

ENSURING ENVIRONMENTAL SUSTAINABILITY IN THE PRINTING INDUSTRY

Eco-printing in Uppsala Nya Tidning AB. (UNT)

Akimbom Michael Che



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Akimbom Michael Che

Supervisor: Bo Öhlmer, Swedish University of Agricultural Sciences,
Department of Economics

Examiner: Karin Hakelius, Swedish University of Agricultural Sciences,
Department of Economics

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Swedish University of Agricultural Sciences
Faculty of Natural Resources and Agricultural Sciences
Department of Economics

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Abstract/ Summary

Environmental sustainability has come a long way and has been defined in many different ways. The focal point of each definition is countering the depletion of natural resources or the restoration of scarce natural resources for future generations. Approaching this issue has not been the same in every industry. The main focus of this thesis was to find out the contribution of eco-printing towards environmental sustainability in the printing industry with the case of Uppsala Nya Tidning AB. It focused on the following specific objectives.

The first was to investigate the role of eco-printing towards environmental sustainability of Uppsala Nya Tidning AB. The second objective was to assess how the environmental sustainability situation of Uppsala Nya Tidning AB. could be enhanced.

Data was gathered from both primary and secondary sources in order to fulfil the aim of the research. Secondary sources were from books, journals, and other published articles including the internet. Company documentation and other published reports and archival records were also used. Primary source included interview with some workers at Uppsala Nya Tidning AB. The result of this interview and other company documentation were analysed using tables and also excel charts and graphs.

The environmental sustainability of printing companies is measured using different key environmental indicators. These indicators may vary between companies. Performance of the different indicators is noticed to be different over different periods. Sometimes the company does well in some indicators while other times, it performs poorly.

Though eco-printing enables companies to strive towards improving their environmental sustainability, these companies should strive to communicate their sustainability situation to stakeholders based on a majority or all of the indicators and not just focus on one or a few indicators on which the environmental performance is high so as to avoid “green washing” of the public.

Abbreviations

BA- Bachelor of Arts

CO₂ -Carbon di oxide

EMS- Environmental Management System

FSC- Forest Stewardship Council

IPS -Iso-propyl alcohol

ISO- International Organisation for Standardisation

PEFC- Programme for the Endorsement of Forest Certification

SGP- Sustainable Green Printing Partnership

SFI- Sustainable Forestry Initiative

UNT- Uppsala Nya Tidning

VOCs-Volatile Organic Compounds

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CHAPTER ONE

1 Introduction

Sustainability and sustainable development finally came to prominence in 1987, when the United Nations World Commission on Environment and Development, chaired by Norwegian prime minister Gro Harlem Brundtland published its report our common future (Simon Dresner, 2002)

Sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Simon Dresner, 2002). As a result, there has been increased awareness by both producers and consumers on the effects of their activities on the environment. Producers strive to ensure that their activities are carried out in an environmentally friendly way while also using sustainable inputs. Consumers on their part also tend to make choices or preferences by assessing the effects on the environment of their contribution to this value chain. This trend has been observed in so many industries. The printing industry on its part responded to this by launching the sustainability in printing conference on June 18-20, 2008 at the Double tree Inn in Philadelphia (Cross, L. 2008). This was meant to accelerate the idea of sustainable printing across the industry. Also, there has been an increase in sustainable printing issues in the area of certifications from the forest management programs such as FSC (Forest Stewardship Council) to print production certification such as SGP (Sustainable Green Printing Partnership) in order to address the issue (print.rit.edu). With this growing concern towards environmental sustainability, I think it's about time both the consumers and producers in the printing industry continue to make decisions based on analyzing the sustainability of the choices they are faced with.

1.1 Background of the problem

The printing process has been undergoing constant growth and innovation from inception. The statistics of 2005 showed that an estimated 45 trillion pages were printed annually around the world (cartridgesave.co.uk). The United States alone in 2006 had approximately 30,700 printing companies which accounted for about \$112 billion in revenue that year. The printing

industry is also regarded as the 5th largest industry in the United Kingdom and the 6th most environmentally damaging (oxfordgrenprint.com). In India, there are over 130000 of all types of printing presses. India in 2004 to 2005 had an estimated print export (books, journals and other printing jobs) estimated to a worth of \$550 million transported to over 120 countries in the world (drupe.de). Apart from increases in the size of output in the printing industry, there has also been a considerable change and increase in the number of inputs used in the printing process as well. There are dozens of chemicals used containing such things as dissolved silver, phosphoric acid and iso-propyl alcohol with some of these compounds being unfriendly to the environment (oxfordgreenprint.com) . A document from Ontario printing and imaging association in 1995 listed 46 different environmental unfriendly compounds used in printing and the proper ways to handle them (oxfordgreenprint.com).

1.2 Problem statement

The printing process is noted to have moved from an unsophisticated to a very sophisticated process involving the use of several inputs. By sophistication, I mean production in the printing industry has involved the increased use of different chemical compounds in materials such as ink which has degrading effects on the environment. Also, the industry has become very attractive with huge financial gains and has developed new and innovative ways to print pictures, designs and type onto a variety of different mediums (cartridgesave.co.uk). This increased demand has led to an increase in the demand from paper companies who often resort to illegal exploitation of the forest natural resource thus destroying the natural ecosystem. This therefore indicates that the growth and development in the printing industry has however come at the price of increased environmental hazards. From this, the specific questions to guide the research project are:

What role does eco-printing play in contributing to environmental sustainability?

How can the environmental sustainability situation of UNT be enhanced?

1.3 Scope and delimitation

The concept of sustainability is usually perceived as a global issue. As a result, it could be seen as very broad and complex since it focuses on the triple bottom line, which is economic, social, and environmental sustainability of organizations. The main focus of the study in question is on the perspective of environmental sustainability and this is done in relation to an industry and not from a global perspective. According to Welford (1995), “the environment must be valued as an integral part of the economic process and not treated as a free good”. This implies minimal use of non-renewable resources and minimal emission of pollutants, as well as protection of ecosystems in order to avoid the loss of plant and animal species (Welford, 1995). Finally, the study is done with a focus on the printing operations of a newspaper company Uppsala Nya Tidning (UNT).

1.4 Objective of Study

The study is focused on investigating the contributions of eco-printing to environmental sustainability. To this effect, the attributes of eco-printing will be examined with a particular case of Uppsala Nya Tidning AB. (UNT) a newspaper company. Also, the study seeks to examine the necessary requirements for printing companies to be eco friendly and also the potential environmental (contributions) benefits of eco-printing. The specific objective of the study includes:

- **To investigate the role of eco-printing towards environmental sustainability of UNT AB. and**
- **To assess how the environmental sustainability situation of UNT AB. can be enhanced.**

1.5Significance of study

To justify the significance of the study, it is worthwhile to mention that the printing industry has changed greatly nowadays. This changed has been both in scale and technology likewise. Due to this, the role and effect of the printing on its environment has also changed.

The result of the study will enable individuals to be aware and cautious of the effects of the printing industry which is usually underestimated by the public (oxfordgreenprint.com).

The study will also enable Uppsala Nya Tidning AB. and other printing companies to assess the efforts they have made towards ensuring environmental sustainability. This will also enable the clients to be aware of the company's role towards environmental sustainability and not feel guilty to be part of a chain that poses threats to the environment. Finally, the results of the study will look into possible ways that environmental threats posed by the printing activity can be managed. Also, possible benefits including environmental and social benefits of eco-printing will be brought to light which might serve as a motivation to companies intending to persure eco-printing but they keep looking at the entire process as a cost to them.

1.6 Outline

The outline of this study as evident in figure 1 below is divided into six chapters. The reason for this is to provide the reader with a picture or an idea of what the thesis is all about. Chapter one starts with an introduction to environmental sustainability, the problem statement, scope and delimitation, significance, and an outline of the study. Chapter two proceeds with the theoretical perspective and chapter three the scientific methods used. Chapter four presents the background information about the empirical study which include information about Sweden in general and Uppsala in particular and also information about Uppsala Nya Tidning AB. Chapter five is the result and analysis and lastly chapter six the discussion, conclusion, recommendation and suggestions for further research.

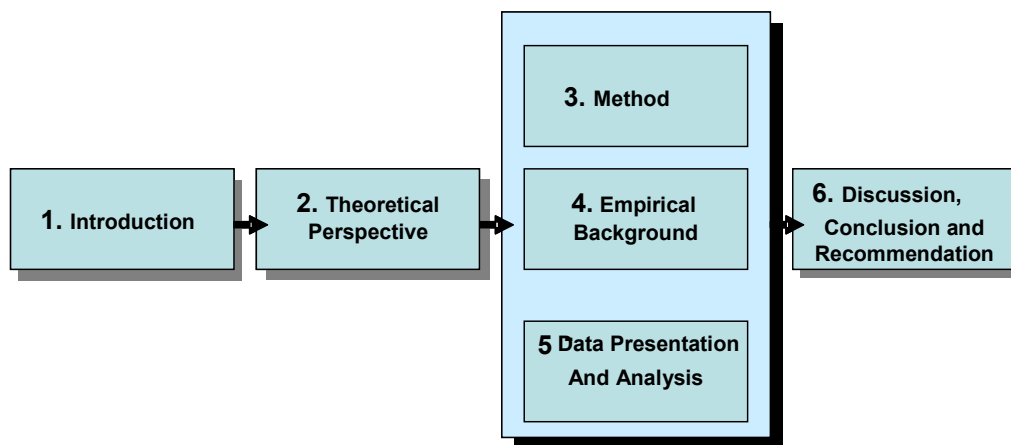


Figure 1: Illustration of the outline

CHAPTER TWO

2 Literature review and theoretical framework

This chapter focuses on the concept of eco-printing. It starts by looking into the attributes or requirements of eco-printing which simply put are the principles to be applied by any company intending to pursue this sustainable way of printing. The benefits of eco-printing are further explained in the chapter shedding more lights on the importance of the concept. Further in the chapter, the definition of environmental sustainability is provided and this is preceded by looking into possible ways of achieving environmental sustainability by applying the Ottman's Five Strategy Framework

2.1 Definition of Eco-printing

Eco-printing simply refers to the use of an environmentally responsible printing process. By this, it implies the use of an approach to printing that aims at eliminating or reducing the environmental hazards (footprint) of the entire printing process. The printing process also refers to the chain from the suppliers of the raw materials (inputs) for printing right up to the end of life (disposal) of the printed material. The concept was enforced due to increased consumer awareness driving companies to have an articulated sustainability strategy, asking for a report card on corporate actions and requiring authenticity in green claims (Wales, T.2008)

2.2 Requirements (attributes) for Eco-printing

Eco-printing (environmental sustainable printing) may seem a contradiction in terms. This is because a green approach to printing seems unlikely given the use of paper and energy and the production with chemical solvents and inks (Mario, A.2009). This makes commercial printers to be viewed as environmental threats rather than green business leaders.

