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Tools for Sustainability Management Accounting

A survey of the frequency and purpose of using tools for sustainability management accounting in Swedish listed companies

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Abstract

Sustainable business operations are essential as organisations have a central role in creating economic, environmental and social welfare. Organisational performance on sustainability matters is further increasingly becoming a question of survival since the reputation and legitimacy of companies is largely based on how it performs in environmental and social areas. It is therefore relevant to assume that businesses need to have management accounting tools to be able to efficiently incorporate sustainability dimensions into corporate practices and to evaluate the environmental and social impact of their businesses. Further, there is a discussion on weather sustainability accounting tools actually are contributing to sustainable development or if the use of such tools instead redirect attention away from the central issues. While research has been conducted on numerous issues regarding external sustainability accounting and communication, little in-depth knowledge has been obtained regarding the practices that are taking place within companies. Thus, the purpose of this thesis is to study how frequently tools for sustainability management accounting are being used by Swedish listed companies. Further, this paper seeks to research for what purposes the tools are used. The analysis is partly based on three contingency factors; industry, size and strategy, which are used to investigate if and how these factors affect the frequency of use of tools within three dimensions; environmental, social and integrative. A web-survey of Swedish listed companies was conducted. The findings were analysed by descriptive and inferential statistics in combination with comments from the respondents collected in the questionnaire. The frequency of use of formal sustainability management accounting tools was found to be quite low indicating that sustainability issues are not very well integrated into the accounting systems of Swedish listed companies. Nevertheless, the usage varied a lot among firms and most of the companies claimed to use at least one tool in each category; environmental, social and integrative. The tools were found to be mostly used for external reasons such as monitoring internal compliance and external reporting and to a lesser extent for internal decision-making purposes. In addition, the frequency of use was found to be significantly related to company size. Industry belonging affected the use of environmental tools but not social and integrative. Finally, weak correlations were found between company strategy and the use of the three categories of tools.

Key words

Sustainability Management Accounting, Sustainable Development, Sustainability Accounting Tools, Contingency Theory

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1. Introduction

This chapter presents the background of the subject in this Master's thesis which lays the foundation for the formulation of the purpose. Further, the relevance and potential contribution of the study is presented along with delimitations and a general outline of the thesis.

1.1 Background

Awareness of environmental and social issues has increased in the business world due to growing stakeholder pressure on companies to minimise the negative and maximize the positive impact of their operations and thereby contribute to sustainable development (Epstein and Widener, 2010). Further, organizational performance on sustainability matters is becoming a question of survival since the reputation and legitimacy of companies is largely based on how they perform in environmental and social areas (Frostenson, 2013). The growing importance has not gone businesses unnoticed which can be observed in the increase of external sustainability reporting. Among the world's 250 largest organizations today, 92 % are reporting their sustainability performance (Globalreporting.org, 2017). Frostenson (2013) further argues that the "going-concern" assumption, upon which for instance external reporting is based, is extended to include all resources that an organisation uses and affects. Following that argument, a company's central resources should also include social and natural capital, and not only areas such as financial and human capital. Thus, also taking social and natural resources into consideration can in the long-run improve economic performance (Frostenson, 2013). It is relevant to assume that businesses need to have management accounting tools to be able to efficiently incorporate sustainability dimensions into corporate practices and to evaluate the environmental and social impact of their business (Christ and Burritt, 2013).

The relationship between accounting and sustainability has been discussed since the 1990s and previous research has aimed at deepening the understanding of how accounting technologies can assist companies as they pursue sustainable development (Bebbington & Thomson, 2013). The literature on this relationship has however been divided into two lines of thought: the critical and the managerial perspectives. The critical perspective argues that tools for sustainability management accounting decelerates sustainable development as companies use the tools to create "win-win" scenarios with an economic focus which directs attention away from the real issues (Milne, Trediga and Walton, 2009). The managerial perspective on the other hand argues that sustainability issues must be incorporated into organisational practices but does not suggest radical changes in the markets function (Bebbington and Thomson, 2013). While a considerable amount of research has been conducted on external sustainability accounting and communication, there is little knowledge about the practices that are taking place within companies and whether these practices are contributing to sustainable development. Business practices regarding sustainability management accounting and how they are carried out by companies are areas that need to be explored to further (Bennet, Schaltegger and Zvevdov, 2013).

