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Exploratory Study about "Planned Obsolescence: A Tool for Business Plans and Strategic Decisions"

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Abstract

With the consumption reaching maximum numbers and the technological sector being responsible for the introduction of new products every week consumers are starting to be much more concerns with several aspects of durable good and not only the price and its purpose. Producers are forced to push new models and versions of their products to the market to continue to operate on an evolution and progress basis for fighting and maintaining their market share. Although that so called technological progress is forced and does not correspond to an actual evolution in the performance of the good.

Companies, mainly durable goods producers, have been using one business practice that always has been observable to the eyes of the consumer but never noticed. That concept is the key aspect of this work and it is called Planned Obsolescence. That basically corresponds to the deliberate manufacturing of a certain good with the objective of stop working or becoming obsolete after a certain period of time, normally a small period.

Following the literature review, this work has as an objective to explore this concept, its ramifications and implications for the economy and the society. Also has the objective to study the behaviour of consumers when purchasing durable goods and which attributes they value the most. The key objective of this work in a preliminary phase and in a critical way, is to obtain a first understanding about the thematic and their implications not only for the consumers but also for the companies. This work represents a different approach about Planned Obsolescence, embracing not only how companies take decisions based on it but also how consumers react, relate themselves with the goods that have it and see the companies that apply it. Concluding, this work tries to explain not only the ramifications of the concept but also how it is seen by the society.

Keywords: *Planned Obsolescence, Durable Goods, Strategic Decisions, Consumer Behavior*

JEL: *L01, L15*

Resumo

Com o consumo a bater recordes históricos e o sector tecnológico a ser responsável pela introdução de novos produtos todas as semanas, os consumidores estão a começar a ficar muito mais preocupados com várias aspectos relacionados com os bens duradouros. Os produtores estão a ser forçados, pelas características competitivas do mercado, a lançar cada vez mais novos upgrades e modelos dos seus produtos para o mercado. Isto faz com que operem numa base de evolução e progresso tecnológico para manter a sua cota de mercado. No entanto "o tão chamado" progresso tecnológico é considerado forçado e não está a corresponder ás necessidades de mercado e à actual evolução de performance dos bens. Isto significa que as evoluções tecnológicas não estão a ser eficientes e não alteram drasticamente a tecnologia inerente aos bens.

Empresas que normalmente sejam produtoras de bens duradouros, têm vindo a utilizar uma táctica de negócio que sempre foi observável aos olhos dos consumidores mas poucos a identificaram. Esse conceito é o aspecto chave deste trabalho e é chamado Obsolescência Planeada. Este conceito significa muito basicamente que um certo bem é deliberadamente desenhado para que depois de um pre-determinado periodo de tempo deixe de funcionar ou fique obsoleto.

Seguindo a revisão literária, este trabalho tem com objectivo explorar este conceito, as suas ramificações e implicações para a economia e a sociedade. Tem também o objectivo de estudar o comportamento dos consumidores quando compram bens duradouros e que atributos mais valorizam nestes mesmos. O objectivo fulcral deste trabalho é numa fase preliminar e de forma crítica, obter um primeiro entendimento sobre a temática e as suas implicações não só para os consumidores como também para as empresas. Este trabalho representa um "approach" diferente sobre a Obsolescência Planeada, englobando não só como as empresas tomam decisões baseadas no conceito mas também como os consumidores reagem, se relacionam com os bens que a detenham e vêm as empresas que a aplicam. Isto significa que este trabalho tenta explicar não só as ramificações do conceito mas também como ele é visto pela sociedade.

Palavras-chave: *Obsolescência Planeada, Bens Duradouros, Decisões Estratégicas, Comportamento Consumidor*

JEL: *L01, L15*

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Contents

1. Introduction

Since the proliferation of capitalism as the main economic system used by nations around the world that the economic model relies in a vital element, that element is consumption. This aspect is seen as the key component in the modern model and is the main driver for the increase in production and consequently the gross product. It is not randomly that when there is a recession most of the theoretic solutions go through the increase of consumption for kick starting an economy. This indicates a positive correlation between economic growth & prosperity and positive levels of homologous consumption. Nevertheless when the model is so focused in a component; it is exposed to the paradoxes of that component. Consumption is not only a positive concept, is does not only generate surplus and wealth for the society giving incentives to companies for increasing production. It has also several downsides like lowering of quality of certain products due to overproduction (paradigm of the Chinese market), the depletion of natural resources or even the increasing number of electronic waste dumpsters in third world countries. These issues will be later analysed in more detail.

For a continuous and prolonged consumption there is a concept that needs to be "attached", that concept is Obsolescence. Obsolescence is the characteristic that according to capital's logic need to be present in all things. This concept will generate new needs that subsequently will be satisfied by new consumption, securing this way the continuity and expansion of consumerism. This way a vicious circle is generated. Although the flows between their agents will increase in volume, meaning production will be increased as a response to higher consumption based on more (sometimes not justified) needs. Other concept that arises in the opposite side of the spectrum is sustainability. As one knows this concept is becoming more and more a trend in management and is present from capital markets to industrial facilities. Further in the work this concept will also appear in more detail contrasting with Obsolescence and what ethic ramifications both origin.

The present work is divided in five main chapters. The first chapter represents the literature review performed about the subject of Planned Obsolescence in which several articles, papers and studies were consulted to understand the truth effect of the concept on the society in economic and social perspectives. The literature review is divided in three parts; first the basic concepts that comprehend that definition of Planned Obsolescence and concepts

as Durability, Compatibility and Tying. Afterwards the second part is the social implications. It approaches relations of Human Development Index (HDI) with consumption per capita values or e-waste dumpsters in third world countries. By last the third part elaborates on economic implications. These implications vary from the very first studies on two time models using Monopolistic Planned Obsolescence, passing through quality as cause and consequence of it and finishing at Schumpeter’s creative destruction theory and self-cannibalism.

The second chapter explains the conceptual board of the work, in which the relevance and purpose of the investigation are presented and explained. In the conceptual board is also explained what is the problem that is trying to be solved with this investigation and the hypothesis are defined.

The third chapter focus on the Methodology of the work and what was the type of work performed and how was that work conducted. Basically explains the methods behind all the research and analysis of the results. Also explain how the questionnaire was designed, how it was conducted and what is the relation with the objective of the investigation.

The forth chapter is the actual presentation and analysis of the results originated by the respondents. It analysis the answers to each question and presents in detail what those results mean in a contextualized perspective. Is one of the most important parts of the work and is where the hypothesis verified. Individual analysis of each question is performed.

The last and fifth chapter are the conclusions undertaken after the analysis of results. In this chapter among other things is it presented a suggestion of how companies can use Planned Obsolescence in an efficient way, the perception that consumers have of companies that use it and the most preferred characteristics of durable goods. The objective of this chapter is to shed some light on the indecision of some companies in how to apply and deal with Planned Obsolescence. It mainly represents what in the opinion of this work should be the behaviour of durables producers regarding the main topic of this work and a first understanding about its implications.

2. Literature Review

2.1 Basic Concepts

Obsolescence is present in almost all aspects of modern society, from sociology to management passing through medicine it shapes and influences several aspects of our world. It has the ability to modify languages, traditions and even make people obsolete. Although the main issue addressed in this work will be the planning and application of this concept in the consumer goods market more specifically the durable goods. But, what exactly is Planned Obsolescence? Well it can be very simply described in this quote from Jeremy Bulow's "An Economic Theory of Planned Obsolescence"…

"Planned Obsolescence is the production of goods with uneconomically short useful lives so that customers will have to make repeat purchases."[1]

Meaning when durable goods are produced they are deliberately designed to stop working after a pre-determined time span initiated in their first usage. Basically they have an "undercover" expiration date that is not disclosed to the consumer conducting the purchase. Del Mastro (2012) in the article *"Planned Obsolescence: The good & the bad"* acknowledges it as a business practice widely used across durable goods manufacturers all over the world that consciously limits the lifespan of products with the objective of incentive consumption.

The first appearance of this concept was in 1932 through a real estate broker. Bernard London introduced the idea that all the products should have an expiration date and afterwards considered legally dead. Goods would be delivered to the government and destroyed, making Planned Obsolescence mandatory by law. The underlined objective of this idea was to kick start the economy after the great depression of 1929 and readjust the equilibrium between production and consumption. By declaring durable goods legally dead consumption would consequently rise and the problem of over production would be solved. The idea was never used. Later in 1950 the idea appeared again. This time the idea was based on the consumption of something newer and more sophisticated. As the documentary *"The Light Bulb Conspiracy"* refers it was the new era of designed based products. Tendencies and fast changing fashion were standard in the new evolving market leading consumers to increase and diversify their consumption patterns. Industrial designers started to have a big influence in the creation of new products and tendencies dictated what to purchase. Planned Obsolescence was one of the instruments that made possible the Growth Society, together

[1] Bulow, J. 1986. An Economic Theory of Planned Obsolescence. The Quarterly Journal of Economics

with wide available credit and vast advertising. These three elements created an exponential increase in consumption levels never seen in human history to the date. Those levels are still rising nowadays, (Waldman 1993).

Planned Obsolescence exists in many forms; the concept can be applied using different practices and business techniques. Throughout articles, papers and other publications one can find several ways of categorize the concept. Although in this work the following connotation will be used to distinguish different forms of the phenomenon.

- **Technical Obsolescence** – The use of materials of lower quality that are susceptible to break or stop working suddenly. Ex: Printers, cell phone batteries, lamps. This is the most common type of Planned Obsolescence and most of the times uses the principle that purchasing a new product (in some cases a newer version) will be cheaper rather than repairing the old one.

- **Systemic Obsolescence** – Modification of the system or reality in which the product is used, with the deliberate objective of forcing it to be obsolete, making its use harder or even impossible. The best example for this category is the software industry, in which the constant actualization of program versions makes difficult to older ones to operate. Another example is the tactic of discontinuing the service and maintenance for a specific model of a product, making this way very difficult its repair, forcing the consumer to buy a new one.

- **Style or Fashion Obsolescence** - Deeply related with fashion cycles and the aesthetics design of products. Makes designers change the style of products 6 based on market studies and tendencies that give the impression to the consumer that we needs to purchase a new one to be “hip”. Clothing and automobile industries are excellent examples of that phenomenon; clothing industry is the supremacy of style obsolescence, some brands introduce new lines of clothes to the stores every week.

- **Notification Obsolescence** - In this case the product informs the user about its lifespan, in other words it tells to the consumer when is time to buy a replacement. In some cases the product states that is no longer viable nevertheless it continues technically functional. Water filters or printers that show the amount of pages that you can still print are a match to this type.

