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PRINT MANAGEMENT IN FINNISH COMPANIES

– opportunities for companies to achieve financial and environmental savings

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PRINT MANAGEMENT IN FINNISH COMPANIES

In the early 2000s, companies started to become aware of the rising printing costs. It is estimated that printing costs are typically 1-3% of the company's turnover (GartnerGroup, 2001). The arrival of personal computers was supposed to shift information management towards electronic ways and gradually decrease the need for printing but the effect was the opposite. The number of printed documents has steadily increased by about 20% annually (Fernandes, 2007).

Besides the costs, excessive printing results in environmental issues deriving from ink and paper use. Ink and toner itself, and the cartridges that are inserted into the printer, contain a number of hazardous chemicals and plastics that pose a problem for waste management. Paper consumption has increase 400% over the last 40 years (The Paperless Project, 2013), resulting in deforestation and increasing amount of paper waste.

In this research we cover different available options that companies have to reduce their printing costs and environmental impacts. Known available solutions and their specifications are reviewed. The environmental impacts of printing are inspected as well.

The different options are studied by interviewing different companies in Finland. The purpose of this research is to find out what kind of solutions are used and is the motivation behind using them purely financial or is there an environmental aspect present. It is also a point of interest whether the potential environmental savings are effectively used for marketing purposes.

The objective for this study is not to stop printing entirely but merely finding suitable ways to reduce the number of unnecessary printing. The research results in suggestions for a manageable combination of different solutions to reach the best possible results from print management.

The result of the research is that large companies rely on MPS-providers for achieving savings and building their print environment. All interviewed organizations used print rules for reducing the paper consumption and to eliminate colour printing. IT-managers are the key players within companies when it comes to the introduction of new print saving options. Organizations seem to be aware of the environmental impacts of printing but have not utilized those savings to their benefit.

KEYWORDS:

Office printing, printing costs, environmental savings, paper consumption, ink, toner, information management, Corporate Social Responsibility

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TULOSTUKSENHALLINTA SUOMALAISISSA YRITYKSISSÄ

2000-luvun alussa yritykset alkoivat huomata tulostuskustannusten olevan nousussa. Arvioiden mukaan tulostuskustannukset ovat noin 1-3% yrityksen koko liikevaihdosta (GartnerGroup, 2001). Tietokoneiden käytön lisääntyessä tiedonhallinnan oletettiin siirtyvän digitaaliseen muotoon ja vähitellen myös vähentää tulostamisen tarvetta, mutta todelliset tulokset olivat päinvastaiset. Tulostettujen dokumenttien määrä on noussut vuosittain noin 20% (Fernandes, 2007).

Kustannusten lisäksi, suurilla tulostusmäärillä on myös ympäristöllisiä vaikutuksia, johon vaikuttavat suoraan musteen ja paperin kulutus. Musteet ja väriaineet sekä muste- ja väriainekasetit sisältävät lukuisia haitallisia kemikaaleja ja muoveja, jotka aiheuttavat ongelmia jätteiden käsittelylle. Paperinkulutus on kasvanut viimeisen 40 vuoden aikana 400% (The Paperless Project, 2013), joka taas aiheuttaa sademetsien tuhoutumista ja kasvavaa paperijätteen määrää.

Tässä tutkielmassa käydään läpi eri vaihtoehtoja, joita yrityksillä on käytettävissään kustannusten ja ympäristöllisien vaikutusten vähentämiseksi. Myös olemassaolevia vaihtoehtoja ja niiden ominaisuuksia käsitellään. Tulostamisesta aiheutuvia ympäristöllisiä vaikutuksia tutkitaan myös.

Eri vaihtoehtoja tarkastellaan haastattelemalla suomalaisia yrityksiä. Tämän tutkielman tarkoituksena on selvittää minkälaisiin ratkaisuihin suomalaisissa on päädytty ja ovatko syyt näiden ratkaisujen käyttöön pelkästään taloudellisia vai onko ympäristöllisillä vaikutuksilla ollut osaa päätöksenteossa. Kiinnostuksen kohteena on myös se, että onko ympäristöllisiä vaikutuksia käytetty hyväksi markkinoinnissa.

Tämän tutkielman tavoitteena ei ole saada yrityksiä lopettamaan tulostamista kokonaan, vaan löytää keinot vähentää tarpeettoman tulostuksen määrää. Tutkimuksen lopputuloksena on ehdotus toteuttamiskelpoiselle yhdistelmälle, joka auttaa yrityksiä saavuttamaan parhaan mahdollisen tuloksen tulostuksenhallinnan avulla.

Tutkielman tuloksena on, että suuret yritykset luottavat tulostuksenhallintapalveluihin säästöjen saavuttamiseksi ja tulostusympäristön rakentamisessa. Haastatellut organisaatiot käyttivät tulostussääntöjä paperinkulutuksen ja väritulosteiden vähentämiseksi. IT-johtajat ovat avainasemassa uusien säästöratkaisujen esittelyssä. Tulostuksen ympäristölliset vaikutukset ovat organisaatioilla tiedossa, mutta säästöjä ei ole käytetty hyväksi.

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LIST OF ABBREVIATIONS (OR) SYMBOLS

IT   Information Techology, the use of any computers, storage, networking and other physical devices, infrastructure and processes to create, process, store, secure and exchange all forms of electronic data (TechTarget, 2015)

MPS   Managed Print Services

PPP   Price Per Page

MFP   Multi-Function Printer, a single print device that serves several functions, including printing, faxing, scanning, and copying (Webopedia, n.d.)

EuPIA   The European Printing Ink Association

OEM   Original Equipment Manufacturer

CSR   Corporate Social Responsibility, a corporation's initiatives to assess and take responsibility for the company's effects on environmental and social wellbeing (Investopedia, n.d.)

ISO   International Organization for Standardization

TUAS   Turku University of Applied Sciences

CIO   Chief Information Officer

CFO   Chief Financial Officer

1 INTRODUCTION

In the early 2000s the cost of office printing started to become a concern for companies around the world. The idea of the future paperless office was in mind when personal computers started to become a necessity in every office (Tam, 2004). The idea was that files and documents would be stored and shared electronically and paper consumption would decrease gradually, when in fact quite the opposite happened, with the rapid increase of computers along with emails and documents, which enabled more people to print with just a click of a button (Tam, 2004).

Quocirca estimated in 2007 that there is a 20% increase of office paper consumption annually (Fernandes, 2007). This estimate is staggering because the benefits of having electronic solutions for information management and sharing has not decreased the volume of printing. A report compiled by the Environmental Defense and Citigroup (2004) states that an estimated 90% of printed paper is only used for a short while, after which the majority of it is either filed or, more often, thrown away. This indicates that by eliminating unnecessary printing companies can cut down a large portion of their printing costs.