In line with this reasoning, there are many well-founded arguments to support a survey to explore how frequently tools for sustainability management accounting are used by Swedish

listed companies and further to investigate for what purposes these tools are used. Sweden is potentially an interesting arena to study this topic since Scandinavian countries have been in the forefront of sustainability and CSR work for a long time (Strand, Freeman and Hockerts, 2014) and are accordingly regularly performing extremely well in various sustainability and CSR performance indexes. Recent ratings can illustrate that this is still the case; e.g. in 2017, four Swedish companies made the Global 100 list of the world's most sustainable companies (Corporate Knights, 2017), Sweden was ranked as the number one country in the 2016 Global Sustainable Competitiveness Index (GSCI) (SolAbility, 2017). Additionally, the Dow Jones Sustainability Index included seven Swedish companies for the year 2016 (DJSI, 2016). Following a strong history of CSR work it would be interesting to study if Swedish listed companies are also in the forefront when it comes to adopting formal tools for sustainability management accounting.

Many studies have previously been conducted in this area. For example, Passetti, Cinquini, Marelli and Tenucci, (2014) found that using tools for sustainability management accounting is quite uncommon in the Italian context and concluded that the area is still in an early stage of development. Several other papers have studied various aspects of sustainability management accounting. For instance, Comoglio and Botta (2012) studied the motivations for use of environmental performance indicators (EPIs) and Ferreira, Moulang and Hendro (2010) studied the use of environmental management accounting systems in relation to product and process innovation. Christ and Burritt (2013) and Mokthar, Jusoh and Zulkifli (2016) have studied the use of such tools based on various contingencies.

However, previous research studying the use of sustainability management accounting tools of this nature has not been conducted in a Swedish setting.

1.2 Research Purpose

A survey of this nature could provide valuable insights into the management control systems of Swedish companies regarding the adoption rates of tools for sustainability management accounting. Insights can also be gained by examining for what purposes these tools are used.

The purpose of this thesis is **to investigate how frequently tools for sustainability management accounting are used by Swedish listed companies and to examine for what purposes the tools are being used.**

By investigating these two dimensions of sustainability management accounting tools, this study aims at adding knowledge about the usage in a Swedish context. Furthermore, in this thesis the analysis will be partly based on three ***contingency factors*** (size, strategy and industry) to investigate if certain contextual relationships affect the frequency of use of tools for sustainability management accounting.

1.3 Relevance and Expected Contributions of the Study

There is a need to extend research in sustainability accounting beyond the scope of external sustainability reporting to better understand practices inside companies and within the management control systems. There is little knowledge about the use of such tools in Swedish listed companies and the scope of this study is to the knowledge of the author unique. The

findings can illuminate if and how the tools are and clarify if sustainability issues are integrated into the accounting practices of Swedish companies. The results can further help map out the practices in Swedish listed companies and provide a starting point for future research in this area. In addition, Christ and Burritt (2013) argue that small and medium sized enterprises have not been sufficiently studied, which is why this thesis conducts a survey which includes large, medium and small enterprises. By investigating differences in use between companies according to size, industry and environmental strategy the findings could provide knowledge on several levels. Furthermore, research in this area has mainly investigated the environmental side of sustainability (Bebbington and Thompson, 2013), whereas this thesis contributes to the area as it explores both the environmental and the social side of sustainability.

1.4 Delimitations and Notes

The following delimitations have been chosen to make the study feasible.

Due to the absence of previous studies of this kind in Sweden, this thesis focuses on studying the practices of Swedish listed companies. The studied population consists of companies listed on any of the Swedish stock exchange markets: Nasdaq OMX Large cap, Mid cap, Small cap, First North or Aktietorget. The study will focus on formal tools for sustainability management accounting and will thus exclude the impact of other types of controls systems e.g. informal controls. Although there is a wide array of formal tools of this nature, to make a web-survey method practicable, nine relevant tools have been chosen and are used for measuring the use of sustainability management accounting. One of the tools that has been chosen for study in this thesis is sustainability reporting. Even though it is mainly related to external reporting it will be included in the term sustainability management accounting throughout the paper.

1.5 Outline of the Thesis

The ***Literature Review*** chapter presents relevant information and knowledge related to this thesis and discusses findings and theories presented in chosen literature. First, the notion of corporate sustainable development and the connection between sustainability and accounting is discussed followed by a review of the literature regarding the use of sustainability accounting. Second, sustainability in relation to management control is considered and different tools for sustainability accounting are recognized. Finally, the contingency factors that are used for analysis are presented.

The ***Methodology*** *chapter* explains the methods used to fulfil the purpose of the study. The chosen research approach is accounted for and a description of the administration and design of the survey is provided. The methods used to measure the different dimensions of usage and the contingency factors are presented. Finally, the approach to the analysis is described followed by an argumentation for the chosen research design and a discussion on potential limitations.