Other nomenclature used in Del Mastro (2012) that will be used throughout the work is the distinction between good and bad Obsolescence, although these are not the best words to describe it, let's use rational and irrational Obsolescence. Rational Obsolescence is indicated as Value Engineering and Functional Obsolescence. Irrational is referred as Pseudo-functional Obsolescence. Value Engineering refers to the company's option to design certain products to be less durable than they could be. This seems exactly what has been stated previous. Nonetheless the minor difference lies in the fact that a lot of goods could be manufactured for lasting much more time than they currently last, however it is not rational to do so. The materials used have less quality for not incurring in wastefully build something in which its lifespan surpasses its useful life – two concepts that also have to be taken into account (Del Mastro, 2012). Basically speaking, lifespan refers to time that a specific good will keep performing for the purpose that was acquired; it is related with the actual time it is functioning. On the other hand useful life is an estimation of how long the goods will have economic value in the market. Del Mastro (2012) states that it depends on several factors like frequency of use or the age when acquired and in legal terms is normally defined by the amount of times an asset could be depreciated. Goods with a very strong base in technology or markets determined by fast forwarding trends and fashions have especially low useful lives. Normally lifespan is larger than useful life. An example of this issue is the fact that cell phones could last for twenty years if they were built of titanium, however than would not be a rational option because it would make them very expensive for consumers and resource depleting. Instead they are built of inexpensive plastic for keeping its lifespan in accordance with the trends and technological advancements of the market.

The other type of rational Obsolescence according to Del Mastro is the functional Obsolescence. It occurs when some sort of innovation is introduced into the market. This will make the products already present in the market obsolete in some way. This type of Obsolescence is the main "producer" of e-waste nonetheless if it is based on improving technology by itself and does not relies on mere visual modifications it makes accessible to the consumer a potentially superior product. An example to this subject is the evolution in the efficiency of combustion motors in the automobile industry. Combustion motors back in the day had a strong positive correlation between size and power, nowadays that correlation is still positive but recent advances make smaller motors have the same performances than bigger ones and much better fuel efficiency.

Irrational Obsolescence is referred as Pseudo-Functional Obsolescence by Del Mastro (2012). This is characterized by seemingly introduce a pseudo-innovative feature in a new product. It is heavily applied under visual or basic functional modifications of an existing product. Most of the cases there in not an underlined engineering purpose behind it rather than make a slightly different product with minor modifications for being marketed as a new and most recent model. Trends and fashion play a huge role in this type of Obsolescence. Designers and visual innovators have establish themselves as trend setters and have a lot of power over the next "hip" type of product or design. The exponent example of this issue is the fashion industry that pushes consumers into buying the latest trends in clothing. Other example more related with technology is the computer and software industry; several new models of computers programs come out every week most of the times marketed as the next model or upgrade. The reality is that most of the times the differences between versions are minor functional features and/or visual modifications. Compatibility is also a practice used for creating exclusivity and impulse renovation of existing models. Networks and their consequent economic and social value is also an important item for the application and maintenance of this type of practices that result in Obsolescence.

Regarding durability, there is little evidence that it is a key consumer buying motive. TV's warranty information is trailed by consumers behind picture quality, resolution or even brand name. Consumers are divided on whether life spam is even remotely important. Also they do not see it as an environmental issue, is only associated to quality (Cooper 2004). Past works and empirical knowledge about producers of durable goods show that durability is always a characteristic considered in its products Swan (1970), however corporate strategists and product developers always calculate the optimal balance between durability and the exact amount of Planned Obsolescence to include in their business plans that stimulates the consumption of their goods maximizing company margins.

Pil Choi (1994) arrives to the premise that Planned Obsolescence is maybe not only related with the durability but also with how compatible a product will be with its older versions. He also verifies that a reduction in the underlined quality of the good results in a commitment to the compatible product. Meaning consumers will only purchase low quality perceived goods if they have the security of compatibility in future versions. Therefore incompatibility becomes more attractive as the superiority of the product over its older version increases. With these findings the concept of Planned Obsolescence suffers some

modifications. It starts to encompass not only the matter of durability but also compatibility. Compatibility is the concept that characterizes if a product can interact or be used together with a common purpose with its older or newer version. Compatibility towards older versions in denominated as backwards compatibility and with newer versions is forwards compatibility.

Compatibility is a deeply important concept for Planned Obsolescence, the benefits from tying[2] and networks created by compatible products is an extremely relevant consideration of consumers when deciding from which brand or which product. Chun-Hui Miao (2010) elaborates on business strategies as tying or offer bundles of products using the benefits of the networks created by one brand or firm as leverage for luring customers. He shows that due to compatibility issues bundle providers (product A + product B) earn a higher profit rather than independent suppliers of solely B. One of the many examples is the "old" Microsoft Windows Vista and Windows Media Player 8. WMP8 only worked in Windows Vista or newer versions and never worked in any of the competing operative systems. Tying allows the brand to explore network externalities and extract revenues from third party independent providers. The downside of this strategy is that lowers the social welfare due to splay the options of consumers. If they want to upgrade or purchase a newer version they will be depraved from the benefits of the older network. New product or system creates a new network. The *"producer's incentive to upgrade depends on the consumer heterogeneity, hence the consumer marginal valuation."*[3] On the other hand *"social welfare depends on the average consumer."*[3] This scenario is better visualized in the software market but if can also be applied to physic products. Recharging cables throughout the years perform the exact same task, recharge an electrical appliance. Nevertheless the development in electric devices included the modification of external connections and with that the recharging port. Older recharging cables turned obsolete due to a modification in the device they charged and not a self-modification.

The problems with compatibility are most of the times related with forwards compatibility. *Will this product work with the upgrades or newer versions of it and all the accessories?*[3] Nevertheless backwards compatibility is also an important issue like it is shown in Miao's work. He states that backwards but not forwards compatibility reduces the non-

[2] Tying is when a product is associated to a certain brand or line of products. One of the best examples is the software industry in which certain software only run in determined hardware. Tying works in both ways, backward and forwards compatibility.
[3] Chun-Hui M. 2010. Tying, Compatibility & Planned Obsolescence. The Journal Of Industrial Economics

upgrading users because it reduces the network externalities and willingness to pay. Add to this also the learning curve for the newer version of the product that sometimes has a very low slope. Meaning that consumer will take a long time to get used to the new product. One can conclude that the impact of tying regarding welfare depends on the market structure, mainly the strength of competition. Incentive to tie is stronger as the potential competition rises to protect market share.

2.2 Social implications

According to the documentary *"The Light Bulb Conspiracy"* consumption is twenty six times higher than two hundred years ago and the tendency is to keep rising. In the other hand happiness levels do not follow that pattern. There is not a positive correlation between the two aspects, meaning that happiness may not be aggregated to consumption. Other data covered in this documentary shows that a new product is created every three minutes. It means four hundred and eighty new products every day. This is one more indicator of the fast forwarding tendencies and technical evolution influencing companies, production processes and consumers.

David Model published a study in College Quarterly called *"Blood Lifestyle: Externalizing the Cost of Human Life"* 2012, in which he makes a relation between consumption per capita and Human Development Index (HDI) – index used ordinarily for quantifying the quality of life. Model used data of 2005 and compared three countries Norway, EUA and Canada respectively in first, fourth and sixth in HDI; EUA and Canada were the first and second countries in the list of consumption per capita.

He concluded that EUA and Canada were way above in terms of consumption per capita *"that would have been necessary to enjoy the same lifestyle as the country ranked highest in quality of life by the United Nations"*[4]. The implication observed by Model clearly demonstrates that for achieving great quality of life, high levels of consumption are not necessary.

Massive concerns have been raised by authors such as Joseph Guiltinan (2009), David Model (2012) or Alex Lobos & Callie W. Babbitt (2013) on sustainability, ethical practices and environmental issues. In the last 20 years these subjects are achieving higher and higher importance towards economic planning; the above cited authors claim that Planned

[4] Model, D. 2012. Blood Lifestyle: Externalizing the Cost of Human Life. *College Quarterly*. Vol. 15.

Obsolescence is one of the biggest catalysers for the levels of consumption registered nowadays; however the world is suffering the repercussions of that aspect with the degradation of the environment, the defilation of ethical practices and the massive depletion of natural resources.

More than one hundred million of cell phones and three hundred million of PC's are tossed every year just in North America and while twenty million televisions are bought only twenty thousand are repaired each year. Guiltinan states that between 50-80% of the electronic waste is sent to third world countries (eg. Gana) resulting in enormous environmental damage from lead, mercury and other toxic material. He also demonstrates that there is an inverse correlation between household income and the propensity to dispose things instead of repairing it; supporting even more the tendency of the richest countries to use poor countries as their waste dumps. The environmental concerns are addressed to designers, engineers and marketing & business strategist that undertake the decisions on the materials and components used. The world business council for sustainable development a global association composed by CEO's of 200 companies, does not include on purpose extending product durability on their list of eco-efficient practices. They believe that repeated purchase is healthy for their lines as well for the public goal of higher levels of employment. Guiltinan also states that companies are not the only ones to be held accountable for resource depletion and e-waste. Consumers also have a big responsibility in it due to poor consumption choices and frivolous needs. This work will also focus on consumer choices and preferences and show that the responsibility is mutual and not only company based.

In conclusion the fact that both agents – producers and consumers – are responsible for this unsustainable behaviour raises complicated social dilemmas like – What should be the perfect trade-off between sustainable consumption, new model introduction and technological progress? – or – Should public policy intervene more in the market regarding new product introduction through regulations? These questions are extremely complicated to answer due to the inherent complexity however the findings of this work will try to shed some light on these and other questions raised by the ramifications of Planned Obsolescence its causes and consequences on nowadays society.

2.3 Economic Implications

The concept started to be empirically studied in Microeconomics. The first studies had the objective to show how the concept could influence both producers and consumers in a

closed environment market and how the use of that practice would influence the decisions of both agents. Pil Choi (1994) designed a model with the following characteristics – two different periods, a monopolist and several consumers entering in both periods and different consumers from one period to another. The monopolist introduced a product in period one and in period two he had the option to either make the new product compatible or not with the previous one. He explores how the monopolist decides between the two options and establishes a comparison between social optimum and market equilibrium. The comparison made between the previous two shows that the market equilibrium is not equal to the social optimum hence the point that generates most benefits to the society. This is very interesting to analyse but it is not entirely relevant for the ramifications of this work. Therefore is not going to be addressed. The main indecision for the monopolist concerning its strategy is if in the second period he tries to capture the entire market share with the introduction of a new version incompatible with the older one or if he includes compatibility between versions. In case of incompatibility one has products of the same company competing against each other; a very delicate situation for the monopolist. Chun-Hui Miao (2010) claimed that despite incompatibility alleviating monopoly undersupply it does not mean that Planned Obsolescence is always welfare enhancing. Nevertheless the incentive to invest may generate social welfare. Investment and Planned Obsolescence are different concepts. As stated previously investment could generate rational Obsolescence and create a viable breakthrough. Monopolist main objective is to maximize its revenues trying to sell the good in period 2 to the maximum number of consumers possible. The challenge is to predict the behaviour of the consumer in period two from the possible outcomes.

