

Planned Obsolescence

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Abstract— Planned Obsolescence, which can be used interchangeably with programmed obsolescence, and can be either product obsolescence or technology obsolescence, is the intentionally producing goods and services with short economic lives and that stimulates consumers to repeat purchases in a shorter period of time [28]. Few decades ago, there was a strong debate about its ethicality and now it is back on the radar again due to the short cycle times of products coming to the market. This paper will explain why the practice is widespread among various industries and why it works even in a perfectly competitive market. In addition, it will examine the effect obsolescence has on the environment.

Index Terms— Planned; Programmed; Obsolescence; Economic; Sustainability; Ethics; Environment; Profit; Product

1 INTRODUCTION

With improved new product development processes and faster production cycles, firms now have the ability to produce new products quickly, which increases the motivation to replace current products in the market.

While consumers may see planned obsolescence as something producers do to increase profit, Phillip Kotler, one of the greatest marketing professionals, said it is a result of competitive and technological forces in a free market.

Schumpeter's theory [27] also supports the notion that established firms can be displaced by innovative firms using the "creative destruction" process. While some planned obsolescence can be necessary to increase investment in research and development, firms tend to use it to maximize profit rather than benefit consumers.

2 OBSOLESCENCE

The purpose of planned obsolescence is to force consumers to purchase newer products by shortening the natural end of life of the current product they own. This can be fostered by companies either through physical obsolescence mechanisms [28] or technical obsolescence mechanisms [25].

Physical obsolescence is the act of intentionally shortening a product's usable life. There are several types of physical obsolescence, but I will only focus on three major ones:

1. *Limited functional life design*: This is a process whereby producers design products to deliberately last for a definite period of time. Slade [28] described this process using a very interesting example of portable radios that were designed to last for just 3 years. Another example is the life of a light bulb; it lasts for about 1,000 hours since the formation of the Phoebus cartel [26], whereas it lasted from about 2,500 hours to forever until then.

2. *Design for limited repair*: Items that are difficult to repair as the high price of repair discourages consumers from repairing and they rather replace their product instead [24]. Examples of this type are disposable cameras and iPod shuffle.
3. *Design aesthetics, which leads to abridged satisfaction* [12]: Some products are designed to wear and tear easily through polishing of the final product. This includes the products that are designed to look old as soon as a newer version gets to the market.

Technical obsolescence is when producers introduce new product to replace the existing one. It is more common in electronic products. It is "voluntary" as the device is still working and does not need to be discarded, but the current state of the product does not provide the satisfaction consumers want from their product due to the fact that newer versions with more functions are available [9].

Technology obsolescence is achieved through design for enhancement [19]. Most of the technology products we have now are updated regularly. For instance, DVDs replaced VHS.

3 WHY OBSOLESCENCE

Planned obsolescence emerged at the same time as mass production started taking off because supply outweighed demand and consumers did not purchase all the products that were produced. The only way to solve the problem was to make them not last as long as they could.

Maintaining high rate of growth is a challenge to producers and durable goods exacerbate the problem. The longer a product lasts, the fewer repeat purchase take place [7].

Second hand products add to the problem because they compete with new version in the same line. Thus, long durability is a drag on profit and that is an incentive for producers to produce goods with short economic life.

Obsolescence therefore enables firms to increase revenue through faster replacement, reduce competition from used goods market and make "second hand" market less attractive

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replacement as those goods can cost more in the long run [20].

Technology has really advanced and has enabled faster new product development cycle. The ability to concurrently develop products has led to faster production processes and also shortened the time needed to adapt to demand and competitive actions. This system is designed on economies of scale model and sustaining it requires companies to replace products faster and increase consumption. As mass production made prices fall, consumers can afford to shop for fun and not for need [18].

On the other hand, studies have shown that rates of technological obsolescence improve consumers' perception about the quality of the product. Fast product improvement makes consumer value purchases made now more than when improvements are not visible. Study also shows that consumers perceive frequent updates as improvement to their current device [5].

Putting all these together, both the economic motives of producers and the insatiable demand of consumers have made obsolescence an attractive plan.

4 CONSEQUENCES OF OBSOLESCENCE

Although the driving force behind this practice is to ensure used products don't compete with new products or new products should be much better off than its predecessors to instigate replacement, it should be unethical to produce products that have short economic lives [17].

What we see around us today is the negative effect of not just obsolescence but also our culture of consumption¹; what we see in landfills around the world especially developing countries is a testament to that. The United States alone discards about 100 million mobile phones and 300 million personal computers on a yearly basis. To make matters worse only 20,000 of the approximately 20 million TVs sold are refurbished. That leads to excess lead, mercury and toxic gases, which result in huge environmental damage and health hazards [4], [28].

The obsolescence practice has therefore increased resource consumption, caused exponential increase in pollution and massive amount of waste disposal.

5 SELECTED CASES OF COMPANIES/INDUSTRIES PRACTICING PLANNED OBSOLESCENCE

To illustrate product obsolescence I will present a few selected cases.

