

Analysing obsolescence for developing sustainability – Literature Review

By Jean-Louis Guery



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Analysing obsolescence for developing sustainability

Dissertation (M6X01293)

BSc – Logistics and Supply Chain Management

Lecturer : Dr Irina Neaga

Student : GUERY Jean-Louis(2008118)

Table of contents

1	Introduction.....	1
1.1	Background	1
1.2	Aims and objectives	2
2	Literature review.....	3
2.1	Introduction.....	3
2.2	Supply Chain Management.....	4
2.2.1	Definition	4
2.2.2	History and development	4
2.3	Obsolescence.....	6
2.3.1	History.....	6
2.3.2	Definition	7
2.3.3	Typology of obsolescence.....	8
2.3.3.1	Technical obsolescence	8
2.3.3.2	Functional obsolescence	8
2.3.3.3	Planned obsolescence	8
2.3.3.4	Fashion obsolescence	9
2.3.3.5	Optional obsolescence	9
2.4	Sustainability.....	9
2.4.1	Definition and history	9
2.4.2	Sustainability for promotion	10
2.5	Summary	11
	<i>References</i>	12

1 Introduction

1.1 Background

We live in a consumer society, where people buy new products , new clothes every day, which will be destined to finish their life in a bin. This dissertation focuses on analyzing obsolescence of different classes of products but especially on electronics products and clothing considering their life cycle, from the beginning with the choice of the raw materials, to the end of their life and the disposal as rubbish (Neckel & Boeing, 2019).

Since the beginning of the 20th century, technical and production progress hasn't stopped, and new products of all kinds come out every day. The number of organizations has multiplied, and large corporations are installed in the market, in the top 10 of the brands the most powerful of the world we find, Amazon, Apple, Microsoft, Google, which all are electronics brands or web society (Huot, 2020). If these brands are here today it is thanks to technical innovation and the development of supply chains and logistics.

Supply Chain has also allowed us to evaluate the industry, with the possibility to buy any product in the world no matter where we are thanks to the internet and logistics (Neckel & Boeing, 2019). All this progress and new possibility of shopping have made the consumers more demanding, and innovation became major for organizations to meet customer demand.

The main issues of this over consumption is ecological, a lot of electronical product are difficult to manage when they are throw out, and begin a real problem for the planet.

Some organizations try to be in a demarche of sustainability as the smartphone brand FairePhone and the clothing brand Patagonia, but this challenge has to be accepted by customers to be effective. In 2020, one billion of telephones will be sold and a study showed that 88% of the French people change their mobile phone before it stops working (Vidal). To make change happen, People have to change their way of consumption, and organizations their way of production, for sustainable stakes.

The purpose of this dissertation is to analyze obsolescence to define its nature and find what can be changed with the objective of sustainability thanks to the new technology, internet and supply chains. It also includes case study of organizations which bet on sustainability for their range of products rather than on cost reduction and competitiveness.

1.2 Aims and objectives

This study objectives is to analyze obsolescence and its nature, to find a solution for more sustainability to preserve our nature and earth, we will see how technology and supply chain could help to meet this aim.

The objectives of this dissertation are:

1. Describe the current state of electronics and clothing market which are the most implicated in obsolescence, and also the possibility offered by supply chains and logistics nowadays.
2. Identify the link between obsolescence, internet of things, supply chains and the over consumption of product, and especially of clothes and electronics products.
3. Analyze the data collection through a survey on people products consumption and case study of organizations which bet on sustainability.
4. Identify the advantages and the disadvantages of technical progress in terms of sustainability and obsolescence, and also the limits of product based sustainability.

2 Literature review

2.1 Introduction

The history of technology begins even before the beginning of our own species, since the existence of the earth technologies have ceased to evolve, century after century, years after years, new technologies are emerging. Even today, technological progress continues with the discovery and the development of new things, which could be the future. Since the 20th century, the electronics market has changed a lot, with the discovery and the commercialization of new technologies and products. This technological progress brings a lot of positive things, and makes life easier for millions of people, but it can also have a negative impact on the society (Spide Group, 2019).