From an entirely theoretical point of view profit maximization involves the production of goods with efficient useful lives. Smart and rational consumers will pay for the benefits that they may take in the future from a product. Meaning that if they realize the market is introducing a new version of the product it will only be acquired if the willingness to pay is equal or larger to the benefits taken from that newer version compared to the previous one, Bullow (1986). Planned Obsolescence generated by incremental modifications that would not alter the quality or functionality of goods would not be accepted. In other words all modifications that would not represent a real innovation would be seen as a big "red flag" and the price of the good would have to be low for the consumers to buy it. Although in the real life market things are different. Jeremy Bulow (1986) tried to explain that this analysis was incomplete and therefore incorrect. Monopolists and Oligopolists choose to produce goods

with short useful lives. In a first perspective it seems that due to competition Oligopolists will increase the durability of its products with the objective of gaining all the market. Nevertheless there is a serious and real threat of collusion. They have incentives to decrease the benchmark durability for not entering in a quality war that will result in a lower level rather if it is agreed. One of the most famous and bizarre cases of this situation was the Phoebus Cartel. The Phoebus Cartel was a cartel composed by several light bulb producers including names as General Electrics, OSRAM and Philips. It was the first case of worldwide Planned Obsolescence eliminating competition within the industry and allegedly preventing technological breakthroughs towards light bulbs that would last longer. These types of business practices as colluding are of course illegal and companies should refrain from applying them.

The main flaw in Bulow's work as he promptly stated in its conclusion was the assumption of a perfect second hand market and durability as an insufficient proxy for the concept of Planned Obsolescence. As mention previously, durability is indeed an insufficient proxy for Planned Obsolescence that is why the understandings of Pil Choi (1994) are so important for completing proxies with the introduction of compatibility.

Waldman (1993) follows the same pattern of Bulow's reasoning regarding Planned Obsolescence characterizing it as the problem and not the solution. Using the same two period monopolist model he concluded that Monopolist will have a higher incentive to use Planned Obsolescence if they market their output by selling rather than renting. Monopolist can market their output no only selling it, they can also rent it. The most common example nowadays is leasing in which a contract is elaborated between the company that provides the good and the agent that is taking benefit of it. Throughout the renting period the agent has to pay a timely fee to the company and in the end of a pre-determined period explicit in the contract the he has to return the good to the company. Other literature around the subject like the article *"Planned Obsolescence as a Signal of Quality"* by Choi Jay Pil elaborates that leasing solves the monopolist commitment problem and thereby restores efficiency in durability choice. The intuition behind the Waldman's and Jay Pil's reasoning is very simple, when companies rent their output it will return to the company after a period of usage specified in the contract. This means that they will be left with the physical product and if so its residual value. Since the good will be once more property of the firm they have a low incentive to apply Planned Obsolescence in its designing and therefore diminish both their

lifespan and useful life. Leasing leads to a new concept approached in Jay Pil's paper, Planned Longevity. This concept works exactly in an opposite manner of Planned Obsolescence and it is presented that may separate the high quality from the low quality producers. Basically pronounces as the tittle says, Planned Obsolescence may be an indicator of quality. Although one does not agree entirely with that point of view; by the several examples on goods and markets already talked previously a counter argument can be that correlation does not imply necessarily an indication of something. Meaning, quality and Planned Obsolescence may come hand to hand and have some sort of interconnection but one may not be an indicator of the other. The relation between them is not well defined and one of the main questions rose to Jay Pil's work is if both concept are interconnected which is one is as indicator of the other. Is Planned Obsolescence a signal of quality or is quality an indicator on the adoption of Planned Obsolescence? More on that question latter. Returning to the concept of leasing, it also reverses the plan of lowering durability to generate repetitive purchases because the company still owns the good. The firm will internalize any externality that his future action will inflict on the value of the goods produced therefore leasing can be helpful in achieving efficiency. This situation commonly happens with heavy or specified machinery and is more common in the industrial sector.

Some examples of leasing applied in private consumption are the automobile industry (probably the most prominent case) or real estate. However as stated above not all things are bad in Planned Obsolescence, it can have a positive effect on the society. One of the most pertinent questions is if it a necessary condition for the achievement of technological progress? A positive answer to this question is debated in the paper *"Planned Obsolescence as an Engine of Technological Progress"*; a joint paper by Arthur Fishman, Neil Gandal and Oz Shy (1993). The main premise of the paper is that *"a pattern of fast deteriorating products and a fast innovation may be preferred to long lasting products and slow innovation."*[5] Attention that long lasting products does not mean and is not directly related with slow innovation. Once more a model of two periods was used but the approach was different having variables for the speed of technological progress, the utility generated by a single product or even the cost of developing new technology. The number of firms presented in the market was large (instead of the previous Monopoly and Oligopoly situations) and had unlimited capacity to produce either durable or non-durable goods.

[5] Fishman, A. Gandal, N. and Shy, O. 1993. Planned Obsolescence as an Engine of Technological Progress. *The Journal of Industrial Economics*, No.4.

The argument presented in Fisman, Gandall and Shy (1993) is that durability in excess is associated with stagnation in two senses. First, continuous innovation must be associated with the production of goods with low durability and therefore stagnation is the opposite, the production of goods with high durability. Second, stagnation results from social convention - point of view of consumer groups, trends or general society preferences. Hence the pressure from consumer groups that promote excessive product durability may retard the development of new products, technologies and production processes. The key point is – what is excess durability? There is not a mathematical equation or standardized process to categorize the perfect durability and even if it existed consumers would view it differently. Preferences differ immensely among consumers and what may be perceived as having the right durability may be completely characterized in other way from a different person. One thing is assured for the companies, if consumers hold a stock of goods with a good share of durability they are only willing to pay for the increased benefits from the innovation by itself, not the additional cost of producing it.

That raises the main challenge of the innovator – development costs. Most of R&D is conducted with a fair amount of risk due to the nature of its costs. They are considered sunk costs. In recent years several companies are even outsourcing their R&D departments to more specified firms. Of course that R&D is extremely important for the development of any company that deals with technology or have it in its productive process but innovators must be able to extract a part from the consumer surplus that was originated by the innovation. Only this way they will be willing to undertake the development. This is why companies have to plan so carefully the balance between the amount of durability and obsolescence to input in each product. In one side, if they make a product too durable there is the risk of not having favourable sales in multiple periods. On the other side, if the good has a very low durability may be perceived as having a low quality and not be purchased. Following Fishman, Gandal and Shy (1993) reasoning, it can be stated that durability and a mind set for durable products is a barrier for the development of new products. Under their point of view, Planned Obsolescence promotes technological advance.

There are also two dimensions that need to be taken into account by the producer when planning its strategy – long and short run. Under Waldman (1996) point of view the R&D choice that maximizes current profitability is not the same which maximizes the long run profitability of the firm. By R&D choice one means the amount of investment by the firm

on that category, having of course as assumption limited funds for investment. Other assumption is a monopolist market. One of the solutions presented by Waldman to mitigate the time problem is that the monopolist might choose a level of durability that is below the socially optimal. This way the company will be decreasing the impact of the R&D decision in previous goods, opting for a more mild Planned Obsolescence. Waldman (1996) argues that this practice will not decrease in a big scale the valuation of previous goods introduced in the market. Having durability below the social optimum is considered a strategy that favours the long run horizon. Other option is choosing more than just one technology in the first period. Using this practice the company will be able to have several items to decide on durability and R&D investment. This way the risk among goods could be diversified and the company is better protected against eventualities of the market. Other way is to choose a technology that is excessively expensive to improve. It will reduce the incentive to practice Planned Obsolescence and in a market with heavy competition is a very good practice for deterring competitors of building on it.

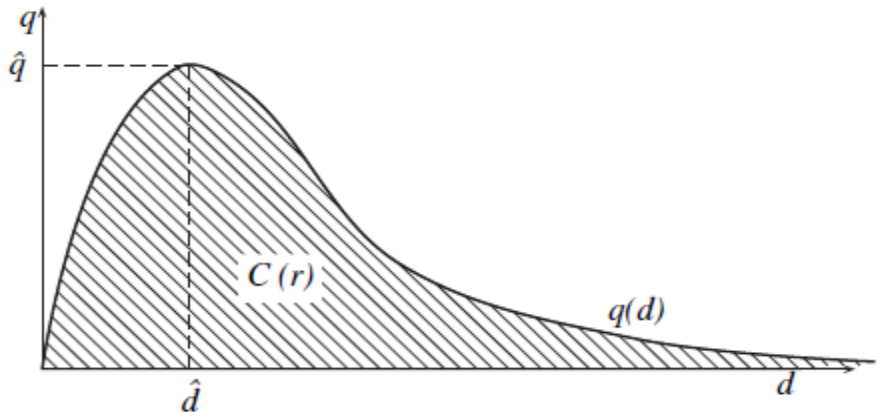
Until this point and after the arguments above presented based on the literature reviewed one can state that along this work two proxies were discussed for accessing the business practice of Planned Obsolescence – Durability and Compatibility. Nevertheless they may not be sufficient to identify, evaluate and understand the dimension of presence and influence the central issue of this work as in the durables market. Therefore the main question asked at this point is – Is there any other proxy for accessing Planned Obsolescence, and if yes which one?

In the attempt to answer this question it is going to be addressed a question previously raised that has to do with the relationship between quality and Planned Obsolescence. Remembering the question raised previously the point was if quality was an indicator of Planned Obsolescence or the opposite. If the first is confirmed it can be indicated that quality together with durability and compatibility can be used as a third proxy for the main subject of this work.

First it is needed to be defined in an objective way what quality stands for and how can it be observed. Roland Strausz (2009) divides the quality of a durable in two aspects. First, how long it lasts and second, how good it works. Hence, durability and performance throughout life spam. Starting with durability Strausz argument is that if goods have half the lifetime consumers' willingness to pay will also be half, hence they are less valuable. The

firm monetary revenues remain the same. One simple and straight forward example used in his work is razors blades that offer less shaves are also less valued by the consumers. Strausz approach is very interesting; he states that reduced durability may actually be in the interest of consumers. This may contradict everything that was said about durability but Strausz argument is very legit. Planned Obsolescence strengthens producers' incentive to provide adequate quality in not only the direct performance of the product but also in other dimensions like interface, design or user friendliness. The idea of the need for repurchases actually gives the consumer power over the producer. Due to repeated purchases being necessary, if consumer is not satisfied he will not repeat the purchase. The main difference between this approach and the older models used to access consumer behaviour is the fact that this is not a theoretic monopoly situation and therefore considerable more close to the reality and present market of durables. Strausz position comprehends the highly globalized and fierce competitive reality in which one lives in the present with companies struggling to maintain its market shares and deal every day with newcomer firms. That is why a solid position in the market is key for assuring revenues and keeping profitability. This is where his argument makes sense, in the presence of repeated purchases the interaction between the consumer and the producer will be increased. Since the interaction between the two agents increase the exigency demanded by the consumer will normally be higher and the producer will be more exposed to constant evaluation by the consumer. A solid position is achieved when facing this kind of exposure the company can still deliver well performing competitive products and comply with consumers' expectations, building this way a good image and stable reputation. Hence Strausz approach comes down to the fact that when a company applies Planned Obsolescence it will increase the interaction with its consumers due to repeated purchases and that is an incentive to provide adequate quality for achieving a solid position. The consumer will stop buying a product when the producer fails to deliver the expected product characteristics and its consequent expected performance.

Old theories about Planned Obsolescence stated that higher durability makes quality more socially desirable because if the consumer would be tied to the good a larger time then it would have to perform properly for that time. Strausz (2009) computes a relationship between durability and quality, having quality in function of durability – q(d). First it increases until a maximum and then the slope is negative tending to zero. The following image shows an illustration of the curve q(d).