The ***Results and Discussion*** *chapter* presents and discusses the empirical findings from the survey and the statistical tests of the contingency factors. Descriptive and inferential statistics are used in combination with the information from the literature review and the comments found in the questionnaire in order to present and discuss the findings.

The ***Conclusion*** chapter concludes the research considering the findings, contributions and limitations of the study. Finally, suggestions for further research are presented.

2 Literature Review

This chapter presents relevant information and knowledge related to this thesis and discusses findings and theories presented in chosen literature. First, the notion of corporate sustainable development and the connection between sustainability and accounting are discussed followed by a review of the literature regarding the use of sustainability accounting. Second, sustainability in relation to management control is considered and different tools for sustainability accounting are recognized. Finally, the contingency factors that are used for analysis are presented.

2.1 Corporate Sustainable Development

Sustainable business operations are essential as organisations play a central role in creating economic, environmental and social welfare. Business operations have a high impact in these three areas and company actions will likely be of even more significance in the future (Schaltegger, Bennet and Burritt, 2006).

The term sustainable development has been widely discussed over the past 20 years (Bebbington & Thompson, 2013). Nevertheless the concept has not been clearly defined making it somewhat difficult to evaluate if sustainable development is being achieved or not (ibid). Adding to the confusion is that several terms are used to explain similar concepts, e.g. corporate social responsibility, sustainability and corporate sustainability (Lueg and Radlach, 2016). The most commonly used definition is derived from the UN World Commission on Environment and Development report: "Our Common Future", where sustainable development is defined as: "*meeting the needs of the present without compromising the ability of future generations to meet their needs*" (WCED, 1987). Schaltegger, Herzing, Kleiber, and Müller, (2002) extend the definition to also include meeting the needs of people in other parts of the world. Evolving from WCED definition was the concept of the "triple bottom line" (Elkington, 1994) where sustainable development includes three dimensions; economic, environmental and social. Hence, sustainability is a state when resources are used consciously and the exploitation of nature does not cause irreversible destruction. The ambition is to hand over the world to future generations with undamaged natural capital, preserved social harmony and good conditions for economic performance (Schaltegger, Bennet and Burritt, 2006).

A common view of companies has traditionally been that they solely exist to generate profits and maximize shareholder value (Friedman and Friedman, 1962), while it has been up to legislators to set boundaries for what is allowed in the operational activities (Frostenson, 2013). The concept of the triple bottom line therefore presents a challenge for companies due to the inherent difficulty, if not impossibility of maximizing the outcome of all three dimensions simultaneously. Most research in this area fails to acknowledge the social dimension of sustainability by focusing only on the environmental side and thereby fail in recognizing the interdependence of the three dimensions (Bebbington and Thompson, 2013).

The challenge of extending the bottom line can accordingly be understood in the perspective of the company's control system where traditionally, organisational strategies and objectives first and foremost have been constructed to create economic value. Consequently, the control systems have been designed to facilitate only that aim (Frostenson, 2013). Frostenson (2013)

argues that control systems and instruments for managing sustainable development have not been commonly present in organisations, at least not up until this point in time. However, increasing external pressure is being applied on companies which can for example be illustrated by the new European Union directive on sustainability reporting which will start affecting Swedish businesses for the fiscal year of 2017. The directive will require companies above a certain size to disclose non-financial and diversity information (Globalreporting.org, 2017). As companies are increasingly being scrutinized by external forces they need to manage risks by adopting concepts and instruments that can handle issues of sustainability. The links between accounting, management control and sustainability will therefore be further discussed in the following sections.

2.2 Sustainability and Accounting

The connection between sustainability and accounting and how different accounting tools and concepts can help companies manage the challenges of sustainable development is frequently discussed in the literature. Subsequently, the topic has developed into two lines of thought (Bebbington and Thomson, 2013).

The first line of thought can be observed in the critical literature which claims that the connection between accounting and sustainability has developed in a way that mostly suits business interest. Companies create "win-win" situations that are unlikely to generate genuine sustainable development (Milne, Tredidga and Walton, 2009). Businesses pursue sustainability for economic reasons and not for achieving actual sustainable development in the sense of improving social outcomes and protecting natural capital (ibid). Accounting for sustainability issues within the critical perspective, is viewed as a method used to achieve increased economic efficiency by gaining control of natural resources and technological developments. The perspective perceives these "win-win" situations as only halfway sustainable and see them as a way for firms to justify their behaviour and demonstrate sustainability concerns but only if it can produce economic returns (ibid). Fundamentally, the view contends that looking at sustainability in the sense of creating "win-win" situations narrows the scope of the sustainability concept and is unconnected to the central issues of sustainable development (Bebbington & Thomson, 2013; Gray 2006).

