethnicity and gender. It is worth stating that nationality has negative correlations with the product aesthetics. In addition, ethnicity and nationality have positive relationships with users' ideas, whereas the gender did not have a significant correlation with users' ideas.

*(*C) Measurement invariance

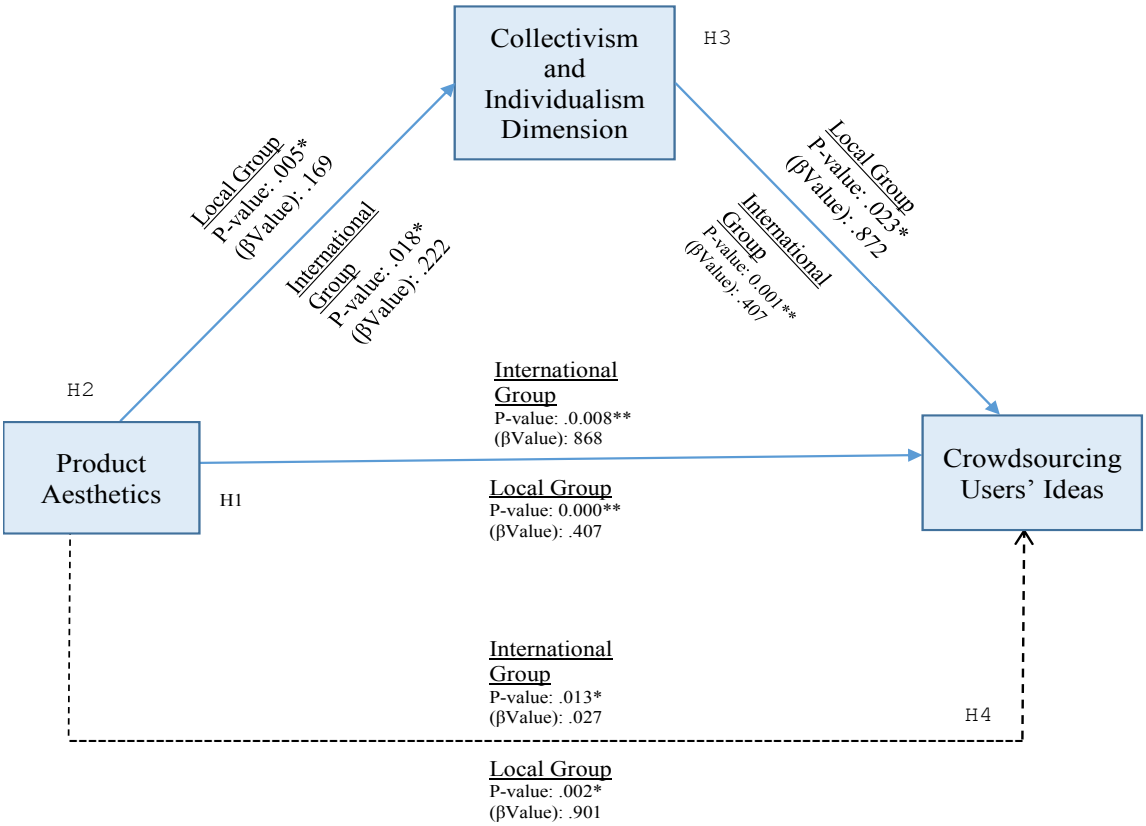
Generally, measurement invariance is used to test multi-group confirmatory factor analysis. This examines the goodness-of-fit index (GFI) of the measurement model between groups.

Several researchers in the social sciences are concerned with the measurement invariance test, which defines whether the items used in the survey tool mean the same thing for different groups (Meredith, 1993; Steenkamp and Baumgartner, 1998; Vandenberg and Lance, 2000). The measurement invariance is very important when comparing groups. If the invariance of measurement cannot be created, this means that the finding of a difference between groups cannot be interpreted critically and clearly. This could be due to different psychological reactions to the items' measurements or to different attitudes, particularly in cross-cultural contexts (Reise et al., 1993; Riordan and Vandenberg, 1994; Janssens et al., 1995; Steenkamp and Baumgartner, 1998).

Little (1997) indicates that there are two types of invariance, which are metric invariance and configural invariance. First, the researcher applied configural invariance to test the model fit for both groups (Milfont and Fischer, 2010). Results display a good fit in which the measurement model between the two groups was .975. Second, metric invariance was used to test the strength of the relationships among basic constructs and items by comparing the goodness of fit between the constrained and unconstrained models, where the goodness-of-fit index was .975 between groups' in the model. In addition, a chi-square difference test between unconstrained and constrained measurement models tended to be non-significant (P-value= .180 > 0.05) which shows no differences between local and international groups in the construct of the measurement models (Cheung and Rensvold, 2009).

5.2.2.2The assessment of the structural model

With the construct reliability and validity measures established in the first step, all the constructs were used as input to shape a structural model representing the hypothesised model drawn in Figure 18. In general, goodness-of-fit statistics display that the structural model is a strong fit for both the local and international groups. However, the results of the goodness-of-fit indices shows that chi-square is 14.460; NFI .986; CFI= .998; CMIN/DF= 1.554; TLI = .988; GFI= 993; RMSEA =.057 and Pclose= .597. Thus, after evaluating the goodness-of- fit indices for the measurement models and structural models, the estimated coefficients of the influences between variables were examined.



The Figure 18: The Proposed Reserch Model

5.3 Testing Hypotheses

Hypotheses 1, 2 and 3 were tested using the structural equation model with an examination of the structural coefficients (P-value and β-value). Table 5.11 demonstrates the structural model results, using multi-group analysis to test the direct effect between local and international groups, and bootstrapping to test **H4** indirect effects between local and international groups. This model appears to have achieved a satisfactory level of construct validity, and it can be observed from this table that coefficients are significant. Generally, the theory represented in the model was supported.

The effect of product aesthetics on users' ideas (H1): It was proposed that product aesthetics would have a positive effect on the crowdsourcing ideas of users' UGC. The

results indicate that Local: β = .868, p-value: 0.000**; International: β = 407, p-value:0.008**. Therefore, there was a significant effect between product aesthetics and users' ideas in the both groups, and **H1** is supported.

The effect of product aesthetics on the culture (H2): It was proposed that product aesthetics have a positive effect on the culture. The results indicate that Local: β = .169, p-value: .005*; International: β = .222, p-value: .018*. Therefore, there was a positive effect between product aesthetics and the culture in the both groups, and **H2** is supported.

The effect of culture on the users' ideas (H3): It was proposed that culture have a positive effect on the crowdsourcing ideas of users' UGC. The results indicates that Local: β = .872, p-value: .023*; International: β = .407, p-value: 0.001**. Therefore, there was a positive affect between culture and the crowdsourcing ideas of users' UGC in both groups, and **H3** is supported.

The effect of product aesthetics on the users' ideas via culture (H4): It was proposed that product aesthetics is a manipulation on the users' ideas, and the culture is a mediator measure. The results indicates that Local: P-value; .002 and B: 901 and International: P-value; .014 and B: .025. Therefore, the culture has a significant effect on the crowdsourcing ideas of international users' UGC through product aesthetics and significant effect on the crowdsourcing ideas of local users' UGC, and **H4** is supported.

Path	Local Group		International Group	
	P-value	Estimate (βValue)	P-value	Estimate (βValue)
H1: Product Aesthetics → Users' Ideas	0.000**	.868	0.008**	.407
H2: Product Aesthetics → Culture	.005*	.169	.018*	.222
H3: Culture → Users' Ideas	.023*	.872	0.001**	.407
H4: Product Aesthetics → Culture → Users' Ideas	.002*	.901	.013*	.027

**p<.05.; **p<.01.*

Table 5.11: Results of the structural equation modelling

Furthermore, the results show that the control variables affect the other variables, where the gender has a significant effect on the culture in the international group (β = .333, p-value: 0.000**). Also nationality has a significant effect on the crowdsourcing ideas of users' UGC in the international group (β = .333, p-value: 0.000**). Ethnicity has a significant effect on the crowdsourcing ideas of users' UGC (β = .125, p-value: .003*).

Mediator Analysis

The literature discusses the bootstrapping indirect effects since the 1990s (for example, Bollen, 1990; MacKinnon and Lockwood, 1997; Karimi et al., 2014). However, this method has only been used recently with increasing (Williams, MacKinnon and Lockwood, 2004). In addition, the studies indicate that bootstrapping is one of the powerful and more valid methods to test the intervention variable effects (MacKinnon et al., 2004; Williams and MacKinnon, 2008). Also one of the bootstrapping benefits is that the inference is based on an evaluation of the indirect impact itself (Hayes, 2009).

Therefore, this research examined the indirect effect of product aesthetics on the users' ideas through culture. It was hypothesised (H4) that individualism /collectivism mediates the impact of product aesthetics on the crowdsourcing ideas of international users' UGC, as well as the crowdsourcing ideas of local users' UGC in New Product Development. Suppose that product aesthetics is an experimental manipulation of the users' ideas, and culture is a mediator measure. Using 200 bootstrap samples, bootstrapping analysis shows that Local: P-value; .002 and B: 901 and International: P-value; .014 and B: .025. Interestingly, the analysis showed that culture has significant effect on the crowdsourcing ideas of international users' UGC through product aesthetics and a significant effect on the crowdsourcing ideas of local users' UGC with a 95% confidence interval in both groups (see Table 5.11).

Additional analysis: G*Power is a statistical tool used to measure the effect size between groups. Many researchers define effect size (qs) of 0.1 as small, 0.3 as medium and 0.5 as large (Cohen, 1988; McGrath and Meyer, 2006; Morris and Fritz, 2011). In this research, an effect size between local and international groups in terms of the product shape is 0.72. In addition, the effect size between the two groups in terms of the product colour is 0.82. That means there is a big difference between groups' preferences. Meanwhile the effect size

between groups in terms of the product size is 0.21, so this means that the difference between groups is among small and medium effect sizes.

Moreover, the power (B) is the probability of discovering an effect. This indicates that the effect power is really on (.08) or 08%, and this helps to define if there is enough power to discover the difference in a particular sample size (Vacha-Haase and Thompson, 2004; Maxwell et al.,2008). Also, if the power (B) exists in 08%, that means have sufficient sample size to determine the differences between the groups. Here, the estimated sample size is 50; this is sufficient to determine the differences between the groups in this research.

In general, estimated effect size differences between groups in terms of product aesthetics is 1.40. This means an extremely large effect size (Richler et al., 2012). This could be due to the different product design characteristics, such as colour, shape, taste and size and that could be explained across cultures differently (Schoormans and Creusen, 2005) (see Figure 19).

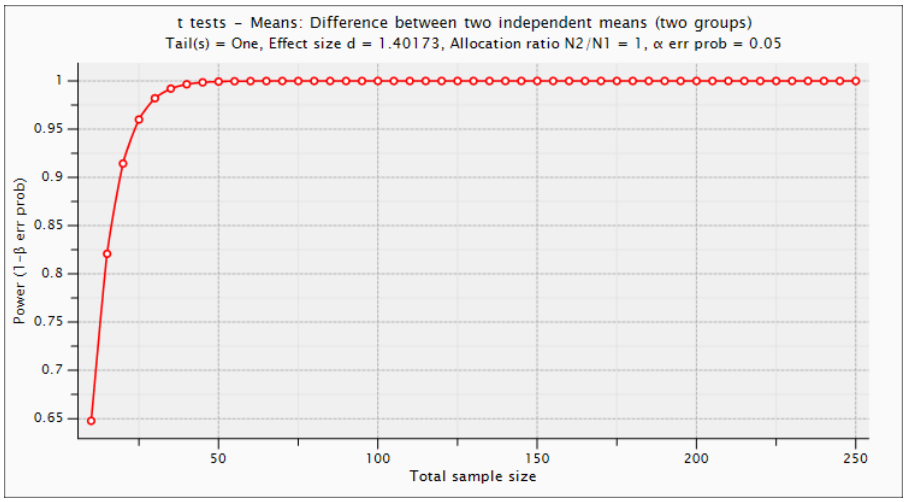


Figure 19: G*Power Result of the effect size difference between local and international group towards the product aesthetics

In summary, the second empirical step indicates that there is a statistically significant difference between product-related beliefs in the local users' ideas compared with product-related beliefs in the international users' ideas towards NPD in the light culture. The researcher examined the users' ideas through product aesthetics characteristics and through

the culture scale and attitudes scale, which reflected their culture in their preferences and judgments. (Gardner and Levy (1955) and Grissom and Kim (2005)) mentioned that the notions of product aesthetics focus on users' psychological or cognitive characteristics, such as attitudes, expectations, feelings, mental constructs, understanding or ideas. Thus, the national culture differences can influence users' behaviour in ecommerce situations. As mentioned above the hypotheses are supported in this research.