Graph 1 – Sustainable Product Characteristics

(Source – Planned Obsolescence as an Incentive Device for Unobservable Quality, Roland Strausz, 2009)

The slope of the function is due to the fact that an increase in durability raises the buyers' willingness to pay. On the other hand durability implies that the buyer interact less often with the producer. Under Strausz, consumers cannot react as quickly to that interaction when the durability is high and he realizes that the quality level is not appropriate. For example when someone buys a pen it can quickly realises if the pen offers good writing, although when someone buys a car or a house it is difficult to understand in the first periods of utilization if that product lives up to the quality expectations deposited on it.

Therefore this aspect changes the interaction between quality and durability shifting both characteristics from complements to substitutes. Nevertheless that situation only happens in the maximum of q(d) when the slope starts to be negative. The factor that Strausz claims responsible for this change is unobservability. This concept lies on the characteristics of products that cannot be observed without trying or using them, like sound quality in a stereo or cleaning ability of a washing machine. However the slope of this function is not equal for all markets and consumers. It will have the same form but different slopes for each consumer and good. Planned Obsolescence is even seen differently in each country and durability may be a very important characteristic for some consumers. The extreme case in which durability is the most important attribute in a certain product will make the slope to be always positive or null, never negative.

Concluding on Strausz position when quality is a multi-faceted experience good, diminished durability provides stronger incentives for providing quality – increased interaction. Shorter durability also makes "cheating" less profitable due to the stoppage on consumer purchasing, once more providing incentives for overall quality. Of course this is

relevant for markets were durability is not too expensive and consumers appreciate more characteristics. One question could be raised to Strausz approach, is there a trade-off between durability and other quality aspects? Theoretically the answer is no, but objectively observing how the durables market operates that is not necessarily true. An illustrious example that divides many opinions is the iPod case. Apple is one of the most prolific technological companies in the world and knows how to use Planned Obsolescence almost in perfection. On top of that Apple utilizes it for maintaining its strong reputation in other quality dimensions as interface, hip designs and user friendliness. It may seem somehow harsh the following statement although, nowadays in the durables market there is not a single technological product considered innovative and with high durability. The actually hardware and software may perform under the expectations but there is always some kind of Planned Obsolescence that will undermine its useful life.

Finally answering the question if quality can be used as a proxy for Planned Obsolescence, the answer is no. Quality is a deeply subjective attribute that depends heavily on consumer expectations and is perceived in different ways depending on the market. Therefore due to the lack of benchmarking product performance and the deep interconnection with durability, quality will naturally be discussed but not used objectively to access Planned Obsolescence.

Every literature reviewed until this point focused mainly in business practices or situations that lead to Planned Obsolescence hence one is going to pin point a practice that conducts to the opposite. An option that every consumer has but is only denied by some companies strategy. That option is maintenance.

Under Schmalensee (1974), maintenance is when the consumer of a certain product decides, after it stops working, to fix it rather than substituting it by buying a new one. Schmalensee (1974) introduced maintenance on Swan's (1970) model and tried to derive whether the consumer discards the old product or tries to increase its life spam. This increase in life spam would be resolved through maintenance. Kinokuni, Ohkawa and Okamura (2009) showed that low maintenance prices resulted in insufficient built in durability due to excessive maintenance efforts. Once more durability is a key issue in consumers' decision and welfare. Increased built-in durability in one side increases the re-sale price in second hand market (positive effect for the monopolist) but also triggers a rise in the value of retaining the

used product (negative effect for the monopolist). By second hand market one comprehends the market where a consumer may resell a previous own good.

This model differed mainly from previous ones by incorporating a monopolist situation with both second hand and maintenance markets at the same time. The situation where maintenance becomes available changes marginally the concepts of durability and life spam. One has to look to the built in durability provided by the producer plus the durability generated by the maintenance, which in a starting point increases the durability of all durables that have access to it. The findings on Kinokuni, Ohkawa and Okamura work show that *"when a secondhand market exists, the monopolist may produce more durable goods with consumer maintenance than without it."*[6] The explanation for this decision is that maintenance reduces both positive and negative effects above discussed – increase of the resale price and the value of retaining the product. "*It encourages the built in durability the monopolist chooses when it largely diminishes the negative effect compared to the positive effect."*[6] The intuition behind that reasoning lies on the fact that in a ceteris paribus analysis when simply the duration of a product is increased it will increase in greater extend its value in the second hand market rather the value of keeping it. Of course an exception to this idea could be sentimental value but on a scientific basis is hard to quantify and extremely subjective for being submitted to analysis. Possible critics that may arise from this work are the very extend of the concept Planned Obsolescence. Kinokuni, Ohkawa and Okamura reach to these conclusions supporting their analysis based solely on technical Obsolescence and addressing only durability, one of many possible characteristics that may be endured to Planned Obsolescence. Taking as important and relevant the previous conclusions, the scope of this work has a broader spectrum and cannot ignore all other dimensions of Planned Obsolescence. In the end the main concept of this work is just a business practice although is a business practice necessary for the survival of most of the companies out there. It enables firms to stimulate revenues through faster replacement, reduce competition from any used goods market and make owned goods less competitive which let companies increase prices for the newer versions and consequent replacements. Business strategists use rapid new product development and introduction as a measure for protect their competitive space. Having in mind Schumpeter's theory, if firms are not "quick on their feet" regarding technological progress they will sooner or later be replaced by innovators.

[6] Kinokuni, H. Ohkawa, T. Okamura, M. 2009. "Planned Antiobsolescence" occurs when consumers engage in maintenance. *International Journal of Industrial Organization.*

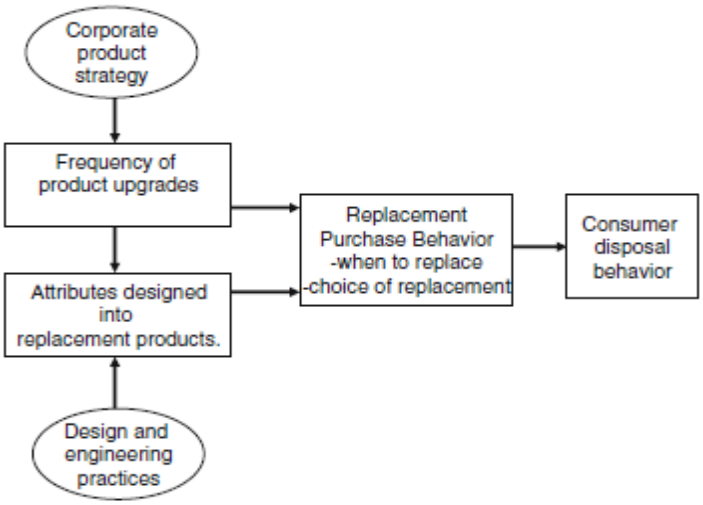


Figure 1 – Planned Obsolescence and the Environment: Decision and Influence

Source – Creative Destruction and Destructive Creations: Environmental Ethics and Planned Obsolescence, Joseph Guiltinan, 2009

In Guiltinan's article about the creative destruction aspect of innovation he talks about the important objective of turning industrial design less harmful for the environment and its underlined that *"the lack of understanding of consumers' behaviour with respect to replacement and disposal of durable goods is an impediment to marketers and public policy makers seeking this goal…"*[7]. The competitive reality leads to the emulation of other companies. Obsolescence is already necessary to compete in the current market and its exigencies. However, heavily applying these practices can lead to negative self-inflicted effects. Gillete's strategy of regularly replacing its market leading razors is called as self-cannibalizing product replacing strategy. Still if a firm does not undertake in self-cannibalization as a downside of its innovation strategy, other competitors will. This raises a managerial dilemma of development pace in which the pace as to be adjusted to three aspects the firm current portfolio, the competitors portfolio and costumer expectations. Brand loyalty is one of the routes followed by an elevated number of brands that see it as key for a high profitability. Grewal et al (2004) reached a very interesting premise; he found that durable products replacement intervals were shorter for unforced decisions. Replacement decisions were driven not only by technical but also systemic and style obsolescence. The simple interest of replacing the good motivates the action per se.

[7] Guiltinan, J. 2009. Creative Destruction and Destructive Creations: Environmental Ethics and Planned Obsolescence. *Journal of Business Ethics.*

3. Conceptual Board

The main purpose of this explanatory study is to help companies to use Planned Obsolescence in an efficient way that is beneficial not only for them but also for the consumers and environment. Due to the fact that the concept of Planned Obsolescence is extremely hard to balance it is key for companies that deal with it to understand all its implications, ramifications and consequences, not only in consumers and their behaviour but also in the society and environment. Therefore if companies use this concept in a more balanced and efficient way the benefits will spread to the entire society. The key questions that this work tries to answer are "How does Planned Obsolescence affects consumer behave?" and "In which extent can Planned Obsolescence mould strategic decisions?". These questions will comprehend not only the side of the consumer but also the real effect on the strategic decisions of companies.

The hypothesis defined for this work are three. They are the following:

- Companies that are perceived as practicing Planned Obsolescence have bad image.
- The most preferred durable characteristics are the most prone to be affected by Planned Obsolescence.
- Consumers see warranty and durability related with quality.

This means that it will be accessed how consumers see companies that practice Planned Obsolescence and how consumers behave when buying durable goods to help companies to decide the best strategy towards the appliance of Planned Obsolescence. This work will try to test all three hypothesis and verify each one of them. One by one they will be rejected or confirmed with the help of several questions in the questionnaire.

The problems that this investigation will try to solve are the indecision regarding the suitable level of Planned Obsolescence and how companies can better apply it; specially regarding which product characteristics.

4. Methodology

This study began with the objective of using a nowadays concept that had great influence in how companies operate and make strategic decisions. This concept should have a very feasible practical application for establishing a bridge over the theory and its actual application in the market. As previously mentioned that concept was Planned Obsolescence. A literature review was conducted for enhancing the knowledge about the subject and increase both depth and width around all the concepts that caused or derived from it.

While searching about the subject several studies, papers and articles were consulted with the objective of accessing all the possible literature already conducted and insights available about Planned Obsolescence. This information made possible a better comprehension of the concept and in a more advanced phase a more precise analysis. Going through the literature several concepts appeared linked to the theme of Planned Obsolescence, which was first thought as a solution for the 1929 economic crisis and evolved into a business practice to incentive consumption in the 50's. It was seen that exits different types of Planned Obsolescence and rational and irrational Obsolescence was discussed. It was established a relation with other concepts like compatibility, durability and quality. It was also underlined how Planned Obsolescence could be balanced for avoiding in one side high and unnecessary

R&D costs and in the other excess durability and consequent stagnation of the technological evolution. The second hand and maintenance market were also approached, finishing with studies about self-cannibalism and environmental concerns.

Besides the global effectiveness of the subject an initial local exploratory study was conducted, meaning that the actual focus of the study was Portugal. The objective was to understand the concept globally and apply that knowledge in our country. The main purpose of this investigation is to help companies to use Planned Obsolescence in an efficient way that is beneficial not only for them but also for the consumers and environment. The key questions here are "How does Planned Obsolescence affects consumer behave?" and "In which extent can Planned Obsolescence mould strategic decisions?". Other questions that this study will also help to shed a light on are:

- Which characteristics of durables are key to consumer?

- How people perceive quality?

- Where can companies apply Planned Obsolescence with more efficiency?