In contrast, the second line of thought is the managerial perspective which argues that connecting sustainability with business objectives is inevitable (Burritt, 2012). This line of thought argues that drastic changes in how business is conducted a too radical alteration for organisations to pursue. Markets were not designed to create sustainable development outcomes such as environmental stability and social fairness and neither does this perspective propose a restructuring of how markets function (Bebbington and Thomson, 2013). Nevertheless, this perspective upholds the idea that companies should integrate sustainability into operational activities and decision-making processes for ethical ***and*** economic intentions (Hopwood, Unerman and Fries, 2010). Burritt (2012) argues that it is necessary to connect sustainability, accounting and business objectives and that the challenge is to incorporate sustainability issues into internal processes such as capital budgeting and planning. Thus, a central ingredient for implementing sustainability in an organisation is to have formal control systems in place

(Epstein and Buhovac, 2010). The following section will examine empirical evidence for the use of sustainability accounting.

2.3 The Use of Sustainability Accounting

The use of sustainability accounting has been previously studied. Christ and Burritt (2013) conducted a survey of accountants and found that Environmental Management Accounting (EMA) adoption in Australian companies was currently low. However, the accountants perceived that engagement in this area would grow during the next three years, indicating that EMA is likely to be used more in the future. This result is consistent with the results from Ferreira et al. (2010) who also found that the use of EMA was relatively low in Australian companies and Passetti et al. (2014) who found fairly low adoption rates of sustainability accounting tools among Italian firms. Another similar result was presented among Malaysian companies where implementation of EMA was shown to be moderate and most activities focused on improving environmental efficiencies to reduce costs (Mokhtar et al. 2016). Further, Crutzen, Zvezdov and Schaltegger (2017) found a moderate to high rate of adoption of EMA among large European firms. Evidence of the usage of planning tools was found in a majority of the studied companies while cybernetic controls for sustainability were found in all companies. However, the tools were used to a varying extent.

Reasons as to why, or why not, companies engage in sustainability accounting and corporate social responsibility (CSR) activities have also been discussed in the literature. Windolph, Schaltegger and Herzig (2014) explain that possible reasons for adopting or not adopting management tools and concepts for handling sustainability may be due to institutional pressure and legitimacy reasons. Since not all companies have the inherent capacity to choose the necessary tools, successful companies may be imitated (Ibid). Carrol and Shabana (2010) states that there is a business case for engaging in such activities since it may result in direct economic benefits for several reasons. For example, by improving the ability to identify cost saving opportunities created from synergies, to generate an improved mix of products and improved pricing strategy (Christ and Burritt, 2013). Benefits may also result from mediating and circumstantial variables such as an enhanced reputation. Complying with regulations is yet another reason for sustainability involvement (Bebbington, Kirk and Larrinaga, 2012).

On the other hand, there are several potential reasons as to why sustainability management accounting tools are not used in companies to such an extent that can be expected. One reason may be that there are technical difficulties associated with the tools. Virtanen, Tuomaala and Pentii (2013) illuminated the technical challenges of implementing an eco-efficiency indicator. The tool caused problems in the management control system because of complications in analysing what using the tool had achieved along with struggles in setting correct targets for improvement. Their results indicated that eco-efficiency is a complex indicator that is still difficult to implement since it is not yet sufficiently technically developed (ibid). Other reasons for low adoption rates that have been presented in the literature are e.g. issues regarding a lack of knowledge of the tools and the usefulness of the tools (Windolph et al. 2014). A survey of large German companies in which firms were presented a list of tools and concepts for sustainability accounting showed that only about 30 % of the tools were applied in the studied

organisations. The results further showed that the awareness of the tools was the main contributing factor driving the use of the tools, hence promoting the tools can potentially increase the application of them (ibid).