5.6: Verification

After testing the construct reliability and validity measures that were established in the SEM in the first and second steps, the researcher also used the ANOVA test for further verification of whether the differences in product aesthetics characteristics could influence product-related beliefs in crowdsourcing ideas of the control and treatment UGCs. Twenty-five (25) Chinese students were recruited from the Southampton University databases via open call (mail survey). Participants were randomly assigned between control and treatment into one of the following groups: (1) an experimental group that received a questionnaire about a table lamp with a green colour, small-sized, and with its simple and creative design, and (2) a control group that received a questionnaire about a table lamp with a blue colour and large-sized, also with its complex and prototypical design.

Generally, this procedure demonstrates that there are significant differences between control and treatment group' values in the product aesthetics characteristics scale (F=8.548; P=.008). In addition, this step examines the differences of crowdsourcing ideas among the control and treatment users towards product aesthetics characteristics separately – these are colour, shape and size (Bloch, 1995; Novak, 1997). This procedure indicates that there are significant differences between the control and experimental users for colour scale (F = 8.226; P=.009), size scale (F=41.482; P=.000) and shape scale (F=.557; P=.363). Largely, this procedure demonstrates that there are statistically significant differences in the crowdsourcing ideas between control and experimental groups towards new product design (see Table 5.12).

Table 5.12: Results of ANOVA test for the influence of product aesthetics characteristics on the crowdsourcing ideas of control and experimental group.

Scale	Control Group			Experimental Group			**Differences** (P-Value)
	N	**M**	**S.D**	**N**	**M**	**S.D**	
PA	12	5.01	.748	13	4.22	.593	**.008**
Colour		5.78	1.871		3.85	1.488	**.009**
Shape		4.46	.658		4.68	.855	**.363**
Size		5.69	.989		3.36	.822	**.000**

**P-Value >.005; PA, product aesthetic; M, mean; S.D, Standard Deviation; N, participants number.*

CHAPTER 6: DISCUSSION

6.1 Introduction

This research investigated the role of cultural differences on the local and international users' idea generation towards new product design. The following sub-research questions were examined to meet the research aim:

1- Can differences in product aesthetics characteristics influence product-related beliefs in crowdsourcing ideas of the control and treatment UGC?

2- What are the differences between product-related beliefs in crowdsourcing ideas of local UGC compared to the crowdsourcing ideas of international UGC?

3- How do cultural differences affect product-related beliefs in crowdsourcing ideas of local UGC and the crowdsourcing ideas of international UGC?

The current paper comprises three objectives which all involve the use of experiment for the purpose of this research. The first step investigated whether differences in product aesthetics characteristic could influence product-related beliefs in the crowdsourcing ideas of control and experimental groups. A total of 221participants (Control users n=121, Treatment users n=100) were recruited from universities' databases in Saudi Arabia. Four hypothesises about whether the differences in product aesthetics characteristics could influence the users' ideas were tested via open call (mail survey). Responses were collected and analysed to offer a general understanding of the effect of change of product aesthetics characteristics on the users' ideas. The results reveal that there are statistically significant differences between the crowdsourcing ideas of treatment and control groups. That means if there is any change in product aesthetics characteristics directly there is a change in product-related beliefs in the users' ideas, regardless of whether the change is in one characteristic or in all characteristics of the product aesthetics.

The second step had two purposes; the first purpose was to examine the crowdsourcing ideas of international users' UGC compared to crowdsourcing ideas of local users' UGC towards product design. The second purpose was to interpret the differences between the international users' ideas and local users' ideas in the light of culture. Thus, the relationship among product aesthetics, culture and users' ideas was investigated. A total of 221participants (Local users n=125, International users n=96) were recruited from universities' databases in Saudi Arabia. Four hypothesises about the differences in the local and international users' ideas were tested

via open call (mail survey). The responses were then collected and analysed to compare, investigate and interpret the ideas of users. The results show that there is a statistically significant difference between product-related beliefs in the local users' ideas compared with product-related beliefs in the international users' ideas towards NPD in the light of the culture. Thus, the national culture differences can influence users' behaviour in ecommerce situations.

This chapter discusses the outcomes of this research. The research questions are addressed to create a comprehensive image of the research problem.

6.2 The influence of product aesthetics characteristics differences on product-related beliefs in the users' ideas of control and treatment groups

This goal demonstrates that there are positive and significant differences between control and treatment users' ideas in terms of product aesthetics. The users' ideas were examined through the product aesthetics characteristics. That means that if there is any change in product aesthetics characteristics directly there is a change in product-related beliefs in the users' ideas, regardless of whether the change is in one characteristic or in all characteristics of the product aesthetics. From this perspective, we can observe that the differences in product aesthetics could influence the users' ideas, and this corresponded with **H1** (Product aesthetics positively affects crowdsourcing ideas of treatment and control UGC in New Product Development). This is could be because some researchers linked cognitive consumer reaction to product aesthetics based on the different external stimuli and design features that influence several positive – and also negative – reactions of the consumer (Ellis 1950; Berlyne 1970; McManus 1980; Malkewitz and Orth, 2008a; Kahn and Sevilla, 2014). also **H1A, H1B** and **H1C** were supported.

As mentioned above, the research used statistical means to describe the product-related beliefs in the users' ideas through different variables that relate to the product aesthetics characteristics such as shape, colour and size. Consistent with **H1a**, the findings show that the product-related beliefs in the users' ideas of the control and experimental groups differed in terms of the colour feature. This is a result of the researcher's manipulation of the product colour that influenced the users' ideas. These findings are in line with Bagchi and Cheema (2013) who stated that colour can influence consumers' perceptions, emotions and

performance; that is, people can distinguish between different colours and develop their preferences accordingly. In addition, Arabi (2017) indicated that the colour stimuli work in synergy with all senses, they symbolise concepts and thoughts, they express imagination, they recall a place, and they produce an emotional response. Also, the results of this research are consistent with those of Gorn and Gerald (2004) who found that the rich colour in the chroma levels could lead to cognitive and affective reactions in the minds of consumers. Also Roulette (2006) mentioned that the colour could affect the consumers' perceptions quickness. Thus, Ellis (1993) documented that colours play a role aesthetically and are important with regard to aesthetic judgements and preferences.

Besides, the results show that most of the control group selected the colour degree green-yellow, while most of the treatment group selected the colour degree purplish-blue. These findings are consistent with Birren's (1945) study that the green-yellow colour is considered more comfortable. Yellow is considered as a joyful colour and the purplish-blue has greater influence in calming the consumers. Also the control group result agree with McManus and Jones (1981) who found that the light colours such as green, white and pink could positively affect the consumers' reactions such as 'satisfied' and 'excited'. Conversely, Güvenz et al.'s study (2002) mentioned that the most of the consumers prefer the blue hues. This study's results are identical to the treatment group results but differ from the control group results. However, the results of this research are not congruent with those of McManus et al. (1981); they found that people prefer colours in the following order: blue, green or red, and yellow. Moreover, these differences in the users' ideas could be because the users preferred the colours that had a positive relationship with the things or objects (Deng et al., 2010), or because the colours have an impact on the users' personality. Another reason could be that the consumers show preferences for particular colours relating to the season, or the month (Birren, 1940).

On the other hand, consistent with **H1B**, the findings show that the product-related beliefs in the users' ideas of the control and experimental groups differed in terms of shape feature. This is as a result of the researcher's manipulation in the product shape that influenced the users' ideas. These results are in line with the study of Bitner (1992) who illustrates that product forms may have an impact on users' beliefs about the product. Also Garg and Kumar (2010) assert that the product form influences the consumers' decision-making processes. In addition, the results of this research are consistent with the study of Bloch (1995) who stated

that the product shape could create beliefs related to product design features. Subsequently, according to Cox and Cox (2002), the product shape creates psychological responses that include emotional and cognitive contents.

Moreover, the outcomes confirm that the control group prefers the complex product shape while the treatment group prefers the simple shape. Thus, the result of the control group is consistent with Kumar and Noble's (2010) study that illustrates that the product with a complex design is more interesting for the consumers. Also perhaps the most complex designs are more interesting for the consumer (Zimring, 1971). Berlyne (1970) indicated that a complex design tends to be more of a trigger than a simple design. Also Cox and Cox (2002) discovered that the consumers' preferred the complex product design; in contrast, the consumers showed less preference towards the simple design. In addition, the current research is supported by Zimring's (1971) study which stated that the product with simple design is less attractive. On the contrary, this result disagreed with Veryzer and Schoormans' (2010) study that the consumers prefer VCRs with low levels of complex design. It also disagreed with Kumar and Noble (2010) who found that simplicity in the design is the subjective judgment and preference where the consumer feels that there is no confusion in understanding what is being offered to them. However, those studies are consistent with the treatment group results where the respondents prefer the simple product shape. However, it is worth mentioning that this research is considered neutral between control group preferences and treatment where Leder and Hekkert (2008) claim that the product design with low levels of complexity is not attractive, and also the product design with high levels of complexity. This mean that the relationship among complexity and preference of aesthetic could be described over an inverted U-curve.

In the same vein, in terms of the novelty and prototypicality product shape, the results suggest that the control group prefers the prototypicality product as opposed to the treatment group that prefers the novel product shape. The findings of the control group agree with those of Herrmann et al. (2013) and correspond with the results of Hutchinson and Veryzer (1998) that the prototypical design has a significant positive influence on the consumers' reactions but only at the first sight of the product. In addition, this research is consistent with Bar and Neta's (2006) study, where the consumers select meaningful designs that are easy to classify, instead of the novel and meaningless designs. Furthermore, psychology researchers confirm that the consumers significantly prefer the prototypical stimuli; that is, the consumers prefer

the products that have high levels of prototypicality (Rhodes, et al., 1999; Creusen et al., 2006 Winkielman et al., 2006; Leder and Hekkert, 2008). In contrast, these results are inconsistent with the findings of Cox and Cox (2002) that people prefer positively the novel product design after repeating the same design. They are also inconsistent with Kennard's study (1991) that the Japanese novel products have achieved great success in world markets. Thus, those studies are in line with the results of the treatment group. However, this study confirms the results of the treatment group that there could be significant deviations in the results when using novel stimuli. Also Cox and Cox (2002) mentioned that the consumers show increasing aesthetic preference for atypical (novel) product design after repeated exposure. Further, the innovative product could display superior and new solutions to users' needs and may generate fully novel markets (Calantone and Schmidt, 2006).

It is interesting to note that the outcomes of the control and treatment groups agreed with each other in terms of the symmetry – i.e. aesthetic harmony and rectangular' product shape. Therefore, the results of the treatment and control groups are consistent with the findings of Keil and Beale (1995) that consumers prefer the perfect symmetry shape. In addition, the current findings agree with Hutchinson and Veryzer (1998) who found that products designed with high levels of harmony could affect the consumers' reactions more positively than the products designed with low levels of incongruity. According to Solomon, Bell and Holbrook (1991), the consumers' preferences towards some furniture items were influenced by the consistency of styling within these types of furniture. Lauer (1979) also mentioned that the symmetrical aspects of products improve ergonomics and help the user in product's use. Hence, symmetrical products are easier to use and consumers perceive them as more organised. Also the consumers feel comfortable when they look at a form that is pretty and symmetric (Dommett et al., 2005). In contrast, the results of this research disagreed with the study of Byatt et al. (1999) that the asymmetry shape could be acceptable and attractive if the shape is not deformed.

In the same vein, the outcomes of the treatment and control group agree with the study of Eckmann and Wagner (1994), who found that consumers greatly preferred a rectangular form to a square form in the products. However, the results of this research disagreed with Zhang et al. (2006) whose results found that the round shape is generally considered more harmonious. Furthermore, Osgood (1957) and Zhang et al. (2006)) indicated that the rounded forms are perceived as a soft and gentle. Thus, marketing researchers have started to

investigate the influences of symmetry and shape of the product design on the reactions of consumers. To date, though, there is only limited research dealing with the symmetry of products (Crilly et al., 2004). Zhang et al. (2006) showed that the logos from mostly individualistic cultures such as Germany and the United States prefer angular designs whereas collectivistic cultures such as Japan and China prefer rounded designs that would be more harmonious.