Moreover, research indicates that a typical office worker prints 10,000 sheets of paper per year (McCool, 2008) and the annual office printing cost per employee is $725, not including the cost of IT-support for occurring technical difficulties (Photizon Group, n.d.). GartnerGroup (2001) estimated that office printing costs can be up to 1-3% of the company's revenue. The research conducted by Photizon Group (Photizon Group, n.d.) estimated it to be as high as 3-6%.

Besides the costs, office printing has considerable environmental impacts as well. In the last 40 years the worldwide consumption of paper has grown by 400% and, at this rate of deforestation, it is estimated that it will take less than 100 years to lose all the rainforests on earth (The Paperless Project, 2013). The paper industry is the world's 5th largest consumer of energy and one A4 sheet

requires 10 liters of water to produce (The World Counts, 2014). A better recycling rate and avoiding unnecessary printing would reduce the need for cutting down forests for paper production. However, even in the United States, only 50% of office paper is collected for recycling (Environmental Paper Network, 2012).

In addition, producing ink and toner has heavy impacts on the environment as well. It takes almost 4 liters of oil to produce a single laser cartridge, releasing 4,8kg of CO^2 emissions (Preton Ltd., 2010). Approximately 350 million ink and toner cartridges are thrown out each year, which is especially problematic because the cartridges contain a type of plastic that is difficult to recycle (Preton Ltd., 2010).

1.1 The objective of the research

The purpose of this thesis is to explore the different options that Finnish companies have to reduce their volume of printing and what kind of financial and environmental impacts those solutions provide. I am keen to finding out what kind of solutions are out there, which companies provide them and what kind of companies benefit the most of such solutions. I am also looking into the decision making process inside Finnish companies and who initiates the process to strive for savings. The decision making progress also indicates whether the motivation to acquire a solution is purely financial or are there environmental considerations involved. I will also briefly cover the concept of paperless office and what are the benefits and disadvantages of it. This thesis will explore especially the internal printing of companies. My assumption is that paper going towards customers can be considered as marketing. Therefore, the quality of those documents should as high as possible and any savings from them could end up being unprofitable for the company.

1.2 Research questions

The research questions will be answered by qualitative data. Data need extensive analysis because the actions of the companies are based on a high

variety of different reasons and therefore the answers of one company does not necessarily reflect on the views of another. The data provide me the tools to make conclusions about the actions and motivation of the interviewed companies, as well as the efficiency of different solutions out there. The different answers will help me draw broad conclusions of the actions of Finnish companies in general. The research questions are:

1. What are some of the current available options for companies in Finland to achieve savings from printing costs?

2. How is the decision made inside the company to reduce printing?

3. Are the environmental savings acknowledged and used for the company's benefit?

1.3   Personal motivation

The personal motivation for this thesis stems from starting a business related to printing. The goal is to introduce two print management software solutions to the Finnish market. The solutions provide companies a simple platform to achieve considerable savings and help them manage and optimize their print environment. Generally, with this thesis, my objective is to understand the print-related market and the business culture in Finland. In order to do so I have to find out what the available solutions are out there. That is the key for understanding the current situation in Finland. This information will help to differentiate from the competitors' offering, which is essential for success.

Identifying who makes the decisions inside these companies helps me approach the key people directly. Also, I expect to get some insight to what kind of companies would have the most need for these software solutions. For example companies of certain size or relatively new companies with high growth who have not had the time nor resources to focus on printing related issues.

Moreover, one of the goals for this thesis is to provide Finnish companies information of available solutions. Browsing through different cost and environment saving solutions might give companies an idea of a specific solution that would suit them in their cost saving efforts. In addition, I also find it important to gain in depth knowledge of the environmental impacts of for example producing ink cartridges or office printing paper. Helping companies gain environmental awareness and, perhaps cut down unnecessary printing as a result, is an important factor when looking at the big picture.

1.4 Structure of the thesis

Chapter 2, the market research, will consist of sustainability, management, corporate social responsibility and marketing. Globally, the environmental impacts of unnecessary office printing and careless disposal of paper waste are valid reasons to shift towards more sustainable practices. On a company level the motivation for printing less might be purely financial. Although, companies might be able to establish themselves as environmental friendly as a side product of saving money from printing, in the end benefitting financially from that positive image as well. I'm interested in the motivation of the management for taking the steps towards savings and whether the results have been used for marketing purposes. Therefore, social corporate responsibility and its marketing value is also included in the literary review.

In Chapter 3 I will explain the methodology used to conduct the research. Chapter 4 covers the research which is compiled from interviewing managers in Finnish companies. The interviews are the way to acquire qualitative data on the solution the companies are using and why this solution has been chosen. The goal is to find some consistency in the motivation and actions towards savings between the different interviewed companies. The data that I wish to receive will include information on how the solutions work and help the company to achieve savings.

2 MARKET RESEARCH

The market research chapter encompasses two different sections. The first section will focus on the printing costs and management related activities. In this section I explore the different pieces that contribute to the total cost of printing. I will browse through different available solutions for companies and shortly analyze the benefits and disadvantages for each solution. Management is also covered briefly in this section in terms of who feels the need to print less and why, and how the decision making process occurs inside companies.

The second section will cover the environmental impacts of printing. Sustainability is one of the objectives that all business operations should be based on and this section explores different ways to get closer to that through printing. I consider the environmental impact of print savings as a benefit that companies could exploit in order to enhance their sustainable image in the market. Corporate social responsibility is viewed as a marketing tool and a way for a company to stand out.

2.1 Managing printing costs

2.1.1 Printing cost breakdown

Printing costs are comprised of multiple different components. While paper, ink/toner and the device itself are the main cost contributors, a company must also take into account the maintenance and repair of the device and the IT-support for technical malfunctions. Hewlett-Packard (2013) estimates that the cost of the device is under 25% of the total cost of ownership, the rest consists of the consumables, maintenance and support. Quocirca (2006) estimated earlier that hardware represents as low as 5% of the total cost. This suggests that procuring cheaper devices barely helps to achieve savings and saving from other components is more feasible.

Companies do have enormous potential in saving money by reducing their ink/toner and paper consumption (Gartner Inc., 2008). Currently there are many

different ways for doing that. Reasonable package deals from a Managed Print Service provider, specifically designed fonts that reduce ink/toner consumption, software solutions that are designed to reduce overall printing costs and, for example, using recycled ink/toner cartridges.

2.1.2 Ink/toner saving fonts

The price of printer ink is exceptionally high compared to other liquids that are commonly perceived expensive. 50 grams of printer ink, at its cheapest, costs roughly 20€ and about three times more than Dom Perignon champagne, while the priciest inks at 115€ per 50 grams even outweigh Chanel Nr. 5 perfume (Consumer reports, 2013). In comparison, if one were to fill the tank of his car with HP or Lexmark ink it would cost approximately 90,000€ (Said, 2004). The comparison is not completely fair due to the minimal amount of ink used in a single cartridge, and the price of the cartridge itself is not taken into consideration, but it gives an indication of the high price.

