

The Commoditization of Consumer Electronics Products and its Influence on Packaging Design

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ABSTRACT

The traditional purpose of packaging for consumer electronics (CE) products was to get them in one piece from the factory to the consumer's home. It was purely focused on the physical distribution. In that time, buying a CE product could be considered a major family investment. However, times have changed, as nowadays a trend of commoditization can be observed in the market of consumer electronics products. Commoditization is the transformation of a non-commodity product into a commodity. A commodity is a product where consumers perceive no difference between the offerings of different suppliers or manufacturers, other than price. Strictly speaking, CE products may currently not be a true commodity; however the term commoditization can be said to describe a process in which CE goods become more and more like daily supermarket purchases. The term commoditization is widely used in literature. A commoditized product is characterized by low-margins, high competition and low importance of brands.

This is an unfavorable situation for OEMs, as non-commodity products have higher margins. To be a non-commodity, products need to have some characteristics that make them stand out. This can apply to an entire product category or just specific brands.

This development has resulted in two changes in packaging design. For the commoditized goods the packaging has become more important as the silent salesman, just like Fast Moving Consumer Goods. For non-commoditized goods packaging has become more important in communicating the brand experience, hence also moving away from the original focus on protection during physical distribution.

This paper describes part of a larger PhD project on sustainable packaging for durable goods, which focused strongly on transport optimization through volume minimization.

This paper will analyze the process of commoditization, the coinciding changes in the retailing of CE products, and the resulting changes in packaging functionality. To describe the commoditization process several empirical studies will be presented; the change in retail will be described using (historical) literature; the change in packaging design will be described using observations of actual packages in the market.

Keywords: Marketing, Sales, Experience, Durable Goods

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1. INTRODUCTION

Consumer Electronic (CE) products have evolved greatly in the last century. They are the fruit of the industrialization in the 19th century. Some of the appliances, that we would currently call CE products, have mass-produced (manual) predecessors from the 19th century, e.g. sewing machines. The first truly consumer electronics product is probably the radio, which arrived in the main market in the 1920s. Since then, the number of different products has increased tremendously. Simultaneously, the purchase of a CE good has evolved from a major family investment to a normal thing, and in some cases, to an impulse purchase.

A trend of commoditization can be observed in the CE market. Commoditization is the transformation of a non-commodity product into a commodity. Strictly speaking, a commodity is a product where consumers perceive no difference between the offerings of different suppliers or manufacturers, other than price. A typical example of a commodity would be flower or sugar. Hence CE products may currently not be a true commodity; however the term commoditization can be said to describe a process in which CE goods become like daily purchases in a supermarket. The term *commoditization* is widely used in literature (e.g. De Neufville and Pirnar, 1999; Greenstein, 2004; Spector, 2005, p.65).

A real-world example of commoditization of a CE product is the Philishave (sold as Norelco in the US). For decades Philips held the patent for three-headed electric shavers, which is a product characteristic that was perceived as added value by consumers. After the patent expired, competitors also introduced three-headed shavers, thus commoditizing the market.

Within CE goods one can see a trend towards commoditization. The classic example in literature is IBM and the commoditization of computers (Beaty 1996, De Neufville and Pirnar, 1999). *"It [the shift from mainframes to PCs] has brought with it a shift in the size and volume of the products themselves – many more units of much smaller size, with much lower margins: our manufacturing value added has dropped from 40% in the 1950s to around 8% today."* (Beaty, 1996). However as Greenstein (2004) argues *"This fact [commoditization of computer] fosters a myth that all high-tech product markets eventually evolve into commodities."* Greenstein argues that a commodity market is the most likely market for any product, and that only occasionally a market player succeeds at obtaining a special position in which higher margins can be maintained. He presents several strategies for fighting commoditization, one of which is through creating added value. This might be extended warranty (De Neufville and Pirnar, 1999) or by building a reputation of providing frontier, yet reliable, products (Greenstein, 2004). Real-world examples of CE brands successfully escaping commoditization are Apple computers and Bang & Olufsen who obtained a special market position (partly) through exclusive product design.

2. EVIDENCE OF COMMODITIZATION

By studying to what extent CE products suffer from low margins, high competition and low importance of brands it is possible to determine the importance of commoditization for CE products. However, it may be hard to acquire direct data on factors such as low margins. Therefore a more indirect approach was taken. First phenomena that would indicate the existence of a commoditization trend will be discussed; second factors causing commoditization will be examined.