In addition, the results show that there is a difference between the control and treatment group in terms of the complete and incomplete product shape element, where the results of the control group are in line with Sevilla and Kahn's (2014) study. They found that the consumers highly preferred the complete shape product to an incomplete shape product. The results are also consistent with those of Beike, Laura, Beaumont and Adams (2007).They found that the design with complete shape may be a great determinant of how the people recognise and select the products. Also extant studies in this field mentioned that the consumers prefer the complete shape product (Drèze and Nunes, 2006; Kivetz et al., 2006). In addition, this study provides additional support for the current outcomes as a product with a complete shape creates greater purchase intentions over a product with an incomplete shape (Krishna et al., 2001). Conversely, the findings of the treatment group are in line with another survey showing that the people are more attractive to incomplete products (Gorn and Sengupta, 2002). Also this study agrees with Beike et al.'s (2007) study which attests that consumers prefer incomplete shaped options over a product with completed shape. Subsequently, it is still unclear what type of product shape is preferred by consumers, and also what the types of product shapes are which trigger the strongest behavioural, cognitive or affective reactions (Bettman et al.,1998; Moreau et al., 2001; Schoormans, Creusen and Veryzer, 2010; Brown et al. 2011; Schloss and Sammartino, 2011).

In the same context, consistent with **H1C**, the third dimension that is product size shows that there is a difference between the product-related beliefs in the users' ideas of the control and experimental groups; this is a result of the manipulation in the product size that influenced the users' ideas. These results are in line with the study of Dubois et al. (2012) which found that the customers like to express their social life via product size. The big and elongated form sizes are seen as more of a luxury product than the short and small products are (Van Rompay et al., 2005). Moreover, this result is consistent with the works of Leder and Hekkert (2008) and Schoormanns and Creusen (2005); they found that consumers show their

preference towards the product size based on the level of social status.

Besides, the control group prefers the big product size while the treatment group prefers the small product size. Hence, the findings of the control group are in line with the study of Raghubir et al. (2001) who found that the consumers realise that products which demand more attention tend to be bigger sized. In contrast, this study is inconsistent with the treatment group results. According to Myaskovsky et al. (1994), consumers depend to a large extent on the number of elements in that stimulus and tend to disregard some of the important elements like size. Thus, no studies support this result sufficiently. However, there is a huge research gap in the marketing area and the fields of psychology and marketing need to study how product size can affect the consumers' behavioural, affective and cognitive reactions and what is the preferred product among them. Therefore, this is a first experimental study conducted to examine the users' cognitive process in terms of the product size. Future researchers should conduct studies about the product size feature.

Generally, this research argues that there are significant differences between the product-related beliefs in the crowdsourcing ideas of control and treatment groups' users. This is a result of the manipulation in the product aesthetics characteristics that influenced the users' ideas. This means that if there is any direct change in product aesthetics characteristics there is a change in product-related beliefs in the users' ideas, regardless of whether the change is in one characteristic or in all characteristics of the product aesthetic. Those findings are in line with those of Crilly et al. (2004); Colin and Moore (1988) and Daniel and Cain (1991) where the design of products can impact on the users' product-related beliefs; this is an interpretation of how the users think of the product and how they build their judgements and preferences. Also thess studies supported the current results. Leder et al. (2004) and Radford (2011) indicated that consumers tend to address and explain external stimuli like product aesthetics. This led academics to refer to this as 'cognitive processing'; that is, how users shape their opinion regarding the product aesthetics and its quality or belonging in a particular category. In this context, the product design is both a basic component of marketing mix and the first point of contact for consumers (Kumar and Garg, 2010).

In the same vein, the aesthetics design element is one of the significance factors that influence consumer perceptions (Van Rompay et al., 2012). Several studies also proposed that product aesthetics evoke cognitive appraisals (Hekkert and Desmet, 2007). Furthermore,

the aesthetical factors could play a key role for product perception, product identification, and use of the product (Veryzer, 1995). The current research results are identical with those of scholars such as Durgee (1988) who argued that the users automatically perceived the products, which means the users perceived each part of the product's design in detail. The findings were also in line with earlier studies on the effects of product aesthetics characteristics on the users' ideas; however, there were some differences. For example, this differs from the concept of psychologists who argue that people do not perceive the individual parts of the product, but they perceive the whole product (Blijlevens, Mugge, Ye and Schoormans, 2013). Also Bloch and Radford (2011) argued that the whole product needs to be designed to be powerful or new, so that users perceive the product as such. This research, however, is inconsistent with Chatterjee's (2004) study which shows that the initial response in the consumers' cognitive response to aesthetics of a product may be considered more universal in nature.

Besides, these differences between product-related beliefs in the users' ideas could be due to the fact that the product aesthetics could positively influence the consumer's quality of life (Crilly et al., 2004) and the quality of the usage experience (Horváth, 2001). Meanwhile environmental factors and technology (Zhang et al., 2012), or the users' reactions were to be subject to their social, cultural and innate characteristics (Lewalski, 1988; Crozier, 1994; Bloch, 1995; Moultrie et al., 2004; Schoormans and Creusen, 2005). It is crucial that more research should be conducted in this area because it would be interesting to know why the users change their preferences towards product aesthetics characteristics.

6.3 The differences between the local and international users' ideas and Interpret the differences between of them in the light of culture

This step demonstrates that there are statistically significant differences between product-related beliefs in the local users' ideas compared with product-related beliefs in the international users' ideas towards product aesthetics. The product-related beliefs in the users' ideas were statistically described through different variables that relate to the product aesthetics characteristics such as shape, colour and size that reflected their cultural backgrounds in their preferences and judgments. However, the researcher observed that these differences in the users' ideas in both groups could be due to the notion that product aesthetics focus on users' psychological or cognitive characteristics, such as attitudes,

expectations, feelings, mental constructs, understanding or ideas. Thus, the national culture differences can influence users' behaviour in ecommerce situations (Gardner and Levy, 1955). Moreover, Creusen and Schoormans (2005) reported that the different product design characteristics can be interpreted across cultures differently. This corresponded with **H1** (There is a difference between the local and international crowdsourcing ideas of users' UGC in New Product Development).

Regarding colour, the local users prefer the product with green-yellow colour. This finding is in line with the study of McManus and Jones (1981) where the light colours such as green, white and pink could positively affect the consumers' reactions such as satisfied and excited. Also Augustin (2009) mentioned that the green colour is associated with strength in the Muslim world. This current research is also consistent with McLachlan's (2012) study that Arabic financial institutions prefer using green. This phenomenon may be explained by the fact that green is associated with strength, belonging and stability in Saudi Arabia (Oriowo and Alotaibi, 2008). In contrast, the results of local users' ideas disagreed with Augustin's (2009) study, which found that blue hues generate more relaxed feelings. At the same time, this study corresponded with the international users' ideas (Australian, British, American and South African) who prefer products of purplish-blue colour. In the same vein, this outcome agreed with Güvenz et al.'s study (2002) which found that most of the consumers prefer the blue hues. In addition, Moore et al. (2005) indicated that the most Western financial institutions use dark blue colour for advertising, logos and other branding attributes with brands such as Barclays and Royal Bank of Scotland being prime examples. Furthermore, the current results are consistent with Aslam's (2006) findings that the blue means that high quality, trustworthiness and dependability in the USA, Japan, Korea, Australia, the UK and China. This phenomenon may be also explained by the fact that the blue is associated with authority and stability in the West (McLachlan (2012).

Furthermore, this research confirms the results of the differences between local users' ideas compared to the international users' ideas with those of the studies of Augustin (2009) and Moore et al. (2005). They found that the different colour schemes in advertising are not equally attractive for customers in Europe and in the Middle East. Therefore, the colour that attracts an individual from Europe does not necessarily attract an individual from the Middle East due to the cultural differences between them on the one hand and due to how each perceives the same colour on the other hand. McLachlan (2012) examined the colour

preferences in product promotion. Consequently, he outlined some differences between the Western and Eastern cultures in choosing colours for different products; for instance, advertising financial services. McLachlan's (2012) study differs from the current paper because one of the most critical limitations of his research was that the scholar did not use any structured methodology to obtain these findings. Furthermore, Aslam (2006) stressed that different cultures have different aesthetic expressions since colours symbolise different meanings and aesthetic applications in different cultures.

The outcome of the local users who prefer the product with complex and innovative shape agrees with Kanuk and Schiffman (2007) who mentioned that the ability of the consumers to select an innovative design is driven by their perceptual, attitudinal, individual and personal characteristics. Adiele and Amue (2012) and Roger (2003) asserted that the novel products attract consumer innovators and other members of the social group to select the innovative design. Also Dawkins (2006) stated that most of the products depend on simple forms such as triangles; however, all cultures tend to like the characteristics of complex products. Furthermore, Berlyne (1970) and Lawrence and Berlyne (1964) demonstrated that the most preferred aesthetic preference are the complex and novel designs. Although all cultures prefer the complex design, however, the international users in this study did not agree with this. Thus, the results of international users are consistent with Shane, Montgomery and Clarke's (2015) study , which found that consumers prefer the prototypical products design to novel products design, because the prototype is more than just shape because also carry semantic content that report the conception of the design character. According to Dirk, Smeesters and Trampe (2011), there is a clear effect on the willingness to purchase the simple design than a complex design. This outcome is also in line with the study of Creusen et al. (2010) who found a positive relationship between prototypes design and preference because the consumer likes easy-to-classify products.

This phenomenon may be explained by the fact that the users' selections are subject to their cultural backgrounds – therefore to their personal, individual, perceptual and attitudinal characteristics. The social practices and cultural norms also generate and enhance meaningful frames which define ways related to the product design, and these frames could impact on the consumers' use of a certain product (Cooper and Press, 2003). Furthermore, a person's preference for an environment is closely linked to their preferred level of arousal, where some people particularly prefer quiet settings while others seek to increase the arousal

through the choice of complex or novel products' design (Holbrook and Hirschman, 1982). Where it was observed that the local users selected the complex and innovative product design, this could be because the complex design has more details, which in turn means that this design is luxurious, and this could express or reflect their social level. On the other hand, the international users selected the simple and prototypes product designs; this could be due to the fact that these designs are more practical and easy to use, which means this design is easier to exploit and classify. Therefore, each community prefers the designs that reflects their culture and by implication their social life. Furthermore, these choices are associated with their relationships with their community and environment. These variations may also be due to huge confliction in their backgrounds, whereby the formal characteristics on which these meanings are based could resonate with most of the people. Thus, the culture gives a meaning to the products, which is reflected in their shape and task (Cooper and Press, 2003).

It is worth mentioning that both of the groups preferred the product with completed shape, this could be because the consumers are more likely to select complete shaped product (Hagtved, 2011). This outcome is in the line with study of Van Ittersum and Wansink (2003) which shows that most of that completed design products create better purchase intentions than uncompleted design products do. Also consumers could be affected by the perceived completeness of the shape of product (Krider, Krishna and Raghubir, 2001). In addition, the past experience of the users could affect their preferences, where 57.5% of the international users have been in Saudi Arabia for 6 to 10 years, while at the same time, 76.6% of local users have previously live outside of Saudi Arabia.

On the other hand, the local users prefer the products of big size, whereas the international users prefer the small sized products. This could be because the customers like to express their social life via product size (Dubois et al., 2012), or that the social and cultural practices differ among communities generally. For example, most local users (Saudi) share the same house with children, grandfathers and wives as well the sons. This means they find the big sized products more suitable for the family (collectivism), whereas the international users (Australian, British, American and South African) care more about themselves and their direct family (individualism). This confirms that the customers from different cultures have different preferences, values and attitudes (Kwon and Suh, 2000). These differences confirm that most of the evolutionary psychologists endorse the opinion that the psychological characteristics could be appear differently between individuals and also across cultures as an

outcome of interactions with the environment (Marcel, Eilan and Bermudez, 1995). This corresponded with **H2** and **H3**.