Adopting an environmental friendly business strategy has become vital in the industry thereby enabling businesses to adopt technologies and processes that helps in reducing environmental footprints. The following can be seen as some of the attributes for environmental friendly printing.

External Environmental Certification

This is a major issue in eco-printing. Environmental certification programs seek to verify for a broader public that the activities of certified enterprises are environmentally appropriate (Errol E. 2001). This relates to the activities of the entire production chain. That is, from raw material extraction by paper companies, to production by printing companies and end of life of the print product by consumers. Therefore, printing companies need to ensure that the paper companies or mills from which it receives paper are environmentally sustainable and certified as well. This could either be via an ISO14001 certification (an environmental management system that indicates a company's level of sustainability) or ISO 9001 for quality assurance.

Therefore, sustainability practices must be transparent, observable to buyers and authenticated. There is therefore no room for false claims or posturing by businesses because getting caught green washing is worse than not having an eco friendly position at all (Wales, T. 2008)

Sustainable Paper

The paper industry is the fourth largest industrial consumer of power, much of which is generated from the by-products of harvesting trees (Wales, T. 2008). Therefore, responsible use of power as well as operating mills within defined guidelines for air, water and solid waste are minimum requirement.

Also, the popular Forest Stewardship council (FSC), Sustainable Forestry Initiative (SFI) and Programme for Endorsement of Forest Certification (PEFC) are earned by the owners of the forests while the associated chain of custody, a paper work trail following the certified trees is awarded to those in the supply chain. These third party verified certifications help identify responsible forestry practices in purchased paper (Wales, T. 2008) Therefore, green printers need to make sure that they are buying paper that is FSC or PEFC certified, and that they are communicating to their customers the realities of paper (Wade, R. 2008)

Eco Ink

This simply implies the use of environmentally friendly ink in the print production process. Vegetable based inks such as soy or linseed are an example of this. It includes the use of vegetable oil instead of petroleum to varying degrees (bigskyprint.com). These inks usually have low rates of volatile organic compounds (VOCs) emissions compared to petroleum based inks which are made of mineral and solvent and thus have significant amount of VOCs. Vegetable based inks are derived from renewable resources and the inks are more easily removed from waste paper during de-inking (bigskyprin.com). The pigments in the ink do not usually contain heavy metal and it also poses less threat to workers in the industry. According to Wade (2008), vegetable inks deliver a brighter cleaner image, whereas solvent inks tend to reproduce with flatter colours.

Sustainable print process

Printing industries also have to make sure the print process is carried out in a sustainable manner. This involves the use of methods or techniques to reduce the use of scarce natural resources. An example of this is the adoption of the waterless printing technique. This is basically sheet-fed printing using different printing plates and a method of transferring the image to the paper without using water (bigskyprint.com). This eliminates the need for IPA (iso-propyl alcohol) and better quality print through reduce dot gain and improved colour consistency.

Green Press

The printing press itself should be specified as green. By this, it should include all the latest environmental benefits (Wade, R. 2008). This could include features such as recyclable wash up solutions, and low waste ink feed solutions, such as cartridges or pumps which eliminates 95% of ink wastage. Also, the format of the press should be a perfector, as this may result to huge energy saving and a significant waste saving as well.

Alcohol free or low alcohol printing

This includes a low-alcohol printing technique which helps reduce both the IPA in the dampening system and volatile organic compounds (VOCs) emissions (bigskyprint.com). Since the main pollutant on the press is IPA (iso-propyl alcohol), green printers should

therefore strive to reduce or eliminate IPA from their font solutions (Wade, R. 2008) This will not only help to reduce VOCs but will eliminate health problems usually encountered by press workers as a result of exposure to these compounds.

CO2 reduction and Carbon neutral footprint

It is however difficult that a business will be carbon negative but there are steps it can take to neutralize its carbon foot-print. These may include such options as planting of trees, sourcing of power from a green power provider, reducing energy consumption where possible such as switching off PCs and lights at night for instance (Wade, R. 2008)

Also, printing companies need to understand that carbon neutral schemes that simply offset carbon emissions by planting trees are ineffectual because they deal with symptoms rather than addressing the causes (bigskyprint.com). Therefore, printing companies should endeavor to undertake environmental schemes that focus on both reducing emissions and offsetting the carbon footprints as well.

Effective waste management

This means separating everything at source, recycling or reusing wherever possible. An example includes Focus Press which sends its used blankets off to the Philippines (Wade, R. 2008). Therefore, an in-house mindset needs to be created so that all employees are sensitive to waste issues.

Full disclosure

As stated by Wade, any aspiring eco-printer must be prepared to embrace full disclosure, in order to convince its potential customers that what it claims is actually capable of being substantiated.

2.3 Outcomes (benefits) of Eco-printing

To be able to identify the contributions made by eco-printing, it is worthwhile to emphasize the general hazards of the printing industry. This involved natural resource consumption and depletion by paper, ink and energy requirements to CO2 emissions and volatile organic compounds (VOCs) concerns. This process therefore has wide spread and considerable environmental impact.

The combined forces of market pressure by customers, environmental legislation and a growing awareness of cost-reducing initiatives and technology in recent years have greatly reduced the environmental impact of the printing industry (ppe.uk.net). This increase awareness in printing has brought forth the following contributions or benefits towards a more sustainable environment.

Reduction in energy consumption

The print process involves a significant amount of energy at all stages of the print process and throughout the factory. This involves the use of energy from heating and lighting to powering equipment and final delivery of the print material. Environmental printing methods have resulted in energy efficient lighting to heat recovery systems and fuel-efficient vans while enhancing more potential for action and innovation.

Reduction in waste

High levels of waste are generated in the print process. This usually include paper waste (sometimes separated into printed and unprinted), hazard waste (such as ink tins) usually collected by licensed companies for safe disposal and finally general waste which is collected and sent to landfill subject to landfill tax (ppe.uk.net). As a result of eco-printing, each category of the aforementioned waste is monitored and documented (by weight on collection) and in the case of paper waste, a payment is received while for hazardous waste and general waste, a fee is paid. This thereby creates financial incentive for print companies to recycle more of their paper waste while reducing the level of hazardous and general waste.

Reduction in water consumption

As a result of increasing water costs, printing companies are charged for water use and disposal (ppe.uk.net). This financial incentive also helps to reduce the amount of water in the print process thus helping to preserve this essential natural resource.

Safer working environment for workers

Low alcohol printing together with the elimination and reduction of other hazardous VOCs in the printing process has gone a long way to enhance workers safety and health in the work place.

2.4 Definition of Environmental Sustainability

The term environmental sustainability was first coined by scientists at the World Bank and was originally referred to as “environmentally responsible development” (World Bank, 1992). Subsequently, the term “environmentally sustainable development” was employed (Serageldin and Streeter, 1993) and finally the concept of “environmental sustainability” was developed (Goodland, 1995).

According to Goodland, 1995, environmental sustainability seeks to improve human welfare by protecting the sources of raw materials used for human needs and ensuring that the sinks of human wastes are not exceeded in order to prevent harm to humans. He further identifies environmental sustainability as a set of constraints on the four major activities regulating the scales of the human economic subsystem. These include the use of renewable and non renewable resources on the source side, and pollution and waste assimilation on the sink side.

Holdren et al. (1995) further defines environmental sustainability by focusing on its biogeophysical aspects. Biophysical sustainability means maintaining or improving the integrity of the life supporting systems on earth. Sustaining the biosphere with adequate provisions for maximizing future options includes enabling current and future generations to achieve economic and social improvements within a framework of cultural diversity while maintaining

a) Biological diversity and

b) The biogeochemical integrity of the biosphere by means of conservation and proper use of air, water and land resources.

Furthermore, the commissioner for environmental sustainability of the Australian state of Victoria P. Sutton defines environmental sustainability as the ability to maintain the qualities that are valued in the physical environment (Sutton, 2004)

2.4.1 Indicators of Environmental Sustainability

From the introduction of the concept of sustainable development in the 1980s, the idea has greatly evolved from its fuzzy notion to more precise specifications covering its fundamental pillars (Moldan, B. et al. 2011). As a result, many important definitions are now presented in

quantitative terms using different indicators thereby making the need for a comprehensive analysis of indicators very obvious.

Once sustainable development indicators are defined, they have to be “measured” in a wide sense by both quantitative and qualitative techniques (ibid). More often, measuring and obtaining the value of sustainability indicators is not a problem but the difficulties relate to the selection, interpretation and the use of indicators.

Based on my review of literature, the object of my study which includes the environmental sustainability of UNT Distribution AB can be measured using the following indicators.

1. The environmental policy of the company.

This simply implies the company’s policy towards environmental issues such as energy use, emissions, waste management, and recycling e.t.c.

2. Company’s objectives.

Objectives are defined as the strategic plans of a company. Therefore, by this I intend to verify if achieving environmental sustainability is regarded as part of the strategic objective of UNT Distribution AB.

3. Environmental Management System (EMS)

This seeks to verify if the company has an external environmental certification program to certify that the activities of the company are environmentally appropriate. This usually includes a certification such as ISO14001 and ISO9001 for quality assurance.

4. Eco-printing

This simply involves an approach to printing that aims at reducing the environmental hazards of the entire printing process.

The above factors can be clearly seen as summarized in the figure on the next below:

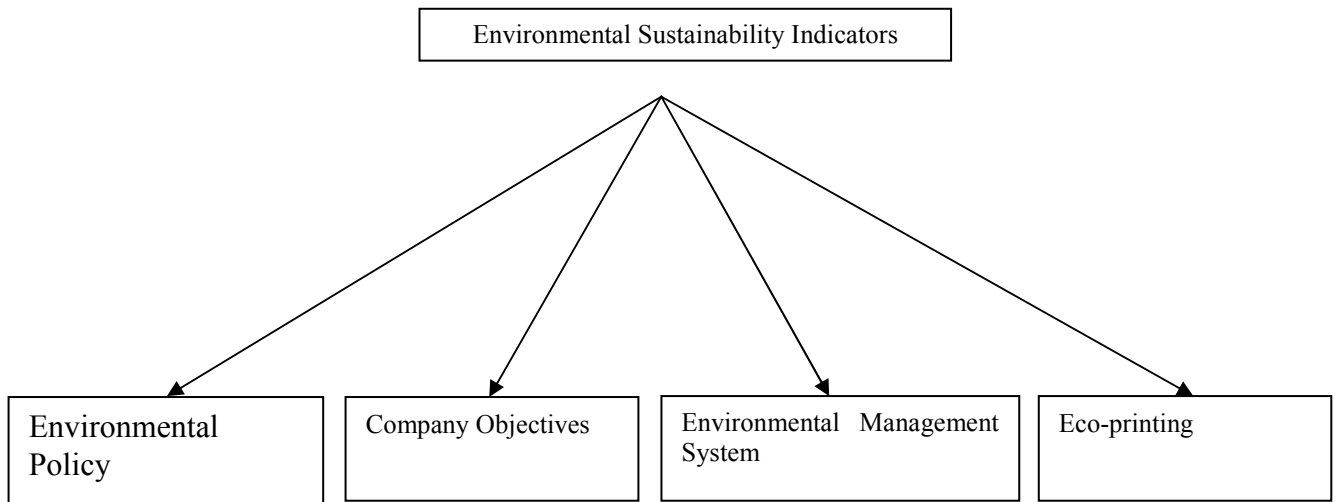


Figure 2: Selected indicators of environmental sustainability based on the review of literature.