In 2013, a 14 year old school boy published a study where he claimed that his school could save up to 24% of its ink consumption (Mirchandani & Pinko, 2013). The way to achieve these savings was by simply changing the font from Times New Roman to Garamond. The study of Mirchandani explored which font was the most efficient when it came to ink coverage on printed pages. After implementing the same method to the governmental scale of the United States of America, Mirachandani calculated the savings to be $234 Million per year (Mirchandani & Pinko, 2014). Michandani had concluded, since 60% of a printed page's cost derives from ink, that using a physically narrower font would consume less ink and thus be less expensive (Mirchandani & Pinko, 2014).

The idea of Mirchandani was quite interesting and the paper received wide publicity. However, experts on fonts and typology quickly pointed out some fundamental mistakes in Mirchandani's study. Thomas Phinney (2014) points out that Garamond is just a physically smaller font and therefore the tests of Mirchandani resulted in such way. The same savings would essentially be achieved just by using Times New Roman and changing the font size a bit

smaller. Phinney (2014) explains that size of different fonts is determined by point size, depending on the design of the font. For example, this is written as Arial with the font size of 12 - and this is written as Garamond with the font size of 12. Same font size but different point size.

Some fonts have been developed especially to consume less ink/toner. They are marketed as sustainable fonts that not only are beneficial for the environment but also financially. As we can see from Figure 1, Ecofont creates small holes to the letters during printing which saves up to 28% in ink/toner consumption (Ecofont, n.d.). The advantage of Ecofont is that the savings do not have an effect on the readability of the text. Another font specifically designed for using less ink without an impact on readability is Ryman Eco, also presented in Figure 1. It uses 33% less ink on average and has been designed with beauty and readability in mind, which is so often compromised with ink saving fonts (Ryman Stationary, n.d.). Ecofont and Ryman Eco are both free to download and have been designed to provide an alternative for the Draft Mode in most printers, which is an option that uses less ink and enables faster printing. Draft Mode, as the name indicates, is meant for example to see what the final print would look like, which basically do not require good looks or perfect readability and definitely not the full amount of ink/toner (Computer Hope, 2016).

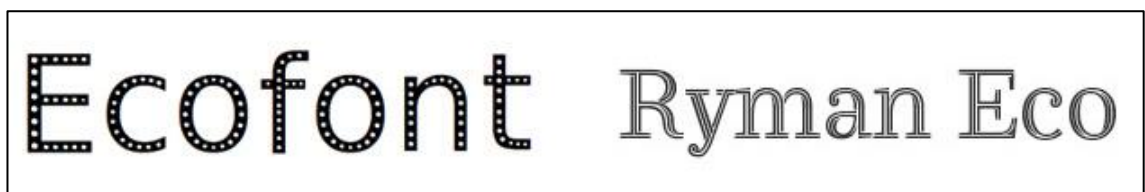Figure 1. Ecofont and Ryman Eco use less ink by not filling the entire letter

2.1.3 Software solutions

The aforementioned Ecofont is available also as a software. The software, designed for both home and business use, includes the font family, a feature that punctures holes is the most common used fonts but also additional enforceable savings options such as mono printing and printing without any

images or graphics. Ecofont has made it quite easy for the users with the added buttons to Word and Outlook. Default settings can be made and printing with the enforced savings options is done with just one click of a button, which makes printing simpler than with Word in general. Ecofont promises up to 50% of savings in ink consumption. Even more can be saved with reducing paper consumption. For example B2B email correspondence often contains logos and pictures in colour and by removing all those the printed version is often considerably shorter, thus reducing the number of printed pages. (Ecofont, n.d.)

PretonSaver is an advanced but light software designed to cut printing costs. The ink/toner savings can be up to 70% due to their patented pixel optimization technique and enforceable mono function. Other savings options include duplex (printing on both sides of the sheet) and n-up printing (printing multiple pages on a single sheet of paper) which are handy tools for reducing one's paper consumption and achieving some 20% additional savings. Apart from the obvious financial value from ink/toner and paper savings, PretonSaver creates additional value for businesses with its management and reporting functions. In order to fit each company's unique needs savings options can be tailored according users, user groups, devices and used application. The reports show exactly which department, which application or which user is most print intensive, which makes it easy for the management of a company to adjust the settings very precisely. The data can also be shared with the users which helps them to see their actual monthly/yearly printing habits in numbers, which might come as a reality check for heavy printers. (Preton Ltd., n.d.)

Greenprint is a software that provides businesses with detailed analytics of their print environment, a tool to deploy prints to the most cost-efficient printer and a preview function that helps the user eliminate unnecessary pages and content of the print job (GreenPrint, n.d.). Greenprint provides useful information and some savings can be generated but it does not necessarily provide businesses with an absolute solution for savings.

With Inkgard companies can set up their ink/toner savings level manually for each device throughout the company's network. The ink saving level can be

adjusted from 25% to 75%. Ink/toner is expensive and Inkgard is designed to effectively mitigate those costs. (Inkgard, n.d.)

PaperCut is a print management software that is helps organizations track the printing behavior of users. PaperCut does not have any ink saving features but it is designed to save paper with for example creating quotas for users and forcing to login to the printer to get the prints out. Default print rules can be created and enforced to ensure economical printing throughout the organization. (PaperCut, n.d.)

2.1.4 Managed Print Services

There are a wide variety of different factors to consider when trying to build an effective and as-cheap-as-possible print environment. Companies might not have the required knowledge nor the resources to come up with a feasible solution. Often printers are purchased one at a time as a company grows and the demand for more devices increases. There is a risk that after a while there is a large variety of devices and consumables without proper management (GartnerGroup, 2001). Taking all aspects into consideration, when trying to optimize a company's print environment, might be a difficult task for any company.

The cost of the device might be the biggest considered factor although it is only roughly a quarter of the total cost. The rest of the cost contributors might not be considered nearly as carefully. Managed print services (MPS) providers have made this problem easier by determining the complete cost of printing and ownership and translating that into a price per page (PPP). They provide everything related to printing for a customer as a service. MPS-providers considers the acquisition and support costs over the expected lifetime of a device and compose a price per printed page, both for mono and colour output, based on those factors (Hewlett-Packard, 2013).

Hewlett-Packard (2013) estimates that the consumables (paper and ink) take up to 45% of the total cost of ownership. Companies that acquire the devices and

consumables themselves have a huge savings potential in reducing paper and ink/toner consumption. However, the companies that use MPS-providers do not necessarily benefit from reducing their consumables because of the fixed price per page. Using one of the above mentioned software solutions can of course help companies gain a better understanding of their own print environment and negotiate better deals with MPS-providers.