Therefore, it can be stated that such essential differences between the local and international users in looking at the world of product aesthetics confirm that the cultural background influences the users' ideas towards the product design. This is because culture appears as an outcome of the designers' substantial cultural preferences and values in the process of product design, particularly in the early stages of ideas' generation (Muller 2001). Moreover, other researches about the cross-cultural aspect have shown that the people from various cultures could systematically vary in the standards, beliefs, thinking and values they hold, such as the degree to which people consider themselves as connected to others (collectivistic), or as separate from others (individualistic) (Sagiv and Schwartz,1995; Hofstede, 2001; Zhang, Price and Feick, 2006).

Here, the researcher interpreted the differences in preferences of the local and international users that the product-related beliefs in crowdsourcing ideas of the users from predominantly collectivistic cultures (e.g., Saudi Arabia) were more dependent on characteristics of the group and society. Saudi Arabia is known as one of the most conservative cultures in the world; it depends on a mix of Islamic and Arabic traditions (Al-Meer and Bjerke, 1993; Goodman and Burkhart, 1998) and Islam plays a major role in the social practices, norms, beliefs, attitudes and behaviour of the people. For example, the Saudi are a social people and they have important social practices such as regularly visiting friends, family and relatives weekly and sometimes daily (Yamani,1987). In addition, the visits to friends and relatives include gift-giving, asking them about their needs, and helping them. In reality, Saudi people also highly support connecting with people from their social groups. These social groups are restricted by several social criteria and principles that determine their acceptability. Subsequently, they can share such criteria as aesthetic quality, preferences, perceived typicality regardless the different level (Hekkert, 2006). Therefore, the social practices and cultural norms generate and enhance meaningful frames which define approaches to related to the product design, and these frames could impact on the consumers' use of certain products (Cooper and Press, 2003). Hence, their culture affected their ideas and preferences when developing product design such as selecting the green colour. This colour makes them feel belonging and stability with the social group, and the number of family and friends they have means they prefer big-sized product. This makes them feel that they belong to and are

proud of their collectivistic society.

On the other hand, the product-related beliefs in crowdsourcing ideas of the users from predominantly individualistic cultures (e.g., Australian, British, American and South African) were more dependent on the characteristics of the individual. In reality, the relationships in these societies are more open and based on individual interest; and also include fewer social norms. These societies attach great importance to personal privacy; also people take care of themselves and their direct family but stay at a greater distance from each other, especially from their children. Furthermore, most people in these closed societies do not like to have close communication with others, and this is a common within the society itself. Sometimes this also is the case among family and friends. This makes them feel that they are free from social limitations and then they feel proud of their individual achievements (Trafimow and Smith, 1998; Inglehart and Baker, 2000; Everard and Cao, 2008). Hence, their cultural background affected their ideas and preferences when developing product design such as selecting the blue colour. This colour makes them feel authority and stability within their social group; however, this colour is the most popular one in these communities, also due to the fact that family and friends prefer the small-sized products in these communities which makes them feel that they belong to their individual society.

In fact, it was fruitful to consider the cultural variations' manifestations that dominate these psychological reactions such as cognitive reaction, to compare these differences, and then to interpret how these manifestations affect cognitive reactions. From this path, Cosmides and Tooby (1992) indicated that culture is 'nothing more and nothing less' than evolved human biology manifestations, where 'Thousands of genes prescribe the brain, the sensory system, and all the other physiological processes that interact with the physical and social environment to produce the holistic properties of mind and culture' (Wilson,1998. P.184). Therefore, a variable responsible for several of the variations in the product aesthetics choices among people is the culture. Even popular wisdom says that our food is usually shaped by the culture that we belong to. It also seems clear that the culture has a significant influence on our preferences of aesthetics when considering the variety between the cultural expressions such as design, fashion and art. Nisbett (2003) examined whether the people in Asian and Western cultures realise objects differently. He found that the Western people realise the objects by analytical style whereas the Asian people realize the objects by holistic style. However, there is a paucity of in-depth research in the marketing area to help

companies establish how to integrate culture with product design (Onibere et al., 2001; Hugo, 2002; Kotro and Pantzar, 2002; Aykin, 2005). Despite that, the relationship between culture and design has taken several twists and turns over the past centuries, and considered design as an agent of change. Based on the above, this research confirms that culture plays a significant role in shaping the crowdsourcing ideas of users (UGC) through the differences between the local and international users' ideas towards product aesthetics design.

6.4 Conclusions

This chapter given the interpretation and discussion of the results emerging from the investigation of crowdsourcing ideas of users (UGC) towards NPD. Specifically, it discussed how users' ideas towards product aesthetics characteristics differ between control and treatment groups. It also discussed and compared the differences between the local and international groups and then interpreted these results through the cultural differences, highlighting differences and significant similarities among these groups. Several important outcomes were offered, and gave an advanced understanding of product-related beliefs in ideas of the users (UGC) towards NPD, including the cultural differences factor that impacts such response.

One of the significant outcomes in this thesis is that users' response and preferences change whenever the product aesthetics characteristics change; thus, the small configurations in product shape elements may lead to significant changes in how users perceive the product. That means if there is any change in product aesthetics characteristics directly there is a change in product-related beliefs in the users' ideas, regardless of whether the change is in one characteristic or in all characteristics of the product aesthetic. However, there are many others factors that could have an influence on the ideas as mentioned above.

Another important finding is that the differences are significant between ideas of the local users compared with ideas of the international users, and it can be reported that the essential difference between the local and international users in looking at the world of product aesthetics confirms that the cultural backgrounds influences the users' ideas towards the product design. Where the local users' preferences depended more on the characteristics of the group, the international users' preferences depended more on the characteristics of the individual.

The local users were also open and flexible to share their ideas and opinions when developing the product through online crowdsourcing platform although literature broadly proposes that Saudi Arabia is the most conservative culture in the world. The discrepancy in the current study could be explained by perceiving the online crowdsourcing as a platform that avoids several social and cultural limitations, and the international users seem to be more conservative considering the risks and uncertainty involved.

The interesting finding is that the size of effect of the culture on the users' ideas was different between the groups. This could be due to many reasons as stated above; also, past life experience could effectively shape the users' ideas. This chapter also discussed the product aesthetics dimensions that affect the users' responses, and found that the product *shape* element most affected the product-related beliefs in the users' ideas in both local and international groups while the product *size* element most affected the product-related beliefs in the users' ideas in the control and treatment groups.

Chapter 7: Conclusion

7.1 Chapter Summaries

This chapter offers a summary of the thesis chapters. Based on the research outcomes and interpretations this chapter can offer both practical and theoretical implications that add to crowdsourcing ideas of UGC to new product development. It also discusses the research limitations, and suggests plans for future work.

This thesis consists of seven main chapters. Chapter 1 included an overview, research questions and objectives, and explained the research problem, the contribution to the field and the theoretical framework with its eight hypotheses. Four hypotheses were developed about influencing the product aesthetics in crowdsourcing ideas of control and treatment UGC in NPD to answer the first research question. Furthermore, this chapter proposed a further four hypotheses about influence of cultural differences in the local and international crowdsourcing ideas of users' UGC in NPD to answer the second and third research questions. It also addressed the main research question: *Investigate the cultural differences that affect the online crowdsourcing ideas of the international and local users' UGC in new product development in Saudi Arabia*. This main question was addressed by investigating the following sub-questions:

- Do differences in product aesthetics characteristic influence product-related beliefs in crowdsourcing ideas of the control and treatment UGC?
- What are the differences between product-related beliefs in crowdsourcing ideas of local UGC compared to the crowdsourcing ideas of international UGC?
- How do cultural differences affect product-related beliefs in crowdsourcing ideas of local UGC and the crowdsourcing ideas of international UGC?

Chapter 2 was the Literature Review that discussed the concepts of User Generated Content (UGC), crowdsourcing, new product development with its aspects, and also how consumers respond to product aesthetics. In addition, it included a national culture model, the target cultures in this research, and the research framework as well as cultural differences in the crowdsourcing ideas of users to NPD.

Chapter 3 described the methodology and research design used in this thesis. Using quantitative methods, this research undertook two main steps all involving the use of experiment. The first step investigated the influence of product aesthetics characteristics in the product-related beliefs in the crowdsourcing ideas of control and experimental groups. The second step examined the crowdsourcing ideas of international users' UGC compared with crowdsourcing ideas of local users' UGC towards product design. It followed up with an interpretation of the differences between the international users' ideas and local users' ideas in the light of culture. Thus, the relationship among product aesthetics, culture and users' ideas was investigated. This chapter also described how selecting this research design was influential and fit for addressing the research questions.

Chapters 4, 5 and 6 separately offered the analysis and outcomes of the empirical research steps. The results of the first empirical step showed that there are statistically significant differences between the crowdsourcing ideas of treatment and control groups. The results of the second empirical step showed that there are statistically significant differences between product-related beliefs in the local users' ideas compared with product-related beliefs in the international users' ideas towards NPD in the light of the culture. Thus, the national culture differences can influence users' behaviour in ecommerce situations.

Another important finding was that the differences are significant between ideas of the local users compared with ideas of the international users; therefore that the essential differences between the local and international users in looking at the world of product aesthetics confirms that the cultural backgrounds influence the users' ideas towards the product design. The local users' preferences were more reflective of the characteristics of the society and they were also open and flexible to share their ideas and opinions when developing the product, although literature broadly proposed that Saudi Arabia is one of the most conservative cultures in the world. The discrepancy in the current research could be explained by perceiving the online crowdsourcing as a platform that avoids several social and cultural limitations. Meanwhile the international users' preferences were more tended to be based on the characteristics of the individual, and also they preferred not to share their ideas and opinions when developing the product. The international users also seemed to be more conservative considering the risks and uncertainty involved.

7.2 Practical and Theoretical Implications

Overall, the results of this research present understanding of the cultural differences between crowdsourcing ideas of local and international UGC. This investigation will inform its success particularly in new product development. The outcomes could be broadly generalised to several companies that have similar services such as crowdsourcing ideas platforms. In terms of the theoretical implications, this research contributes to the existing body of knowledge on NPD in Saudi Arabia by shedding light on the way in which ideas generated by local users are grounded in cultural differences with international users. This research suggested a new approach to design the product by systematically examining the product-related beliefs in the users' cognitive reactions, while previous research investigated the product-related beliefs using the product design dimensions separately.

Although it is important to know the cultural differences in the users' ideas to design the products, cross-cultural comparisons have featured relatively little in past research. This research will enable a more comprehensive understanding of the process of NPD in multicultural countries, particularly in Saudi Arabia. Moreover, one of the strengths of this research because this is the first study to conducte such investigation and comparison where users have been selected from multi-cultures from one region. Most past studies have been conducted on comparing the users through selecting data from the different countries and then drawing comparisons between them.

In addition, this research contributes to the existing literature on the relationship between culture and design; It also contribute to the literature on the impact of the product aesthetics dimensions in the users' cognitive reactions. This research offered worthy outcomes related to design of the product size and will enrich the previous literature. This research also has cultural implications, where the results reference that the ideas of local users are completely different compared with the international users' ideas. Thus, the research contributes to the wider literature on the impact of the collectivism and individualism dimension on generating ideas. It is also the first study to have used Hofstede's theory to investigate the product-related beliefs in the users' ideas towards the product aesthetics. On the other hand, the previous experience life of the users is another cultural strength of this research, where 57.5% of the international users have been in Saudi Arabia for six to 10 years, and at the same time, 76.6% of local users have previously lived outside the Saudi Arabia. Therefore, the other

cultures experienced by users could affect their thinking and their preferences. Furthermore, at the methodological level, this research utilised an experimental questionnaire to examine the product-related beliefs in the users' ideas, and was able to obtain extensive quantitative data that lead to a richer understanding of the different users' ideas from one country.

From the practical implications, this research contributes to help international companies to increase their profits and gain the users' satisfaction through classifying users' ideas based on their nationalities when developing a product to meet local users' needs. Once these issues are settled, companies and designers can take into consideration any cultural issues when generating new products. The thesis recommends that the designers consider users' national cultures when developing the products in order to achieve successful global growth. Thus, product design is a powerful strategic tool for companies to gain continuous competitive advantages (Haemoon and Parks, 1997; Weigold and Lynch, 1998).

This research also offers another practical contribution to the international furniture companies in Saudi Arabia. It provides them with quantitative outcomes about the users' preferences towards the aesthetics of product design. Looking at these outcomes could contribute to increased sales and customers' satisfaction, and ultimately the success of these companies in the multicultural country. In addition, the crowdsourcing platform (open call) confirms again that it works effectively and efficiently to obtain a large volume of users' ideas in the product aesthetics development.