Obsolescence term was born due to the development of new technologies. Recently obsolescence has been used by a lot of media and association to accuse electronics organizations of planning the “death” of their products. In fact, nowadays, some of the organizations anticipated product obsolescence to push customers to switch from newer products. This practice is illegal and very difficult to notice, the law is nonexistent to struggle against these practices, because that is something new (ScienceDirect, 2012).

Supply chain management and Logistics evolution have also played a key role in the development of the electronic market. Thanks to Logistics evolution, production of electronics goods can be divided in different countries to lower production costs, allowing the internet to have access to any product everywhere, at any time. Supply Chain and electronic products are linked in their developments, and depend on each other (Springer Link, 2017).

Through this dissertation, I will present the supply chain management history, and most especially the development of this area. To continue I will introduce the term of Internet Of Things (IoT), before presenting the concept of obsolescence and the different typology of obsolescence known in present. Finally, I will study the sustainability importance for a product, what the issues are, and why that should be an essential element in the conception of a product, whether they are electronic or not.

2.2 Supply Chain Management

2.2.1 Definition

The definition given by The Supply Chain Council (1997) is “The supply Chain - a term increasingly used by logistics professionals – encompasses every effort involved in producing and delivering a final product. From Supplier’s supplier to the customer’s customer. Four basic processes – plan, source, make, deliver – broadly define these efforts, which include managing supply and demand (Deep Dyve, 1999).

Stein and Voehl (1998) defines SCM as “the systematic effort to provide integrated management to the Supply Value Chain in order to meet customer needs and expectations, from suppliers of raw materials through manufacturing and on to end-customers”.

Definitions may vary, but the SCM objectives will be always the same, satisfying customers by giving them what they expect. One of the first definitions of SCM is given by Keith Oliver “Supply chain management is the process of planning, implementing, and controlling the operations of the supply chain with the purpose to satisfy customer requirements as efficiently as possible. Supply Chain management spans all movement and storage of raw materials, work-in-progress inventory, and finished goods from point-of-origin to point-of-consumption. (Kransdorff, 1982, p. 16).

Supply Chain Management is linked to technical progress and innovation, these concepts have changed a lot during the years and don’t stop to evolve as the technical progress. Despite this Supply Chain Management evolution, the objectives are always the same and the definition of Keith Oliver is, even today, suitable.

2.2.2 History and development

Logistic and Supply Chain (SC) have evolved during the years, with the development of technologies and innovation. The Internet has also played an important role in the logistics and SC history. We will see the history from the beginning to their actual form of these two concepts to understand their evolution.

The beginning of supply chain management history took form in 1911 with Frederick Taylor, the founder of industrial engineering and the person who developed the improvement process of manual loading in this work. In the 1940s, logistics were more developed for the needs of WWII for logistical military operational solutions. Then, the logistics has continued to develop, with the evolution of transportation management in 1950 by utilizing intermodal containers together with ships, trains, and trucks to transport them (Flash Global, 2015).

However, the first use of “Supply Chain Management ” occurred in the 1980s with the development of personal computers and the standardization of the internet (Flash Global, 2015). Firms saw the benefits of collaborative relationships within and beyond their own organizations, they understand the importance of working together, with their suppliers to be competitive (Deep Dyve, 1999). From that moment, the innovations in logistics are followed, with the development of 3PL (Thrid part Logistics), the concepts of “Lean Management” to reduces waste and losses during the production, the creation of the Supply Chain Council have also allow to organizations to use tools created by this council to develop themselves, all his advance are regroup under the name of Industry 4.0.