MPS-providers have been able to steadily grow their foothold in the market. More than a third of all printing device procurement is handled through MPS-contracts (Photizon Group, n.d.).

2.1.5 Reducing paper consumption

Some of the software solutions are designed so that companies are able to reduce their paper consumption as well. For example by setting up duplex printing and n-up printing for certain applications has a great impact on paper consumption. As stated earlier, a typical office worker prints up to 10,000 sheets of paper each year (McCool, 2008). Citigroup estimated that if each of their employees would print one double-sided page per week, in order to save one sheet of paper, the company would save over 600,000€ each year (Environmental Defense and Citigroup, 2004). The logic behind this is that Citigroup takes into consideration not only the price of paper, but all the additional associated costs related. The associated cost of paper can be up to 31 times the original purchasing price of the paper when including for example storage, copying, printing, postage, recycling etc. (Environmental Defense and Citigroup, 2004). Basically reducing paper consumption automatically reduces the associate costs as well, even though it might be difficult to calculate those savings.

2.1.6 Optimizing the print environment

As stated earlier, companies might have acquired printers over the years according to their growing needs. This poses a problem that there might be a variety of different printers scattered throughout the organization, which might

not all be even known to the IT-staff (Quocirca, 2006). According to DocuVision International (2005) the IT infrastructure and document technology have traditionally been procured by different departments, which in turn has led to a defragmentation of the document output fleet. Gradually it has become the responsibility of the IT-staff to purchase devices, consumables and also stand by as technical support (Quocirca, 2006). By switching from a large variety of inkjet printers to a few centralized and shared Multi-Function Printers (MFPs), a company has enormous saving potential. There is a great deal of competition in the printer market and usually the real money is made by selling consumables (Tech Radar, 2016). A large variety of different printers that have been purchased over time based on purchase price will probably not save any on the long run, due to a mismatch of consumable providers. By standardizing the print fleet and buying the consumables in bulk companies can predict their costs and plan their print strategy better.

2.1.7 Company culture

One of the ways to save money is to stop printing unnecessary documents. The less one prints, the less it costs. There will always be some need for printing but the difference between a needed and an unneeded document is hard to define. Quocirca (2006) stated that half of the document output in a typical office space is waste. Paper is being thrown in the waste bin, recycled, lost on desks and left on the printer trays. If a company could successfully implement a culture within the employees to think each time they press the print button, that might alone have a big percentual impact on the total cost. In order to do so, the company must at first acknowledge the issue, acquire some data on the employees printing habits and successfully communicate it towards them (Quocirca, 2006).

It might be a difficult task for the company to make the employees understand the impact of printing. After all, the cost of a single printed document is somewhat insignificant. It is the aggregated costs for the entire organization or worker for a year that will put things into perspective for the workers. Printing less means less costs, which in turn could mean for the employees more perks,

better equipment, better IT-support or whatever that is motivational. The company might even put together a rewarding system for those who manage reduce expenses.

2.2 Environmental impacts of printing

Besides being expensive, printing also has considerable environmental impacts. From the rain forests to the recycling bin, worldwide paper consumption is a great burden for the environment. With today's technological advancement there are ways to reduce the overall paper output and for example store and share information electronically. Ink and toner manufacturing releases excessive CO^2-emissions and the disposal of the used ink/toner cartridges exposes the environment to chemicals and heavy metals. The environmental impacts of the lifecycle of paper and ink/toner cartridges are covered in this chapter, as well as the environmentally beneficial effects that companies would achieve by, essentially, saving money.

2.2.1 Paper

Worldwide paper consumption has increased by 400% in the last 40 years (The Paperless Project, 2013). This statistic is partly influenced by the developing countries as well but the rate is alarming and unsustainable. Experts estimate that at this rate it will take less than 100 years for the rainforests to disappear on earth (The Paperless Project, 2013). The consequences are devastating both locally and globally. The paper industry isn't the only contributor in deforestation but still has a big role, as well as being partly to blame for the endangerment of various species that live in the forests (The World Counts, 2014). 4 billion trees are cut down each year for paper production, which is 42% of all harvested trees (Statistic Brain, 2016).

The biggest consumer of paper is the U.S. with a 30% share of the total consumption and 9 billion tons per year consumed (Statistic Brain, 2016). When it comes to office paper, an average office worker prints 10,000 sheets of paper annually and shockingly 45% of all printed documents are thrown away by the

end of the day (McCool, 2008). This number could be drastically decreased by pausing to think whether printing is necessary, before actually printing.

Deforestation is the biggest problem when it comes to excessive paper consumption but not the only one. The paper industry consumes high amounts of water and energy, and when paper is being discarded by burning or dumping it into landfills, it releases carbon dioxide and methane. The paper industry is the 5th largest energy consumer in the world, using 4% of the world's energy. One A4 sheet requires 10 liters of water to produce and approximately 1l of petrol is used to produce each kilo of virgin paper. (The World Counts, 2014)

Paper is highly recyclable and the recycle rate has increased globally over the past 20 years. In Europe, over 70% of all paper consumed was recycled, reaching 82,5 million tons (Confederation of European Paper Industries, 2016). The paper industry is doing its share to ease to environmental load. In 2014 the European paper industry used 46% of its raw material from recycled sources (Confederation of European Paper Industries, n.d.). In the U.S., only 50% of office paper waste is recovered for recycling and the landfills are composed of 25% or paper waste (Environmental Paper Network, 2012). Paper waste poses a problem in landfills because when paper decomposes, it releases harmful methane gas to the atmosphere, which is a climate warming gas 25 times more harmful than carbon dioxide (Environmental Paper Network, 2012). Paper is recyclable and, even though virgin fiber is needed to produce quality paper, discarding paper into landfills is damaging the environment. Things are going in the right direction in Europe and the U.S. but there is still room for improvement, both by consumers and the business sector.

Paperless office is a term that can be defined as a work environment in which the use of paper is eliminated or greatly reduced (National Computer Board, n.d.). As long as computers have been a part of the everyday business world, a vision of a future paperless office has been floating around. Today it already is a reality great extent but paper is still heavily used in all companies. There are quite many advantages in storing information electronically. First of all, when the amount of paper decreases, so does the storage costs, paper purchase

costs and the environmental impacts (National Computer Board, n.d.). Secondly, electronic information can be accessed, shared and copied easier, faster and by more people (Rico Software Consulting, n.d.). Paper archives are also vulnerable to the elements and can be destroyed by for example fire, theft or water (Rico Software Consulting, n.d.). There are many information management tools available these days for companies which make the transition towards a paperless office easier. It's just a matter of implementing them and making them work. Each company must evaluate its own printing practices and evaluate whether there is room for improvement. Some of the earlier covered software solutions provide an affordable alternative to get started and receive the print statistics throughout the company.