Furthermore, Bebbington, J., Gray, R., Thomson, I. and Walters, D. (1994) found that accountants' level of involvement in organisational environmental agenda was low and that there was a general lack of knowledge of environmental accounting techniques. The authors discuss that there may be a conflict between environmental responsibility and translating this area into action in the accountants' field of work which could provide an explanation as to why environmental accounting appears to be absent in practice. In addition, the authors found that the attitudes of accountants towards the environment were largely homogenous and that attitudes towards sustainability were not aligned with practices in the work place. These results are in line with Wilmshurst and Frost (2001) findings, who conclude that there is a lack of understanding of the role that accounting and the accountant should have in environmental management. According to them, accountants should be interested in sustainability issues as they are associated with financial costs, hence these issues should be incorporated into accountants' decision-making. However, their survey of CEOs and CFOs among listed Australian companies found that the accountants' participation in environmental management was limited. 59 % of the respondents claimed that they included environmental issues in capital budgeting and 48 % in the budgeting system, the inclusion of environmental factors was mostly for cost-benefit purposes (ibid). As can be seen in this section, the use of sustainability accounting has attracted a lot of attention. However, it is relevant to consider for what purposes companies use sustainability management accounting to understand if it is also promoting sustainable development. The following section will review the literature on this area.

2.4 Purposes for Using Sustainability Accounting

The sections above, concerning the importance of corporate sustainable development and the critical and managerial lines of thought raises concerns for what purposes companies use sustainability accounting tools.

Regarding decision-making and sustainability accounting, Owen (2008) explains that several studies have shown that implementing environmental accounting techniques does not change managerial priorities in decision-making. On the same note, Epstein, Buhovas and Yutas (2013) argue that it is difficult for managers to handle trade-offs in the three dimensions of sustainability. Within traditional accounting systems there are often incentives in place only for short-term earnings which makes it a challenge for decision-makers to integrate social and environmental factors into decisions. Thus, there is a potential conflict between short-term and long-term goals which can disconnect sustainability aspects from decision-making. However, case studies among large American firms showed that managers did not find the various dimensions as conflicting, but rather as complementary. Since the formal systems had a financial focus, sustainability work was carried out because it increased financial profits and thus decision-making in this area was experienced as less problematic (ibid). Adams and Frost (2008) argue that the use of performance indicators must be integrated into decision-making if collection of data is to improve sustainability performance. Indeed, their research found that

many companies use environmental KPIs in decision-making and not just in their reporting. In a survey of Canadian companies, Henri and Journeault (2008) found that the use of environmental performance indicators (EPIs) for internal decision-making purposes was moderate. The rates were however higher for firms pursuing an environmental strategy. Further, Virtanen, Tuomaala and Pentii (2013) discuss that, from a managerial perspective, a concept such as eco-efficiency is a relevant tool for facilitating decision-making for sustainable development since it increases productivity and simultaneously decreases environmental impact. In their case study on a petrochemical industry plant in Finland the results showed difficulties in measuring and managing the eco-efficiency indicator.

Morioka and Carvalho (2016) discuss how companies that aim to act sustainably must have sustainability incorporated in their performance measurement systems since it will influence decisions. Such systems can promote learning and provide a base for more informed decision-making. However, there is a gap between sustainability measures and strategic measures which should preferably be integrated with one another (ibid). Even though some tools have been suggested for such integration, e.g. the sustainability balanced scorecard (SBSC), Morioka and Carvalho concluded that more research is needed to better understand interactions, priorities and trade-offs between the three sustainability dimensions (ibid). According to Maas, Schaltegger and Crutzen (2016) the integration of sustainability into corporate strategy is still at its infancy. Accordingly, Tung, Baird and Scoch (2011) maintain that the sustainability dimension in the balanced scorecard is not widely used.

The use of sustainability reporting and its' relationship to sustainability performance has also been discussed in the literature. Adams and McNicolas (2007) claim that a lack of knowledge of how to develop a framework for sustainability reporting hinders companies from integrating sustainability into decision-making and planning. Their research found that when companies were assisted in including social and environmental issues in their external reporting, these issues found their way into corporate planning and decision-making and in extension, sustainability performance was improved (ibid). In similar fashion, other research has shown that external and internal accounting practices may be related and it has been argued that changes in environmental reporting may induce changes in EMA activities (Bouten & Hoozée, 2013). The reason for this is that EMA is needed to provide data for the environmental reporting and thus adopting environmental reporting can incite the use of EMA systems and lead to organisational change towards increasingly sustainable operations (ibid). This argument is contrasted by Milne et al. (2009) who argue that sustainability and triple bottom line reports are merely ways for companies to frame their sustainability work in certain ways and thereby manage external impressions on the company. They discuss how corporate discourse on sustainability is balancing economic factors with environmental factors, which may reinforce existing patterns of halfway sustainability or "win-win" situations. Further, they found that rhetoric and presentations in corporate communication claimed a sustainability interest. However, a content analysis of the language and the images used in the reports revealed a narrow and economic view on sustainability. The authors argue that sustainability accounting is used to create a perception of sustainability interest among stakeholders in order to legitimize company existence and hence not for making more informed sustainable decisions (ibid).