There are several developments in the CE market that demonstrate that commoditization is taken place. These are:

- the length of product cycles;
- prize erosion;
- the success of retail brands;
- product knowledge of consumers and sales assistants;
- the importance of impulse buying;

These factors will be analyzed in the remainder of this section.

There is a strong business belief within the CE industry that product cycles are getting shorter. However, literature is not conclusive on whether the time between introduction and retirement of a certain design is actually shrinking (Bayus 1994, 1998). However, there is no doubt that the period in which a new design can be sold at a substantial profit *is* decreasing.

As Beaty (1996) states: "On many of our products today, the window of profitability can be measured in a matter of months." The speed of prize degradation in a product category can be an indication of the extent to which that type of product is susceptible to commoditization. Minderhoud and Fraser (2005) discuss the subsequent introduction of video, first generation DVD and second generation DVD. Using street prizes and quantities sold, they demonstrate that the time-to-commodity has decreased from 30 years for the video to 3 years for the second generation DVD. The findings of Beaty (1996) and Minderhoud and Fraser (2005) indicate increased prize erosion in CE products. The characteristics that make products stand out (hence making them non-commodities) do so for only a short period of time.

One could say that retail brands are a good indication of a commodity market. If consumers do not believe that one specific supplier is distinctively better than another, they may be prepared to buy retail brands. Retail brands are usually cheaper than premium brands. This price advantage can make them successful. Looking at the Dutch market one sees that in the past some retailers have attempted to launch retail brand electronics (Vendomatic in 1972 & 1981, Skala in 1981-1984, Hema in 1986-1990). These attempts have long since been abandoned, although Hema does sell retail brand domestic appliances nowadays. However, as Eagle (et al, 2000) describe, retailers are constantly looking to strengthen their position, by moving into markets new to them. In markets where there are already strong brands Eagle (et al, 2000) foresee the appearance of co-branded products. This is a development that might occur in the CE market; products co-branded by a large retailer and a traditional CE brand. Spector (2005, p. 71) mentions several examples such as Costco selling retail brand dishwashers build by Whirlpool.

Due to the Internet consumers have become more knowledgeable about CE products. At the same time, due to the quick changes in products offered and the vast array of products on offer in large CE retail stores, the product knowledge of the sales assistants seems to have gone down. It is not uncommon for a sales assistant to answer a question of a customer by looking up the answer on the packaging or the information on the extended prize tag. Or as Spector puts it (2005, p. 185):

"Consumer electronics has become a low-prices commodity business, so that it is difficult even for specialty stores to make much in the way of sustained profits. A DVD player, for example, is familiar to most consumers, so discounters such as Wal-Mart and Target can pile them high and sell them cheap without having to hire knowledgeable sales and service help. Manufacturers put as much product information as possible on their Web sites (as well as the boxes the products come in), so that the customer is given enough data to make an informed decision, regardless of whether the purchase is ultimately made at Costco or Wal-Mart or Best Buy."

In a previous study, also presented at IAPRI (Wever, De Vries *et al.*, 2007) the importance of impulse buying in the CE market was analyzed, showing a remarkably high level of impulsive purchases, even in high prized categories such as flat TVs.

The previous has demonstrated that a process of commoditization is in fact taking place. The question remains however what is causing this phenomenon. Several phenomena can be identified which may to some extent cause a product (category) to become commoditized. These are:

- the financial commitment consumers need to make, i.e. the development of price levels in comparison to consumers disposable incomes;
- the perceived quality differences in products within one product category;
- the number of brands available in the market;

In this paper the last two will be analyzed further.

PERCEIVED PRODUCT QUALITY

If the quality of all products offered in a certain category is at least good, or the quality of all products is more or less equal, this would make these products more into a commodity, as it eliminates quality differences from the buying decision. This raises the question whether CE goods are of better quality today than they were some decades ago, and/or whether the spread in quality has declined. Here, quality is taken to mean reliability, usability and durability.