7.3 Study Limitations and directions for Future Research

This paper has limitations that are presented below along with suggestions for future work.

1- This study is limited in scope; it only investigated the users' ideas from the Saudi Arabia region. Future research could apply this strategy to the users from other multicultural countries to achieve greater generalisability; for example, the United Kingdom and African countries.

2- Although the proposed model was developed after an extensive review of the literature, the research has only interpreted the cognitive reactions in the light of the cultural differences and other factors that could affect the users' ideas such as the anthropological and social backgrounds of the users have been ignored, because there were no sufficient studies has

coved this factor (Culture). Thus, future works could try to identify additional factors and theories related to this domain.

3- The research data were collected only through an experimental survey. Thus, future work can use other strategies like interviews to gain a deeper understanding of the users' ideas and perspectives about how they shaped their ideas towards product design development.

4- The research data were covered the past experiences of the users and has only interpreted if the past experiences could influenced the ideas and perspective of the users. Thus, future work can extend this data through the longitudinal study to get adequately data and interpretation then generalized it.

5- This paper also only used one dimension of the Hofstede theory – individualism and collectivism – given the time limitations of the current research, as well from a pragmatic perspective. Future research may include the other dimensions such as power distance, uncertainty avoidance, femininity vs masculinity.

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Appendices

Appendix A: The Ethics files (Consent, Debriefing, Participant Information Sheet).

Appendix B: The Experimental Questionnaires (For control and treatment groups)

Appendix C: The results of the pilot study.

Appendix D: The results of the G*Power Programme.

Appendix A: The Ethics files.

Ethics number: 23777

UNIVERSITY OF Southampton

Crowdsourcing of New Consumer Product Ideas in The Cultural Context

Consent Form for Research Participants (ERGO ID: 23777)

I am **Dina AL-Ghamdi** a *PhD student at School of Business in the University of Southampton*. I am requesting your participation in a study regarding the role of culture in shaping users' views towards new product design. The current work will investigating the differences between crowdsourcing ideas which are generated by local users in comparison with the crowdsourcing ideas which are generated by international users towards new product development. The users are demanding to meet their certain needs by the local solution.So, The international companies need to integrate the technology and product design with culture. This study will explore to what extent some factors might influence the new product ideas. The study should last approximately *10* minutes. You will be asked to fill out a short questionnaire. Personal information will not be released or viewed by anyone other than researchers involved in this project.

Any information you give will be kept completely confidential and in no cases will responses from individual participants be identified. As with any piece of research it is important to consider whether there are any risks to participants. The study involves minimal risk to participants (i.e., the level of risk encountered in daily life). There may be no direct benefit to you other than the sense of helping the public at large and contributing to knowledge.

All responses are treated as confidential, and in no case will responses from individual participants be identified. Rather, all data will be pooled and published in aggregate form only. Participants should be aware, however, that the experiment is not being run from a 'secure' https server of the kind typically used to handle credit card transactions, so there is a small possibility that responses could be viewed by unauthorised third parties (e.g., computer hackers). However, the data would appear only as a string of numbers, so your responses will remain totally anonymous.

Visitors to this web site are welcome to complete the study, although they will receive no credit or monetary compensation. Participation is voluntary, refusal to take part in the study involves no penalty or loss of benefits to which participants are otherwise entitled, and participants may withdraw from the study at any time without penalty or loss of benefits to which they are otherwise entitled.

If participants have further questions about this study, they may contact the principal investigator, Dina AL-Ghamdi *at* (da2a14@soton.ac.uk).

If participants have further questions about their rights or if they wish to lodge a complaint or concern, they may contact Head of Research Governance, Research Governance Office, University of Southampton, Southampton, SO17 1BJ. (Phone: 02380 595058, Email: rgoinfo@soton.ac.uk)

_____ Please tick (check) this box to indicate that you consent to taking part in this survey.

Ethics number: 23777

UNIVERSITY OF Southampton

CONSENT FORM (*Version number 1.0*)

Study Title: **Crowdsourcing of New Consumer Product Ideas in The Cultural Context**

Researchers**: Dina AL-Ghamdi and Dr Tahir Nisar.**

Brief description: The current work will investigating the differences between crowdsourcing ideas which are generated by local users in comparison with the crowdsourcing ideas which are generated by international users towards new product development. The users are demanding to meet their certain needs by the local solution.So, The international companies need to integrate the technology and product design with culture. This study will explore to what extent some factors might influence the new product ideas. The study should last approximately *10* minutes. You will be asked to fill out a short questionnaire. Personal information will not be released or viewed by anyone other than researchers involved in this project.

Please initial the box(es) if you agree with the statement(s):

	Initial
I have read and understood the information sheet (10/04/2017 version no 1.0) and have had the opportunity to ask questions about the study.	
I agree to take part in the research project and agree for my data to be used for the purpose of this study.	
I understand that my participation is voluntary and I may withdraw at any time without my legal rights being affected.	
Data Protection: I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study. All files containing any personal data will be anonymised.	

Ethics number: 23777

UNIVERSITY OF Southampton

Debriefing

Study Title: **Crowdsourcing of New Consumer Product Ideas in The Cultural Context**

Researcher: Dina ALG-HAMDI **Ethics number**:23777

Thank you so much for participating in this study. Your participation was very valuable. It has been acknowledged that you are very busy and very much appreciate the time you devoted to participating in this study. There was some information about the study that could not be discussed with you prior to the study, because doing so probably would have impacted your actions and thus skewed the study results. This form explains these things to you now.

What is the research about?

The current work purpose is investigating the differences between crowdsourcing ideas which are generated by local users in comparison with the crowdsourcing ideas which are generated by international users towards new product development. The main motivation for conducting such a research is the observable research paucity in drawing comparisons between the views of local users on new product ideas with the views of the international users to the same product in terms of the aesthetic features. The second reason, the international companies need to integrate the technology and product design with culture. The third reason, the users are demanding to meet their certain needs by the local solution. Although the most of the current studies which try to treats the relationship between culture and product design are in Asian, America and Europe and still there is a lack in-depth research on multicultural countries (Moalosi et al. 2005a). Such studies would be fruitful because the potential factors that affect the two users (local and international) might be different (i.e. culture, technological development, habits, races and cost etc.). However, can determine whether cultural differences between users also have a role in their views towards new product development. Accordingly, this line of research actually provides a promising way to explore to what extent such factors influence new attractive product ideas. It is worth stating that increased the international exchanges and communication, led to increased defensive positions of the regional and the national identities in product development (Baxter 1999 and De Souza and Dejean 1999).

Use of active deception or misleading participants
The sampling will be randomly, so, there is no active deception, bias or omission in my study about any participant. Definitely, no active deception as for the participants who will receive questionnaire via online. Also no active deception as for the participants who will receive questionnaire face-to-face, because I will stay away from participant the for 10 minutes then I will come back to collect the questionnaire, and I want for this study success.

We hope this clarifies the purpose of the research, and the reason why we could not tell you all of the details about the study prior to your participation. If you would like more information about the research, you may be interested in the following:
Aesthetic product for Paul Hekkert (1970). And
http://bschool.huji.ac.il/.upload/publications/sharonHors/ThePowerofPlain.pdf

If you have any questions or concerns, you may contact me:
Dina AL-Ghamdi –(da2a14@soton.ac.uk).

It is very important that you do not discuss this study with anyone else until the study is complete. Our efforts will be greatly compromised if participants come into this

study knowing what is about and how the ideas are being tested. Once again results of this study will not include your name or any other identifying characteristics.

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the research support officer, Dr Jennifer Sarha (risethic@soton.ac.uk) or Head of Research Governance, Research Governance Office, University of Southampton, Southampton, SO17 1BJ. Phone: 02380 595058, Email: rgoinfo@soton.ac.uk

Ethics number: 23777

UNIVERSITY OF Southampton

Participant Information Sheet

Study Title: Crowdsourcing of New Consumer Product Ideas in The Cultural Context

Researcher: **Dina AL-Ghamdi**
ERGO number: 23777

Please read this information carefully before deciding to take part in this research. It is up to you to decide whether or not to take part. If you are happy to participate you will be asked to sign a consent form.

What is the research about?
I am Dina AL-Ghamdi a PhD student at School of Business in the University of Southampton. I am requesting your participation in a study regarding the role of culture in shaping users' views towards new product design. The current work will investigate the differences between crowdsourcing ideas which are generated by local users in comparison with the crowdsourcing ideas which are generated by international users towards new product development. However, this study was supported by Saudi Cultural Bureau.

Why have I been asked to participate?
We are looking for volunteers to take part in our study who have an interest in product development.

What will happen to me if I take part?
This experimental questionnaire study will take no more than 10 minutes to complete. And participation in this experimental questionnaire (the questionnaire doesn't have any sensitive question). The participation in this study is voluntary and you are free to withdraw from the study at any time. However, any details given will remain confidential. This means nobody will ever be made aware, or become aware, of your individual participation.

Are there any benefits in my taking part?
There is no benefit or payment to the individual who takes part in this study.

Are there any risks involved?
No, there are unlikely to be any side effects or risks from the questionnaire.

Will my participation be confidential?
Yes, this is an anonymous survey. And all the information will be addressed confidentiality and just will be used it for the study purposes. All data will be kept and coded on a password protected computer. However, will stored the personal data and study results securely at the university data base.

What should I do if I want to take part?
Just fill the questionnaire.

What happens if I change my mind?
You have all the right to withdraw from the study and that will not affect you at all. All of your data will be still protected according to the university ethics rules and regulations.

What will happen to the results of the research?

Ethics number: 23777

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These results will be presented at PhD thesis, scientific conferences and may be published in scientific journals. Please let us know if you would like a copy of the published results at the end of the study. On completion of the research study, the data collected will be securely stored at the University of Southampton for 10 years according to University policy.

Where can I get more information?
If you have further questions about this study, they may contact the principal investigator, Dina AL-Ghamdi at (da2a14@soton.ac.uk).

What happens if something goes wrong?
If you become uncomfortable or distressed during the questionnaire, any explanation will be given by the researcher. If you have a concern or a complaint about this study you should contact at the Research Governance Manger (023 8059 5058, rgoinfo@soton.ac.uk). If you remain unhappy and wish to complain formally, the Research Governance Office can provide you with details of the University of Southampton Complaints Procedure.

Thank you for your consideration with regard to taking part in this study. You will be given a copy of the information sheet and a signed consent form to keep.

Appendix B: Experimental Questionnaires (For control groups)

Ethics number: 23777

UNIVERSITY OF Southampton

Crowdsourcing of New Consumer Product Ideas in The Cultural Context

I am **Dina AL-Ghamdi** a *PhD student at School of Business in the University of Southampton*. I am requesting your participation in a study regarding the role of culture in shaping users' views towards new product design. The current work will investigate the differences between crowdsourcing ideas which are generated by local users in comparison with the crowdsourcing ideas which are generated by international users towards new product development. The users are demanding to meet their certain needs by the local solution. So, the international companies need to integrate the technology and product design with culture. This study will explore to what extent some factors might influence the new product ideas. The study should last approximately *10* minutes. You will be asked to fill out a short questionnaire. Personal information will not be released or viewed by anyone other than researchers involved in this project.

Any information you give will be kept completely confidential and in no cases will responses from individual participants be identified. As with any piece of research it is important to consider whether there are any risks to participants. The study involves minimal risk to participants (i.e., the level of risk encountered in daily life). There may be no direct benefit to you other than the sense of helping the public at large and contributing to knowledge.

All responses are treated as confidential, and in no case will responses from individual participants be identified. Rather, all data will be pooled and published in aggregate form only. Participants should be aware, however, that the experiment is not being run from a 'secure' https server of the kind typically used to handle credit card transactions, so there is a small possibility that responses could be viewed by unauthorised third parties (e.g., computer hackers). However, the data would appear only as a string of numbers, so your responses will remain totally anonymous.

Visitors to this web site are welcome to complete the study, although they will receive no credit or monetary compensation. Participation is voluntary, refusal to take part in the study involves no penalty or loss of benefits to which participants are otherwise entitled, and participants may withdraw from the study at any time without penalty or loss of benefits to which they are otherwise entitled.

If you have further questions about this study, they may contact the principal investigator, Dina AL-Ghamdi *at* (da2a14@soton.ac.uk).