2.5 Achieving Sustainability

When environmental issues resurfaced as a source of consumer concern in the late 1980s, industries responded primarily by cleaning up their operations (pollution prevention) and refining its products. Excess packaging for example was eliminated or recycled content used in place of virgin (Martin Charter and Michael Polonsky, 1999).

While the need for radical innovation is clear and the rewards are potentially great, the direction for individual businesses is not well defined. Businesses are faced with questions which include: What does sustainable development mean for our industry and our company? What are the implications for our existing products and services? How can we turn long-term threats into opportunities? (*ibid*).

The experience from some companies that have already began to tackle the challenges of sustainability suggest that answering the questions above will require creativity ‘out-of-the-box’ thinking and also viewing one’s business and the value it provides from a fresh perspective. The following five strategies supported by the pioneers’ experiences can be used by companies in reinventing one’s business in order to meet the challenges of sustainable development. These strategies are part of a proprietary innovation process created by Ottman (Jacquelyn A. Ottman), called Getting to Zero in order to guide environmentally sustainable product development efforts (*ibid*).

2.5.1 Ottman's Five Strategy Framework

These strategies enable companies to be able to reinvent themselves in order to meet the challenges of sustainable development and include setting outrageous goals, thinking like a system, Dematerialise, make it fit and restore rather than take.

1 Set Outrageous Goals.

These are goals that sound virtually impossible to achieve. Such goals, when presented hypothetically for brainstorming purposes represent an excellent way of by passing incremental thinking quickly in favour of 'out-of-the-box' thinking (*ibid*). An example of two companies that understand the meaning of setting outrageous goals is DuPont and Xerox. DuPont has an environmental goal of 'zero waste' while Xerox's environmental goal is 'waste free products from waste free facilities'. When such goals are set, the company strives to enhance its environmental performance thereby ensuring a sustainable environment.

2 Think like a system

Instead of making adjustments to specific features of an existing product in and of itself, the environmental performance of products can be more significantly improved through modifications to the system in which the product operates (*ibid*). The system in this case is defined as the product value chain beginning with extraction of raw materials, processing and distribution through to the in-use phase and the product's eventual recovery or disposal which consist the various stages in the product life-cycle. Many products refinements to date have often involved or focused primarily on reducing impact within specific stages. An example includes reducing the amount of recyclable materials, reducing energy or water consumption during the in-use phase, or by designing the product to be recyclable. However, other ways exist to further reduce the impact by attempting to collapse two or more life-cycle stages. An example might include the case of Xerox who refurbishes its used copies and sells them as remanufactured machines combining the recover/disposal and manufacturing stages of its own product life cycle. A second tool employed in 'thinking like a system' is industrial ecology. It studies material and energy flows in the economy and ecosystems and aims at enabling companies redesign industrial processes whereby "waste" from one process becomes "food" for another.

3 Dematerialise

The basic notion of dematerialization is to be able to meet consumers needs with as few materials and as little energy as possible. It describes a technology shift away from economies based on enormous and increasing consumption of raw materials (Van Weeman, 1995). This could further be viewed or defined from an environmental perspective as change in the amount of waste generated per unit of industrial product (Herman et al 1989). It assumes that we can use services based on technology or know-how in place of material products so as to reduce global material flows and energy significantly (Martin Charter and Michael Polonsky, 1999). One important question to be asked in order to be able to “dematerialise” one’s business is: Can our consumers’ needs be met equally or better by providing them with a service as adjunct to or replacement for a material product? Some excellent examples of dematerialization are electronic voice mail as a replacement for answering machines, e-mail virtual libraries including electronic alternatives to direct-mail catalogues, yellow pages directories and encyclopaedias and telecommuting (*ibid*).

4 Make it fit

From a sustainability standpoint, this can be translated into the notion of maximizing the utility of resources by designing products to fit the real needs of consumers as closely as possible (*ibid*). It assumes that product design, materials and technology are appropriate to the scope and difficulty of the task as well as the locality (climate, resources, available solid waste infrastructure for example). One questions often asked when uncovering ways of using existing products and technologies more efficiently is: How does our technology best fit within the entire range of alternatives that meet a particular need of consumers?

5 Restore rather than take

It is generally accepted that all products must use up resources and create waste. Therefore, the current goal in eco-related design projects is to minimise the impact of this waste on the environment (*ibid*). What if the paradigm shifted so as to design products with the goal of restoring the environment? An example of a company that employed this strategy was Volvo that announced that starting in spring 1999, it will incorporate special “PremAir” catalyst systems to its S80 model car that are capable of destroying ozone created from other car’s pollution (*ibid*). In order to use this strategy to generate out-of-the-box thinking regarding

environmentally preferable product development, businesses can ponder the following questions. What will it take for our products actually to benefit the environment or society? Can our marketing efforts help to educate consumers about key environmental and sustainability issues? Can our manufacturing be a source of jobs for the handicapped? This strategy can lead to environmental marketing opportunities that can reinforce one's overall business strategy. An example includes the US-based Hannah Anderson catalogue of children's clothing that encourages customers to send back used children's clothing by offering a 20% discount on future orders. The company then sends the clothes to the poor in a programme that they call "Hannadowns" (*ibid*).

From the above, it is evident that sustainable development strategies can make businesses more competitive and also result in better products with enhanced level of customer satisfaction over conventional products. Therefore, developing sustainable products requires that companies operate under a new paradigm that includes (*ibid*):

- Products do not have to be disposed of. They can be more useful to the society and more profitable for businesses if they can be re-used or recycled into new products.
- Products do not have to be designed for obsolescence to be profitable. They can be more productive to society and the bottom line if they are durable.
- Consumers' needs can be profitably met with services rather than products, or at least an optimum combination of both.
- Consumers will reward businesses that help restore the environment while creating the products consumers want (See Fig 3)

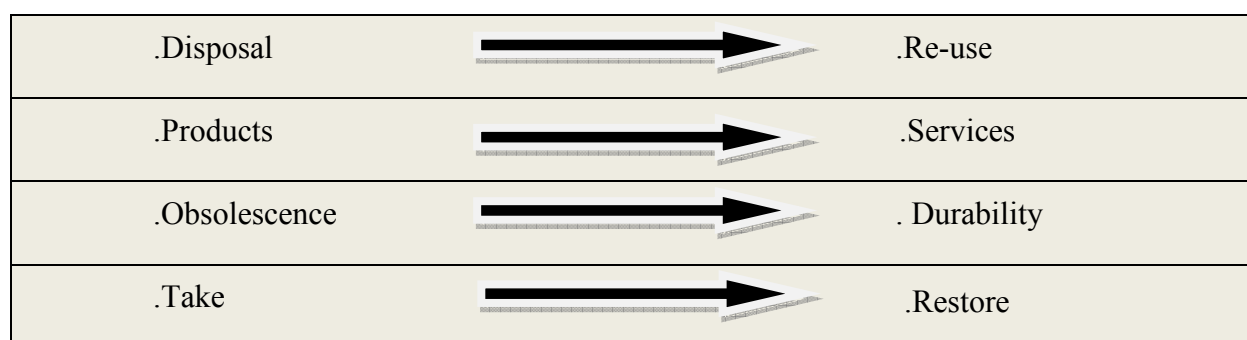


Figure 3: The sustainability paradigm (J. Ottman Consulting, Inc.).

2.5.2 PESTEL Framework

The PESTEL refers to a method by which organizations use to carry out an analysis of their external environments. It stands for Political, Economic, Social, Technological, Environmental and Legal and it provides a comprehensive list of influences on the possible success or failure of particular strategies (Johnson et al, 2010). Politics highlights the role of governments, Economics refers to the macro-economic factors such as exchange rates, business cycles and differential economic growth rates around the world, Social influences include changing cultures and demographics, for example ageing populations in many western societies, Technological influences refer to innovations such as the internet, nanotechnology or the rise of new composite materials, Environmental stands specifically for “green” issues, such as pollution and waste, and finally Legal embraces legislative constraints or changes such as health and safety legislation or restrictions on company mergers and acquisitions (ibid). The figure below illustrates the different aspects of the framework.

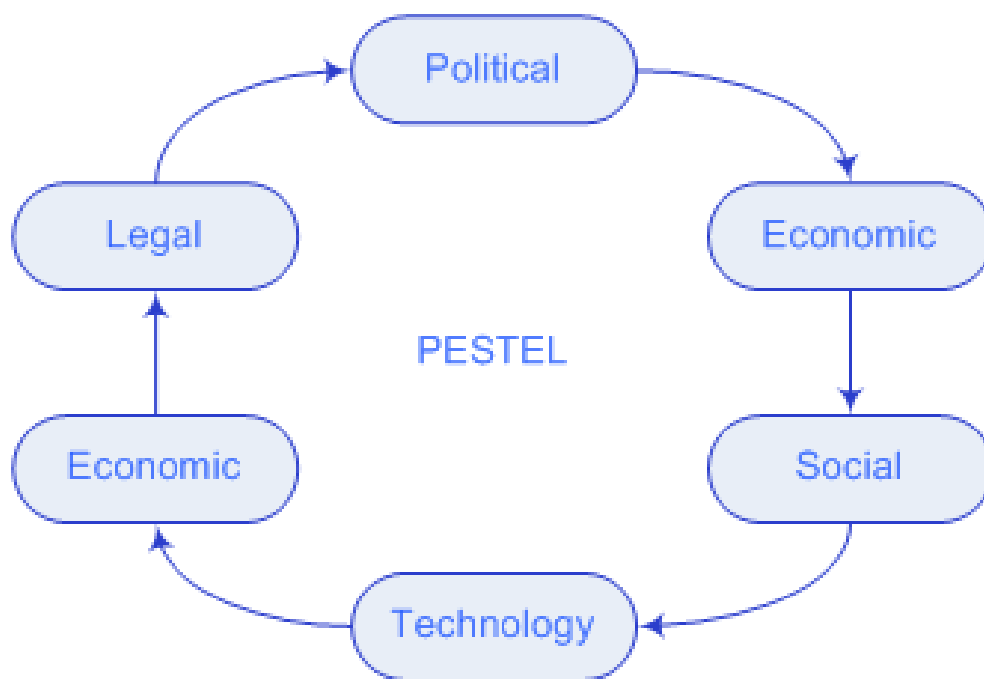


Figure 4:PESTEL Analysis(whatmakesagoodleader.com)

Worth mentioning is the fact that, it is important not just to list PESTEL factors because this does not in itself tell managers very much (oup.com). What managers actually need to do is

think about which factors are most likely to change and which ones will have the greatest impact on them i.e each firm must identify the key factors in their own environment (ibid). These factors otherwise known as key drivers for change are those environmental factors which are likely to have a high impact on the success or failure of a strategy (Johnson et al, 2010).

