

[DOI: 10.20472/IAC.2017.031.007](https://doi.org/10.20472/IAC.2017.031.007)

**SUDHIR KUMAR ATREYA**

Indian Institute of Technology Delhi, India

**SONAL ATREYA**

Indian Institute of Technology Roorkee, India

**SUSHIL S**

Indian Institute of Technology Delhi, India

**RHICHA SHUKLA**

Indian Institute of Technology Delhi, India

## **DESIGN FLEXIBILITY IN PRODUCT FORMS**

### **Abstract:**

Flexibility in product Design has been defined as the 'Ability to change or adapt with economy of time, effort, cost or performance.' Hence Flexibility ensures the greater economy, adaptability and evolution of the product.

The form and aesthetics of a product is its unquestionable determinant of success in the market. In today's market, companies have to keep up with fast changing technologies, fashion trends, economy and user needs. This paper presents a review on the role of flexible design in finalising the form of a product, for achieving economy by design. The research work includes studying the form of few successful smartphones and cars and; from their understanding, deriving how forms played the role in success of the product in the market while the product and its iterations themselves follow flexible design.

### **Keywords:**

Design Management, Flexible Design, Economy By Design, Aesthetics, Product form, iPhone, Lamborghini.

**JEL Classification:** D47, O39, F17

## 1. Introduction

### 1.1 Flexible design

Today, manmade products are inseparable part of a person's life. There are many factors that affect the evolution of product, among which the most important ones are changing needs of the user, era, manufacturability, technology available, economy, legal and regulatory policy changes.

Every Designer, manufacturer, Businesses want their product to sustain and evolve to meet the changing demands that the market has to offer and this calls for the concept of Flexibility in Product Design. Flexibility in product Design can be defined by (Upton D.M., 1994) as the 'Ability to change or adapt with economy of time, effort, cost or performance.' Hence Flexibility ensures the greater economy, adaptability and evolution of the product.

Among the factors affecting Flexibility of the product the most important to cater is the changing user needs that is the demand, the demand of the user is in turn affected by the fashion trend, society, technology, economy and the aesthetic attitude of the user in a particular time space.

### 1.2 Form and its Significance

Throughout history and in every known culture, people have found pleasure and meaning in the use of their eyes. They have consciously attempted to produce objects of beauty and have delighted in them (Csikszentmihalyi and Robinson 1990, p.2).

Visual appearance has been a great motivation for a user to buy a product, many techniques have been innovated to get the perfect beauty for example -

a) Golden ratio, which has an application to yield pleasing, harmonious proportions in products, buildings and art.

b) We have Shadang also which is :

"|| रूपभेदः प्रमाणानि भावा-लावण्या-योजनम्

साद्रिष्यम् वरणाकाभाङ्गम् इति चित्रम् शदाकम् ||"

("Roopabhedah pramanani bhava-lavanya-yojanam |Sadrishyam varnakabhangam iti chitram shadakam ||") taken from ancient Indian scripts by Rishi Vatsyayana, which means that beautiful forms have a clearcut agenda or purpose to attract; when visible, they are directly appealing and are preferred, and there is no need to further explain them. Thus these ancient Indian scriptures also highlight and strengthen the importance of form and elements to achieve aesthetics of a product.

From above examples we can infer:

a) That in a cluttered market, product form is one of the ways to attract consumers, notice (Berkowitz 1987; Dumaine 1991; Jones 1991) form of a product, plays a very important role to make a product successful in the market.

b) Also the form of a product is extremely important as a means to communicate information to the consumer (Nussbaum 1993)

c) Product form creates the first impression of a product on the minds of the customers and helps in comparing the product attributes with that of the other product attributes in the same manner as the price does (Berkowitz 1987).

In one survey of senior marketing managers, design was mentioned as the most important determinant of new product performance by 60% of respondents; only 17% considered price as most important (Bruce and Whitehead 1988).

Similarly, an analysis of the performance of 203 new products revealed that product design (form) was the most important determinant of sales success (Cooper and Kleinschmidt 1987).

The various examples of products which were a huge success in market because of its form can be listed as:

Swatch which launched its products for with variety of unusual product form of wristwatches was successfully able to stand out in market (Hollins and Pugh 1990). With new products with distinct form and features can render old competitors vanish and future competitors a shallow struggling copies in the market (Midgley 1977).

d) Form of a product also helps to create brand value as we can see in products like Braun, Apple and Smith and Wesson each one of them have their individual design philosophies that also helps them to create a distinctive corporate character.

e) Apart from management considerations form of a product is also important because a product which is designed beautifully gives a sense of pleasure and sensory stimulation.