2.2.2 Ink and toner

Reducing the total amount of printed documents naturally has an impact on the ink and toner consumption as well. As it was mentioned in the introduction of this thesis, producing ink and toner has heavy impacts on the environment, not to mention the cartridges as well.

Ink itself is composed of raw materials such as additives, solvents, pigments, and binders (Noe, 2014). Basically all the ingredients are man-made chemicals and some of the solvents are labelled as "volatile" due to their rapid evaporation and separation features (Noe, 2014). Manufacturing a single toner cartridge requires almost 4 litres of oil and releases 4,8kg of CO^2-emissions (Preton Ltd., 2010).

Manufacturers are striving towards more sustainable ways to produce ink. Raw-materials, production methods and emissions are studied heavily and the industry is trying to find the most energy-efficient and environmental friendly solution to produce ink (European Printing Ink Association, 2013). The European Printing Ink Association (EuPIA) (2013) states that no single ink technology or printing process will provide a universal environmental solution but the ongoing study process will determine the most sustainable methods. Minimizing the environmental impact is a great goal from the industry but

realistically speaking the solution will never be 100% impact-free. The steps that EuPIA has taken are eliminating the most toxic heavy metals from production and beginning to use raw-materials from renewable sources (European Printing Ink Association, 2013).

Each year over 375 million used ink and toner cartridges are thrown away (A Greener Refill, n.d.). Cartridges are generally made from two different components: the body works as a container for the ink and the printhead transfers the ink onto the paper. Cartridges are made from plastic mixtures and micro-engineered electronics which make them problematic to dispose (Noe, 2014). Most used cartridges end up in landfills or in incinerators and it takes from 450 to 1000 years for a cartridge to fully decompose (A Greener Refill, n.d.).

Only 30% of all ink cartridges and 50% of all toner cartridges are recycled (A Greener Refill, n.d.). There are many companies in the world that provide refilled or remanufactured ink cartridges as an alternative. Not all remanufactured cartridges can produce the same quality as Original Equipment Manufacturer's (OEM) ones. LaserCycle USA (n.d.) brings up the point that even though refilled or remanufactured ink cartridges might be environmentally friendlier than OEM cartridges, they often lack the consistency and quality that is required. Some remanufacturers simply drill a hole in the side of a cartridge and refill it with ink while forgetting to inspect whether the cartridge is fully working (LaserCycle USA, n.d.). LaserCycle USA promises a 100% performance guarantee, meeting or even exceeding the OEM cartridge performance (LaserCycle USA, n.d.). They even provide pick-up services in the U.S. to ease companies recycle their ink cartridges and join the movement for better sustainability.

2.2.3 Sustainability

John Morelli (2011) defines environmental sustainability as "meeting the resource and services needs of current and future generations without com-promising the health of the ecosystems that provide them". Through printing

companies can effectively reduce their total amount of waste by printing less. Reduced paper consumption, on a global scale, leads to a smaller demand for paper production which in turn slows down deforestation and the destruction of ecosystems. By printing less companies impact the need for ink and toner manufacturing, leading to fewer harmful chemicals being used and less hazardous waste. A substantial part of environmental sustainability can be influenced by proper waste disposal. Printing may be a minimal part of companies' total carbon footprint and waste amount so therefore my assumption is that companies might not even consider printing less as a viable solution.

2.2.4 Corporate Social Responsibility

Corporate Social Responsibility (CSR) can be defined as a corporation's initiatives to assess and take responsibility for the company's effects on environmental and social wellbeing (Investopedia, n.d.). CSR-programs in companies are the current way to affect the progress of sustainable development. Businesses are more often viewed as entities that have an even bigger obligation than just creating jobs and paying taxes. Their relationship with society and the environment has become a critical measurement of their overall performance and the ability to continue operating effectively (International Organization for Standardization, 2010). ISO 26000 contains seven core subjects of social responsibility for companies to pursue. The core subjects are organizational governance, human rights, labour practices, the environment, fair operating practices, consumer issues and community involvement and development (International Organization for Standardization, 2010). By investing to their social responsibility program companies can gain competitive advantage, good reputation in the eyes of future employees, customers and investors and maintain good relationships with for example the government and media (International Organization for Standardization, 2010). Therefore, by reducing their amount of printing companies can utilize their environmental savings for marketing purposes and gain a profit from, essentially, reducing costs.

Even though corporate social responsibility is not a completely new phenomenon and the benefits are quite immense, at least at a theoretical level, many companies around the world do not consider it that important. The problem at the moment is for example that it is generally cheaper to buy a product that has a worse effect to the environment than the product that does less harm (Chouinard, et al., 2011). The illusion of sustainable development is shattered with the fact that at the moment it is economically beneficial to exploit the nature instead of conserving it. The changes are very slow but CSR, as a program that differentiates a company from its competition, is a good start.

3 METHODOLOGY

The research questions for this thesis are:

1. What are some of the current available options for companies in Finland to achieve savings from printing costs?

2. How is the decision made inside the company to reduce printing?

3. Are the environmental savings acknowledged and used for the company's benefit?

For gathering information on current ways to achieve savings from printing I conducted interviews with four companies from different fields of business and Turku University of Applied Sciences (TUAS). The interviewed companies include a global consulting company, a Scandinavian IT-company, the marine sector of a global company that designs vessels and integrate power systems, and an insurance company. The goal was to contact the person in charge of print related issues and discuss the kind of steps they have taken to achieve savings, if they have taken any. The interviewees were all personal contacts in sufficient positions that were able to provide me with a clear insight of the companies print environment and strategy. This means I used non-probability sampling based on my own judgement, as Saunders et. al. (2009, p. 233) discuss. Due to the nature of having access to these personal contacts, the sampling method used was convenience sampling, which means selecting those cases that are easiest to obtain (Saunders, et al., 2009, p. 241).

The data I gathered are qualitative due to the broad nature of different solutions and alternatives available for companies. Qualitative data can be defined as data describing the attributes or properties that an object possesses (OECD, 2004). My intention was to gain deeper understanding of why the companies have made the decisions they have made. Therefore I require qualitative data instead of quantitative. For example an email survey for quantitative data is out of the question because there is no list of email addresses available for such

people who can provide me with such answers. All four interviewees requested to leave the company name out of the thesis.

The data was gathered through conducting semi-structured interviews. I chose the interview type because I wanted them to be informal like a natural conversation from which I expected to gain a better understanding on the companies' motives for their actions. Some structure is however needed in order to be able to compare the answers with one other. A semi-structured interview consists of a list of themes and questions to be covered (Saunders, et al., 2009, p. 320). I conducted the interviews as a discussion with a list of themes in order to be able to answer my research questions. I conducted the interviews over the phone, which was convenient enough to get the discussions on the way and gain the required answers.