A possible PESTEL analysis of Uppsala Nya Tidning ab with regards to the external environment in the printing industry might include the following:

Table 1: Possible PESTEL factors to consider for UNT AB.

Factor	Could include
Political	e.g, EU enlargement, international trade
Economic	e.g inflation, unemployment, interest rates
Social	e.g ageing population, attitude towards work
Technological	e.g innovation, new product development
Environmental	e.g global warming, environmental issues
Legal	e.g employment law, health and safety

CHAPTER THREE

3 Research Method

This chapter looks into the following. It starts with the purpose of the research which is mostly explorative. This is followed by the research approach, research strategy and finally the method of data collection used in the study which was mainly via focused interview conducted with the company workers.

3.1 Research purpose

Research can simply be defined as a systematic investigation of phenomena which we seek to explore, explain and predict. This therefore indicates that a research study may involve multiple purposes which may include describing, explaining, analyzing and criticizing (Ghauri and Gronhaug, 2005).

The following three different categories of research purposes involving explanatory, descriptive and exploratory perspectives are explained by Yin (2009)

Explanatory research involves testing and understanding casual relationship. It studies casual relationship between variables. It also studies problems and situations with the main purpose of explaining relationship between variables (Saunders et al, 2003).

Descriptive research involves summarizing, gathering information and mapping. It also portrays an accurate profile of events or situation (Robson, 2002).

Explorative research involves discovering, uncovering and exploring. It provides a valuable means of finding out what is happening, seeking a new insight, asking questions, assessing a phenomenon in a new way (Saunders et al. 2003). Exploratory research is useful when the understanding of the nature of the problem being studied is not clear.

The purpose of the research in question is exploratory in nature. Given that the subject of study (Eco-printing) is new and companies are just starting to embrace the concept, the research seeks to explore the possible contributions of the subject on environmental sustainability. It also seeks to discover possible ways via which companies can enhance the

environmental sustainability situation of their businesses via adopting this environmental friendly printing method. This research is done with the particular case of UNT Distribution, a news paper printing company located in Uppsala, Sweden.

3.2 Research approach

There are basically two main approaches used in scientific writing. These include the Quantitative and the Qualitative research approaches. As explained by (Gill and Johnson, 2006), there is actually no one best approach to study management research. The approach most appropriate for addressing a particular problem depends on a large number of factors such as the nature of the problem (ibid).

Quantitative research approach is that which generates statistics through the use of large-scale survey research using methods such as questionnaires or structured interviews (e-articles.info). It lays emphasis on the collection of data which is thus viewed as a deductive approach. The deductive approach develops theories, hypothesis and designs a research strategy to test the hypothesis (Saunders et al, 2003). That is, the deductive approach also referred to as “top-down” studies from more general to specific issues.

Qualitative research on the other hand refers to all non-numeric data (Saunders et al, 2009). It explores attitudes, behavior and experiences through such methods as interviews or focus groups thereby attempting to get an in-depth from participants (e-articles.info). Because it relates to attitude, behavior and experiences which are important, fewer people usually take part in such research but the contact with such people tends to last a lot longer. The method focuses on an inductive approach which implies the research collects data and develops theory from analyzing this data (Saunders et al, 2003).

Worth mentioning is the fact that both quantitative and qualitative research approaches can be used in a research since this allows the researcher to have an extensive in-depth of the process. Therefore, I intend to employ both research approaches in my study but with more emphasis on the qualitative data collection via focused interview with management and other workers about the subject.

3.3 Research Strategy

A research strategy is a plan of action that gives direction to the research efforts, enabling the research to be conducted systematically rather than haphazardly (lib.unca.edu). This plan usually enables the researcher to stay focus, reduce frustration, enhance the quality of the research and save time in the long run.

3.3.1 Case Study

The most frequently encountered definition of case studies have merely repeated the types of topics to which case studies have been applied (Yin, 2009). For example, in the words of one observer, case study could be defined as:

The essence of a case study, the central tendency among all types of case study is that it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented and with what result (Schramm, 1971, emphasis added by Yin, 2009).

The case study is but one of several ways of carrying out social science research. Other ways include but are not limited to experiments, surveys, histories and economic and epidemiologic research (Yin, 2009). Each of the aforementioned methods has peculiar advantages and disadvantages, depending upon three conditions: the type of research question, the control an investigator has over actual behavioral events and the focus on contemporary as opposed to historical phenomena.

Case studies are the preferred method when “how” or “why” questions are being posed, the investigator has little control over events and also when focus is on a contemporary phenomenon with a real life context (ibid).

Basically, case study method allows investigators to retain the holistic and meaningful characteristics of real life events such as individual life cycles, organizational and managerial processes, neighbourhood change, international relations and the maturation of industries (ibid).

As explained by Bryman and Bell, (2003), case study is mostly associated to qualitative research method used to study organizations. The use of case study method is appropriate to this research since it explores a real life phenomenon involving the contributions to environmental sustainability from eco-printing. Also, as Schramm (1971) explains, the case study format lends itself to the examination, implementation and outcome of a decision. In

this research, the case study enabled me to look at the contributions to environmental sustainability and also possible ways by which organizations could enhance their sustainability situation by adopting or implementing eco-printing with regards to the printing operations of UNT Distribution.

3.4 Data Collection

The evidence used in case studies can come from many sources. Six of these sources include: documents, archival records, interviews, direct observation, participant observation and physical artifacts (Yin, 2009).

A major strength of case study data collection is the opportunity to use many different sources of evidence. This allows an investigation to address a broad range of historical and behavioral issues (ibid). However, the most important advantage presented by using multiple sources of evidence is the development of converging lines of inquiry, a process of triangulation and corroboration. This therefore makes case study finding and conclusions more convincing and accurate if it is based on several different sources of information following a corroboration mode (ibid)

Data for the study was collected via primary and secondary means. Secondary data was obtained from the internet, journals, articles, company reports and also text books.

Primary data was obtained via focused interview with the company employees.

3.4.1 Interview

An interview is a purposeful discussion between two or more people (Kahn and Cannel, 1957) or it can also be referred to as a guided conversation rather than structured queries (Yin, 2009). Also, as explained by Ruin H.J. & Rubin I.S. (1995), although you will be pursuing a consistent line of inquiry in an interview, your actual stream of questions in a case study interview is likely to be fluid rather than rigid.

The following three types of interview can be identified (Yin, 2009).

- **The in-depth interview**

In this situation, you ask the key respondent about the facts of the matter as well as their opinion about events (ibid).

- **Focused interview**

As explained by Merton et al, 1990, this is a type of interview in which a person is interviewed for a short period of time say an hour for example. The interview in such situation may still remain open ended and assume a conversational manner, but you are more likely to be following a set of questions derived from the case study protocol (ibid).

- **Structured interview**

It entails more structured questions along the lines of formal survey (ibid). This type of interview could produce quantitative data as part of the case study evidence since it involves the use of questionnaire. Thus while structured interviews are referred to as quantitative research interview (Mark Saunders et al, 2009), in-depth interview or semi structured (focused interview) are referred to as qualitative research interview (King, 2004).

For the study in question, it used both the focused interview and review of company documentation or company archival records to obtain the necessary information required to fulfill the aim of the research. I had a focus interview with four employees in the company that lasted at least an hour each and also went through environmental reports supplied to me by the interviewees. From the documents, I could get necessary information about some environmental indicators used to measure the company's performance for the past years.

CHAPTER FOUR

4 Background for empirical study

This chapter is focused on providing an introductory information to the case study and also providing relevant information about the city of Uppsala where it's situated and information about Sweden as a whole. The chapter begins with information about the city of Uppsala where the case study is situated and the country as a whole. This is then followed by information about the environmental sustainability situation of the country, the Swedish Environmental Protection Agency, Organizational chart of UNT AB and finally the history of the company.



Figure 5: Map of Sweden (wordtravel.com).

4.1 Uppsala (Sweden), Environment and Environmental Sustainability

Uppsala which is Sweden's fourth largest town has a population of 180,000 inhabitants and is located in the heart of Sweden close to the capital city Stockholm (uppsalatourism.se).

Sweden is the 3rd largest country in Western Europe with an area of 450,000 square kilometers. The capital city is Stockholm and the country has a population of 9.4 million inhabitants (Sweden.se)

The environment of Sweden consist of 53% forests, 8% cultivated land and 9% lakes and rivers (ibid). Sustainable development is a key objective of the Swedish government both at home and abroad. The main reason for this being that current generation should be able to conserve resources for future generations (ibid).

Swedes as individuals, as politicians and as entrepreneurs in recent years have become increasingly aware of the responsibility to the environment. There has been a steadily growing interest in organic food, organic clothing and also, Sweden is at the forefront of recycling and waste management (ibid). Stricter requirements were introduced for packaging and paper products in 2005 aimed at making producers take responsibility for the products.