### 1.3 Factors that affect Product form

a) From the designers end the factors that affect the form of a product are:

Design goals and constraints which are constituted of ergonomics, performance, production/cost, regulatory/legal, marketing program and the aesthetic attitude of the designer

b) From the consumer end the factors that affect the form of a product are:

Individual taste and preferences which is constituted of innate design preferences, social and cultural context, consumer characteristics (personality, experience and design acumen) and the aesthetic attitude of the consumer.

#### 1.4 How can a product be Flexible with respect to the form of the product

We realize the need for flexibility in product and the importance of the form of the product with respect to the success of the product in market, since form is an important characteristic of product it plays a much important role in the flexibility of a product design

Three products series are taken into account to understand the role of form in making a Flexible product design.

## **2. Case Study**

### 2.1 Analysis of Apple iPhone from year 2010 to 2016



iPhone 4- Released 2010, June



iPhone 4S- Released 2011, October



iPhone 5- Released 2012, September



iPhone 5S- Released 2013, September

All iPhone Images. (Source : [gadgets.ndtv.com](http://gadgets.ndtv.com)).

Apple has maintained the basic form grammar of rectangular packaging and circular home button over the years to launch a number of products, as seen in the image above and the one following. Starting from iPhone 4 the basic form is rectangular outer casing incorporating a 3.5-inch touch screen. A little change in proportion could be seen with the launch of iPhone 5, which incorporates a 4-inch touch screen. This proportion is then followed on to launch further products like iPhone 5S and iPhone SE. It is interesting to see that almost 6 years has passed since the launch of iPhone 4 and technology has evolved many folds but apple is still following the same basic

form (core design) to launch modern looking products. Apple iPhone is still seen as a style statement and an aesthetically pleasing smartphone.



iPhone SE (right/rose gold Color) released in 2016, March, follows the same packaging design as that of iPhone 5S (left/golden Color), released in 2013, September. (Image Source : [gadgets.ndtv.com](http://gadgets.ndtv.com)).

## 2.2 Analysing the form of Motorola phones from year 2014-2015:

Motorola has used the same core design (basic form) to launch a number of products in the budget segment. Motorola's Moto G2, Moto G3 and Moto E that were launched at different price points and over different period of time has all same basic form. The only changes have been in that of detailing on the body of the phone like adding texture and metal strip on the back panel.



Clockwise: 1. Moto G2, Released 2014, September; 2. Moto E, Released 2014, May; 3. Moto G3, Released 2015, July.



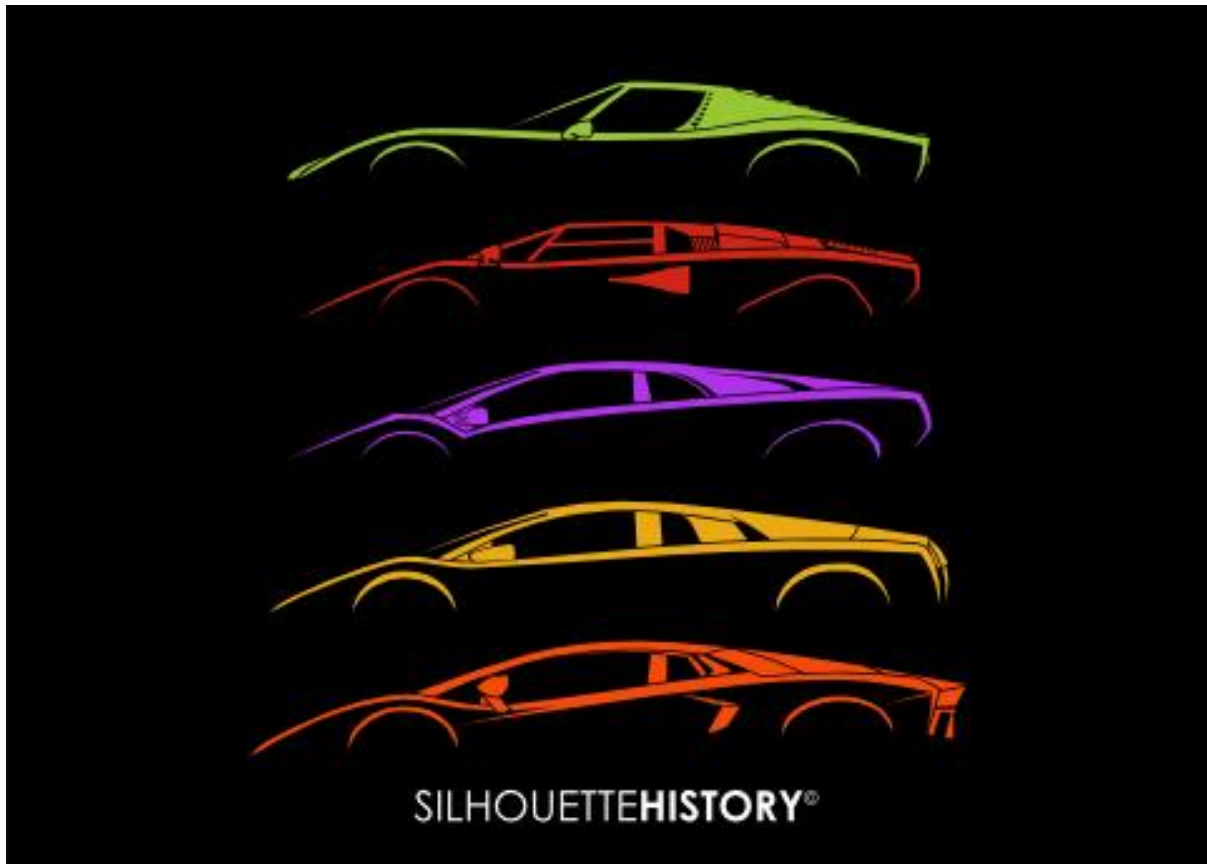
Motorola's Motto Phone Series (Image Source: Gadgetsaroundyou.com).