The size of the sample was limited due to the timeframe of the research. The results, though, already started to repeat each other and therefore continuing to interview large companies might have resulted in just more similar answers. My assumption was that there is sufficient knowledge in companies to achieve savings by applying basic print rules.

For the data analysis I used the deductive approach. The secondary data of the environmental impacts of producing ink cartridges and office printing paper gave a good comparison to the interviewee's environmental consciousness when it comes to printing. Based on the qualitative data, I was able to determine whether the companies' motivation to try to achieve savings from printing costs was purely financial or was there an environmental aspect to it. And whether the environmental value was sought after because of the financial value in the end or some ideological reason. The research provides insight from each company's print environment and why it is formed the way it is. All the companies and their different print environment features are analysed individually and commented if there is room for improvement. The research analysis will question the companies' decision making and speculate whether all the available print saving alternatives have been reviewed when the print environment has been formed.

The data gathered from the interviews was supposed to give me a sufficient understanding of the companies' motivation to achieve savings. What I was most interested in finding was what the available solutions are in Finland in the companies' opinion. I was interested in seeing whether companies think they even need a solution from outside the company or whether they feel they can achieve adequate savings just by optimizing their printers and educating the staff. I expected the interviews to conclude that the MPS-providers are the best known solution available, due to the convenience and quality, and that companies might not even have considered other alternatives.

3.1 The limitations of this study

One of the limitations of the research is that only large organizations were interviewed. The study did not include SME's, who could provide very different results than the interviewed organizations. The limitation of the depth of the bachelor's thesis is that the cost saving options and environmental impacts were discussed in a general, global scale, and not studied deeper. As the MPS-providers seem to be the current method for building a print environment in large companies, the research did not provide alternative solutions.

The large variety of cost saving solutions meant that it was difficult to find out a comprehensive solution that would benefit all companies. The suggestions for cost saving options are for large companies based on the literary review and the interviews. All companies are unique and therefore just one combination will not work for all.

Due to the lack of information about print saving solutions, the literary review provided information mainly from the companies that provide solutions and environmental groups. It was difficult to find any books written about the subject and not many studies were found. Therefore, the thesis functions as a market research rather than a study and some of the information used might be biased.

4 RESEARCH ANALYSIS

As stated in Chapter 3, the interviewees comprised of four different companies and Turku University of Applied Sciences. Only two of the company representatives, from the IT-company and the insurance company, were directly in key positions when it comes to printing related decision making. The interviewee in TUAS was a member of the IT-staff whose duties included printing related matters.

4.1 Cost saving solutions

All five interviewed organizations were using the services from an MPS-provider. The use of an MPS-provider allows the print environment to be comprised of a few large centralized MFPs and eliminates the need for small individual printers. The usage of MPS-providers of large companies was not suprising (see chapter 2.1.4). It seems to be a natural way of composing the print environment in large companies. MPS-contracts eliminates high purchasing costs and enables the organizations to pay for the devices gradually per each printed page. This pricing method is quite appealing and I assume that it has an impact on the decision making. All the aspects of printing is calculated together and a price of a printed mono and colour page is determined (see chapter 2.1.4). This eases the burden of the company when it comes to the purchase of the consumables and maintenance for example. The findings of this research supports my assumption that MPS-providers offer a valuable service for companies and organizations are able to focus better on their own field of business by outsourcing the entire print environment.

However, the motivation for using an MPS-provider was left for most part unclear in the research – whether the decision was made out of convenience or whether cost savings were in mind. Only two of the interviewees mentioned their MPS-provider as a cost saving solution, the other merely mentioned them when they were describing their print environment. This suggests that using large MFPs from an MPS-provider is a convenient solution that is easy to implement and sustain. The IT-company and TUAS explicitly mentioned that

both aspects had an influence. Based on these two organizations' answers, the MPS-contracts are a convenient method for a company to procure quality devices without having to use much time and effort. As discussed in chapter 2.1.4, there are so many different factors to consider when designing an effective and cost saving print environment that it is a heavy task for any company. It is deductible from the research that it might not be worth the effort to allocate time to explore different options when the MPS-providers provide such a service. MPS-providers have done the research and are experts in their field, therefore they can provide valuable insight of any print environment and propose a most suitable solution from their own catalogue. I assume that the amount of competition keeps the pricing under control and the MPS-providers might not be able to overcharge. The entire printing related market is controlled by a small number of providers, therefore the available information for companies might be very one sided. Even though the service from MPS-providers is valuable and extensive, other solutions do not necessarily reach the attention companies.

Two of the interviewees communicated that by centralizing and uniforming their entire print fleet the companies are able to achieve considerable savings from consumables. By having a set of uniform printers, the acquisition of consumables becomes easier and less time consuming. The MPS-providers deliver paper and new ink cartridges when they are running out. The customer organization does not need to worry about the type of paper or cartridge models, unlike when there is a variety of different kinds of printers in the print environment. Consumables are no longer purchased, they are ordered and delived and the pricing is determined per printed mono and colour page. The contracts may, however, vary and the pricing method might not always be similar.

Three of the interviewees also mentioned savings from power consumption. Large MFPs shared by a group of employees enables the printers to work on near full capacity which minimizes the idle time. Energy is saved by reducing the amount of devices that are on stand by. With the help of MPS-providers,

companies are able to determine how many printers are needed in each floor so that there are as-few-as-possible devices, but also enough that the employees do not need to travel great distances to pick up the prints. The energy consumption depends on the size, model and brand and MPS-providers compete with each other on energy effiency. Energy savings leads to cost savings from electricity and also provide environmental benefits from reducing excessive enery consumption.

Each of the five interviewees discussed the enforced print rules as being an effective way to achieve savings. Duplex printing was the common rule shared by all of the organizations, which essentially cuts the amount of printed paper in half. Duplex printing is a great way to reduce costs without compromising the quality of the prints. Monochrome printing is another popular print rule, used as a default setting by three organizations out of the interviewed five. MPS-providers define the PPP for both monochrome and colour prints, the price of the colour print is often considerably higher. Therefore, setting monochrome printing as a default rule is an effective way to reduce costs. The interviewee from the IT-company mentioned that most of his sales departments prints are intended for the customers and cannot be compromised in quality. My assumption for this thesis was that all documents that are sent towards customers is a valuable part of marketing and should be of high quality. Duplex printing, however, does not affect quality. All of the interviewed organizations with enforced monochrome printing still provide the option to print in full colour if needed. This also suggests that organizations understand the need for colour printing at times but try to encourage monochrome printing for most part.