2.5 Sustainability and Management Control

This section will discuss the challenges of incorporating sustainability into management control systems. Section 2.6 will then present tools for sustainability management accounting that can be used to manage sustainability issues in organisations.

Management control has been defined as "*the process of steering organizations through the environments in which they operate in order to achieve both short-term and longer- term goals*" (Otley and Soin, 2014). The purpose of a control system is to steer the company in the desired direction by motivating certain behaviours in the organisation. This is carried out by assessing the behaviours and oftentimes rewarding employees and managers for what they have achieved based on certain measures (Bonacchi & Rinaldi 2007). A few different ways of categorising management controls have been presented in literature, however a common way of classifying controls is by dividing them into formal and informal control (Langfield-Smith, 1997). Management control can hence be considered to encompass all formal and informal tools and systems that are installed in the organisation to align employee actions and decisions with the objectives of the company (ibid).

Formal controls consist of e.g. performance evaluation, official rules, reward systems and budgeting while informal controls include company culture, belief systems, values, norms and traditions (ibid). While historically, control systems have mainly been associated with formal accounting based controls (Crutzen, Zvesdov & Schaltegger, 2017), literature has studied both formal controls and informal controls. Research has also addressed the integrative nature of these systems and developed all-encompassing conceptualizations of control systems such as the "*package of controls*" (Malmi and Brown 2008), Simons levers of control (Simons, 1995) and the Balanced Scorecard for strategy alignment (Kaplan and Norton, 1992;1993;1996). As touched upon previously, conventional management control systems are nonetheless usually designed to assist management in creating economic value. Thus, they are not aligned with the triple bottom line paradigm in which the bottom line of the company is extended beyond the economic dimension (Gond, J., Grubnic, S., Herzig, C. and Moon, J. 2012; Frostenson, 2013). This view is shared by Ditillo and Lisi, (2014) who also claim that typical management control systems are not properly designed to deal with environmental and social matters or to cope with a wide-ranging set of stakeholders other than shareholders.

Companies that want to integrate sustainability into business actions and not merely use external sustainability accounting and communication for legitimacy, should have control systems installed to provide information regarding the firm's performance in these areas (Bonacchi & Rinaldi, 2007; Gond et al. 2012). Bonacchi and Rinaldi (2007) also argue that planning and control tools are essential for the integration of sustainability into organisational activities. They state that, to understand the challenges of the activities that affect sustainability performance and further to be able to quantify sustainability, there is a need for the installation of proper planning and control systems. Consequently, both the objectives of the organisation and the design of the management control system play an important role for implementing sustainability. This view is shared by Henri and Journeault (2010) who explain that control

systems for sustainability are important components to support overall sustainability efforts within an organisation.

Because of the incompleteness of traditional control systems and the increasing interest of corporate sustainable development, new accounting and control tools have emerged to better handle sustainability issues (Henri and Journeault, 2010). Management control for sustainability is defined as "*all devices and systems that managers develop and use to formally and informally ensure that the behaviours and decisions of their employees are consistent with the organization's sustainability objectives and strategies*" (Crutzen, Zvezdov and Schaltegger, 2017).

2.6 Tools for Sustainability Management Accounting

Schaltegger et al. (2002) have composed an extensive list of tools and concepts for controlling for sustainability in organisations. The list consists of 46 sustainability accounting tools which are categorised in three dimensions; **social, environmental** and **integrative** based on the nature of the tool. According to Schaltegger et al. (2002) there are four challenges for managing sustainability; *the ecological, the social, the economic challenge to environmental and social management and the integration challenge.*

The ecological challenge concerns the strain that economic activity puts on the environment. The environment can only handle a certain amount of burden before irreversible damage is caused by e.g. global warming or decline in bio-diversity. The goal is to ensure long-term sustainability and for companies the challenge lies in minimizing the total impact their operations have by improving the ecological effectiveness of their activities. *The social challenge* addresses the task of improving the social impact. Businesses are a natural part of society and the challenge lies in maximizing the positive and minimizing the negative social impact of their operations. *The economic challenge to environmental and social management* concerns the fact that most companies act in competitive environments where the main purpose is economic gains. Therefore, the challenge lies within optimising social- and eco-efficiency while maintaining value creation in business activities. *The integration challenge* consists of two parts. Firstly, to simultaneously accomplish the three challenges mentioned above. Secondly, to integrate the management of social and environmental capital into the conventional and economically focused management systems and not deal with these issues separately.