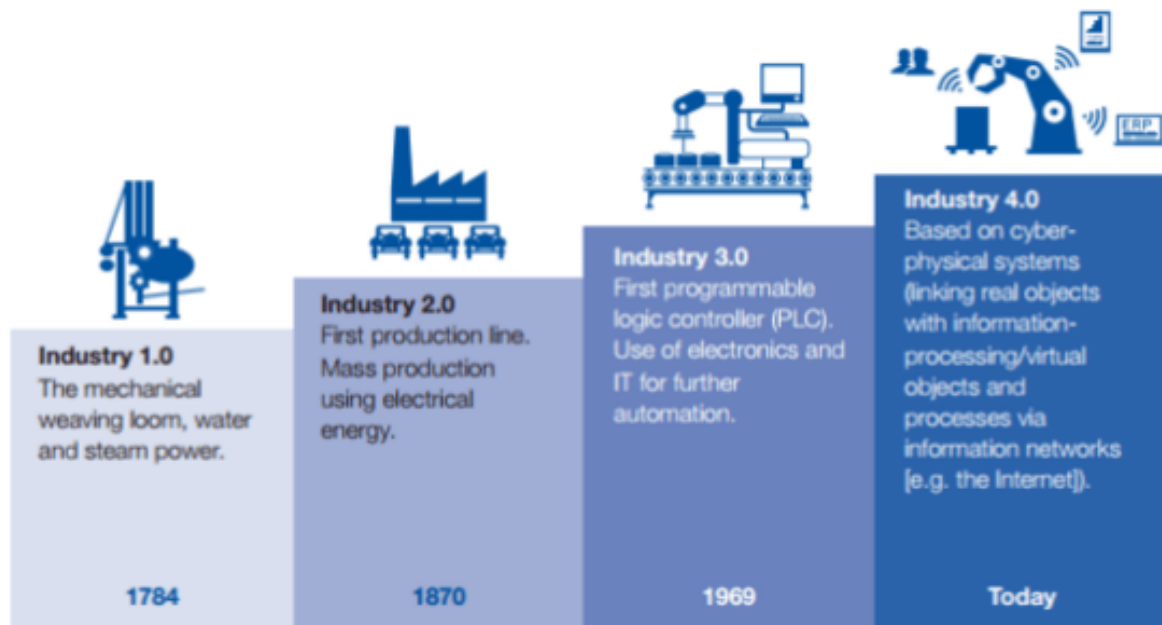


Figure 1: *History of Industry Evolution* (Marco Logistique)

According to Mr Barry Crocker (2007) Supply Chain history can be divided in three development phases. The first one in the 1980s can be defined as a “Functional supply chain”, with a hierarchical management approach, the customer can wait, he is focused on the time, but to finally receive his product. The collaboration between the different actors was low, and the performance focused on cost minimization. The period of the 1990s is defined as a “Responsive supply chain” for Crocker (2007), with more reactivity to customers demand, a management aspect less hierarchical and more controlled. Organizations gave more of their time to this function and started to understand the collaboration importance for the business. The last phases begin in the 2000s, the management approach is collaborative, customers want the product now, and they need to get it quickly. Web connections allow us to be interconnected between different actors of the supply chain, and everything is faster. The performance is now focused on revenue and profit rather than on cost minimization (Barry Crocker et al, 2007).

In 20 years, the supply chain approach is totally different, the sector has been developed simultaneously than internet and technological progress. Thanks to these tools and innovation, supply chains are currently a way to be more competitive and to generate profit for organizations.

2.3 Obsolescence

2.3.1 History

The term of obsolescence appear in the years 1820-1830, but became most known to people in the 1932 thanks to the book of Bernard London named “Ending the Depression Through Planned Obsolescence”. The first book treated of obsolescence have been write in the 1960s by Vance Packard, the author gave example of obsolescence in the sector of airplane and automobile industries during the second half of the 1950s. Obsolescence can be difficult to define and located in the hisotry, because of his form which could be vague and varied. (M.Mellal, 2020). Technical progress and innovation are necessary followed by obsolescence, every new product or new technological advance will make the product used before obsolete. Therefore, more product are becoming obsolete since the end of the 20s century, due to technological progress and innovation which have been more numerous.

Today, obsolescence is faster than ever, with the development of social media and the globalization of the internet, everybody has access to new things immediately and from his house. This evolution has a lot of positive aspects, but also negative ones, with the phenomenon of overconsumption, products begin obsolete before being unusable and can be difficult to treat as rubbish, especially for the electronical product.

2.3.2 Definition

According to Mohamed Mellal Obsolescence is “the act of becoming obsolete, outdated, outmoded, ect. It is a trend to make something “out-of-date””. In economics, obsolescence is the fact that a productive asset may become outdated, and thus lose its utility, due to a technical developments, innovations, or fashion, even if the products is always operational. The word obsolete can be define by two different way, first with the word “obsolete” for a product which is “no longer available”, in this case reasons can vary. The other utilization is “obsolescent” for a product which is subject to be obsolete due to future innovations of technical progress, the product is obsolescent before becoming obsolete. A product can become obsolete just due to the appearance of a new product with the same function but with higher performance level (Mellal et al ,2020).