Testing to which extent quality has become less important is difficult. The perception of consumers changes over time (e.g. the battery lifetime of mobile phones, or the number of pixels in a digital camera). A product that would be perceived as very good three years ago may be mediocre in today's market. Hence, to operationalize this concept an information source was selected that judges products on a consistent scale but with evolving criteria; the product tests by consumer organization *de Consumentenbond*. Their evaluation of the quality of consumer durables is useful for this analysis, as they represent the expectations of product quality among consumers at the time of the test. The *Consumentenbond* has tested the available products in a product category, and awarded total scores ranging from bad to very good. There were also some products tested as unsafe, which for this analysis has been taken to be one step worse than bad. The tests performed on electrical and electronic consumer goods were reviewed for three periods; 1983, 1993 and 2002- March 2003 (as of April 2003 the presentation of test results was changed which makes comparison with previous results dubious). The products included audio/ video equipment, DIY tools, personal care products and domestic appliances. Figure 1 shows the results of the analysis. The figure allows the conclusion that the spread in scores has reduced somewhat, and the average quality has increased.

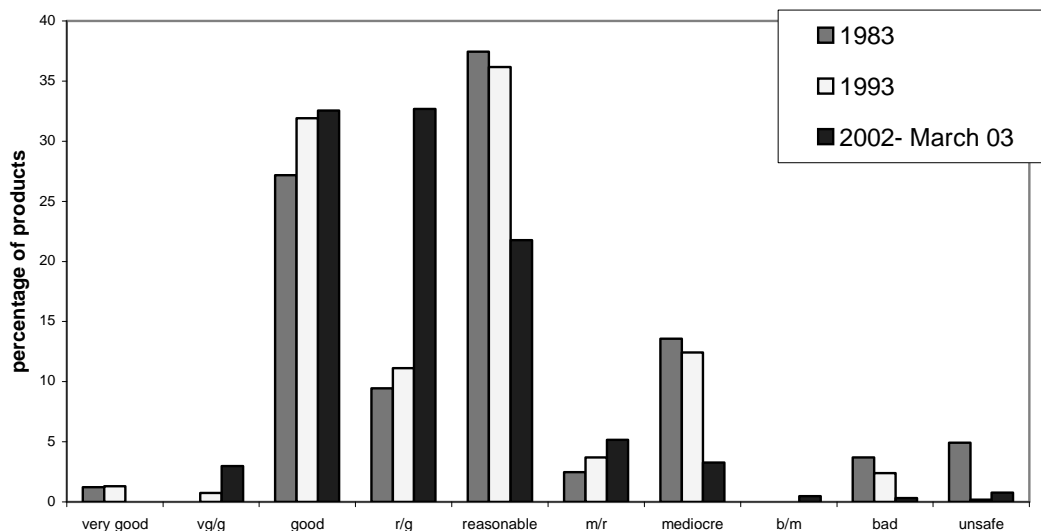


Figure 1: the spread in test scores as given by *de Consumentenbond* for electrical and electronic products for three periods, 1983 (243 products), 1993 (539 products) and 2003 (639 products). Based on data from *de Consumentengids*.

NUMBER OF BRANDS

A factor that may also be relevant to commoditization is the number of brands available on the market. More brands mean that there will be more competition and that it will be harder to distinguish oneself from the competition. To research this factor an analysis was done for the Dutch market by studying the tests of television sets by the *Consumentenbond*, the Dutch Consumer organization. It was assumed that they try to give an honest review of the entire market, thus including all brands that are readily available. For the period 1968-2004 all tests for television sets (48 in total) were studied to see which brands were included. If brands were reviewed regularly, but not in each test, it was assumed that this brand was also available between the tests in which it was included. Thus a picture was developed of the number of brands available (see Figure 2). From this figure it is evident that the number of brands has

reduced in recent years, but is still close to a dozen competitors¹. This number is considered large enough for a level of competition were commoditization can occur, but as the number has decreased in recent years, it can not be seen as a direct cause for commoditization.