For this thesis, nine tools have been chosen from the list of 46 tools presented by Schaltegger et al. (2002) and are used to analyse the use of sustainability management accounting. The tools are chosen from the three dimensions: social, environmental and integrative and are presented further in Table 1 in section 3.2.2.

2.7 Contingent Factors for Analysis

Three contingency factors will be applied in the analysis to try and explain the use of sustainability accounting tools under different circumstances. The analysis will hence be conducted by looking at different contexts in which the responding companies find themselves. Therefore, a short introduction and description of contingency theory and how different contingency factors might affect adoption rates and usage of the tools will follow.

Contingency theory was first developed in the 1960s and is still a central theory in management accounting research. Basically, the theory argues that there is no single best way to lead and organise a company, instead the best organisational design varies among companies and depends on the circumstances that each company finds itself in (Otley, 1980). The most fitting solution for the management control system in each firm varies depending on certain contingencies. Organisations will therefore adapt their structure and practices to these circumstances in order to improve performance (Gerdin and Greve, 2008). Over the years, research has analysed contingencies such as the size, industry, structure, environment and corporate strategy to try and find generalizable ways to design management controls system for increased effectiveness.

Contingency based research is especially relevant in the area of sustainability accounting since the overall low uptake of tools and techniques for sustainability management calls for more research on how various contexts affect and drive adoption (Christ and Burritt, 2013). Basically, the understanding of what factors that have an influence on adoption of these practices needs to be deepened. In this thesis three contingency factors will be used for analysing the frequency of use of the tools; if the company pursues an *environmental strategy*, the company's *industry belonging* and the *size of the organisation*. Literature on these three factors provides foundations for how each contingency should affect the uptake of sustainability management accounting tools within these contexts. However, empirical evidence has been inconclusive for all three factors which makes them interesting to investigate further.

Regarding the first factor, environmental strategy, contingency theory suggests that depending on the strategy adopted by the company, different practices can be expected to present in the organisation (Chenhall, 2003). Companies that adopt an environmental strategy that is incorporated into the overall strategy can therefore be expected to use sustainability management accounting tools to a higher degree (Parker, 1997; Christ and Burritt, 2013). Confirming results of this assumption have been found by Christ and Burritt (2013) and Henri and Journeault (2008) while Mokhtar et al. (2016) found that strategy did not affect use.

In relation to the second factor, industry, Wilmshurst and Frost (2000) discuss how companies that are present in environmentally sensitive industries will use more environmental management accounting tools since they are of greater use to them. Their research found that industry affected external reporting but not environmental management accounting activities. These results are shared by Mokhtar et al. (2016) who found that industry was not a driver of environmental management accounting use, however, both Christ and Burritt (2013) and

Ferreira et al. (2010) found that it was. Windolph et al. (2014) surprisingly found that companies in environmentally sensitive industries use fewer tools for sustainability accounting.

The third factor, organisational size, has been found to increase the use of advanced management accounting practises the larger the organisation is. Abdel-Kader and Luther (2008) argue that the reason for this is that smaller organisations do not have the resources required to engage in these types of practices. Patten (2002) argues that larger companies are more visible and therefore their operations will be more closely inspected which is an incentive for sustainability engagement. Christ and Burritt (2013) find evidence of increasing organisational size driving the use of sustainability accounting, while Mokhtar et al. (2016) does not. However, Christ and Burritt (2013) maintain that smaller organisations have not been sufficiently explored.

3. Methodology

This chapter explains the methods used to fulfil the purpose of the study. The chosen research approach is accounted for and a description of the administration and design of the survey is provided. The methods used to measure the different dimensions of usage and the contingency factors are presented. Finally, the approach to the analysis is described followed by an argumentation for the chosen research design and a discussion on potential limitations.

3.1 Research Approach

This thesis adopts a quantitative research strategy to investigate the use of sustainability management accounting in Swedish listed companies in two dimensions; the frequency and the purpose of use. To explore the frequency and purpose of use of sustainability management accounting, a web-survey of Swedish companies was conducted. A survey format was chosen for several reasons. First, it allows the researcher to study a large number of companies at limited cost (Dillman, 2009). Second, the respondents can answer anonymously and without pressure at their own convenience (Ferreira et al. 2010). Third, a survey is a good alternative when respondents are scattered geographically (Bryman and Bell, 2013). Furthermore, the analysis is partly based on comments that were provided by the respondents which are interpreted by the author to find potential explanations behind the findings.