All five interviewed companies mentioned pull printing as a way of reducing the number of uncollected prints. In pull printing, the user must log into the printer in order to print out the wanted document. Pull printing is an effective way to ensure that all printed documents are actually collected to use. All companies mentioned the problem that a user might accidentally print the same document more than once on the course of the day. When the print jobs are selected after the login, the user should notice duplicate copies of the same files. However,

usually there is an option to "print all" and the duplicate copis might go unnoticed until after printing. Four interviewees also mentioned that pull printing enables the user to retrieve the document from any device within the print environment. This allows the user to collect the prints from a convenient device. The feature is especially useful in offices without preset workstations where the user is not bound to a certain location in order to be able to print.

Two interviewees also mentioned pull printing to be important for security reasons. Confidential material is safely waiting in the print queue and only printed when the user logs in to the printer. Sensitive documents used my managers and sales could be a liability when printed out unattended and therefore pull printing provides a secure way to print.

4.2   Decision making

All five interviewees were able to name a position within the organization who are able to take print cost saving initiatives further. IT management was mentioned by all five interviewees but only two provided a more precise answer. Printing is a part of IT and does provide a path forward to some extent. The interviewee from the IT-company described a problem when it comes to the IT-managers. The Chief Information Officer (CIO) is essentially the person who decides which solutions are viable for implementation. The person right beneath the CIO is usually the person who reviews new solutions and takes them forward to the CIO, which is where the process usually stops according to the interviewee from the IT-company. The CIO often needs to discuss the possibility of new investments with the Chief Financial Officer (CFO). Based on my empirical data from phone calls to companies, talking directly to the CIO might lead to the contact being transferred towards the CFO, who in turn refers printing related to be the IT-departments area of expertise. Moreover, as all the interviewed companies only included Finnish branches, the research did not provide answers in global scale. However, by reaching a local IT-manager who can deliver the message higher up the ladder it might be possible to introduce a solution international throughout the organization. The research did not

conclude whether the print saving decisions are made locally by each division within an international company.

4.3 Environmental savings

Environmental values were an important aspect of the operations of all five organizations. However, environmental savings from printing was not viewed as an essential part the environmental program. Environmental savings from printing were acknowledged in all five organizations but were mostly not utilized in any way to the organizations benefit. The interviewed companies discussed that the main environmental focus point is through their core business, for example manufacturing. Two companies mentioned the reduced power consumption from using large, centralized MFPs as a direct positive environmental impact. Fewer devices that work on near-full capacity reduces the amount of energy needed to keep idle devices on stand by.

One interviewee mentioned that the environmental savings are communicated to the users within the organization. The company uses PaperCut as a print management software where the users can see their own accumulated environmental savings when they login to the printer. This is a great way of communicating the company's environmental values directly to the employees, which helps creating a company culture with environmental friendly practices. Users can evaluate their own print habits and see for example how much energy is consumed and how many trees have been saved.

Unfortunately only one of the companies had utilized their environmental savings that derive from printing. It used pull printing as an environmental attribute in their annual report but did not provide details. As a global company, their statistics might be considerable if communicated properly. Again, printing was not viewed as a key part of environmentally friendly practices and therefore not seen as a valuable enough addition to marketing.

4.4   Company 1

The first interviewed company, a consulting company, is using Canon as an MPS-provider to cover its entire print environment. The company's way to reduce printing costs, besides using an MPS-provider, is by enforcing default print rules such as duplex and monochrome printing. The employees are able to change the settings if necessary. The company limits unnecessary printing by using pull printing, which requires the employee to login to the printer to obtain his print queue. This reduces the number of uncollected pages from the printer and allows the employee the flexibility to collect the documents from any printer in the print environment. Environmental friendly practices are a major theme for the company but printing is not particularly a key part, even though pull printing is mentioned in the annual report as one of the environmental saving methods.

My analysis is that the company successfully eliminates some of the unnecessary printed documents with the pull printing feature. Having 245,000 employees across the globe, pull printing and duplex printing does create sizable financial and environmental savings but for a company of that scale could benefit greatly from reducing the ink consumption of internal documents. The interview only covered the Finnish part of the organization so the printing practices may vary globally.

4.5   Company 2

From the IT-company, I managed to interview the head of sales who, amongst other solutions, handles the sales of print services. Their print environment is composed entirely from large MFPs, thus eliminating the mismatch of small printers. A department of 50-100 employees normally shares two printers. The company uses pull printing, which serves two purposes. Firstly, the print job is activated only when the employee logs in and triggers it, therefore any confidential information does not print before the employee is present (secure printing). Secondly, it eliminates unnecessary printing that otherwise would pile up in the printer tray. They also enforce duplex printing as a rule but do not enforce monochrome printing. The interviewee mentioned that as he is in sales

and the printed material goes directly to the customers, no expenses should be spared and quality must be maintained. Environmental matters are a massive point of interest for the company but on the generic level. The interviewee mentioned that they don't consider printing as a significant part of their environmental program. He mentioned their current focus is on utilizing the excess heat that derives from their datacenters and save energy that would otherwise go into building's heating costs. According to the interviewee, the person who can take new solutions further inside the company is the person right beneath the Chief Information Officer, often in charge of end-user services.

I regard the IT-company as very knowledgeable and I assume they have considered different kinds of options for print related savings. Their solutions are simple but effective. Using centralized MFP's, they ensure that all the printers are from the same manufacturer, making it easier to purchase the consumables and predict the consumption rates. Pull printing makes it easy for the employees to print the required documents without creating a pile of unneeded documents by the printer. Two printers per every 50-100 employees also means that the printers might be working close to full capacity which leaves very little idle time and saves costs.

4.6   Company 3

The third company, who designs vessels and integrate power systems, use a similar approach than the two companies covered above. They use MFPs and PaperCut as print management software, which enables users to log in and print the print queue from any MFP in the print environment. PaperCut also enables to set print rules and provides statistics of environmental impacts to the employees and the management. The environmental savings are mostly generated from reducing the footprint of their products. Printing is not viewed as a major environmental saving opportunity. The key players to contact are the IT-managers who can take the solutions further to be reviewed higher up abroad.

Using a print management software, such as PaperCut, goes to show that there is interest towards detailed statistics and environmental impacts. Managers are

able to monitor the employees' printing habits and make sure unnecessary printing is minimal. Even if there would be no ongoing monitoring, it might prevent employees from taking advantage of the printing possibilities due to the collected statistics.

4.7   Company 4

The insurance company has eliminated most of the printing by establishing an electronic information management system. The company uses large MFPs by Ricoh, each shared by about 70 people. The sales personnel mostly send offers and customer communication electronically but sometimes by printing as well. The prints are duplex but coloured. The company uses pull printing in for confidentiality reasons and also to reduce the number of uncollected documents. Environmental awareness is a large part of the company's vision but paper usage is limited partly due to the company striving to be a front runner in digital services. Printing related savings is not viewed as a marketing priority but the company culture and vision automatically reduce a large part of paper waste. The person to contact within the company is an IT-manager, who in turn can introduce the available solutions corporate-wide. The company's vision to be a front runner in digital services does not entirely relate to printing but effectively reduces paper waste.