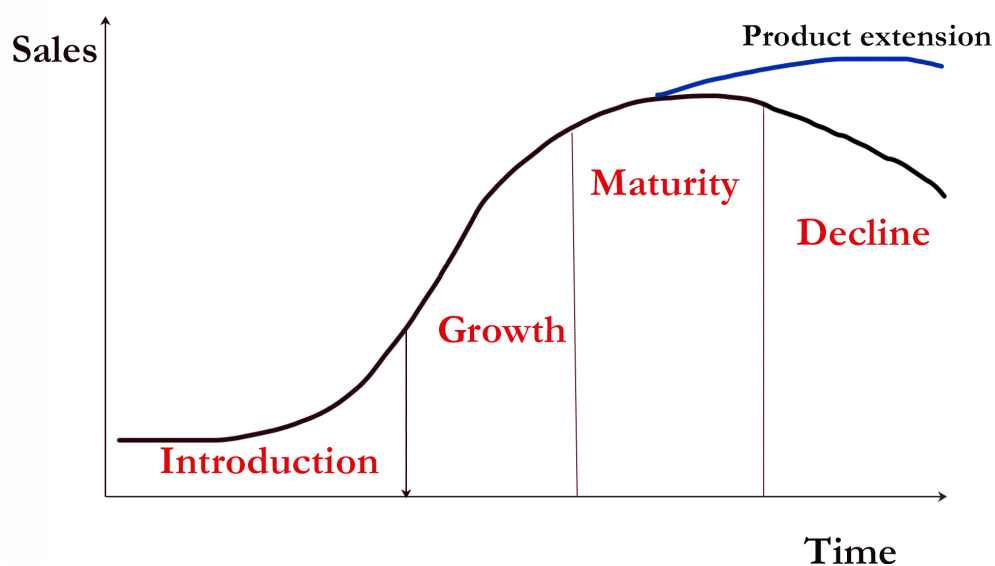


Figure 2: *Product Life Cycle* (Economic help)

Obsolescence can be caused by different things, as we talk before obsolescence can be technological, with the notice of sale of a new product more efficient and which use new technology. But the obsolescence can also be functional, optional, planned, or due to the fashion trend.

2.3.3 Typology of obsolescence

2.3.3.1 Technical obsolescence

Technical obsolescence is caused by technical progress, the product is devalued due to the selling of new products with higher performance or with newer technologies. Economically is preferable to use the new product, even if the old one is still functional and operational (Mellal et al, 2020). We can take the example of television, the first TVs were replaced by flat screens, today flat screens are replaced by smart TVs.

2.3.3.2 Functional obsolescence

Functional obsolescence can be defined by becoming obsolete “when the main function of the component is degraded or insufficient without opportunity to be or be brought up-to-date” (Mellal et al, 2020). The best example of functional obsolescence is the mobile phone, smartphones make the old phone obsolete and unlikely by people, most of the people use smartphones nowadays.

2.3.3.3 Planned obsolescence

Planned obsolescence appeared quite recently, Mr Mellal defined this type of obsolescence as the act to “introduce obsolescence into their production policy, with the objective to generate short- and-medium-term a significant volume of sales by reducing the time between repeat purchase.” (Mellal et al, 2020). Examples are difficult to find, organizations do not boast of using planned obsolescence, Nintendo firms have been accused recently of using planned obsolescence.

2.3.3.4 Fashion obsolescence

Fashion obsolescence does not include the functional aspect of a product but its physical aspect. This type of obsolescence is defined by Mr Mellal as a product “no longer attractive because it is out of fashion, style becomes obsolete” (Mellal et al, 2020). Fashion obsolescence is especially present in the clothing industry, trend changes every season and clothes become obsolete quickly as they become fashionable.

2.3.3.5 Optional obsolescence

Last type of obsolescence is the optional obsolescence, definition given by Mohammed Mellal is “optional obsolescence refers to a situation where technological improvements are not applied to a product, even if they could be.” (Mellal et al, 2020). Sometimes organizations choose to not apply a new technology to one of their range of products, which is often the case for the cheapest range of products.