4.2 Swedish Environmental Protection Agency (NATURVARDSVERKET)

The Swedish Environmental Protection Agency has as motive to ensure a good living environment for humans and all other living things now and for future generations (naturvadsverket.se). By parliamentary decision in June 2010, the environmental objective system was revised. The Swedish Environmental Protection Agency had been given a coordinating responsibility for follow up of the environmental objectives. The 16 environmental quality objectives define the necessary characteristics of the natural environment and the cultural heritage environment in order to ensure environmentally sustainable development (ibid). The 16 quality objectives include:

- Reduced climate impact
- Clean air

- Natural acidification only
- A non-toxic environment
- A protective ozone layer
- A safe radiation environment
- Zero eutrophication
- Flourishing lakes and streams
- Good quality ground water
- A balanced marine environment
- Thriving wetlands
- Sustainable forests
- A varied agricultural landscape
- A magnificent mountain landscape
- A good built environment
- A rich diversity of plant and animal life

4.3 The Organizational chart of UNT AB.

UNT-GROUP 2008

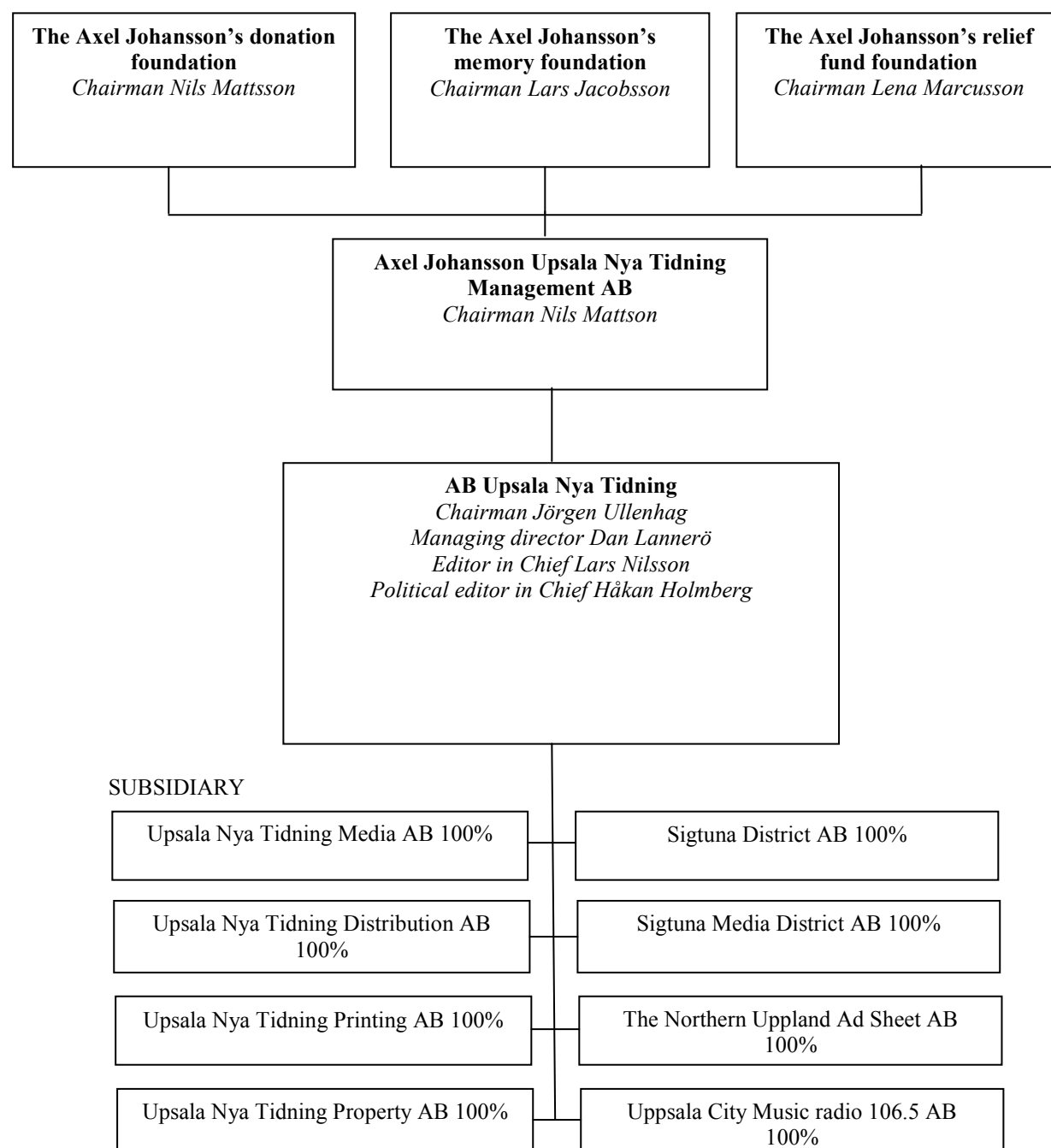


Figure 6: Organizational chart of UNT AB. (UNT-Group Annual Report 2007).

The Johansson foundation is a collection name on Axel Johansson's foundation, Axel Johansson's memory and Axel Johansson's relief fund. This has since after the estate of Axel Johansson, owned and managed the majority share holdings in Uppsala Nya Tidning and has been in control since 1992 by wholly owning and managing all shares in the company.

Axel Johansson was in his time not only the editor in chief in Uppsala Nya Tidning but also its board chairman and biggest shareholder. The three foundations support different institutions which in turn allocates the financing.

4.4 History of Uppsala Nya Tidning

Uppsala Nya Tidning (UNT) was created in the 1890s by a group from the radical student association *verdandi*. The aim was to create a newspaper that would challenge the three conservative newspapers in the city at that time. They included *Tidningen Uppsala*, *Uppsala-Posten* and *Fyris*. The three founders of UNT were assistant professor Hjalmar Ohrvall, Nils Von Sneidern (BA) and law student Axel Lilliehook. The first issue of UNT was published on the 3rd of December 1890. Publisher and editor was Yngve Svartengren who had been brought from the newspaper in Karlstad (*Karlstads-Tidningen*) (UNT-Group annual report, 2007).

In the 1910s, the paper had reached its position as Uppsala and the country's biggest newspaper and was the sixth biggest amongst Sweden's provincial newspapers. The number of ads had increased heavily during this period enhancing the economic situation of the company leading to the purchase of a new press.

The company experienced continued success throughout the years and in 2007, a move of all activities from Bolanderna to Uppsala was carried out except for printing and distribution. Within the distribution activity, new technology was gradually introduced such as PDA and mobile communication which creates possibilities and distribution of more products (*ibid*).

CHAPTER FIVE

5 Empirical Study

5.1 Data Presentation and analysis

This chapter is focused on the presentation and analysis of data gathered during the study. The initial source of data collection for the research was intended to be a research questionnaire, since most employees at the company were Swedish speakers and found it hard to understand and answer the questionnaires, I changed the option to a focused interview so I could speak to a few of them one-on-one. Before changing the option, I had received 3 responses out of 20 questionnaires which I had already sent out. I then used some questions from the questionnaires to guide me in the interview I had with the workers that I had chosen. I had a focused interview that lasted at least an hour with 4 workers in the company. 3 of them were from the top management level and 1 from middle management. The interview together with some information I received about the company's environmental record were the two main sources of information I used in the study. The following therefore presents the information obtained during the interview which was mainly centered around such issues including the environmental policy at the company, company's objective environmental certification, eco-printing, reasons for adopting eco-printing and possible barriers encountered during this process and finally how the environmental sustainability situation of the company could be enhanced.

5.2 Interviewee “A”

The interviewee was a male and has worked in the company between 11 to 15 years. He explained the following with regards to the interview topics that was presented to him.

Environmental policy at UNT distribution ab

He explained there is an environmental policy in operation at Uppsala Nya Tidning AB. and this is mainly focused on

- ◁Efficient use of energy
- ◁Waste minimization
- ◁Recycling.

Company's objective

He also explained the company's objective is focused towards ensuring environmental sustainability.

It is due to this that the company is part of an environmental network of newspaper companies in Sweden that is involved in compiling and comparing results of selected environmental indicators for the different newspaper and magazine companies. This is done from year to year and also a regular internal check carried out to catch up when necessary (untryck.se). The network is called mint and it communicates key environmental figures about selected environmental indicators to the different newspaper companies. This gives the paper companies a solid knowledge about their environmental impact relating to the use of different inputs thereby enabling them to work towards improving the environment, motivation and corporate image (miljonnyckeltal.se)

Environmental certification

The interviewee explained the company has the svanen environmental certification. This he explained is a Nordic eco-label that certifies the environmental activities and operations of the company. Svanen's vision is a sustainable society and the way to achieve this is via a sustainable consumption (svanen.se). The requirements for products and companies registered with the svanen are tightened continuously which implies that these product and companies are getting better and better from an environmental standpoint. The printing industry and svanen have made a significant progress together. The cooperation has led to a decline in the use of harmful substances including compounds suspected to be carcinogenic (svanen.se). The next major challenge is in the transport and energy sectors where major environmental benefits are expected to be gained.

Eco-printing at UNT ab

He confirmed his awareness of eco-printing and explained the following attributes of ecoprint were already implemented in the company.

- ◇ Effective waste management system
- ◇ Recycle and reuse of paper
- ◇ Purchase of sustainable paper

Reasons for adopting eco-printing

The main reasons suggested by this interviewee as to the adoption of eco-printing include, importance of conserving natural resource, need to keep up with competitors and pressure/demand from customers.

5.3 Interviewee “B”

This was the next interviewee who was as well a worker at UNT. He too has worked in the company now for a period between 11 to 15 years. He presented the following views with regards to the interview discussion.

Environmental policy at UNT distribution ab

He explained the company’s environmental policy is ensuring environmental sustainability and emphasized it was focused towards the following issues

- ◁Control over emission
- ◁Minimisation of waste
- ◁Waste recycling

Company’s objective

He explained the objectives of UNT are focused towards ensuring a sustainable environmental environment. Thus the reason for the belonging to the mint network so that the environmental impact of the company could be measured continually so that the company can strive to improve on its performance.

Environmental certification

He also confirmed his awareness about the environmental policy in operation at the company which he said was the svanen. This he emphasized on the strict requirements of entry and the continuous revision of the environmental requirements making it very effective.

Eco-printing at UNT ab

He also confirmed his awareness of eco-printing and explained the following attributed of eco-printing were in operation at Uppsala Nya Tidning.

- ◊ Effective waste management system
- ◊ Recycle and reuse of paper
- ◊ Purchase of sustainable paper
- ◊ Low alcohol printing
- ◊ Purchase and use of sustainable printing ink

Reasons for adopting eco-printing

The main reasons suggested by this interviewee as to the adoption of eco-printing include, importance of conserving natural resource, need to keep up with competitors and pressure/demand from customers.

5.4 Interviewee “C”

This interviewee was a worker at UNT and has worked in the company for less than 5 years. He presented the following views with regards to the interview discussion.

Environmental policy at UNT distribution ab

He explained the company’s environmental policy is ensuring environmental sustainability and emphasized it was focused towards the following issues

- ◊ Minimisation of waste
- ◊ Waste recycling

Company’s objective

He also explained ensuring environmental sustainability is part of the company’s objective.

Environmental certification

He stated the environmental certification in place at the company is the svanen. He explained the svanen is good but not internationally recognized since it's just a Nordic eco-label. According to him, the company should strive towards adopting an internationally recognized environmental management system such as the ISO with stricter environmental standards.

Eco-printing at UNT ab

He also confirmed his awareness of eco-printing and explained the following attributes of eco-printing were in operation at Uppsala Nya Tidning.

- ◇Effective waste management system
- ◇Recycle and reuse of paper
- ◇Purchase of sustainable paper
- ◇Reduction of carbon dioxide and other emissions
- ◇Low alcohol printing
- ◇Purchase and use of sustainable printing ink
- ◇Reducing energy consumption

Reasons for adopting eco-printing

The main reasons suggested by this interviewee as to the adoption of eco-printing include, importance of conserving natural resource, need to keep up with competitors and pressure/demand from customers.

5.5 Interviewee “D”

This interviewee was a worker at UNT and has worked in the company as a middle level management for a period of between 5 to 10years. He presented the following views with regards to the interview discussion.