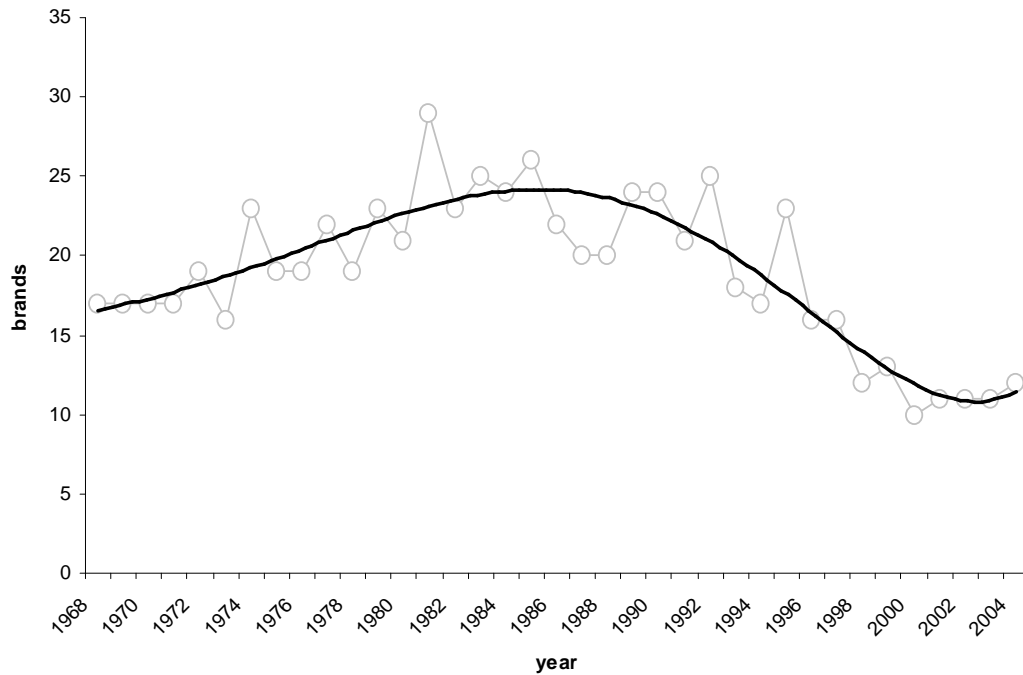


Figure 2: Number of television brands on the Dutch market (1968-2004). Data points represent the number of brands reviewed in comparative tests by the Dutch consumer organization *Consumentenbond*.

The previous sections demonstrated that commoditization is clearly taking place in the CE market, as most CE products can only temporarily command higher margins. Some of the driving forces behind this development were identified. Quality of CE products seems to have improved in the eyes of the consumer, in the sense that there are hardly any bad or mediocre products left in the market. Furthermore, the spread in quality between brands appears to have gotten smaller. As the financial commitment needed to purchase a CE product has gone down, this makes a purchase decision easier to make.

As stated in the introduction to this paper, one can say that commoditization is used to describe a process in which products become more like daily purchases in a supermarket. If one looks at the retailing of CE goods, one can see a historical development, in which the retailing is also evolving towards a more supermarket-like environment. This development will be analysis in the next section.

3. THE CHANGE IN RETAILING

With the societal and economic developments described above, the way consumer electronics have been sold has also evolved over time. It will not be argued here whether these developments are in part the cause of the process of commoditization, or a consequence of it. In the next section the development in CE retailing will be described, by analyzing the different types of retail environments. Most will be mentioned only briefly, but

¹ Please note that this only refers to the brands available in the market. Many brands that used to be (readily) available in the Netherlands still exist (e.g. Telefunken, Loewe, Finlux), but are not on the Dutch market anymore. For this analysis the *real* range of brands consumer can choice from is relevant, not the number of brands in the world.

special attention will be given to the ones relevant to this paper; brand stores, category killers and hypermarkets.

Originally consumer electronics were sold in specialist stores. History shows that there used to be specific outlets during the introduction years of specific CE products. Before WWII one saw Radio shops, electricity shops (for lighting), gas shops (for stoves and heating), see Westwood & Westwood (1937) for some examples. Later, in the 1980s, the phenomenon re-emerged with the specialized Personal Computer stores, of which there are still quite a few around. Later most stores became more general in their merchandise, thus evolving into independent CE stores.

In the mid 1900s the department stores moved into the electronics market. The Dutch department store *Magazijn de Bijenkorf* already had a radio department in 1925 (Miellet, 1999, p.215). Although these stores in total were much larger than independents, their respective departments were not extremely large. The department could be described as a shop-in-a-shop. The display of goods and the number of shop assistants were similar to independent shops. The innovation of department stores lay in fixed prizes, and the idea of making profit through low margins combined with high turnover.

In a response to department stores, which had been able to buy cheaper because they had introduced cash payment, independent store keepers started to organize; the birth of the chain store. As a group they were able to buy in higher quantities, thus demanding even lower prices than the department stores. Department stores were all single stores then, although they too started to open new branches in a response to the emerging chain stores. This competition with chain stores was evident in most departments that were present in department stores. As consumer electronics were just arriving, this development seems to have taken effect only after WWII. For example, Best Buy started out as an independent store in 1966, which expanded to 9 location in 1980. In 2006 Best Buy was the largest consumer electronics retailer in the U.S. Circuit City, which is currently the 3rd largest retailer in the U.S. started out in 1949 as an independent store, expanding to four stores in 1959.