2.4 Sustainability

2.4.1 Definition and history

Defined by Bruntland et al. (1987) “sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” (Ukko et al, 2018). Protecting the planet is one of the key missions to our society, the environment must be preserved and taken care of to ensure its prosperity.

The concepts of sustainability are directly linked with three major dimensions : environmental, economic and social (Ukko et al, 2018). According to R. Goodland, the environmental dimension refers to the life-support systems essential to the existence of humanity (Goodland, 1995).

The environmental dimensions should follow few principles to be preserved and sustainable, pollution should not exceed the environment’s assimilation capacity, usage rate of renewable resources should not exceed the renewal rate, and the depletion of nonrenewable resources should not exceed the development rate of renewable substitutes (Ukko et al, 2018). These principles require an adaptation of human activity to be respected, and human activity has to adapt itself to follow this principle for sustainability.

According to Goodland and Daly (1996) “social sustainability can be achieved through community participation and a strong civil society. Maintaining social capital requires investments in areas such as education or, like physical capital, it will deteriorate” (Goodland, 1995). The social dimensions concern organizations and humans, thanks to their choice of consumption, each person and organizations can implicate himself as he wants to work for sustainability.

Economic dimension is “the maintenance of capital” (Goodland, 1995). This dimension considers all the resources inputs for the production process and is composed of factors such as profit, cost, new business creation, time, quality (Ukko et al, 2018). Economics is often the dimension where organizations are the most focused, to be efficient and competitive, they need to make some choice for the rentability of the organizations, and this choice can be more or less sustainable.

2.4.2 Sustainability for promotion

Today, some organizations bet on products longevity, with the use of quality raw materials, and the possibility to replace broken pieces rather than push the customers to buy a new product because of the impossibility to change pieces or because the cost is too expensive for a new component. This tendency spreads with the importance of sustainable development, and has a huge role to play in the coming years.

FairePhone is a smartphone brand which produces a phone with the possibility to change almost every component by themselves. Another example for clothing is Patagonia, these brands guarantee all his clothes for life, with the possibility to repair, or change broken pieces as zip, the main objective of Patagonia is to make clothes, which can be used for a long time. In the production of his clothes Patagonia, make the maximum to minimize their impact on the earth, 72% of their range of products include renewable material, 1% of their sales are given for the environment preservation and restoration. Patagonia makes sustainability their priorities, to reduce their ecological impact on the earth (Patagonia).

FairePhone and Patagonia are perfect examples of brands, which choose sustainability rather than maximize their profit and reduce their cost of production, but this choice can participate

to make them known by people, to make their promotion. With these types of brands, people have the choice of what they consume, they can choose to buy a product sometime a little bit more expensive but for a long time and which are in sustainable movement.

2.5 Summary

Through this literature review, I mentioned different subjects which will be essential for the rest of the dissertation. The documentary research was focused on three principal aspects. The first one was the concept of Supply Chains Management, with a quick definition of the subjects followed by the history of the sector.

Afterward, I defined the term of obsolescence, which is the principal subject of this dissertation, with his evolution during the years caused by technical progress and innovations. It was necessary to see the different nature of obsolescence and their reasons to understand this concept and see what can be improved.

Finally, I have defined what sustainability is and the importance of making things sustainable for the planet and for humans. It includes a resume of sustainability history especially for clothes and electronics products, which allow to see the evolution of obsolescence through the years and decade. It was interesting to take examples of brands which used sustainability for their product promotion, which is the way to follow for every organization.

Obsolescence can't be wiped out, but can be limited and less important, obsolescence has an impact on industry and daily life, it can be both voluntary and involuntary (Mellal et al, 2020). Solutions exist to limit obsolescence and make things better for the environment, but this solution has to be applied to be efficient.

References :

Alice Huot, A. H, 2019. *Les marques résistent mieux à la crise du Covid-19 qu'à celle de 2008*. L'ADN tendances.