5.1 Case 1: Apple Products

Apple MacBook Pro retina display cannot be fixed if broken without sending it back to Apple, the battery is glued in with industrial strength glue, and the screen is bonded. ifixit, the

popular website that tears apart Apple products to show consumers what is inside their laptops, couldn't remove the battery and it was given a score of 1 out of 10 for reparability². In addition, Apple uses proprietary pent-a-lobe screws to prevent anyone from opening the laptop for repair³.

Upgrading the RAM or the SSD (hard disk) in the MacBook Air is impossible as it is soldered to the logic board. To make matter worse, the display has no glass protecting it, which means that if the screen is damaged you may have to replace your laptop or pay for an expensive repair. Apple also uses proprietary tools to open any of their products, which means that when something breaks down one needs to buy tools that are made bespoke to Apple and can only be used on Apple products.

New Apple and other technological firms products are released regularly but with only incremental improvements. On the other hand, replacing or fixing any of the parts of Apple products, such as battery, is expensive when the product is no longer in the warranty period. Therefore, if you are on a contract (for mobile device), rather than shoving out money for new fix or battery, designed to last only for a limited period of time, it is only natural to upgrade due to the affordable pricing model. However, if you are unlucky and without warranty or option to upgrade on contract, you may have to pay a hefty price to fix the product and purchasing a newer model with all the additional "benefits" will all of a sudden make sense as the difference will be minimal. The worst example in Apple's portfolio of products is the iPod Shuffle, which costs about \$49 to purchase but replacing the battery cost \$49 as well so it only makes sense to purchase a new device once the battery is worn out.⁴

5.2 Case 2: Inkjet Cartridge

In some cases new inkjet cartridges can cost more than the printer. Inside these cartridges are chips that will prevent the cartridge from printing when one of the inks in it reaches a certain level even though what is left inside is enough to do the job. In addition, smart chips are being inserted into cartridges to prevent them from working after refilling them. This practice is a clear example of obsolescence as the cartridges could be re-used several times but manufacturers want consumers to buy new cartridges every time. The Brother HL-2140 Toner, for instance, prompts the 'out of ink' message when there is still ink in it. However, if one covers the sensor with tape and puts the toner back into the printer, it will continue using the toner and will print another 200 pages or so with it.⁵

In addition, the message written on the back of one of the Lexmark printers' cartridge boxes reads:

² <http://www.ifixit.com/Teardown/MacBook+Pro+15-Inch+Retina+Display+Mid+2012+Teardown/9462/3>

³ <http://www.geekosystem.com/apple-pentalobe-screws/>

⁴ <http://www.ifixit.com/blog/2011/01/20/apples-latest-innovation-is-turning-planned-obsolescence-into-planned-failure/>

⁵ http://www.youtube.com/watch?feature=player_embedded&v=hPCGZZIdXyM

*"The patented print cartridges contained inside are licensed for a single use only and are designed to stop working after delivering a fixed amount of ink. A variable amount of ink will remain in the cartridges when replacement is required. After this single use, the license to use the print cartridges terminates, and the used cartridges must be returned only to Lexmark for remanufacturing, refilling or recycling. If you do not accept the terms of this single use license/agreement, do not buy these products."*⁶

According to research by printer manufacturer Epson⁷, 60% of inkjet cartridges go to waste; ink efficiency for printing photos is 50% and 47% for documents. Furthermore, research done by TUV Rheinland showed that Kodak EasyShare printer is the worst performer as its efficiency level is only 40%. This means that more than half of the expensive ink goes to waste. The main reason for this practice is to ensure customers repeat purchases sooner than needed.⁸

5.3 Case 3: Textbook

This is an unusual suspect as it is academic related but it makes my list because publishers revise editions more often than required to kill off the used textbook market. Even if that is not the reason for periodic revision some economists have argued that it is not necessary to revise them as often as they do [20].

The initial price has captured the future value of all transactions [20] and if new editions are issued to keep the content up to date, there are technology advancements to make "the up to date" content available online for free through mediums already in use by the publishers.

6 ECONOMICS OF PLANNED OBSOLESCENCE

After the great depression in 1929 it has become obvious that the economy is driven by consumption and not just production. Swan [30] argues that durable goods producers do not gain anything in setting a maximum life unit for their products because the interest in durable goods will decline over time as new products with better functions enter the market. However, Benjamin and Kormendi [3] and other theoretical models⁹ find that under certain conditions, such as increased availability of used products, producers may want to increase profitability by setting a limited life for their product.

Some scholars say producers introduce new products to kill used units while others say used units cannot compete against new units because of the differences, such as the price and functions. However, my observation is that consumers want

more every time due to factors such as easy access to credit, disposable income, and consumption culture. Companies, on the other end, try to gain more market share, stand out from competition and above all please shareholders. With all these factors put together into consideration planned obsolescence can be justified.