RadioShack, another well-known electronics retailer in the U.S. started out as an independent in 1921, growing to a handful of shops around 1960. All three now fall into the group of category killers.

Specialist stores, department stores and chain stores have in common that they sell products from multiple brands, which they display in the store unpacked. Only after a purchase a packed product is collected from the backroom by a sales assistant. These retail formats still play an important role in today's CE retailing, but there are also several other retail concepts that take a different approach.

BRAND STORE

In CE there are a few examples of brands that are sold through brand specific outlets. For some decades this has been the case with Bang & Olufsen. In recent years the best known example has become Apple, which operates high profile Apple Centers all over the world. The brands that operate such outlets usually distinct themselves from mainstream products. In both the case of Bang & Olufsen and Apple this is done through design. The products are usually priced in the top-end of the market, and one won't often find items on sale here. This is typically a retail format fitting the brands aiming to escape commoditization. The packaging plays hardly any role in the purchase, but customers do expect design-packaging. Hence it does play an important role in after-sales experience.

CATEGORY KILLERS

Starting in the US the retail format of several chain stores changed. Store sizes were increased, and locations were moved to outside town centers. Big Box retailing emerged. This development started with toys (toys 'r us). The new format was based on large stores with a very complete collection of products within a clearly defined narrow market. These new stores are called *category killers*. The idea is to sell large numbers of products at low margins (which is the same success formula of department stores around 1900).

These formats are gaining market share fast, at the cost of small and medium size retail formats that traditionally dominated the CE retail landscape. For instance, in 2004 69 new Saturn and MediaMarkt stores were opened in Europe, bringing the total to just over 500.

Category Killers are typically catering to 'price buyers'. To keep prices down use of floor space is maximized and the number of employees is kept relatively low. In MediaMarkt and Saturn stores the shop floor is used as storage space. Packed products are available on the shelves, and many consumers make their purchase choices without contact to sales assistants.

HYPERMARKETS

In more or less the same way in which chain stores evolved into category killers, there has been a development in which supermarkets evolved into hypermarkets. Eventually mega-stores emerged that combined an extensive assortment of fast-moving consumer goods with durable goods. The best-known example is Wal-Mart, currently the largest retailer in the world. The same format is also applied by other retailers, such as Carrefour and Auchan in France. The assortment of durable goods consists of e.g. clothing, sporting goods, and CE goods. Hypermarkets, just as category killers, display packed products on the shelf in a self-service environment.

This can be seen as a typical sign for commoditization of a product; ending up on the shelf of a hypermarket or supermarket. It requires that consumers are knowledgeable enough, and the prices are low enough, for consumers to be capable and willing to purchase in such a retail setting (Spector, 2005, p. 185). This is illustrated by a quote of Alan McCollough, chairman and CEO of Circuit City: "*Who would have thought that five years ago, when DVD was introduced at \$600 (a player), that today the market share leader would be Wal-Mart? Because a DVD player is now \$39 and you can throw it in a cart.*" (quoted in Spector, 2005, p. 66. original ref.: "Circuit City Stores Will Offer Private-label Brand Products," Wall Street Journal, 31 March 2004)

This different way of displaying and selling CE goods, combined with the importance and power of these retailers has led to changes in the way these goods are packed, as will be discussed in the next section. The power of retailers is shown through demanding certain pack dimensions to fit their shelf heights, their demand that goods be palletized to optimize utilization of their warehouse system (irrespective of efficiency in the rest of the chain) and, most extremely, through Wal-Mart's Packaging Sustainability Scorecard. Here Wal-Mart has practically decided what sustainable packaging is, and forced this definition on all its suppliers, because it uses the scorecard in purchase decisions. Thereby Wal-Mart's definition of sustainable packaging will largely become their suppliers' definition as well.