If you have further questions about their rights or if they wish to lodge a complaint or concern, they may contact Head of Research Governance, Research Governance Office, University of Southampton, Southampton, SO17 1BJ. (Phone: 02380 595058, Email: rgoinfo@soton.ac.uk)

(Section 1)

Demographic Questions (D).

Please answer the following questions.

D1: What is your nationality and cultural background (Ethnicity)?

- Saudi Nationality with Saudi Background
- Saudi Nationality with Non-Saudi Background

  Original Nationality (…….....) and/ or Original Background (……. …….)
- Non- Saudi (please specific your Nationality and Background)

  Nationality (…….....) and Background (……..…….)

D2: Gender ○ Male ○ Female

**Please, if you're Non-Saudi User answer the (Question 3):*

D3: How long have you been in Saudi Arabia?

(.....) Years (.....) Months

**Please, if you're Saudi User answer the (Question4):*

D4: Do you have previous life outside of Saudi Arabia, for how long and where?

- Yes
- No

(.....) Years (.....) Months, Place (……..)

Ethics number: 23777

UNIVERSITY OF Southampton

Participants Information Sheet for the Product Aesthetics

No.	Product Aesthetic	Product Description
1: About Product color		**Product Details:** size: Height: 17 cm Cord length: 2cm. Shade: 100% Polystyrene plastic. Frame/ Tube: Aluminum. Color: Blue. shape: A rectangle. Price: 7 pound: 35 Riyal. Designed: IKEA Team **Full description:** The table lamp was described as 'tube of the Steel plated base with a blue color textile shade provides a diffused and decorative light. IKEA
2: About Product size		**Product Details:** Frame/ Shade: Glass. color: off-white. size: Width:23 cm Height: 22 cm Length: 30 cm Cord length: 2 m. Price: 10 pound : 55 Riyal. Designed: Designed: Michiko Nakata. **Full Description:** The lamp gives a soft light and creates a warm, cosy atmosphere in your room. IKEA
3: About Product shape		**Product Details:** Shade: Glass. Frame/ Tube: silver -plated. color: white glass and silver. size: Width: 25 cm Height: 23 cm Length: 26 cm Cord length: 15 cm. Price: 40 pound : 199 Riyal. Designed: IKEA Team **Full Description:** The shiny aluminum plated base with glass prism shade provides a diffused and decorative light. IKEA

(Section 2)

Product Aesthetic (PA).

Part 1: From now on, you can see the photo of table lamp (1) when you see this photo please concentrate on the product design in terms of color. After looking to the color of the the table lamp, you will take a few minutes to think about development the table lamp color.

**Please rate each of the following statements provided which is in accord with your background and opinion on a 1 to 9 points scale: Where: 1= 4- Dislike a lot to 4=like a lot.*

No.	Items	*Dislike a lot*								*like a lot*
PA 1	I like to develop the product with the color degree like Green-yellow.	-4	-3	-2	-1	0	1	2	3	4
PA2	I like to develop the product with the color degree like Purplish-blue.	-4	-3	-2	-1	0	1	2	3	4
PA3	I like to develop the product with high pigment of saturation.	-4	-3	-2	-1	0	1	2	3	4
PA4	I like the product with high levels of brightness	-4	-3	-2	-1	0	1	2	3	4
PA5	I like to develop the product with a garish color in the product	-4	-3	-2	-1	0	1	2	3	4
PA6	I like to develop the product with the polished color in product	-4	-3	-2	-1	0	1	2	3	4

Part 2: From now on, you can see the photo of table lamp (2) when you see this photo please concentrate on the product design in terms of size. After looking to the size of the the table lamp, you will take a few minutes to think about development the table lamp size.

Ethics number: 23777

UNIVERSITY OF Southampton

**Please rate each of the following statements provided which is in accord with your background and opinion on a 1 to 7 points scale: Where: 1= Strongly disagree, 2= Disagree, 3= Somewhat disagree, 4= Neither agree or disagree, 5= Somewhat agree, 6=Agree, 7= Strongly agree.*

No.	Items	Strongly Disagree						Strongly Agree
PA1	This size would look good and fit with the rest of the things in my home.	1	2	3	4	5	6	7
PA2	This product size is prestige	1	2	3	4	5	6	7
PA3	I would recommend this size to my family or friends.	1	2	3	4	5	6	7
PA4	This size is stylish	1	2	3	4	5	6	7
PA5	This size is a practical.	1	2	3	4	5	6	7

UNIVERSITY OF Southampton

Part 3: From now on, you can see the photo of table lamp (3) when you see this photo please concentrate on the product design in terms of shape. After looking to the shape of the table lamp, you will take a few minutes to think about development the table lamp shape.

**Please rate each of the following statements provided which is in accord with your background and opinion on a 1 to 7 points scale: Where: 1= Strongly disagree, 2= Disagree, 3= Somewhat disagree, 4= Neither agree or disagree, 5= Somewhat agree, 6=Agree, 7= Strongly agree.*

No.	Items	Strongly Disagree						Strongly Agree
'A1	I Prefer the symmetric product, i.e. aesthetic harmony between color, shape or size.	1	2	3	4	5	6	7
'A2	I prefer the prototypicality product, i.e. standard design.	1	2	3	4	5	6	7
'A3	I prefer the uncomplicated design	1	2	3	4	5	6	7
'A4	I Prefer the complex product.	1	2	3	4	5	6	7
'A5	I Prefer the novelty product, i.e. Innovative designs.	1	2	3	4	5	6	7
'A6	I Prefer the product of the rectangular shape.	1	2	3	4	5	6	7
'A7	I like the luxurious design	1	2	3	4	5	6	7
'A8	I Prefer the product of the simplex shape.	1	2	3	4	5	6	7
'A9	I prefer the complicated design	1	2	3	4	5	6	7
'A10	I Prefer the asymmetric product, i.e. aesthetic harmony between color, shape or size.	1	2	3	4	5	6	7

Users' Preferences (UP).

The statements in this section are related to your general thoughts about Product Aesthetics Development.

**Please rate each of the following statements provided which is in accord with your background and opinion on a 1 to 6 points scale: Where: 1= Strongly disagree, 2= Disagree, 3= Slightly Disagree, 4= Slightly agree, 5= Agree, 6= Strongly Agree.*

Statements	1	2	3	4	5	6
UP1: I have positive feelings to this design	○	○	○	○	○	○
UP2: I like this design	○	○	○	○	○	○
UP3: I have favourable feeling to the design	○	○	○	○	○	○

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(Section 3)

The statements in this section are related to the cultural orientations in terms of Individualism and Collectivism communities towards New Product Design.
**Please rate each of the following statements provided which is in accord with your preferences and approach toward new product design on a 1 to 6 points scale: Where: 1= Strongly disagree, 2= Disagree, 3= Slightly Disagree, 4= Slightly agree, 5= Agree, 6= Strongly Agree (Please answer all questions with one tick only).*

Statements	1	2	3	4	5	6
IC1: I feel good to share my knowledge of product development with one or more people in my social network.	○	○	○	○	○	○
IC2: In my society, I get support from my surrounding for my product design activities.	○	○	○	○	○	○
IC3: My personal identity is important to me when I develop the product.	○	○	○	○	○	○
IC4: I rely on myself most of the time; I rarely rely on others.	○	○	○	○	○	○
IC5: I prefer to develop the product with different communities.	○	○	○	○	○	○
IC6: Independently, I can develop any product based on my beliefs.	○	○	○	○	○	○
IC7: It is important to me that I respect the decisions made by my groups.	○	○	○	○	○	○
IC8: I'd rather depend on myself than others.	○	○	○	○	○	○
IC9: I often do "my own thing").	○	○	○	○	○	○
IC10: When another person does better than I do, I get tense and aroused.	○	○	○	○	○	○
IC11: If a coworker gets a prize, I would feel proud.	○	○	○	○	○	○
IC12: To me, pleasure is working with others.	○	○	○	○	○	○
IC13: Family members should stick together to develop the product.	○	○	○	○	○	○
IC14: The well-being of my coworkers is important to me	○	○	○	○	○	○

- If you would like to share your ideas and opinions with others please click here ……

The Experimental Questionnaires (For control groups)

Ethics number: 23777

UNIVERSITY OF Southampton

crowdsourcing of New Consumer Product Ideas in The Cultural Context

I am **Dina AL-Ghamdi** a *PhD student at School of Business in the University of Southampton*. I am requesting your participation in a study regarding the role of culture in shaping users' views towards new product design. The current work will investigate the differences between crowdsourcing ideas which are generated by local users in comparison with the crowdsourcing ideas which are generated by international users towards new product development. The users are demanding to meet their certain needs by the local solution. So, the international companies need to integrate the technology and product design with culture. This study will explore to what extent some factors might influence the new product ideas. The study should last approximately *10* minutes. You will be asked to fill out a short questionnaire. Personal information will not be released or viewed by anyone other than researchers involved in this project.

Any information you give will be kept completely confidential and in no cases will responses from individual participants be identified. As with any piece of research it is important to consider whether there are any risks to participants. The study involves minimal risk to participants (i.e., the level of risk encountered in daily life). There may be no direct benefit to you other than the sense of helping the public at large and contributing to knowledge.

All responses are treated as confidential, and in no case will responses from individual participants be identified. Rather, all data will be pooled and published in aggregate form only. Participants should be aware, however, that the experiment is not being run from a 'secure' https server of the kind typically used to handle credit card transactions, so there is a small possibility that responses could be viewed by unauthorised third parties (e.g., computer hackers). However, the data would appear only as a string of numbers, so your responses will remain totally anonymous.

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If you have further questions about this study, they may contact the principal investigator, Dina AL-Ghamdi *at* (da2a14@soton.ac.uk).

If you have further questions about their rights or if they wish to lodge a complaint or concern, they may contact Head of Research Governance, Research Governance Office, University of Southampton, Southampton, SO17 1BJ. (Phone: 02380 595058, Email: rgoinfo@soton.ac.uk)

(Section 1)

Demographic Questions (D).

Please answer the following questions.

D1: What is your nationality and cultural background (Ethnicity)?

- Saudi Nationality with Saudi Background
- Saudi Nationality with Non-Saudi Background

  Original Nationality (…….....) and/ or Original Background (……. …….)
- Non- Saudi (please specific your Nationality and Background)

  Nationality (…….....) and Background (……..…….)

D2: Gender ○ Male ○ Female

**Please, if you're Non-Saudi User answer the (Question 3):*

D3: How long have you been in Saudi Arabia?

(.....) Years (.....) Months

**Please, if you're Saudi User answer the (Question4):*

D4: Do you have previous life outside of Saudi Arabia, for how long and where?

- Yes
- No

(.....) Years (.....) Months, Place (……..)

Ethics number: 23777

UNIVERSITY OF Southampton

Participants Information Sheet for the Product Aesthetics

No.	Product Aesthetic	Product Description
1: About Product color		**Product Details:** size: Height: 17 cm Cord length: 2cm. Shade: 100% Polystyrene plastic. Frame/ Tube: Aluminum. Color: Green. shape: A rectangle. Price: 7 pound: 35 Riyal. Designed: IKEA Team **Full description:** The table lamp was described as 'tube of the Steel plated base with a blue color textile shade provides a diffused and decorative light. IKEA
2: About Product size		**Product Details:** Frame/ Shade: Glass. color: off-white. size: Width: 19 cm Height: 18 cm Length: 19 cm Cord length: 140 cm. Price: 4.50 pound: 20 Riyal. Designed: Michiko Nakata. **Full Description:** The lamp gives a soft light and creates a warm, cosy atmosphere in your room. IKEA
3: About Product shape		**Product Details:** Shade: 100% polyester Shape: Tube silver-plated color: white and silver. size: Width: 26 cm Height: 22 cm Length: 26 cm Cord length: 15 cm. Price: 16 pound: 75 Riyal. Designed: IKEA of Sweden **Full Description:** "It is combine several lamps from the series to create a soft, comfortable light and a unified look". IKEA

Ethics number: 23777

UNIVERSITY OF Southampton

(Section 2)

Product Aesthetic (PA).

Part 1: From now on, you can see the photo of table lamp (1) when you see this photo please concentrate on the product design in terms of color. After looking to the color of the the table lamp, you will take a few minutes to think about development the table lamp color.