Environmental policy at UNT distribution ab

He stated the company has an environmental policy focused towards:

- ◁Control over emissions
- ◁Minimisation of waste
- ◁Waste recycling

Company's objective

He also explained ensuring environmental sustainability is part of the company's objective. The reason why the company belongs to the mint network of newspaper companies in Sweden that continually strive to improve its performance via measuring and improving some industry selected indicators.

Environmental certification

He also explained the environmental certification in place at Uppsala Nya Tidning is the svanen. This he explained is a Nordic eco-label with strict environmental requirements and trusted by most of their customers and consumers. An example of a customer that requires this certification is the ICA Group which he stated was one of the companies that UNT does printing for.

Eco-printing at UNT ab

He also confirmed his awareness of eco-printing and explained the following attributes of eco-printing were in operation at Uppsala Nya Tidning.

- ◁Effective waste management system
- ◁Recycle and reuse of paper
- ◁Purchase of sustainable paper
- ◁Reducing energy consumption

Reasons for adopting eco-printing

The main reasons suggested by this interviewee as to the adoption of eco-printing include, importance of conserving natural resource, need to keep up with competitors and pressure/demand from customers.

5.6 Barriers to eco-printing and possible measures to enhance the environmental sustainability of UNT

The interviewees explained adopting the process of eco-printing is not automatic. This they explained was a gradual process involving time. Therefore, as any other process, there are normally some difficulties that are encountered and possible barriers. These difficulties together with possible ways to enhance the sustainability situation of the company can be seen on the next page:

Table 2 Barriers to eco-printing and possible measures to improve the environmental sustainability of UNT

Barriers encountered in the implementation of eco-printing			
Interviewee “A”	Interviewee “B”	Interviewee “C”	Interviewee “D”
-No potential benefit -High implementation cost of certification -Renewal of certification is too high -Lack of human resources	-No potential benefit -High implementation cost of certification -Renewal of certification is too high -The process is time consuming -Making necessary infrastructural change is too difficult	-High implementation cost of certification -Renewal of certification is too high	-No potential benefit -High implementation cost of certification -Renewal of certification is too high -The process is time consuming
Possible measures to improve the environmental sustainability of the company			
-Increase effort on waste reduction -Decrease pollution from transportation by proximity to necessary resources -Increase environmental requirements on suppliers of raw materials	-Decrease transportation by purchase of paper close to the print factory.	-Implementation of an internationally recognized environmental certification such as the ISO (ISO 14001). This is internationally recognized and has stricter environmental requirements thus imposing increase pressure on the company.	-Reducing energy consumption

Apart from the interview, the following tables and graphs shows information of selected environmental indicators used to measure the environmental performance of Uppsala Nya Tidning AB. This was obtained from the environmental report of the company.

5.7 Selected environmental indicators showing the environmental performance of Uppsala Nya Tidning AB.

5.7.1 Energy use

The data for energy use (renewable and non renewable) as obtained from the company documentation over the past 11 years can be seen in the table below.

Table 3:Energy use over the past 11 years at UNT AB. (Environmental report of UNT AB)

		1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Energy	Unit											
Renewalable	MWh	0.65	0.71	0.81	0.81	0.48	0.51	0.53	0.49	0.32	0.38	0.45
Non-renewable	MWh	0.41	0.44	0.49	0.49	0.28	0.29	0.27	0.25	0.17	0.18	0.21

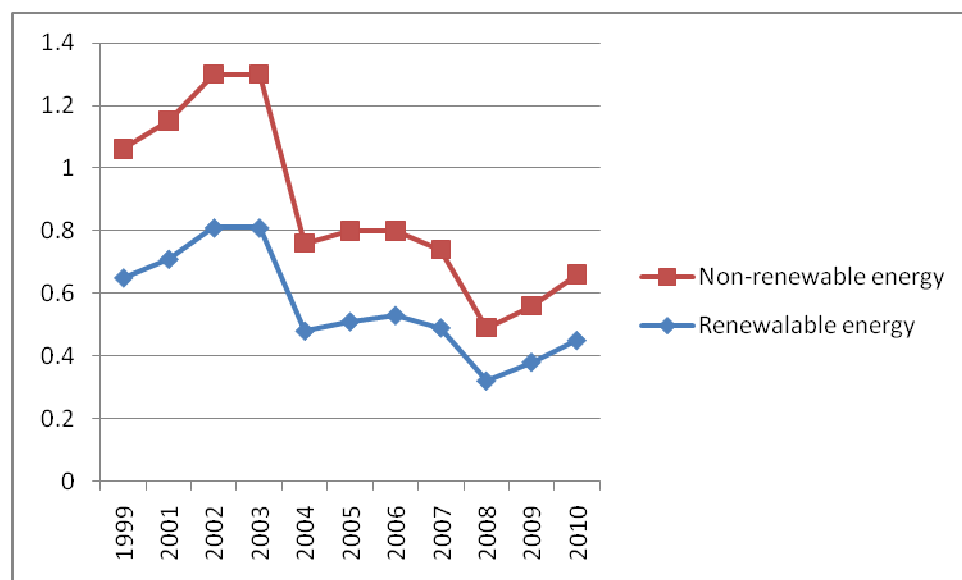


Figure 7:Illustration of energy use at UNT AB.

The table and figure above indicates that from 1999 to 2003, there was an increase in the use of energy. But after 2003, there was a significant reduction in the amount of both renewable and non renewable energy used. From 2003, there have been slight fluctuations of increases and decreases in the amount used of both renewable and non renewable energy until 2010.

5.7.2 Waste minimization

The data for the total waste over the past 11 years which includes both hazardous, waste to landfill and electronic waste could be seen on the table below:

Table 4:Waste information over the past 11 years at UNT AB. (Environmental report of UNT AB)

		1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Waste	unit											
waste to landfill	Kg	0.069				0	0	0	0	0	0	0
Hazardous	Kg	3.1	1.7	1.7	0.803	1.4	2.0	1.9	1.2	1.19	1.6	1.4
Electronic	Kg	0.29	0.15			0.051	0.054	0	0	0.022	0.017	0
Total Waste	Kg	159	170	150	179	147	150	177	158	186.62	162	144

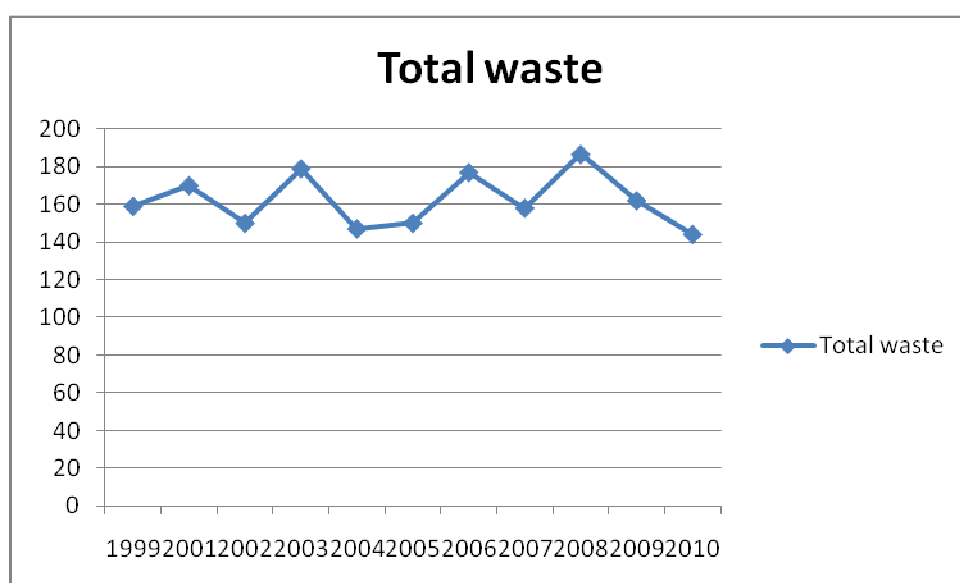


Figure 8:Illustration of total waste at UNT AB.

The data for the total waste indicates some fluctuations from 1999 till 2008. From 2008 to 2010 we observe a decrease in the amount of total waste dispose from the company.

5.7.3 Control over emissions

The data for emissions by the company over the past 11 years can be seen in the table below. The emission include Carbon dioxide, Sulfur oxide, Nitrogen oxide and other volatile organic compounds (VOCs)

Table 5:Emissions over the past 11 years at UNT AB. (Environmental report of UNT AB)

		1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Emissions	Unit											
Carbon dioxide	Kg	61	67	70	72	44	46	27	25	16.48	17	20
Sulfur oxide	Kg	0.091	0.996	0.104	0.101	0.065	0.069	0.041	0.037	0.0299	0.032	0.037
Nitrogen oxide	Kg	0.0696	0.077	0.085	0.085	0.055	0.058	0.043	0.0395	0.028	0.040	0.047
VOCs	Kg	0.38	0.45	0.21	0.13	0.55	0.48	0.79	0.24	0.59	0.56	0.55

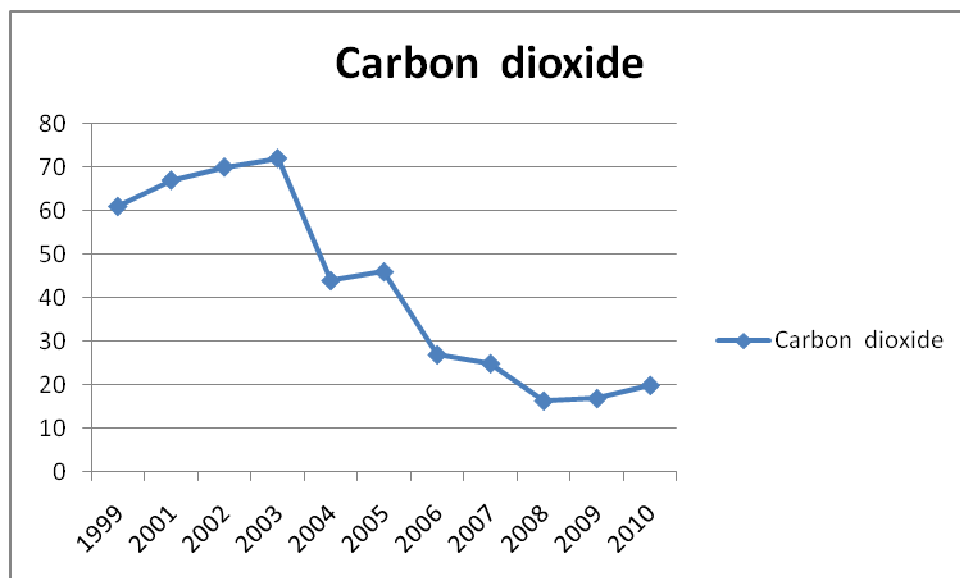


Figure 9: Illustration of carbon dioxide emission at UNT AB.