The final objective of answering to these questions is to create a first understanding about the thematic of Planned Obsolescence and their implications in the society. In a critical way, this will help companies to understand and apply some guidelines when facing situations of Planned Obsolescence maintaining ethical behaviour towards the consumer and the environment. Since the sample is limited and focused in a specific kind of people it is hard and may not be very correct to generalize the conclusions reached in this work. The sample is considered a sample by convenience.

Questionnaire Breakdown

The questionnaire has a total of sixteen questions and its design comprehends two parts, first the respondents have to answer to four demographic questions. Those questions are related with age, gender, current occupation and level of education. The second part is composed by twelve conceptual and behavioural questions that access respondents' knowledge about several concepts as Planned Obsolescence or durable goods and the consumer behaviour towards durable goods purchase. The questions addressing directly Planned Obsolescence are five in total. They establish which companies respondents associate to that business practice, if they have a good or bad image of them and if there are perceived as ethical and environmental friendly. Questions regarding durables are seven in total. They access the valuation of durables characteristics' and how consumers rank different attributes. Also include questions on the relation of quality with durability and warranty and in which extent consumers perceive quality. The second part is key for the analysis of how consumers relate with the subject of the work and how they behave when consuming durable goods, while the first part was written with the objective of knowing and tracing a profile of the respondents. This will latter help extracting conclusions and contextualizing the findings of the work. The main decision regarding the structure of the questionnaire was pending on which part to come first. Without any meaningful reason it was decided to put the demographic first. Concerning the conceptual and behavioural part there was only one issue regarding the order of the questions, the first four questions should be about accessing the familiarity with the concept Planned Obsolescence, if the respondent would associate it to any company or brand in particular and the perception of ethical and environmental friendly matters. That matter addressed, the following questions do not follow any order in specific due to their independence.

For the demographic part of the questionnaire it was chosen to include only four questions. Those questions (age, gender, current occupation and level of education) cover the essential demographic information about the respondents that will be relevant to establish parallelism, conclusions and insight about the profiling of respondents. The objective is to access if the view towards companies associated with Planned Obsolescence and if the behaviour when evaluating and acquiring durable goods differs with age, gender, level of education or occupation. This way if different clusters derive from the analysis, it will be easier to understand and characterize the demographics of each one of them and help one to understand why they behave in a certain way. To explain the type of questions used in the second part it is better to firstly elucidate the legitimacy of the five questions directly related with Planned Obsolescence and only then the seven questions of durables. The main objectives with the first five questions were to access if the concept of Planned Obsolescence was known in general and if so, which were the companies that were associated with that business practice.

First of all it was necessary to access if respondents already had contact with the concept before the explanation in the beginning of the questionnaire. As it was clarified in the literature review, Planned Obsolescence is something that everyone already had contact with directly or indirectly but did not know how to call it. Hence the first objective was to clarify how present was the concept. After defining the knowledge about the concept a question of direct association was asked. For overcoming possible lack of knowledge about the concept, a simple explanation was laid out in the initial statement of the questionnaire. This explanation was superficial, although gave enough insight about the topic for respondents to answer the following four questions. The direct association intent to establish a bridge over the business practice of Planned Obsolescence and the companies or brands that respondent perceived as using it. It was essentially a perception question and the brand or companies referred could not even use that business practice. At least two or three examples were asked. The next three questions were qualificative, meaning that were designed with the objective of qualifying the image, environmental friendliness and ethical behaviour of the companies or brands previously referred. The objective was to establish a parallelism between Planned Obsolescence and ethical behaviour, environmental concerns and a good or bad image; always analysed as a perception of consumers and not the actual practices of the companies referred. The following set of seven questions had as main topic durable goods and how consumers value and distinguish its characteristics. Earlier in this work it was stated how

Planned Obsolescence could be present in several characteristics. The first two questions of this subset ask which attributes the consumer value in durables and their rank from the most important to the least; the goal was to understand which characteristics consumers value most and if those characteristics were prone to be highly affected by Planned Obsolescence. Understanding if characteristics that are heavily affected by it are considered important is pivotal for the influence and importance of Planned Obsolescence towards the consumption of durables. The following three questions relate warranty and durability with quality. Perceived quality is a very subjective concept that varies under numerous pretexts. It depends on the expectations of the consumer and the performance of the durable, although the performance of the durable hinge on its proper usage, its design, compatibility, the ability to maintenance and so on. Hence the objective with these three questions was to understand how consumers see quality and define it in a more precise manner recurring to feasible specifications like warranty. The warranty is a characteristics heavily used to undertake Planned Obsolescence, it specifies a predetermined period of time in which the company "secure" the proper function of the durable. By decreasing this period, companies are implying the lack of trust in the good performance of the good. One can even argue that it is an indicator for the durability aspect. Hence the question regarding if consumers, when purchasing durables look for the warranty. Looking for the warranty when acquiring durables implies rational consumption behaviour; this consequently takes to better decisions and smarter purchases. Finally the last question followed the same pattern of better defining quality and what it means for the respondents; this time implying a closer or more direct relation with each attribute of durables.

The questionnaire was conducted using an online survey provider. A link containing the survey was created and distributed through social media and email to several possible respondents. The survey was initiated at 7 of September 2014 and closed at 12 September of 2014. It was distributed only to Portuguese natives due to the objective of maintaining the analysis local. The initial number of respondents gathered was ninety. Although from those ninety there were thirty that did not finish the survey and were automatically removed before any analyses. At this point there were sixty questionnaires finished, nonetheless when accessing the responses it was noted the presence of some missing answers that made the number of respondents to vary across different questions. This issue was addressed by eliminating respondents with missing answers across the questionnaire in questions that demanded an answer; all questions besides six, seven, eight and nine. Using these procedures the final number of fifty-four respondents was reached and used for conducting the analysis.

Although from these fifty-four respondents only thirty-nine answered to question 6, forty-five to question 7 and forty-three to question 8 and 9. After a considerable analysis, conclusions were reached and presented in chapter 5. The questionnaire designed can be consulted in annex 19.

Before the activation of the questionnaire a beta version of the questionnaire was tested using 4 future respondents. Those respondents have ages between 21 and 49 years old. It was measured the time they took to answer the questionnaire and in which concepts or questions they had doubts. After this initial assessment it was determined an average time of 6 minutes for completing the questionnaire and the questions that originated some doubts were modified. A clear problem after closing the online questionnaire was the fact that only 67% of the respondents that started the questionnaire finished it. After analysing the respondents that did not finished the questionnaire and the time they were online answering to it, it was noted a correlation between the time and the lack of completion. Almost all of these respondents were online for more than 40/50 minutes, fact that may indicate that they were doing the questionnaire ate the same time of other things and in the meanwhile they forgot to finish it. In the end, they closed the questionnaire without answering to all the questions and the questionnaire was considered incomplete.

5. Results

All detailed tables are presented in the annex section of this work.

5.1 Data Analysis

Since the survey was conducted online there was no specific geographic location that can be attributed to the respondents. Although the objective was to analyse Portuguese consumers therefore the questionnaire was designed in Portuguese and distributed only to Portuguese citizens. The demographic results show that the biggest part of respondents – 70% – is between the age of [20; 24]. The gender is evenly distributed – 52% men and 48% woman. Related with the age factor, 69% of the respondents are students that are currently enrolled or have finished a superior education degree – 44% bachelor and 48% master degree. In the occupation question the other relevant category is employed with only 20%. Hence for context purposes and better understanding the analysis of the following questions, one can state that the demographic profile of the average respondent for this survey is a young adult between twenty and twenty-four currently enrolled in superior education.

The following five questions are related directly with the concept of Planned Obsolescence and establish the bridge between the concept, the image, ethical behaviour and environmental concerns. The results of the first question show that 57% of the respondent never had contact with the concept of Planned Obsolescence prior to the questionnaire.

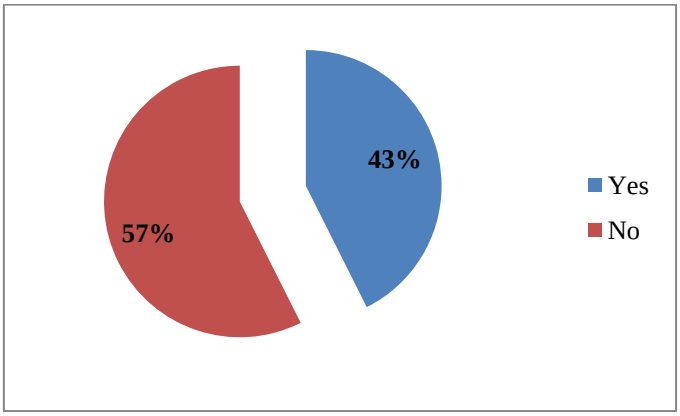


Chart 1 – Question 5, Knowledge of the Concept

This value overcomes the expectations due to the fact that almost every consumer have already had contact of some sort, directly or indirectly, with the concept but never identified it. It was expected that the "No" had a higher percentage. This low value regarding the expectations could be attributed to the profile of respondents, young adults with superior education, therefore having discussed this concept in their classes or on their studies. This

result indicates that consumers are getting more rational and informed about the market and their options. More informed consumers result in more exigent ones, fact that makes difficult and more competitive for the companies to thrive in the durables market. The evolution of this indicator could be an interesting thing to study in future work on this area. The next question asked for brands or companies that, in case of positive answer to the previous question, respondents would associate to the concept. The perception of respondents identified several brands mainly connected to the technological sector.

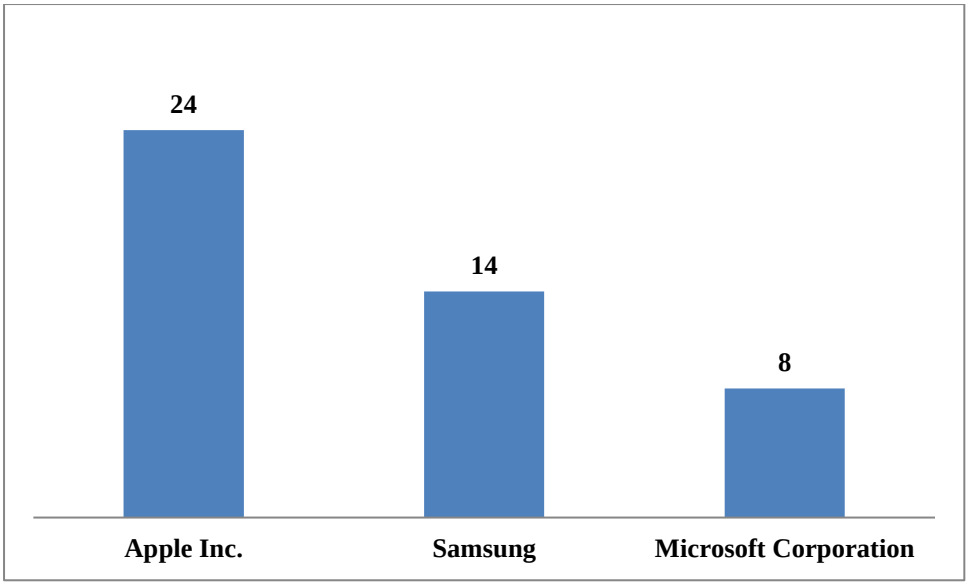


Chart 2 – Question 6, Brand/Companies Associated

The clear "winner" of references was Apple Inc. with 24 references in 39 answers. The next two companies with more references are Samsung with 14 references and Microsoft Corporation with 8. Other companies are referred but have less than 5 references. Car companies are also referred as General Motors Corporation or Volkswagen. It clearly shows a predominance of technology based companies among the most referred. An interesting fact is that the most valuable brand of 2014 according to the Forbes magazine is the brand most associated to practice Planned Obsolescence. Question 7 presents the image that each respondent has of the companies referred previously and helps to verify the first hypothesis "Companies that are perceived as practicing Planned Obsolescence have bad image.". The results are the following.