**Please rate each of the following statements provided which is in accord with your background and opinion on a 1 to 9 points scale: Where: 1= 4- Dislike a lot to 4=like a lot.*

No.	Items	*Dislike a lot*								*like a lot*
PA 1	I like to develop the product with the color degree like Green-yellow.	-4	-3	-2	-1	0	1	2	3	4
PA2	I like to develop the product with the color degree like Purplish-blue.	-4	-3	-2	-1	0	1	2	3	4
PA3	I like to develop the product with high pigment of saturation.	-4	-3	-2	-1	0	1	2	3	4
PA4	I like the product with high levels of brightness	-4	-3	-2	-1	0	1	2	3	4
PA5	I like to develop the product with a garish color in the product	-4	-3	-2	-1	0	1	2	3	4
PA6	I like to develop the product with the polished color in product	-4	-3	-2	-1	0	1	2	3	4

Part 2: From now on, you can see the photo of table lamp (2) when you see this photo please concentrate on the product design in terms of size. After looking to the size of the the table lamp, you will take a few minutes to think about development the table lamp size.

**Please rate each of the following statements provided which is in accord with your background and opinion on a 1 to 7 points scale: Where: 1= Strongly disagree, 2= Disagree, 3= Somewhat disagree, 4= Neither agree or disagree, 5= Somewhat agree, 6=Agree, 7= Strongly agree.*

No.	Items	Strongly Disagree						Strongly Agree
PA1	This size would look good and fit with the rest of the things in my home.	1	2	3	4	5	6	7
PA2	This product size is prestige	1	2	3	4	5	6	7
PA3	I would recommend this size to my family or friends.	1	2	3	4	5	6	7
PA4	This size is stylish	1	2	3	4	5	6	7
PA5	This size is a practical.	1	2	3	4	5	6	7

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Part 3: From now on, you can see the photo of table lamp (3) when you see this photo please concentrate on the product design in terms of shape. After looking to the shape of the table lamp, you will take a few minutes to think about development the table lamp shape.

**Please rate each of the following statements provided which is in accord with your background and opinion on a 1 to 7 points scale: Where: 1= Strongly disagree, 2= Disagree, 3= Somewhat disagree, 4= Neither agree or disagree, 5= Somewhat agree, 6=Agree, 7= Strongly agree.*

No.	Items	Strongly Disagree						Strongly Agree
'A1	I Prefer the symmetric product, i.e. aesthetic harmony between color, shape or size.	1	2	3	4	5	6	7
'A2	I prefer the prototypicality product, i.e. standard design.	1	2	3	4	5	6	7
'A3	I prefer the uncomplicated design	1	2	3	4	5	6	7
'A4	I Prefer the complex product.	1	2	3	4	5	6	7
'A5	I Prefer the novelty product, i.e. Innovative designs.	1	2	3	4	5	6	7
'A6	I Prefer the product of the rectangular shape.	1	2	3	4	5	6	7
'A7	I like the luxurious design	1	2	3	4	5	6	7
'A8	I Prefer the product of the simplex shape.	1	2	3	4	5	6	7
'A9	I prefer the complicated design	1	2	3	4	5	6	7
'A10	I Prefer the asymmetric product, i.e. aesthetic harmony between color, shape or size.	1	2	3	4	5	6	7

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Users' Preferences (UP).

The statements in this section are related to your general thoughts about Product Aesthetics Development.

**Please rate each of the following statements provided which is in accord with your background and opinion on a 1 to 6 points scale: Where: 1= Strongly disagree, 2= Disagree, 3= Slightly Disagree, 4= Slightly agree, 5= Agree, 6= Strongly Agree.*

Statements	1	2	3	4	5	6
UP1: I have positive feelings to this design	○	○	○	○	○	○
UP2: I like this design	○	○	○	○	○	○
UP3: I have favourable feeling to the design	○	○	○	○	○	○

(Section 3)

The statements in this section are related to the cultural orientations in terms of Individualism and Collectivism communities towards New Product Design.

**Please rate each of the following statements provided which is in accord with your preferences and approach toward new product design on a 1 to 6 points scale: Where: 1= Strongly disagree, 2= Disagree, 3= Slightly Disagree, 4= Slightly agree, 5= Agree, 6= Strongly Agree (Please answer all questions with one tick only).*

Statements	1	2	3	4	5	6
IC1: I feel good to share my knowledge of product development with one or more people in my social network.	○	○	○	○	○	○
IC2: In my society, I get support from my surrounding for my product design activities.	○	○	○	○	○	○
IC3: My personal identity is important to me when I develop the product.	○	○	○	○	○	○
IC4: I rely on myself most of the time; I rarely rely on others.	○	○	○	○	○	○
IC5: I prefer to develop the product with different communities.	○	○	○	○	○	○
IC6: Independently, I can develop any product based on my beliefs.	○	○	○	○	○	○
IC7: It is important to me that I respect the decisions made by my groups.	○	○	○	○	○	○
IC8: I'd rather depend on myself than others.	○	○	○	○	○	○
IC9: I often do "my own thing").	○	○	○	○	○	○
IC10: When another person does better than I do, I get tense and aroused.	○	○	○	○	○	○
IC11: If a coworker gets a prize, I would feel proud.	○	○	○	○	○	○
IC12: To me, pleasure is working with others.	○	○	○	○	○	○
IC13: Family members should stick together to develop the product.	○	○	○	○	○	○
IC14: The well-being of my coworkers is important to me	○	○	○	○	○	○

- If you would like to share your ideas and opinions with others please click here ……

Appendix C: The results of the pilot study.

The Results of Pilot study.

Table 4.9: Statistics of Saudi users in the control case (COLOR)

		ethnicity	Q2.1	Q2.2	QA2.2	Q2.3	QA2.3	Q2.4	QA2.4
N	Valid	10	10	10	10	10	10	10	10
	Missing	0	0	0	0	0	0	0	0
Mean		2.00	1.10	1.90	1.60	1.30	1.40	1.20	1.70
Mode		2	1	2	2	1	1	1	2

Table 4.10: Statistics of Non-Saudi users in the control case (COLOR)

		ethnicity	Q2.1	Q2.2	QA2.2	Q2.3	QA2.3	Q2.4	QA2.4
N	Valid	10	10	10	10	10	10	10	10
	Missing	0	0	0	0	0	0	0	0
Mean		4.50	1.60	1.20	1.40	1.60	1.70	1.80	2.20
Mode		2	2	1	1	2	2	2	2[a]

a. Multiple modes exist. The smallest value is shown

Control groups: The results shows that there were a variations between groups in terms of ethnicity as following; 80% of Saudi users were Asian, while the Non-Saudi users compromise of 30% Asian, 20% White African and 10% European.

In terms of product development, 90% of the Saudi users would like to develop the product with a group (Mean= 1.10) and (Mode= 1) (table 4.9); whereas 60% of Non-Saudi users would like to develop the product alone (Mean= 1.60) and (Mode= 2) (table 4.10). In addition, 90% of the Saudi users would like to develop the product based on the hue of color degree like Green-yellow (Mean= 1.90) and (Mode= 2) and 80% of Non-Saudi users would like to develop the product based on the hue of color degree like Purplish-blue (Mean= 1.20) and (Mode= 1). As well 70% of of the Saudi users would like to develop the product based on the high pigment color (Mean= 1.30) and (Mode= 1) on the contrary 60% of Non-Saudi users would like to develop the product based on the low pigment color (Mean= 1.60) and (Mode= 2). However, 80% of the Saudi users would like to develop the product based on the dark color (Mean= 1.20) and (Mode= 1) contrary of that is 80% of Non-Saudi users would like to develop the product based on the light color (Mean= 1.80) and (Mode= 2). In the same vein, the tables shows that most of the Saudi and Non-Saudi users were agree with their chosen which is based on their backgrounds and preference.

Table 4.11: Statistics of Saudi users in the experimental case (COLOR)

		Ethnicity	Q2.1	Q2.2	QA2.2	Q2.3	QA2.3	Q2.4	QA2.4
N	Valid	10	10	10	10	10	10	10	10
	Missing	0	0	0	0	0	0	0	0
Mean		2.10	1.10	1.90	1.40	1.10	1.60	1.20	1.40
Mode		2	1	2	1	1	1	1	1

Table 4.12: Statistics of Non-Saudi users in the experimental case (COLOR)

		Ethnicity	Q2.1	Q2.2	QA2.2	Q2.3	QA2.3	Q2.4	QA2.4
N	Valid	10	10	10	10	10	10	10	10
	Missing	0	0	0	0	0	0	0	0
Mean		2.90	1.70	1.20	2.00	1.70	2.10	1.80	2.50
Mode		2	2	1	2	2	2	2	2[a]

a. Multiple modes exist. The smallest value is shown

The experimental groups: The results shows that there were a variations between groups in terms of ethnicity as following; 90% of Saudi users were Asian ethnicity, while, 40% of the Non-Saudi users were from Asian and 20% of the White African, also 20% of the white and black ethnicity.

In terms of product development, 90% of the Saudi users would like to develop the product with a group (Mean= 1.10) and (Mode= 1) in the table 4.11, and 70% of Non-Saudi users would like to develop the product alone (Mean= 1.70) and (Mode= 2) in the table 4.12. In addition, 90% of the Saudi users would like to develop the product based on the hue of color degree like Green-yellow (Mean= 1.90) and (Mode= 2) and 80% of Non-Saudi users would like to develop the product based on the hue of color degree like Purplish-blue (Mean= 1.20) and (Mode= 1). As well 90% of of the Saudi users would like to develop the product based on the high pigment color (Mean= 1.10) and (Mode= 1) also 70% of Non-Saudi users would like to develop the product based on the low pigment color (Mean= 1.70) and (Mode= 2). 80% of the Saudi users would like to develop the product based on the dark color (Mean= 1.20) and (Mode= 1) on the contrary, 80% of Non-Saudi users would like to develop the product based on the light color (Mean= 1.80) and (Mode= 2). In the same vein, the tables shows that most of the Saudi and Non-Saudi users were agree with their chosen which is based on their backgrounds and preference.

The Statistics of Saudi users in the Experiment case (Size)

		Q2.2	QA2.1	Q2.1	ethnicity
N	Valid	76	76	76	76
	Missing	0	0	0	0
Mean		1.38	2.28	1.29	2.42
Mode		1	1	1	2

The Statistics of Non-Saudi users in the Experiment case (Size)

		Q2.1	Q2.2	QA2.2	
N	Valid	50	50	50	50
	Missing	0	0	0	0
Mean		1.68	1.76	1.66	2.98
Mode		2	2	1	2

The experimental Groups: There were variations between groups in terms of ethnicity as following; most of Saudi and Non-Saudi users from Asian, also 25% of Saudi users have a mixed ethnicity and 10% of Non-Saudi from European.

In terms of product development, 71% of the Saudi users would like to develop the product with a group, while 68% of the Non-Saudi users would like to develop the product alone. In addition, 62% of the Saudi users prefer to develop the product based on the big size and 39% of them prefer the small size, contrary of that, 76% of the Non-Saudi users prefer to develop the product based on the small size. As well the tables shows that most of the Saudi and Non-Saudi users were strongly agree with their chosen which is based on their backgrounds and preference.

The Statistics of Saudi users in the control case (Size)

		QA2.2	Q2.2	ethnicity	Q2.1
N	Valid	84	84	84	84
	Missing	0	0	0	0
Mean		2.36	1.30	2.68	1.32
Mode		1	1	2	1

The Statistics of Non-Saudi users in the control case (Size)

		QA2.2	Q2.2	Q2.1	ethnicity
N	Valid	83	83	83	83
	Missing	0	0	0	0
Mean		2.35	1.67	1.71	3.55
Mode		2	2	2	2

The control Groups: The results shows that there were a variations between groups in terms of ethnicity as following; most of Saudi users are from Asian, 16% of them have white and black ethnicity and 15% of this users have a mixed ethnicity. contrary of that, 48% of Non-Saudi from Asian and 13% of them have a mixed ethnicity as well.

In terms of product development, 68% of the Saudi users would like to develop the product with a group, while 71% of the Non-Saudi users would like to develop the product alone. Also 70% of the Saudi users prefer to develop the product based on the big size and 68% of the Non-Saudi users prefer to develop the product based on the small size and 32% of them would like to develop the product based on the big size. In the same vein, the tables shows that most of the Saudi and Non-Saudi users were agree with their chosen which is based on their backgrounds and preference except 21% of Saudi users strongly disagree with their choses.