Duplex printing is a great way to save paper and colour prints are essential customer communication. Pull printing also helps to lower the total number of prints. The company utilizes modern information management methods and stores most of the information electronically. A software solution, such as PretonSaver (see chapter 2.1.3), which enables the company to define paper and ink saving settings by software, might help the company to reduce the cost of their internal printing. The programs that are used for printing material for the customers could be printed in full quality, but for example notes and emails could be printed with considerably less ink.

4.8   Turku university of applied sciences

TUAS works in very similar ways than all the interviewed companies. Print jobs are enforced as duplex and monochrome but the settings can be changed if needed. Students and personnel need to login to the printers, which allows students to print their documents from any device in the print environment. Pull printing is also implemented to reduce uncollected documents. The decisions are in the end made by the principle/CEO but are brought forward to him by a member of the IT-staff.

The print rules provide a very effective way to reduce the cost of printing. Most of the printed documents by students are essentially study material and does not need to show quality. The same applies for employees as well. Teachers might print the same document for an entire class of students and readability is the only criteria for quality. TUAS could benefit highly from an ink saving software, given that the majority of their prints are essentially for internal use only. Even a 30% saving from ink consumption might result in enourmous cost savings and the quality would hardly be affected.

5 CONCLUSIONS

5.1 Research findings

The research comprised of only five companies but the results were very similar to each other. The first research question examined the available options for Finnish companies to save from printing costs. Generally, companies seem to be aware of cost saving opportunities, at least large companies. The interviewed companies relied on MPS-providers to provide them with an efficient print environment. By uniforming their print fleet, companies are able to ease their procurement of consumables and make it less time consuming. MPS-contract also enables companies to acquire quality printers with the flexible payment method, PPP. By using large printers that are shared by a number of users and run with near-full capacity at all times, companies are able to reduce their energy consumption and achieve cost savings.

Print rules are viewed as an easy and effective way to reduce paper consumption and unnecessary colour printing. Companies tend to favour duplex printing, which essentially cuts paper consumption in half and reduces costs. Monochrome printing is considerably cheaper than colour printing and companies tend to enforce monochrome printing. Colour prints are used for documents which are intended for the customers.

Pull printing eliminates uncollected documents from the printer tray. The interviewed companies all used pull printing to reduce the total amount of printing. Cost savings is achieved from ensuring that all printed documents actually go into use and that documents are only printed once.

Other solutions, such as software solutions designed to achieve direct savings, have not made an impact in Finland as of yet, at least in the large companies that were interviewed. Software solutions that reduce ink consumption were not used and they seem to be a cost saving factor that is overlooked by large companies.

Printing, however, is not viewed yet as a game-changing way to achieve savings. In my analysis of the findings, I concluded that printing is still considered as an everyday part of a company and, besides the basic benefits of print rules and MPS-providers, is not perhaps worth the effort to tamper with any deeper. The research did not provide an answer to why other solutions have not been utilized to add to the savings generated by MPS-contracts and print rules.

The second research question was intended for finding out the decision making process in companies and who is the key person to contact. The reason for this research question was to find out the most effective way to introduce a software solution for cost savings from printing. The CIO is the key decision maker but not the one who should be contacted. They key person is an IT-manager just below the CIO who is able to review new introduced solutions and promote the interesting ones to the CIO. The final decision is made by the CIO after an approval from the CFO if there is a budget to allocate. The interviewee from the IT-company indicated that this process usually stops to the CIO due the lack of time to thoroughly investigate the benefits of a new solution or then the tight IT-budget that leaves little room for new solutions.

The third research questions discussed the environmental side of printing. The goal was to find out any print saving steps had been taken for achieving environmental savings and whether those savings had been used to the companies' benefit. Companies view environmental issues as important and do strive for more environmental friendly processes within their own core-business, but the environmental savings from printing is generally a marginal side for the companies. Hence, none of the companies use the environmental savings as an effective marketing opportunity. My assumption was that the positive environmental impacts of printing less would be a great contribution to a company's sustainability programs. By calculating the reduced paper and ink consumption companies could communicate their smaller carbon footprint and gain value from it.

5.2 Managerial contribution

My suggestion, in light of the findings from the literary review, is that companies have quite a lot of unutilized potential ways to save more. By researching the software solutions, backed by the results of the interviews, my view is that the MPS-providers have a strong foothold of the market. Companies seek consultation from these market giants and therefore receive only one side of the available solutions, which leaves very little room for penetrating the market with an outside solution.

The combination of an MPS-provider, effective print rules and ink/toner saving software would provide a company a great starting point. These solutions might be overlapping but do not cancel each other out. Instead, they strengthen the ways for cost savings. MPS-providers provide a quality print fleet with a flexible payment system. Print rules, such as duplex and monochrome, reduces the majority of the consumable costs. Pull printing eliminates uncollected prints and provides flexibility for the users. A print management software provides the management an effective tool to monitor the costs and the employees printing habits. Ink saving software could be used to define print rules according to user or software for example, which would help reduce drastically the cost of internal printing. Essentially, all these solutions save more than they cost, so experimenting and finding a suitable solution for the company does not require heavy investments.

The cost savings could be reported to the shareholders to promote the effects that these savings have on the company turnover. The company would also highly benefit from the savings if they could be directly allocated to a stronger IT-infrastructure or even technical support.

The environmental savings are also an underutilized opportunity in marketing. Companies could communicate their statistics from reduced CO_2 emissions or the number of trees saved. At least for environmentally conscious consumers these savings might make the difference when choosing between two similar products or services. Also, in the B2B market, choosing a partner from a similar

type of field of competition, these small environmental impacts could make the difference. Saving money from printing less and creating value from it is good business.

5.3   Suggestions for further research

The research showed that MPS-providers are a well-used solution for large organizations. For further research, it would be interesting to find out whether print saving options are known for the SME's. The software solutions might be an effective reduce print costs from a print environment which is not as properly managed as the MPS ones. A study could be performed whether any print saving options have been implemented and what the results are. This study could also indicate whether there is a certain size of a company that would benefit the most from a print saving solution. And at the which size does a company start benefitting from the services of a MPS-provider. The decision making process is far shallower in SMEs and therefore the introduction and implementation new solutions might be easier.

Another point of interest for further research is studying the actual statistics from experimenting with different solutions. It would be interesting to find out which solutions provide the best cost saving solutions with the best quality. Conducing an empirical study by setting up a test environment with various different solutions might yield interesting results. Empirical testing would also help gain a better understanding of the usability, implementation and the amount of work that goes along with different solutions.

6 SOURCE MATERIAL

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