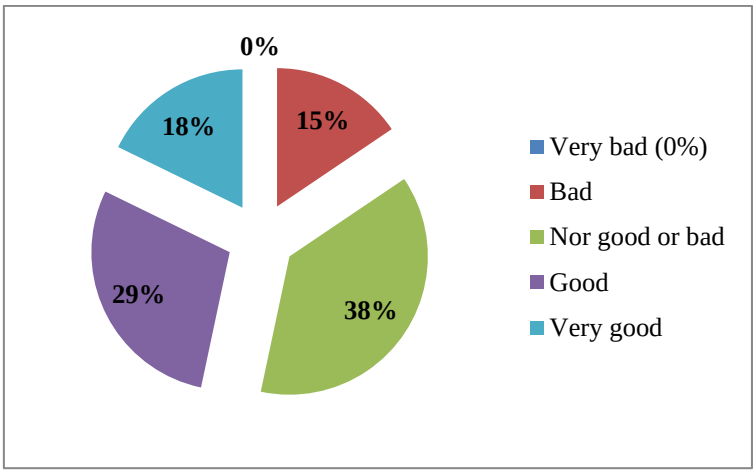


Chart 3 – Question 7, Image of the Company

Only 16% of the respondents have a bad image, 38% nor good or bad and 47% have a good or very good image. These results clearly show that respondents have mainly a good image on the companies referred; the big part of respondents 85% (rounding up) do not have a bad image of them. This fact refutes the first hypothesis. It is false.

Although only an analysis based on the image perceived is not enough, respondents could interpret it in various ways and do not have the concept in line with what is requested for this work. The concept of "Image" despite enlightening is subjective. Hence further and more specific questions were performed. The next two explore the ethical behaviour and environmental concerns. The findings show that 70% of the respondents think that they do not have ethical behaviour and 79% think that they do not have environmental concerns.

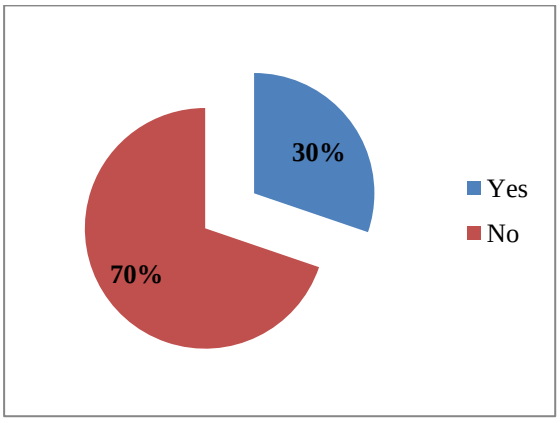


Chart 4 – Question 8, Ethical Behavior

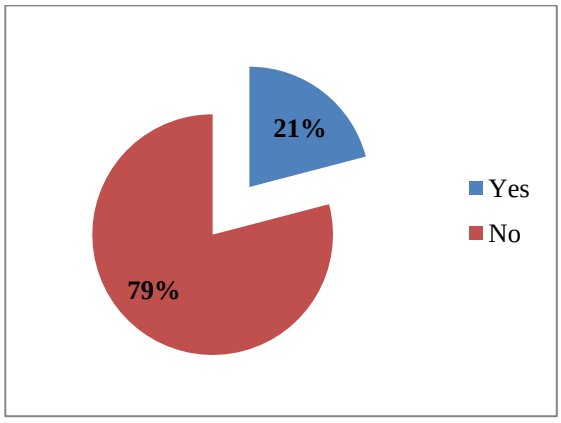


Chart 5 – Question 9, Environmental Worries

These results contradict the perceived good image previously stated. Therefore one can state that the interpretation of image by the respondents does not follow the same reasoning of this work. The results considered for further analysis are the ones from the last two questions due to their specificity and more direct questioning. Hence one can state that the companies associated to the business practice of Planned Obsolescence are in a big extent seen as not having ethical behaviour or environmental concerns.

The next subsection of questions has as main focus durable goods and their characteristics. First it is asked which attributes are important for the respondents. The results are, 87% of the respondents said Price, 61% Brand, 57% Warranty, 48% Design and 33% Compatibility. On the less referred one as Trendy and County Manufactured with 7% and 4% respectively. Other characteristics mentioned in the Others category are Quality and Durability but since they are very subjective and dependent on other aspects as mentioned early in the work, they are not considered relevant for the analysis. The percentages of the following chart were computed dividing the individual references of each attribute by the total references (168).

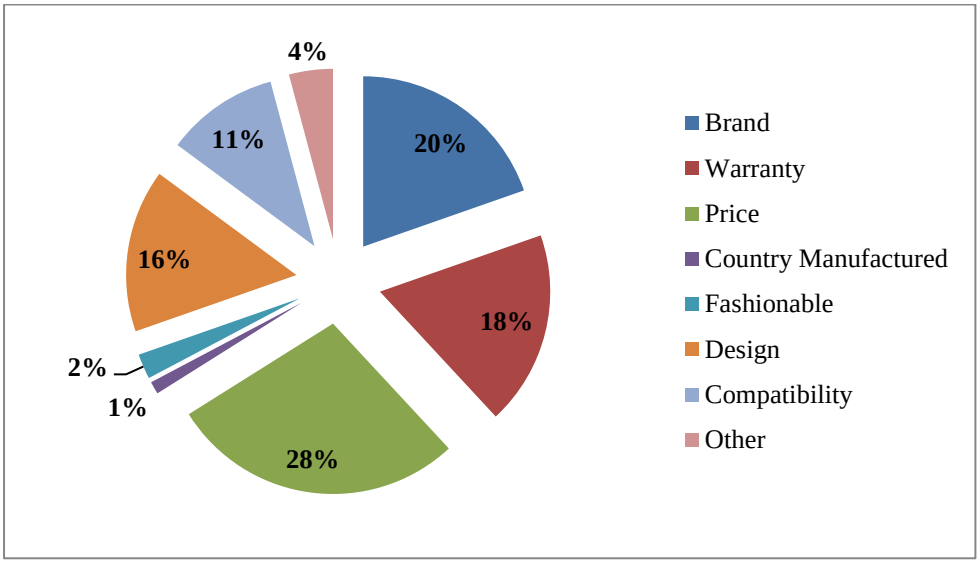


Chart 6 – Question 10, Durables Characteristics

The first two most mentioned characteristics cannot be affected by Planned Obsolescence, but the following three can. Warranty can be aggregated to Planned Obsolescence; meaning that higher or lower Warranty can be granted depending on the intensity of the Planned Obsolescence applied. Hence there is a negative correlation between them. Design and Compatibility are directly influenced by Planned Obsolescence.

Question 11 presents the same conclusions of the previous question; the order in which the characteristics were presented is the same of the percentage mentioned as important so resuming one as in terms of importance, Price – Brand – Warranty – Design – Compatibility – Trendy – Country Manufactured. The previous two questions verify the second hypothesis of this work "The most preferred durable characteristics are the most prone to be affected by Planned Obsolescence.". From the seven characteristics the ones that are most affected by this business practice are Warranty, Compatibility and Design.

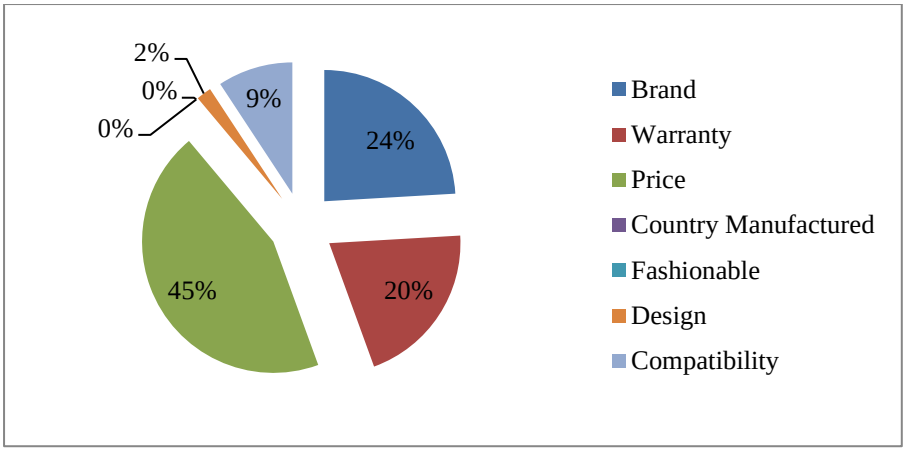


Chart 7 – Question 11, Characteristics Preferences

In terms of importance for the consumer they only appear in third, fourth and fifth respectively. Despite Warranty being considered the third most important it is not enough for confirming the hypothesis. Therefore the second hypothesis of the work is also false.

The next questions focus on the quality issue of durables and how consumers see it. The first question that approaches this subject asks if the respondent associates Durability to quality; 93% answer positively to it. On the other hand when they are asked if Warranty is associated with quality only 65% of respondents say yes.

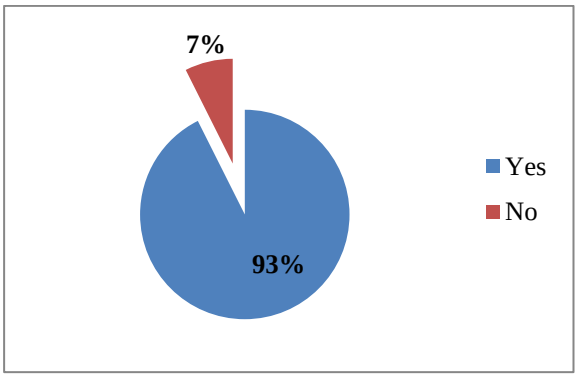


Chart 8 – Question 12, Durability <> Quality

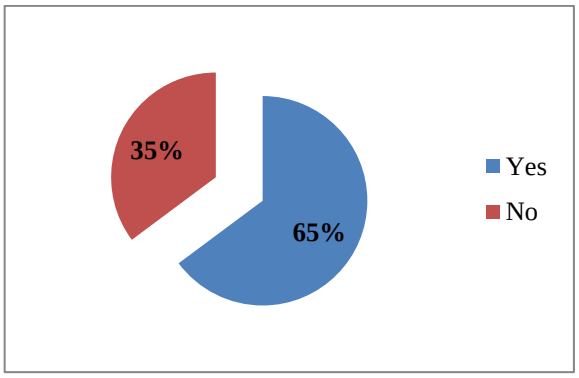


Chart 9 – Question 13, Warranty <> Quality

This indicates that unless Warranty not being identified as a top attribute is still important for consumers when associating and projecting the concept of quality. The previous results also indicate that consumers deeply associate Durability to quality, when as seen earlier in this work that is not so true. A certain good is able to last for a great amount of time but perform badly. The perception of the consumer is different from that fact. Question 14 inquires about the behaviour in the purchase act and if consumers check the Warranty before buying a durable; 74% of respondents said yes.