From 1999 as indicated on the figure above, there were slight increases in the amount of carbon dioxide emission until 2003. From 2003, there was a significant reduction in the amount of CO₂ emission in 2004 and a continuous slight reduction over the years till 2010.

Other emissions including (Nitrogen oxide, Sulfur oxide and VOCs).

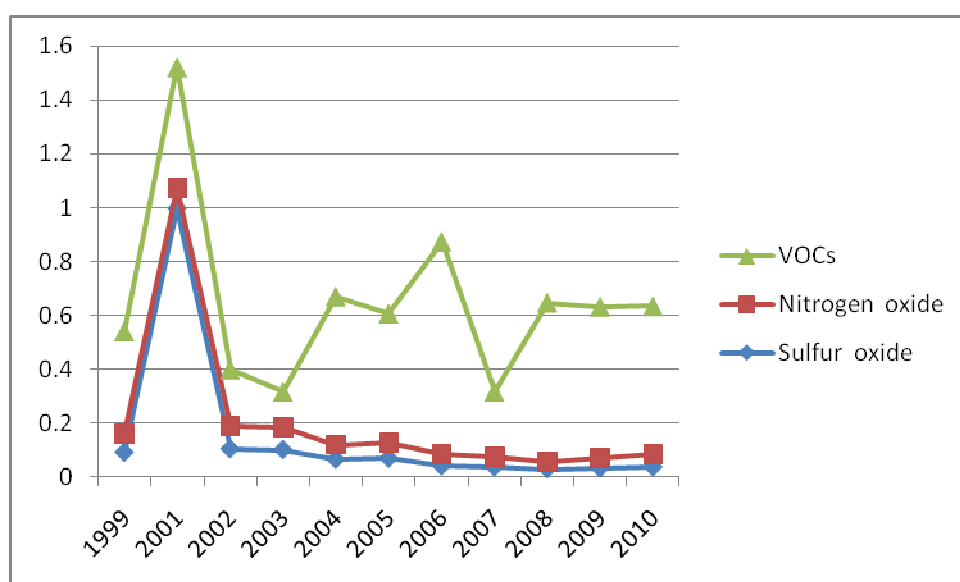


Figure 10: Illustration of other emissions at UNT AB.

The data for other emissions indicates that the amount of VOCs in 2010 has increased compared to the amount in 1999. Also, the amount of sulfur oxide emitted has decreased drastically from 2001 and nitrogen oxide has also witnessed slight decreases over the years from 2001.

5.7.4 Use of environmental acceptable paper

The data for the use of environmental acceptable paper in Uppsala Nya Tidning can be seen in the table below as extracted from the environmental report of the company.

Table 6: Use of environmental acceptable paper over the past 11 years at UNT AB. (Environmental report of UNT AB)

		1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	Unit(Kg)											
Environmental acceptable paper		1148	1148	1136	1163	1135	1138	1166	1144	1182	1156	1138

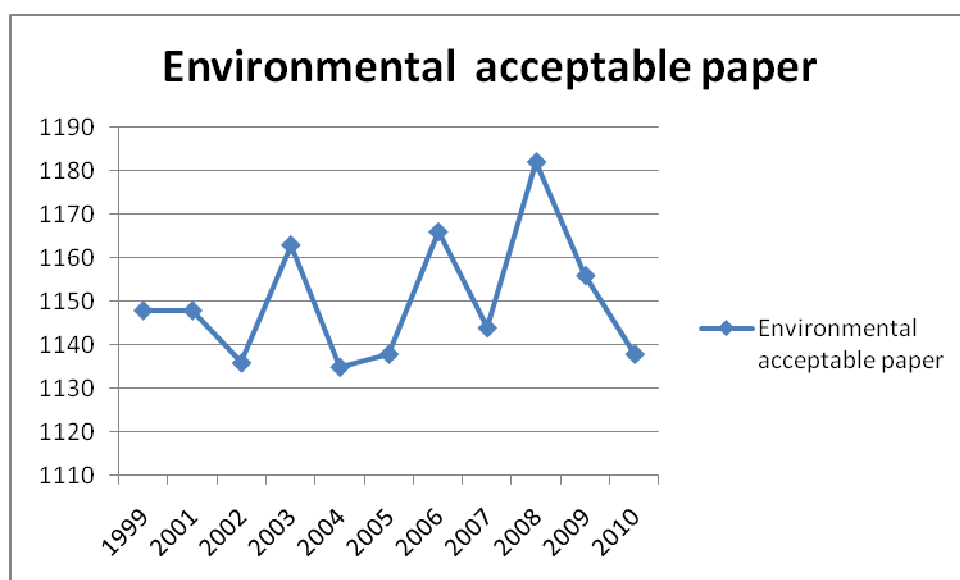


Figure 11: Illustration of the use of environmental acceptable paper at UNT AB.

The data and figure indicates that there have been fluctuations of increases and decreases in the company's use of sustainable paper over the years. The most use was experienced in 2008 and then a slow decline over the past two years to 2010.

5.7.5 Use of hazardous chemicals

The data for the use of hazardous chemicals can be seen below:

Table 7: Use of hazardous chemicals over the past 11 years at UNT AB. (Environmental report of UNT AB)

		1999	2001	2001	2003	2004	2005	2006	2007	2008	2009	2010
	Unit(Kg)											
Hazardous chemicals		0.75	0.48	0.25	1.5	1.1	1.3	1.4	1.3	1.5	1.9	0.55

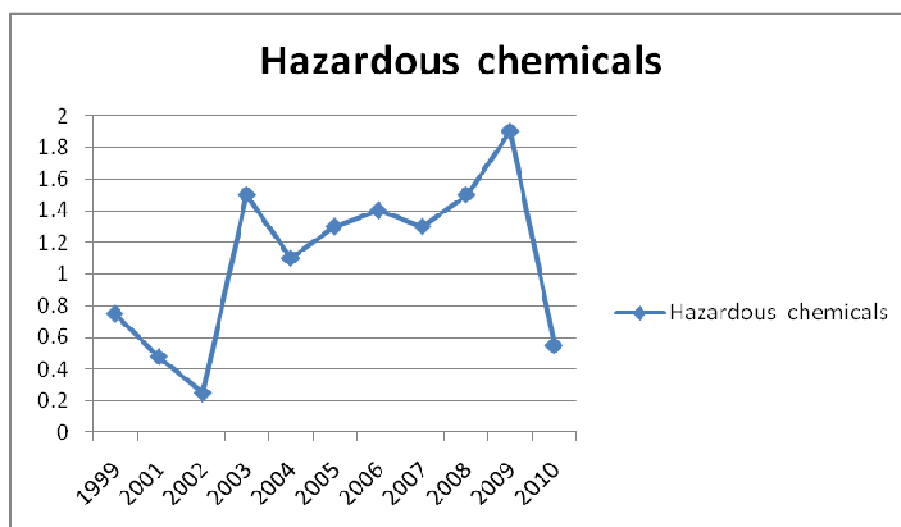


Figure 12: Illustration of the use of hazardous chemicals at UNT AB.

The figure indicates a decrease in the use of hazardous chemicals from 1999 to 2002, then a sharp increase in 2003. From 2003, the company witnessed a decrease and then slight increases from 2005 to 2009 and then a sharp decrease in 2010.

CHAPTER SIX

6 Discussions, Conclusion and Recommendation

6.1 Discussion

The main aim of this chapter is to address the research questions stated in chapter one, based on the theoretical framework and empirical data. That is, each of the research objectives is compared with the research theory and a conclusion is drawn. If discrepancies are found in the analytical process, the reasons for these are explained and possible solutions proposed.

The main objectives of the study were:

To investigate the role of eco-printing towards environmental sustainability of UNT AB.

To assess how the environmental sustainability situation of UNT AB. can be enhanced.

6.1.1 How does eco-printing affects the environmental sustainability of UNT AB?

For a company's environmental situation to be measured and analyzed, certain environmental indicators need to be taken into consideration. The case of eco-printing in this study was done in relation to the printing industry. From the literature review, the analysis of the environmental sustainability of Uppsala Nya Tidning AB was done in relation to the company's objective, environmental management system, environmental policy and eco-printing.

Based on the results of the study, the following can be understood as the role of eco-printing towards ensuring the environmental sustainability of Uppsala Nya Tidning AB.

According to Wade, R. 2008 a sustainable printer must strive towards reducing its emissions such as carbon dioxide (CO₂) emissions and must also strive towards a carbon neutral footprint. He further explains this may include measures such as planting of trees, sourcing of power from a green power provider, reducing energy consumption where possible such as switching off personal computers and lights for instance. In the case of Uppsala Nya Tidning, we see a situation where the company is striving towards the same objective of reducing its CO₂ emissions as well. This is evident in figure 8 where the graph was plotted with the use of

figures from the environmental report of Uppsala Nya Tidning ab. This was achieved by the company continuously striving to reduce particularly its CO₂ emission from transportation by obtaining raw materials from sources close to the factory. Also, the company has also reduced its used of water by carrying out the process of plate washing with comparatively a lesser amount of water as before.

Also, Uppsala Nya Tidning embraces the policy of full disclosure by making available the results of its environmental reports to respective stakeholders. As a result of this, its able to continually review its performance with respect to other companies in the industry via the mint network. This encourages the company to strive for improved performance thus ensuring a sustainable environment. This supports the statement from Wade, R. 2008 which states that “any aspiring eco-printer must be prepared to embrace full disclosure in order to convince its potential customers that what it claims is actually capable of being substantiated. This policy of full disclosure thereby keeps the company environmentally conscious and enables Uppsala Nya Tidning to strive towards improving its environmental performance.

Uppsala Nya Tidning also has a positive attitude towards waste management. That is, an in-house mindset has been created and all employees are sensitive to waste issues. According to Wade, R. 2008 waste management implies separating everything at source, recycling or reusing wherever possible. Uppsala Nya Tidning ab. is now involved in recycling some of its waste including used papers. It also has business deals with other companies in need of its waste as a raw material. Used steel plates as an example are sent to skrot where this is recycled and sold to companies in need of the raw material. Also, the process of plate making now involves just two stages which are Computer-Plate and not Computer-Film-Plate as done before. This thereby goes a long way to reduce the amount of raw material needed in this process and relatively the waste as well and also the total amount of energy used in plate making is reduced.

Uppsala Nya Tidning as a sustainable printer continuously strives towards increasing its use of sustainable paper. According to Wade, R. 2008 a green printer need to make sure that they are buying paper that is FSC or PEFC certified and also that they communicate to their customers the realities of papers.