All of these factors contribute to the effect of planned obsolescence, which indicates that, in contrast to popular notion that planned obsolescence is a way of making more profit, obsolescence is also a result of consumers' consumption pattern.

The consumers' attitude of "what you have done for me lately that counts" [13] is a huge contribution to technology obsolescence as competition is fierce and firms have to strive to keep customers loyal. Therefore, by releasing products with incremental updates consumers are satisfied and producers get their desired return.

Planned obsolescence thus benefits companies producing modern products. In addition, it encourages investment in research and development [8].

7 RATIONALE BEHIND PLANNED OBSOLESCENCE

In a free market durable goods mean lasting goods and having sold off durable goods to consumers, producers have the incentive to reduce the price in the long run to capture more market share. Consumers, on the other end, are aware that prices will come down after an unknown initial period and those who do not really value the goods would wait for the price drop before making a purchase.

This current market effect means that producers do not capture as much profit as they want. This effect was explained by Coase [11] and has been further developed by Bulow [6], Bagnoli, Salant, and Swierzbinski, [2] and others.

If producers are able to alter this market effect by distorting technology, they can make more profit even though this strategy restricts the market and reduces consumers benefits [15], [22], [32], [33]. Drawing from previous conclusions, producers have the incentive to obsolete the goods they produce over a time period [7], [10], [31].

Compelling consumers to replace their products will generate long-term sales. Firms that undertake this kind of practice believe that the additional revenue this practice generates contributes to the cost of research and development and also prolongs the life cycle of the product line. However, critics like Vance Packard [25] argue that the process is purely to exploit consumers and waste resources. At the same time, scholars in support claim that it drives technology advancement, improves material well-being, brings innovation to the industry and provides employment.

⁶ Real Life Research 02/20/2011; <http://printerinkobsolescence.wordpress.com/tag/printer/>

⁷ Epson did the research to prove that the environmental impact of ink waste is justifiable as it is cheaper and also less wasteful to use their printers with individual ink tanks.

⁸ <http://www.pcworld.com/article/132969/article.html>

⁹ Theoretical papers on planned obsolescence include Bulow (1986), Choi (1994), Waldman (1996b) and Fudenberg and Tirole (1998).

8 ETHICS AND RESPONSIBILITY

Researchers have shown time over time again the enormous contribution of technology to the society but the benefit of some goods may not outweigh the societal cost [23]. It is the society that pays for the environmental damage that results from the disposal of durable goods that could have lasted longer than the time they are designed for, and the more frequent the disposal the higher the environmental damage as a result of obsolescence.

Planned obsolescence is not just the responsibility of producers; it is a shared one because

1. Designers working on developing new products design them to last for a shorter period of time for their gain as well as for the benefit of the corporation they work for [21].
2. The product replacement managers release new products often, thereby making consumers think the product they currently hold has less value due to the illusion of benefits they may get from the upgraded version [16]. Sonntag [29] also shows in his article that the World Business Council for Sustainable Development (a CEO led global association of about 200 companies) excluded the extension of product durability in their manifesto of eco-friendly practices because of the financial gains it brings. In addition, the association claims planned obsolescence brings about higher level of employment.
3. Consumers also act unethically; not only when they dispose of products in ways that damage the environment, but also when they purchase items that are of marginal benefit to them. This can lead to different social dilemmas that include the cost and effort of recycling, giving up desirable benefit to purchase eco-friendly product and denying one self the gratification of purchasing an updated product. Some scholars like Ferrao and Amaral [14], however, argue that public policies directives, such as the EU minimum reuse and recovery rate for end-of-life automotive vehicles, can solve this issue. However, there is no way we can properly check that it has been enforced.

9 CONCLUSION

This paper has analyzed the motivation for planned obsolescence, which can be profit motivated from the producer's perspective and the insatiable demand from the consumer's perspective. What is not clear and would require further research is the effect on employment and the type of effect it has on innovation. Is the effect on innovation an upward one where products are improved to do more or a downward one where products are improved to do less in order to get more from the consumers?

Reforming planned obsolescence is not enough to solve the problem. We need to rethink our entire economic system and values. We need a cultural change because our culture makes

us rely on objects to give self-esteem, happiness, satisfaction and identity. We should not forget that happiness does not depend on consumption [1].

Gandhi once said, "The world is big enough to satisfy everyone's needs but will always be too small to satisfy individual greed"¹⁰.

Business and sustainability can go hand in hand if policies set at the government level are enforced, if firms put into consideration the true cost of resources that have been used, the energy consumption, indirect energy consumption such as transportation cost and other costs to the society, and consumers take responsibility for ensuring products are disposed properly.

This paper proves that the current economic system supports planned obsolescence by encouraging our consumption culture. Further research should be done into whether an alternative economic model could change the way we consume, thereby reducing incentives for planned obsolescence and the tremendous effect it has on the environment.

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¹⁰ <http://mindprod.com/ethics/gandhi.html>

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