[Accessed the 31 January 2021]

<https://www.ladn.eu/nouveaux-usages/etude-marketing/marques-resistent-mieux-crise-covid-19-que-2008/>

[On line]

Crocker Mr Barry, B., 2007. *The relationship-driven supply chain: creating a culture of collaboration throughout the chain* – Gower

Flash Global., 2015. *The History and Progression of Supply Chain Management*

[Accessed the 29 January 2021]

<https://flashglobal.com/blog/infographic-the-evolution-and-history-of-supply-chain-management/>

[On line]

Goodland, R. (1995). *The concept of environmental sustainability*. Annual Review of Ecology and Systematics, 26, 1–24.

[Accessed the 31 January 2021]

[On line]

Goodland, R., & Daly, H. (1996). *Environmental sustainability: Universal and non-negotiable*. Ecological Applications, 6(4), 1002–1017.

[Accessed the 31 January 2021]

[On line]

Günter Prockl, G. P; 30 March 2017. Springer Link. *Supply chains and electronic markets – impulses for value co-creation across the disciplines*

[Accessed the 27 January 2021]

<https://link.springer.com/article/10.1007/s12525-017-0253-6>

[On line]

Julien Vidal, J. V. *J'achète un smartphone réparable. Ca commence par moi*.

[Accessed the 2 February 2021]

<https://cacommeceparmoi.org/action/smartphone-reparable/>

[On Line]

Kem-Laurin Kramer, KL. K; 2012. *Planned Obsolescence*. User Experience in the Age of Sustainability

[Accessed the 27 January 2021]

<https://www.sciencedirect.com/topics/computer-science/planned-obsolescence>

[On line]

Kransdorff, A., 1982. The management Page: High Stock Levels – Not the Answer – Arnold Kransdorff reports on “Supply Chain Management” Financial Times, p 16

Vincent Ghislain & Essiane Andje, V. G, E. A ; 2017 *Quelle est la différence entre la Gestion Logistique et La Gestion de la Chaîne d'Approvisionnement (Supply Chain Management) ?* MBA, Research doctorate : African logistics and supply chain facing industry 4.0

[Accessed the 30 January 2021]

<http://marcologistique.com/quelle-est-la-difference-entre-la-gestion-logistique-et-la-gestion-de-la-chaîne-dapprovisionnement-supply-chain-management/>

[On line]

Mohamed Azerzki Mellal; MA. M., 2020. *Technology in Society*. Science Direct. Obsolescence – a review of literature.

[Accessed the 30 January 2021]

[On line]

Neckel Anderson & Boeing Ricardo, N. A, B. R; 2019. *Influence of online consumer innovativeness behavior in electronic products on planned obsolescence process*. Brazilian Journal of Management / Revista de administracao da UFSM

[Accessed the 2 February 2021]

<https://web-a-ebsohost-com.ezproxy.uwtsd.ac.uk/ehost/pdfviewer/pdfviewer?vid=2&sid=46f98836-5708-4b6d-8afe-6d5affd1587e%40sessionmgr4008>

[On line]

Patagonia, web site

[Accessed the 1 February 2021]

<https://eu.patagonia.com/fr/fr/home/>

[On line]

Paul D. Larson & Dale S. Rogers ; PD. L, DS. R ; 15 Dec 2015. *Journal of Marketing Theory and Practice*. Taylor & Francis

[Accessed the 27 January 2021]

<https://www.tandfonline.com/doi/abs/10.1080/10696679.1998.11501805>

[On line]

Rhonda R. Lummus; Robert J. Vokurka ; RR. L, RJ. V ; 1999. *Defining supply chain management: a historical perspective and practical guidelines*. Deep Dyve page 11.

[Accessed the 30 January 2021]

<https://www.deepdyve.com/lp/emerald-publishing/defining-supply-chain-management-a-historical-perspective-and-Oyu21QSQQN?key=emerald>

[On line]

SpiderGroup, S.G; 2019. *Technology: A positive or Negative Impact on Society?*

[Accessed the 27 January 2021]

<https://www.spidergroup.com/blog/technology-a-positive-or-negative-impact-on-society>

[On line]

Tejvan Pettinger, T. P, 2019. *Product life-cycle*. Economic Help.

[Accessed the 29 January 2021]

<https://www.economicshelp.org/blog/140934/business/product-life-cycle/>

[On line]