Table 4.6: Statistics shape of Non-Saudi users in the intervention case (shape)

	Q2.1	Q2.2	QA2.2	Q2.3	QA2.3	Q2.4	QA2.4	Q2.5	QA2.5	Q2.6	QA2.6
Valid	10	10	10	10	10	10	10	10	10	10	10
issing	1	1	1	1	1	1	1	1	1	1	1
Mean	3.00	1.60	1.70	1.70	1.20	1.80	1.80	1.90	1.40	1.40	1.30	1.90
Mode	2	2	2	1	1	1	1	1	1	1	1	1[a]

a. Multiple modes exist. The smallest value is shown

Table 4.5: Statistics of Saudi Users in the intervention case (shape)

			Q2.1	Q2.2	QA2.2	Q2.3	QA2.3	Q2.4	QA2.4	Q2.5	QA2.5	Q2.6	QA2.6
N	Valid	10	10	10	10	10	10	10	10	10	10	10	10
	Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean		1.90	1.20	1.20	1.20	1.10	1.20	1.20	2.00	1.40	1.70	1.30	1.90
Mode		2	1	1	1	1	1	1	1	1	1	1	1

The experimental groups: The results shows that there were a variations between groups in terms of ethnicity as following; 70% of the Saudi users were from Asian and 20% of the white and black ethnicity. While, 40% of the Non-Saudi users were from Asian and 30% of the mixed ethnicity.

In terms of product development, 80% of the Saudi users would like to develop the product with a group and 20% of them would like to develop the product alone (Mean= 1.20) and (Mode= 1) in the table 4.5, also 40% of the Saudi users would like to develop the product alone and 60% of them would like to develop the product with a group (Mean= 1.60) and (Mode= 2) in the table 4.6. Also 80% of Saudi users prefer to develop the product based on the symmetry, i.e. aesthetic harmony, and 20% of them prefer to develop the product based on the asymmetry, i.e. aesthetic incongruity (Mean= 1.20) and (Mode= 1). On the contrary, 30% of Non-Saudi users prefer to develop the product based on the symmetry, i.e. aesthetic harmony, and 70% of them prefer to develop the product based on the asymmetry, i.e. aesthetic incongruity (Mean= 1.70) and (Mode= 2). However, 90% of Saudi users prefer to develop the product based on the simplicity

(Mean= 1.10) and (Mode= 1), and 80% of Non-Saudi users prefer to develop the product based on the simplicity (Mean= 1.20) and (Mode= 1). 80% of of Saudi users prefer to develop the product based on the novelty (Mean= 1.20) and (Mode= 1) and 60% of Non-Saudi users prefer to develop the product based on the novelty (Mean= 1.80) and (Mode= 1). In addition, the result was equal between Saudi and Non-Saudi users where 60% of them prefer to develop the product based on the completely shape and 40% they prefer to develop the product based on the incompletely shape (Mean= 1.40) and (Mode= 1). Also 70% of the both groups prefer to develop the product based on the rectangular shape and 30% of them prefer to develop the product based on the square shape (Mean= 1.30) and (Mode= 1). In the same vein, the tables shows that most of the Saudi and Non-Saudi users were strongly agree with their chosen which is based on their backgrounds and preference.

Table 4.7: Statistics of Saudi Users in the control case (shape)

		ethnicity	Q2.1	Q2.2	QA2.2	Q2.3	QA2.3	Q2.4	QA2.4	Q2.5	QA2.5	Q2.6	QA2.6
N	Valid	10	10	10	10	10	10	10	10	10	10	10	10
	Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean		2.60	1.30	1.30	1.10	1.70	1.70	1.30	1.30	1.70	1.80	1.40	1.50
Mode		3	1	1	1	2	1	1	1	2	1	1	1[a]

a. Multiple modes exist. The smallest value is shown

Table 4.6: Statistics of Non-Saudi Users in the control case (shape)

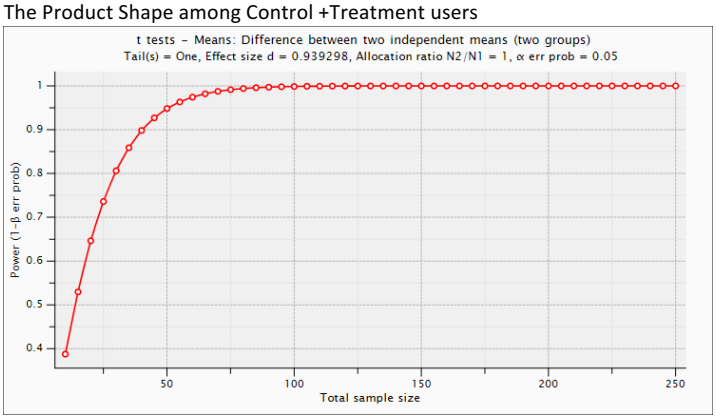
		ethnicity	Q2.1	Q2.2	QA2.2	Q2.3	QA2.3	Q2.4	QA2.4	Q2.5	QA2.5	Q2.6	QA2.6
N	Valid	11	11	11	11	11	11	11	11	11	11	11	11
	Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean		-	1.64	1.64	1.45	1.45	1.82	1.36	1.55	1.45	1.64	1.64	1.45
Mode		3	2	2	1	1	2	1	1	1	1	2	1

The control groups: The results shows that there were a variations between groups in terms of ethnicity as following; 70% of the Saudi users were mixed ethnicity and 20% of Asian, while, 60% of the Non-Saudi users were from mixed ethnicity and 20% of the black and white ethnicity.

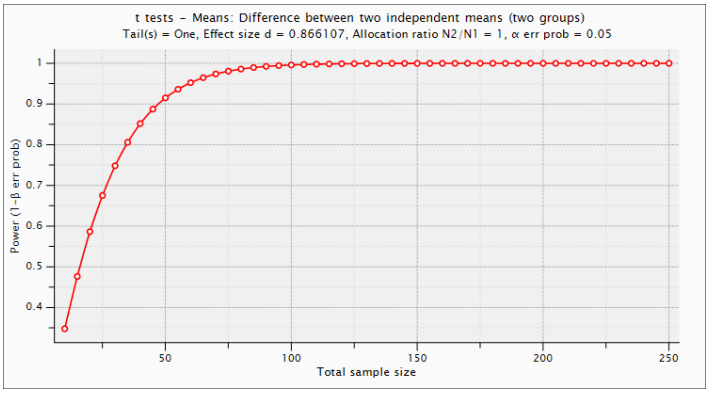
In terms of product development, 70% of the Saudi users would like to develop the product with a group and 30% of them would like to develop the product alone (Mean= 1.30) and (Mode= 1) in the table 4.7, on the contrary, 30% of the Saudi users would like to develop the product with a group and 70% of them would like to develop the product alone (Mean= 1.64) and (Mode= 2) in the table 4.7. Also 30% of Saudi users prefer to develop the product based on the symmetry, i.e. aesthetic harmony, and 70% of them prefer to develop the product based on the asymmetry, i.e. aesthetic incongruity (Mean= 1.30) and (Mode= 1), as well 30% of Non-Saudi users prefer to develop the product based on the symmetry, i.e. aesthetic harmony, and 70% of them prefer to develop the product based on the asymmetry, i.e. aesthetic incongruity (Mean= 1.64) and (Mode= 2). However, 30% of Saudi users prefer to develop the product based on the simplicity and 70% of them prefer to develop the product based on the complexity (Mean= 1.70) and (Mode= 1). 60% of of Non-Saudi users prefer to develop the product based on the simplicity, and also 40% of Non-Saudi users prefer to develop the product based on the complexity (Mean= 1.45) and (Mode= 1). In addition, 70% of of Saudi users prefer to develop the product based on the novelty (Mean= 1.30) and (Mode= 1) and 60% of Non-Saudi users prefer to develop the product based on the novelty (Mean= 1.36) and (Mode= 1). as well the result shows that 30% of Saudi users prefer to develop the product based on the completely shape (Mean= 1.70) and (Mode= 2) and 60% of Non-Saudi users prefer to develop the product based on the incompletely shape (Mean= 1.45) and (Mode= 1). Also 60% of Saudi users prefer to develop the product based on the rectangular shape (Mean= 1.40) and (Mode= 1) and 60% of Non-Saudi prefer to develop the product based on the square shape (Mean= 1.64) and (Mode= 2). In the same vein, the tables shows that most of the Saudi and Non-Saudi users were strongly agree with their chosen which is based on their backgrounds and preference.

Appendix D: The results of the G*Power Programme.

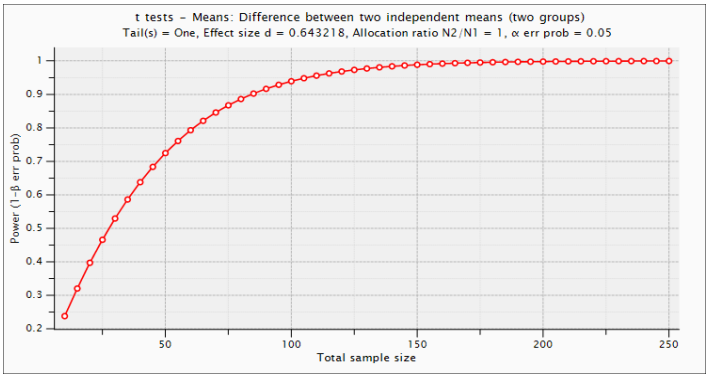
1- The Product Shape among Control +Treatment users



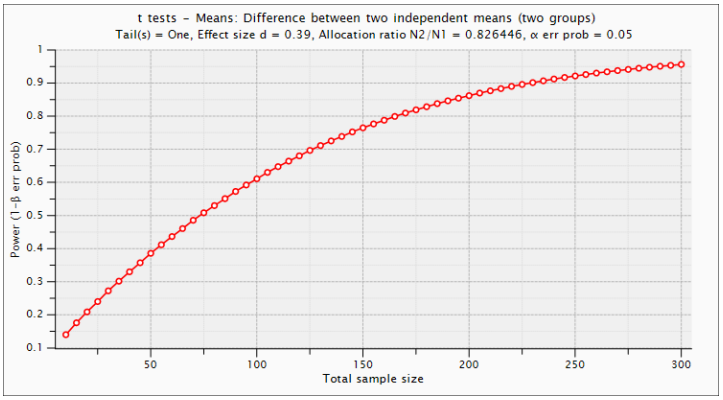
2- The Product Size among Control +Treatment users



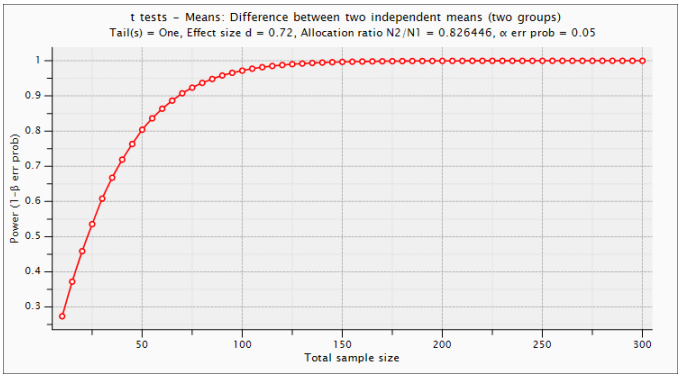
3- The Product Color among Control +Treatment users



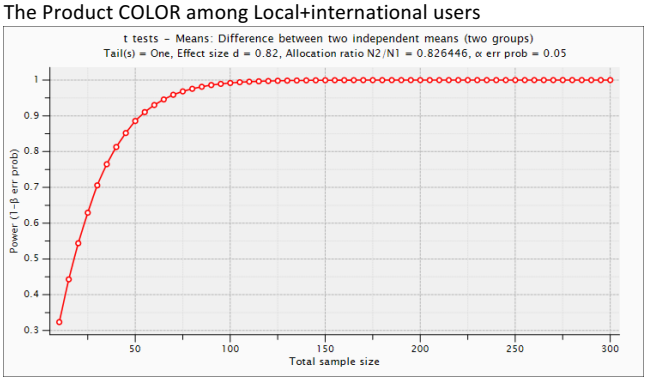
4- The Product Aesthetics among Control +Treatment users



5- The Product Shape among Local+international users



6- The Product COLOR among Local+international users



7- The Product Aesthetics among Local+international users