4. INFLUENCE ON PACKAGING DESIGN

This paper has discussed the changes in retailing of CE goods, emphasizing the move to retail concepts where packed products are on the shelf for consumers to select. The packaging plays an important role in attracting consumer attention in order to ensure the specific product is noticed and considered by the consumer, to communicate the advantages of the specific product (and brand), and to close the deal. Even though shop assistants can still help consumers if required, many consumers will buy products unassisted. This puts considerable demands on the packaging, which are illustrated perfectly by the following quote:

At the point of sale it is necessary to communicate what the product is, what it can do for the consumer, and why it is better than any other product offering from our competitors in that specific category. In addition, it is also has to convey a general impression of the company as a whole. This is no easy task, given the cacophony of messages and choices potential buyers are faced with. Packaging plays a crucial role in persuading consumers to buy. This is particularly true in American hypermarkets, where consumers make a choice purely based on the packaging and unaided by sales personnel. Approximately 80% of all consumer electronics products in the US are sold this way - which is why packaging is also referred to as the 'silent salesman'. (Marzano, 2006, p. 368)

Packaging designers faced with such challenges often choose increased packaging volumes as a means of fulfilling such sales functionalities. As demonstrated in a previous study (Wever, Boks et al., 2007a) this can lead to packaging that is 20 to 40 times as voluminous as the product contained within, and fully loaded sea containers, of which the volume percentage actually occupied by products is as low as 4%.

Next to attracting attention, self-service retail concepts put another challenge on packages, that of tampering. There can be several reasons for people to open packages, for instance to check to completeness of the contents or the color of the product. These kinds of consumer actions may damage boxes, or cause accessories to go missing. In either case the product may become unsalable. Next to that, pilferage issues may cause a retailer to prefer voluminous and hard to open packages. Finally, some products require a proof of newness, particular those related to personal hygiene (e.g. electric toothbrush). All these issues result in a retailer demand for tamperproof packaging. The most common version of tamperproof packaging is the clamshell or blister, which consists of two plastic shells which are sealed around a product, or a plastic shell glued to a cardboard liner. This does however present problems of openability, which in turn may conflict with marketing goals (Wever, Del Castillo, 2006).

Several retailers will put additional safety strips around packages which could otherwise be easily opened, or place packages that are deemed too valuable and small into sealed plastic cases (see Figure 2). In both cases, this will likely have negative effects on the pursued sales performance.



Figure 2: anti-tampering strips added to packaging (left), and anti-pilferage plastic containers (right). (source: Hettema, 2005).

5. ENVIRONMENTAL ASPECTS

The previous sections have demonstrated that the developments in socio-economical circumstances have led to a different way of retailing of CE goods, and subsequently to a different way of packaging these products. These developments in packaging design are negative from an environmental perspective, as well as from the perspective of direct costs. They are however quite real, and their bad environmental performance is not sufficient ground for established businesses to change them, although environmentalists may wish differently, as is demonstrated by the following quote:

“The degree to which modern packaging serves marketing, branding, and sales interests rather than fulfilling the more essential functions of safety, efficiency, convenience, delivery, and environmental health and safety deserves to be questioned.” (Imhoff, 2005, p. 12-13)

The aim of the PhD project of which this paper represents a part is to demonstrate that different functionalities can be balanced in such a way, that the environmental burden is

considerable decreased (see also Wever, Boks, Stevels, 2006, Wever, Boks *et al.*, 2007b, Wever, *et al.* 2008).

6. DISCUSSION AND CONCLUSION

As this paper demonstrated the CE industry is an industry of “change”, where new products are introduced at a high rate and the time window for turning a profit is limited. Hence the design process is under continued time pressure. For packaging design this means that there is little time for the development. In optimal cases packaging design is partly parallel to product design, *i.e.* concurrent engineering. However, irrespective of any concurrent engineering, there often is limited time for testing (both mechanical and consumer testing).

Larger and fewer retailers control access to the consumer. Whereas it used to be OEMs determining what products would be introduced into the market, nowadays the large retailers, be it category killers or hypermarkets, decide which products will be available to the public. Furthermore, they can enforce their opinion on how these products should be offered. The demands retailers set on packaging are non-negotiable for most OEMs.

Due to commoditization in the CE industry two trends can be observed. On the one hand there are brands that accept the commoditized market and try to turn a profit through the combination of low margins with high turnover. These products are often characterized by sales packaging. On the other hand there are brands which are trying to escape commoditization through offering specific added value. Their products are often characterized through experience packaging. Both sales and experience packaging are far more elaborate than the brown cardboard box originally used to ship CE products. From the perspective of environmental impact and direct economical costs more needs to be done to balance these new packaging functionalities with the old ones.

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