### 2.3 Analysing the form of car line up of Lamborghini over the years:

Needless to say that Lamborghini line up of cars are considered one of the best looking cars in the world. The following line described it the best possible way (Vaughn 1994, p. 15; on the Lamborghini Diablo):

“That shape-flat as a manhole cover and moulded to look like the wheeled equivalent of a long, wailing scream drives people nuts. They waded into traffic with cameras to take pictures, they cut across three lanes of freeway to give the thumbs up.”

This statement is true for almost all the flagship models that the company has launched using the same basic form. To get the clarity of the same we can see the silhouette of 5 flagship models of company over the years. These are as follows: 1. Lamborghini Miura; 2. Lamborghini Countach; 3. Lamborghini Diablo; 4. Lamborghini Gallardo; 5. Lamborghini Aventador.



On careful observation of Silhouette, one can see that Lamorghini designed its model-line on almost same segment-lines, rendering the same kind of form and character in all models. (Image Source : SilhouetteHistory.com)

That shape-flat as a manhole cover and moulded to look like the wheeled equivalent of a long, wailing scream can be seen over the line ups from Miura to Aventador.

### 3. Conclusion

All successful products continue to grab the market with innovation and design flexibility. Form of a product platform plays a very important role in determining the success of a product. In order to compete with the pace of innovation in technology, the companies need to incorporate flexible design in developing forms of their products. Changing grammar and form of a product may not always be the best approach to increase the chances of success of a product, but rather maintaining a same basic form over the years gives the product a legacy and helps the company to celebrate its own distinct and unique design language. A well thought of Form of a product adds more flexibility to the product with respect to changing demands, time, market competition, manufacturability and user experience as well. In addition to creating an identity of the product on the minds of the customers, the semantics of a refined form can achieve what form-juggling, form-gimmickery and form-varieties can not achieve.



## References

- [1] Peter H.Bloch (July 1995) *Seeking the Ideal Form:Product Design and Consumer Response*.
- [2] A.Bischof and L.Blessing(May 2008) *Guidelines for the development of flexible products*
- [3] William O.Bearden and Micheal J.Etzel (May 1981) *Reference Group influence on product and brand purchase decisions*.
- [4] Jan Jurging, *Flexibility:Bringing the one constant factor into projects*
- [5] P.K Palani Rajan, Michael Van Wie, at al., (2005) *An Empirical foundation for product flexibility*
- [6] Eun Suk Suh, Olivier L. de Week at al., (2005) *Flexible Product platforms: Framework and case study*.

“Roopabhedah pramanani bhava-lavanya-yojanam |Sadrishyam varnakabhangam iti chitram shadakam  
||”

"|| रूपभेदः प्रमाणानि भावा-लावण्या-योजनम्

साद्रिष्यम् वरणाकाभाङ्गम् इति चित्रम् शदाकम् ||"

Roopabhedah