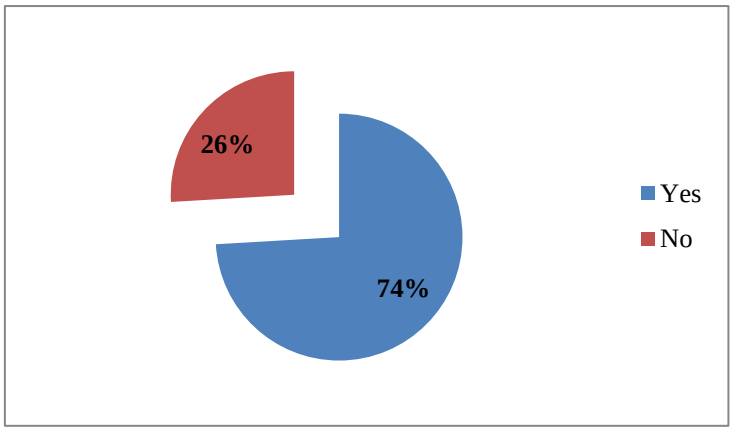


Chart 10 – Question 14, Warranty Check

This once more reinforces the fact that despite Warranty is not the most important attribute it can have a big influence in the purchase decision of consumers and a be a differentiation factor. Going further on the concept of Durability once more it was asked if a big Durability was necessary for the presence of quality in a certain good, 83% of respondents answered yes underlining once more the importance of Durability regarding the perceived quality.

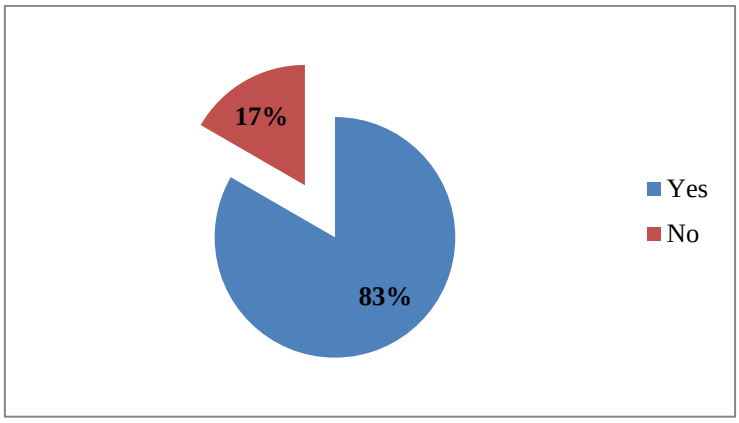


Chart 11 – Question 15, Quality demands big Durability

For understanding what quality meant for consumers the next question was elaborated. It asked what quality meant for consumers, the two most referred situations were Good Performance and Elevated Durability with 96% and 78% of respondents referring them respectively. The next situation referred was Attractive Design and Wide Compatibility with only 24%.

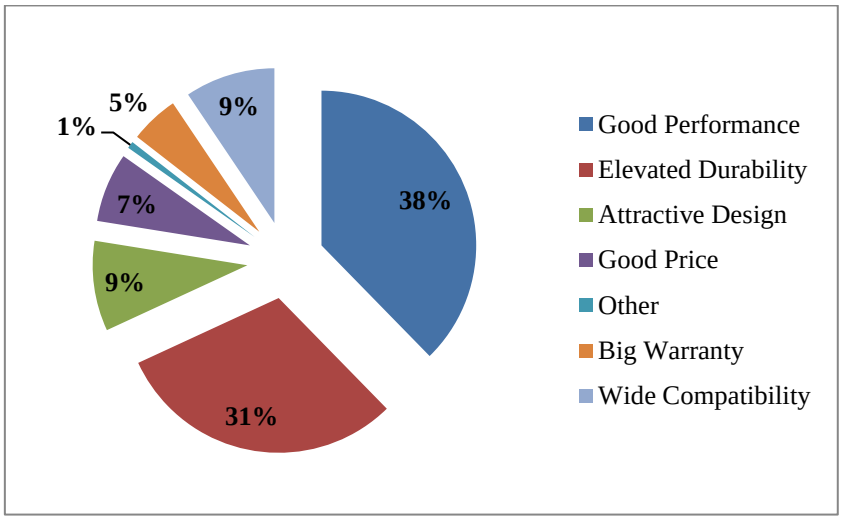


Chart 12 – Question 16, Meaning of Quality

To see the rest of situations see Annex 15 in the annexes section in the end of the work. The results to this question indicate first the logical option of identifying the performance as key aspect for the quality issue and once more classify Durability as extremely important for classifying a good as having quality. These aspects support the validity of the last hypothesis "Consumers see Warranty & Durability related with quality." and the hypothesis is therefore, true.

5.2 Comparative Analysis

The objective of this comparative analysis is to verify if the conclusions taken are in line with different groups within the sample. This means that is going to be verified if for example respondents with different levels of education have the same perceptions about the subjects approached in the questionnaire. Criteria are going to be established, the respondents will be segmented under that criteria and the differences regarding the main questions are going to be compared. The criteria chosen to subdivide respondents are Age and Level of Education. Using these two demographic questions a cross tabulation was performed to see if the distribution of answers had differences among different segments.

Analysing the first part of the questionnaire, perception of the companies associated to the concept of Planned Obsolescence, this is the table constructed (see Annex 16). Regarding Age one can see that all the subgroups within the sample are in line with the general conclusions taken for questions 5, 7 and 8. This means that the conclusions to those questions can be applied across all ages. In the case of Level of Education it has one small exception. In question 5 the respondents that have a Master's degree answered in an opposite way of the general tendency. With 62% of respondents answering yes. This aspect is not in line with the general tendency but is an expected result due to the fact that people with a higher education level are expected to be in contact with more scientific concepts. Therefore it is a logical result. Annex 17 shows the previous analysis but now directed to the questions 11, 12 and 13. Questions 12 and 13 that associate the concepts of Durability, Warranty and Quality are in line with the general answer so the conclusions can be projected for both criteria. Although question 11 has minor differences, especially in the criteria of Age. Remembering the general answer, respondents classified the attributes in the following order from the most important to the least, Price-Brand-Warranty-Design-Compatibility-Other-Fashionable-Country Manufactured. Respondents from 15-19 years old put Brand as the most important attribute, respondents from 25-29 classify Price-Warranty-Design/Compatibility and respondents with more than 35 years old answered Price-Warranty-Brand. The differences are minor and not very significant in terms of absolute numbers nonetheless they are once more, expected. It is normal that people with different ages have different consumption patterns. Normally people with higher age have higher income and the price becomes less important. It is not randomly that the price is the most important attribute within all the ages between 20 and 29. The conclusion that can be taken from this aspect is already straight foward, companies that want to target different ages have to focus on different attributes and use alternative approaches to

each subsection of consumers. The last cross tabulation is performed once more using Age and Level of Education with questions 14, 15 and 16. Although significant differences were not identified in all the questions, the conclusions can be extended across different Ages and Levels of Education (see Annex 18).

6. Conclusions

The objective of this work is to help companies to use Planned Obsolescence in an efficient way that is beneficial not only for them but also for the consumers, the society and environment. To fulfil that objective the previous chapter analysed the data extracted from the questionnaire performed to the 54 respondents. Hence the conclusions are going to be divided into four parts. The first part refers to the perceptions of companies by the consumers when the business practice of Planned Obsolescence is identified. The second part undertakes the conclusions referent to the most preferred characteristics in durable goods. Afterwards conclusions regarding the relation of quality and Durability & Warranty are going to be addressed in part three and finally it is going to be presented some guidelines that comprehend all the good practices towards Planned Obsolescence that this work analysed. These practices have as main characteristics transparency, ethical framework and environmental concerns. All the conclusions withdrawed from this initial exploratory study are not definitive due to the limitations of the sample.

Regarding the first part of conclusions, it is deeply related with the first hypothesis. The first set of questions tested through association the companies identified with Planned Obsolescence and the conclusion taken is that the companies that are identified as using that business practice may have a good image but are perceived as not having ethical behaviour or environmental concerns. This is actually in some sort contradicting, although the discrepancy verified between the image perceived and the other two aspects is related with the fact that most part of consumers associate image to other aspects rather than ethics and green trends. Since a large part of respondents are young adults they probably associate image to "hipness" and innovation. Although the main conclusion that can be undertaken at this point is that companies associated to the business practice of Planned Obsolescence may be seen as unethical and non-environmental friendly. That aspect affects the reputation of companies in the long run.

The second conclusion that may be derived by this work is the most preferred characteristics of durables. Following the previous analysis and the results from the questionnaire the most preferred characteristics are Price, Brand and Warranty. From the first three only one (the third) is directly influenced, or at least could be, by Planned Obsolescence. This means that this business practice losses some impact regarding direct influence in durables' characteristics. Consumer behaviour will be explained in a greater part for exogenous aspects to Planned Obsolescence, therefore and following the reasoning of the

results, Planned Obsolescence only affects one of the three most preferred characteristics of durables, losing this way influence in consumer behaviour.

Concluding on the relation between quality and Durability & Warranty one can partially conclude based on the results from the analysis that quality is highly correlated with Durability. Going even further one can state that the consumers inquired think that Durability is a necessary condition for quality. On the other side Warranty is also seen as very important for considering quality but works more like an indicator. Meaning that before buying a certain good one can see the predetermined Warranty granted but the Durability will be only realized after purchasing and using the good for a certain period of time. Summing up both concepts are and can be related with quality.

The comparative analysis verifies if the global conclusions taken from the analysis can be generalized for the different subgroups of the sample. The criteria chosen were Age and Level of Education. After the analysis one can conclude that despite minor and expected divergences, with the overall analysis regarding the knowledge about the concept of Planned Obsolescence by Master students and durables characteristics preferences by different ages, the conclusions taken based on the overall responses can be generalized for the different groups of the sample.

By last some guidelines of behaviour are going to be presented. Companies that deal with Planned Obsolescence are extremely prone to be associated with unethical behaviour and lack of environmental concerns therefore the first aspect to correct is that issue. Companies that use that business practice have to make sure to incorporate green trends in their operations and assure that they do not have any possibility to be liable for unethical behaviour. This is very difficult to do because it demands a huge social responsibility to mitigate the risk of bad perception by the consumers in other areas. Other risk associated to this behaviour is the costs that the company undertake to fuel these initiatives. The attitude of the company should be coherent and transparent to gain the trust and respect of current and future clients and consumers. The next issue to be addressed is the application of the business practice, more specifically the attribute in question. As concluded previously Warranty is the attribute affected directly by Planned Obsolescence that appears first in the preferences of consumers. This means that companies should have a special attention to this aspect. Warranty will function as a signalling of possible quality and consumers will be sensible to it. Consumers will react positively to higher warranties and will have more confidence in the

goods associated to it. Of course companies should not neglect other attributes but from the point of view of Planned Obsolescence this is the behaviour that companies should have when applying it to certain aspects. Regarding technologic advanced companies, they should stop advertising minor changes like huge improvements. Nowadays the consumer has a lot of information about a huge array of good all over the market, this makes consumers more rational and "smart" when choosing what to purchase. Meaning that these types of "technological improvements" will soon be noted as false and prejudice the image and reputation of the company. Companies should also bet in wider compatibilities. Products that work in several types of hardware or with one range of products gain comparative advantages against their competitors. This is explored in the work of Chun-Hui Miao (2010). This is a very good option for luring consumers due to the various possibilities that they are presented but also a way of using Planned Obsolescence. This will not influence directly the good but rather the network created around it and all the benefits and externalities that may advert from it.