Environmental certification is another major issue in eco-printing and it seeks to verify for a braoder public that the activities of certified companies are environmentally appropriated (Errol, E. 2001). The environmental certification in place at Uppsala Nya Tidning is the

svanen. This is a Nordic eco-label with strict environmental requirements for companies. Companies with the svanen eco-label are those that have met strict environmental requirements. The requirements of the svanen are continually reviewed and improved upon throughout so as to enhance the performance of these companies. Therefore, the svanen ensures that the sustainability practices of Uppsala Nya Tidning AB. are transparent, observable to buyers and authenticated. This therefore avoids false business claims as explained by Wales, T. 2008 who states that “getting caught green washing is worst than not having an eco-friendly position at all”

6.1.2 Possible measures to enhance the environmental sustainability situation of UNT AB.

Three out of the four interviewees confirmed they were satisfied about the current environmental situation of UNT AB. while one interviewee confirmed he was not satisfied at all. They all came up with possible measures that could be used to enhance the environmental situation and it includes the following:

First, they suggest the company should try to acquire its resources such as paper and other inputs from close sources so as to reduce the pollution from transportation. As seen on the **appendix1** (environmental impact per ton of product), the carbon dioxide emission resulting from transportation of inbound shipments has increased drastically in recent years leading to more environmental pollution from this operation. Therefore, the company should try to buy these resources from certified suppliers who are closely located so that they will not have to be transported over long distances.

Second, the company should adopt an internationally recognized environmental management system or standard such as the ISO14001. With this, it will be faced with stricter environmental requirements and this will enable the company to enhance its environmental performance.

The company should also work towards fixing its energy policy. It should strive to reduce energy consumption from such operations as lighting and computers.

Also, the company should increase its demand on the suppliers of raw materials to meet necessary or basic environmental requirements. This could be done by boycotting purchases from suppliers without an environmental certification and making contacts with new suppliers with the necessary environmental certifications.

Uppsala Nya Tidning could also revise its printing techniques such that printing could be done with less and more environmental friendly inputs so as to reduce the total waste resulting from the process.

6.1.3 Application of the PESTEL framework on the operations of Uppsala Nya Tidning AB.

PESTEL framework as explained in the literature review is a means by which organizations use to assess their external environments. With regards to UNT AB, the following aspects of the environment relating to the PESTEL framework could be of importance in case of an environmental analysis.

With regards to political environment, two possible areas of external assessment could include international trade and the EU-enlargement. A government policy encouraging international trade might enable the company to expand its market deals thereby searching for new suppliers in other countries that are environmentally certified. Also, EU-enlargement might present a challenge to the company to quit the svanen Nordic eco-label that it has and adopt a more internationally recognized environmental management system with stricter requirements for the environment.

Possible economic factors to consider by the company include the inflation rate, unemployment rates and interest rates. High inflation rates might discourage investments while high interest rates and unemployment might also discourage consumers from making necessary purchases.

Regarding the social environment, possible factors to consider might include the ageing population and individual attitude towards work. In a country with an increasing ageing population and low birth rate, the number of available young labour force is reduced which might intend have adverse effect for the company.

Regarding the technological environment, innovation and new product development might be possible influences from the external environment. Innovation refers to advancement of existing products while new products implies and entirely new discovery. New products such as the iPad can readily bring information to consumers without the need to print them on paper. Therefore, this could enhance the environmental sustainability in this industry a great deal.

Regarding the environmental aspect, two possible factors including global warming and environmental issues could be assessed. If there is an increase in the propagation of environmental issues and an increase in the awareness of global warming, this might generate environmentally friendly consumers thereby contributing to a sustainable environment.

Regarding the legal environment, the employment law, health and safety could be considered. A possible improvement in the health and safety rules of the company and industry might enhance the situation of workers thereby promoting a sustainable work environment.

6.2 Conclusion

As mentioned earlier, environmental sustainable development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs (Simon Dresner, 2002).

For a company to be doing well environmentally, then it has to be performing well regarding the various indicators from which the measurement and analysis of its environmental situation was done.

In this study, we see a situation where there are fluctuations over the years in which the measurement was done leading to improvements in some indicators in some years while the performances of others are poor. For example, while the company was struggling to increase its use of environmentally sustainable paper and also to reduce its emissions of carbon dioxide (*Figure 10 & 8*) we notice a situation of drastic increases in the amounts of hazardous chemicals used in production over the years until 2010 (*Figure 11*). This therefore implies that companies need to view their environmental sustainability situation as a whole made up of

parts. And for the whole to be environmentally friendly, then the individual parts (indicators) that make up the whole needs to be environmentally friendly as well.

Though the results of the empirical study supports the literature review that eco-printing as a process or technique helps to enhance the environmental sustainability situation of Uppsala Nya Tidning AB and other companies in the printing industry, these companies nevertheless should strive to:

- Enhance the performance of all their environmental indicators
- Communicate their environmental sustainability results based on all the indicators on which the assessment is done so as to give a true picture to stakeholders and
- Disclose their environmental reports to respective stakeholders so that the effect of the print media could be identified thus enabling some stakeholders to make environmentally friendly choices when it comes to consuming products from this industry.

6.3 Recommendation

Consumers of products from this industry should develop positive attitude towards the environment and put pressure on producers to be able to meet up to basic environmental requirements. That is, they should strive that producers use papers only from forest sources that are certified and also make sure that they use environmental friendly printers in their production processes.

Simply put, consumers should think twice the environmental effect before the give a print command and read thrice the source of paper before they purchase a print product.

6.4 Suggestion for further research

I wish further research could be done on the following topic

- Comparative study between the environmental hazards of print media and electronic media.

- Investigating the contribution of technology on the environmental effects of the print industry.

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Personal messages

1) Magnus Bergmark

Interviewee/ Controller, Uppsala Nya Tidning AB.

Personal Meeting

2) Tobias Ernbrandt

Interviewee/ Project Leader, Uppsala Nya Tidning AB.

E-mail

Appendices

Appendix 1



Swedish University of Agricultural Science
Department of Economics

8 February 2011

To: Whom it may concern

Akimbom Michael Che (831026-T097) is currently enrolled in the Environmental Economics and Management MSc-program at the Swedish University of Agricultural Sciences. He is starting his Master Thesis work, and has chosen the subject "Ensuring environmental sustainability in the printing industry – Eco-printing in Uppsala Nya Tidning Distributions AB". Thus, he has chosen Uppsala Nya Tidning as case study. Department of Economics, SLU, certifies that this case study is part of his Master Thesis. The Department would be grateful for assistance by UNT in the form of providing data and allowing interviews. In return, UNT will have free access to the results of the thesis work.

Akimbom Michael Che (831026-T097) är antagen till Masterprogrammet "Environmental Economics and Management" vid SLU. Han påbörjar nu arbetet med sin Magisteruppsats och har valt ämnet "Ensuring environmental sustainability in the printing industry – Eco-printing in Uppsala Nya Tidning Distributions AB". Han baserar således sin uppsats på en fallstudie av UNT. SLU intygar att fallstudien är en del av hans Magisteruppsats. Institutionen för ekonomi skulle vara mycket tacksam om UNT kan assistera honom med data, att tillåta intervjuer och liknande. I gengäld får naturligtvis UNT fri tillgång till alla resultat från uppsatsarbetet.

Yours sincerely,

Bo Öhlmer
Professor of Agricultural Economics
Department of Economics
Swedish University of Agricultural Sciences

Department of Economics, PO Box 7013, SLU
SE 750 07 Uppsala, Sweden
Phone: + 46 (0) 18- 67 1726
Fax: +46-(0) 18 – 67 3502
E-mail: bo.ohlmer@ekon.slu.se
Web: www.ekon.slu.se

Appendix 2

mint

Miljönyckeltal Upsala Nya Tidning/Tryckeri AB år för år

Miljöbelastning per ton produkt

Företag	Enhet	Upsala Nya Tidning AB										
År		1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
ENERGI												
Energianvändning	MWh	0,65	0,71	0,81	0,81	0,48	0,51	0,53	0,49	0,32	0,38	0,45
Icke-förnybar energi	MWh	0,41	0,44	0,49	0,49	0,28	0,29	0,27	0,25	0,17	0,18	0,21
MATERIAL												
Materialanvändning (tryckpapper)	kg	1149	1148	1136	1163	1135	1138	1166	1144	1182	1156	1138
Icke-förnybara material	kg	12	9,7	9,6	9,7	9,3	10	9,9	8,02	8,8	8,9	10,2
Miljögodkänt papper 1)	kg	1148	1148	1136	1163	1135	1138	1166	1144	1182	1156	1138
Nyfiber, certifierat hållbart skogsbruk 2)	%							27	59	68	60	60
Returfiber 2)	%							29	68	10	0	0
FÄRLIGA KEMISKA PRODUKTER	kg	0,75	0,48	0,25	1,5	1,1	1,3	1,4	1,3	1,5	1,9	0,55
TRANSPORTER												
Ingående transporter	kg CO2	9,6	12	18	8,5	11	7,8	7,5	16,1	12,9	12	21,4
Distribution	kg CO2	126	80	102	110	77	97	95	75	70,2	0	0
Tjänsteresor	kg CO2	4,4	8,2	12	12	8	9,7	9,7	8,3	0,0307	0,073	0,11
UTSLÄPP TILL LUFT (exkl. transporter)												
CO2 utsläpp	kg	61	67	70	72	44	46	27	25	16,48	17	20
Varav internt CO2 utsläpp	kg	0	0	0	0	0	0	0	0	0	0	0
NOx utsläpp	kg	0,0696	0,077	0,085	0,085	0,055	0,058	0,043	0,0395	0,028	0,040	0,047
Varav internt NOx utsläpp	kg	0	0	0	0	0	0	0	0	0	0	0
SO2 utsläpp	kg	0,091	0,0996	0,104	0,101	0,065	0,069	0,0401	0,037	0,0299	0,032	0,037
Varav internt SO2 utsläpp	kg	0	0	0	0	0	0	0	0	0	0	0
VOC	kg	0,38	0,45	0,21	0,13	0,55	0,48	0,79	0,24	0,59	0,56	0,55
AVFALL												
Avfall totalt	kg	159	170	150	179	147	150	177	158	186,62	162	144
Avfall till deponi	kg	0,069				0	0	0	0	0	0	0
Färligt avfall (exkl. elektronikavfall)	kg	3,1	1,7	1,7	0,803	1,4	2,0	1,9	1,2	1,19	1,6	1,4
Elektronikavfall	kg	0,29	0,15			0,051	0,054	0	0	0,022	0,017	0
MILJÖEKONOMI												
Miljökostnader	kr		49	42	42	38	39	36	38	32	35	37
Andel kunder (läsare och annonsörer) som anser att miljöfrågor är viktigt	%											
Andel kunder (läsare och annonsörer) som anser att tidningens bevakning av miljöfrågor är tillfredsställande	%											

1) Nyckeltalet var för data 2005 och tidigare icke-miljögodkänt papper. Tidigare data har räknats om till Miljögodkänt papper.

2) Nytt nyckeltal fr o m data 2006. Måts i % (relateras ej till nyttomåttet ton produkt).