In the end this work tries a different approach on the subject of Planned Obsolescence focused on the Portuguese reality. It sheds some light on the relation of concepts as Quality, Warranty or Durability and their perception by the consumers. It also helps companies to understand consumers' preferences and adapt their practices to better serve them. Although there is still a lot of work to be done to fully understand the implications of the business practice that originated this work.

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8. Annexxes

Annex 1 – Question 1

#	Answer	Response	%
1	Menos de 14	0	0%
2	15 - 19	6	11%
3	20 - 24	38	70%
4	25 - 29	6	11%
5	30 - 34	1	2%
6	35 ou mais	3	6%
	Total	54	100%

Annex 2 – Question 2

#	Answer	Response	%
1	Masculino	28	52%
2	Feminino	26	48%
	Total	54	100%

Annex 3 – Question 3

#	Answer	Response	%
1	Estudante	37	69%
2	Empregado	11	20%
3	Desempregado	4	7%
4	Reformado	0	0%
5	Outra	2	4%

	Total	54	100%

Annex 4 – Question 4

#	Answer	Response	%
1	9ºAno	0	0%
2	Secundário	3	6%
3	Licenciatura	24	44%
4	Mestrado	26	48%
5	Pós-Gradução	0	0%
6	Doctoramento	1	2%
	Total	54	100%

Annex 5 – Question 5

#	Answer	Response	%
1	Sim	23	43%
2	Não	31	57%
	Total	54	100%

Annex 6 – Question 7

#	Answer	Response	%
1	Muito Má	0	0%
2	Má	7	16%
3	Nem Boa Nem Má	17	38%

4	Boa	13	29%
5	Muito Boa	8	18%
	Total	45	100%

Annex 7 – Question 8

#	**Answer**	**Response**	**%**
1	Sim	13	30%
2	Não	30	70%
	Total	43	100%

Annex 8 – Question 9

#	**Answer**	**Response**	**%**
1	Sim	9	21%
2	Não	34	79%
	Total	43	100%

Annex 9 – Question 10

#	**Answer**	**Response**	**%**
1	Marca	33	61%
2	Garantia	31	57%
3	Preço	47	87%
4	País Fabricado	2	4%
5	"Na Moda"	4	7%

6	Design	26	48%
7	Compatibilidade	18	33%
8	Outro	7	13%

Annex 10 – Question 11

#	**Answer**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	Marca	13	13	7	12	8	1	0
2	Garantia	11	7	19	7	7	2	1
3	Preço	24	19	7	4	0	0	0
4	País Fabricado	0	0	0	3	9	19	23
5	"Na Moda"	0	0	4	3	4	20	23
6	Design	1	9	8	18	10	6	2
7	Compatibilidade	5	6	9	7	16	6	5

Annex 11 – Question 12

#	**Answer**	**Response**	**%**
1	Sim	50	93%
2	Não	4	7%
	Total	54	100%

Annex 12 – Question 13

#	Answer	Response	%
1	Sim	35	65%
2	Não	19	35%
	Total	54	100%

Annex 13 – Question 14

#	Answer	Response	%
1	Sim	40	74%
2	Não	14	26%
	Total	54	100%

Annex 14 – Question 15

#	Answer	Response	%
1	Sim	45	83%
2	Não	9	17%
	Total	54	100%

Annex 15 – Question 16

#	**Answer**	**Response**	**%**
1	Boa Performance	52	96%
2	Durabilidade Elevada	42	78%
3	Design Atractivo	13	24%
5	Bom Preço	10	19%
6	Outro	1	2%
8	Grande Garantia	7	13%
9	Compatibilidade Alargada	13	24%

1 Annex 16 – Cross Tabulation 1. Age, Level of Education » Questions 5, 7 and 8

		Antes deste questionário, alguma teve contacto com o conceito de "Obsolescência Planeada"?			Considera que essas empresas têm um comportamento ético?			Acha que essas empresas apresentam preocupações ambientais?		
		Sim	Não	Total	Sim	Não	Total	Sim	Não	Total
Idade.	Menos de 14	0	0	0	0	0	0	0	0	0
	15 - 19	1	5	6	1	5	6	0	6	6
	20 - 24	17	21	38	8	22	30	7	23	30
	25 - 29	3	3	6	3	2	5	1	4	5
	30 - 34	0	1	1	0	0	0	0	0	0
	35 ou mais	2	1	3	1	1	2	1	1	2
	Total	23	31	54	13	30	43	9	34	43
Qual o nível de educação que actualmente frequenta? Se neste momento não frequenta nenhum, ponha...	9ºAno	0	0	0	0	0	0	0	0	0
	Secundário	2	1	3	1	1	2	1	1	2
	Licenciatura	5	19	24	2	16	18	2	16	18
	Mestrado	16	10	26	10	13	23	6	17	23
	Pós-Gradução	0	0	0	0	0	0	0	0	0
	Doctoramento	0	1	1	0	0	0	0	0	0
	Total	23	31	54	13	30	43	9	34	43

Annex 17 – Cross Tabulation 2. Age, Level of Education » Questions 11, 12 and 13

		Que atributos valoriza nos bens duradouros? (Bens duradouros - todo o bem que não é consumido na...									Associa durabilidade a qualidade?			Associa garantia a qualidade?		
		Marca	Garantia	Preço	Pais Fabricado	"Na Moda"	Design	Compatibilidade	Outro	Total	Sim	Não	Total	Sim	Não	Total
Idade.	Menos de 14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	15 - 19	5	2	4	0	1	3	2	0	6	4	2	6	3	3	6
	20 - 24	23	22	34	2	3	19	12	5	38	37	1	38	24	14	38
	25 - 29	2	4	5	0	0	3	3	1	6	6	0	6	4	2	6
	30 - 34	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1
	35 ou mais	3	3	3	0	0	1	1	1	3	2	1	3	3	0	3
	Total	33	31	47	2	4	26	18	7	54	50	4	54	35	19	54
Qual o nivel de educação que actualmente frequenta? Se neste momento não frequenta nenhum, ponha...	9ºAno	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Secundário	3	3	3	0	0	1	1	1	3	2	1	3	3	0	3
	Licenciatura	15	15	18	0	2	9	7	4	24	22	2	24	15	9	24
	Mestrado	15	12	25	2	2	16	10	2	26	25	1	26	16	10	26
	Pós-Gradução	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Doctoramento	0	1	1	0	0	0	0	0	1	1	0	1	1	0	1
	Total	33	31	47	2	4	26	18	7	54	50	4	54	35	19	54

Annex 18 – Cross Tabulation 3. Age, Level of Education » Questions 14, 15 and 16

		Quando compra bens duradouros, olha para a garantia?			Para um bem duradouro ter qualidade, tem que possuir grande durabilidade?			Para si, qualidade significa...							
		Sim	Não	Total	Sim	Não	Total	Boa Performance	Durabilidade Elevada	Design Atractivo	Bom Preço	Outro	Grande Garantia	Compatibilidade Alargada	Total
Idade.	Menos de 14	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	15 - 19	3	3	6	6	0	6	6	4	1	1	0	0	1	6
	20 - 24	29	9	38	30	8	38	37	31	8	5	0	5	10	38
	25 - 29	4	2	6	6	0	6	6	5	3	0	0	1	1	6
	30 - 34	1	0	1	0	1	1	1	0	0	1	0	0	0	1
	35 ou mais	3	0	3	3	0	3	2	2	1	3	1	1	1	3
	Total	40	14	54	45	9	54	52	42	13	10	1	7	13	54
Qual o nivel de educação que actualmente frequenta? Se neste momento não frequenta nenhum, ponha...	9ºAno	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Secundário	3	0	3	3	0	3	2	2	1	3	1	1	1	3
	Licenciatura	18	6	24	20	4	24	24	20	3	4	0	4	5	24
	Mestrado	18	8	26	21	5	26	25	19	9	3	0	2	7	26
	Pós-Gradução	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Doctoramento	1	0	1	1	0	1	1	1	0	0	0	0	0	1
	Total	40	14	54	45	9	54	52	42	13	10	1	7	13	54

Annex 19 – Questionnaire

Muito obrigado por participar neste questionário sobre Obsolescência Planeada. Este conceito é muito basicamente uma táctica empresarial utilizada para produzir bens que deixam de trabalhar após um certo período de tempo, têm uma vida útil pequena ou que serão substituídos rapidamente por um modelo mais recente.

Leia cuidadosamente todas as questões e afirmações abaixo e responda de acordo com a sua opinião, não existem respostas certas ou erradas. Os resultados serão analisados confidencialmente.

Este questionário demora aproximadamente 6 minutos.

1- Idade.

Menos de 14

15 - 19

20 - 24

25 - 29

30 – 34

35 ou mais

2- Género.

Masculino Feminino

3- Que situação melhor descreve a sua ocupação?

Estudante

Empregado

Desempregado

Reformado

Outra _____

4- Qual o nível de educação que actualmente frequenta? Se neste momento não frequenta nenhum, ponha o mais recentemente completo.

9º Ano

Secundário

Licenciatura

Mestrado

Pós-Graduação

Doctoramento

5- Antes deste questionário teve algum contacto com o conceito de "Obsolescência Planeada"?

Sim Não

6- Que empresas ou marcas associa a este conceito? (enumere pelo menos 2 ou 3)

7- Que imagem tem dessas empresas ou marcas?

Muito Má

Má

Nem Boa Nem Má

Boa

Muito Boa

8- Considera que essas empresas têm um comportamento ético?

Sim Não

9- Acha que essas empresas apresentam preocupações ambientais?

Sim Não

10- Que atributos valoriza nos bens duradouros? (Bens duradouros - todo o bem que não é consumido na primeira utilização. Ex: computadores, telemóveis, roupas, carros...)

Marca

Garantia

Preço

País Fabricado

“Na Moda”

Design

Compatibilidade

Outro_____

11- Ordene os seguintes atributos por ordem de importância para si.

Marca

Garantia

Preço

País Fabricado

“Na Moda”

Design

Compatibilidade

12- Associa durabilidade a qualidade?

Sim Não

13- Associa garantia a qualidade?

Sim Não

14- Quando compra bens duradouros, olha para a garantia?

Sim Não

15- Para um bem duradouro ter qualidade, tem que possuir grande durabilidade?

Sim Não

16- Para si, qualidade significa…

Boa performance

Durabilidade elevada

Design Atractivo

Bom Preço

Grande Garantia

Compatibilidade Alargada

Outro_____