3.2 Research Methods

3.2.1 Research Sample and Survey Administration

The sample in this thesis consists of 73 companies that responded to the survey. The survey aims at examining the practices of Swedish that are listed on one of the Swedish stock exchanges; NasdaqOMX Large cap, Mid cap, Small cap, First North or Aktietorget. The population thus includes small, medium-sized and large enterprises according to the European Union categorisation (Eur-lex.europa.eu, 2017). The companies were gathered in February and March 2017 from the database Business Retriever in a descending order based on annual turnover. To approach the population, contact information to the 500 largest companies in terms of annual turnover was collected by locating email addresses on the companies' websites. The websites were browsed for contact information to suitable employees in the organisations to approach with the survey. First and foremost, email addresses to people with titles such sustainability manager or similar were chosen. In companies where email addresses to employees with this title could not be found, email addresses to employees with other titles such as controller, accountant, CFO, CEO, investor relations manager etc. were collected depending on what the website provided. Since many of the companies do not post information to specific employees on their websites the first contact to many of the companies was made via general "info-email" addresses. An email was composed and sent to the collected email addresses with an explanation and background of the study and an appeal for assistance with answering the questionnaire or to be connected to someone in the company who works in the accounting department and has insight in the control systems of the company. The survey was administered via the Webropol survey tool and consisted of a self-completion questionnaire. Further, to increase the response rate and ensure understanding of the survey which takes place in a Swedish setting, all the questions, including the English definitions of the tools were translated to Swedish. All the information, questions and definitions were hence presented in

both English and Swedish and the survey could accordingly be completed in both languages. The translations of the tools were when possible validated by using definitions of the tools that were found in Swedish literature. Upon completion, the questionnaire was pre-tested on two academics in the field. Feedback was given and minor alterations were made to the wording of a few questions and the translation of a few definitions.

3.2.2 The Frequency of Use of Sustainability Management Accounting

To measure the frequency of use of sustainability management accounting within the research population, a set of nine sustainability accounting tools were presented to the respondents (Table 1). The nine tools were chosen from the list crafted by Schaltegger et al. (2002) with an ambition to put together a balanced set of tools from the three dimensions: social, environmental and integrative tools. The tools were chosen because of their relevance in academic literature (Table 1). Further, the respondents were given the opportunity to state if they use any additional tools for sustainability accounting. Altogether, the nine tools and the opportunity to add extra tools aim at measuring the concept of use of sustainability management accounting tools.

To quantify the frequency of use in the survey the respondents were presented with the question: "how often does your firm use the following tools?" followed by a presentation of each of the tools. The respondents were subsequently presented with a Likert scale ranging from one (never) to seven (very often) for each of the sustainability accounting tools. The respondents were also given the option to freely comment on each tool in text. In addition, and as mentioned above, the respondents were given the possibility to describe if their organisation uses any other sustainability accounting tools that were not presented to them to find other tools which might be present in Swedish companies. Finally, there was an option for the respondents to freely comment any issue regarding the area. In the survey, the respondents were provided definitions for each of the tools. The definitions of the tools originate from the list by Schaltegger et al. (2002). In this thesis however, the summarizations of the definitions provided by Passetti et al. (2014), were used for all of the tools except for the sustainability balanced scorecard where the definition provided by Schaltegger et al. (2002) was summarized by the author. Table 1 presents the final list of tools that were used and their definitions as provided to the respondents. The Swedish definitions of the tools can be seen in the appendix.

Table 1.

Environmental tools	
Environmental budget	A future-oriented planning tool which determines the funds available for environmental issues for the coming period. It helps to set environmental targets (Gray and Bebbington, 2001)
Environmental cost accounting	It records and measures direct and indirect environmental costs to determine production costs for different products/services (Parker, 2000)
Environmental life cycle assessment	It addresses the environmental issues of a product and its environmental impact during its life-cycle. It includes all the production phases, from raw material acquisition to the disposal of the product at the end of its life. It forecasts environmental consequences and a timely identification of precautionary measures inside and outside an organisation (Gray and Bebbington, 2001)
Environmental performance Indicators	Internal indicators which measure environmental issues (water use, GHG emissions, waste management, etc.) and the links between the company business and the environment. They are represented by financial and non-financial numerical data which provide key information about the organisation's environmental issues such as the environmental impact of its operational activities (Henri and Journault, 2008)
Social tools	
Social budget	A future-oriented planning tool which determines the funds available for social issues for the coming period. It helps set social targets (Schaltegger et al. 2002)
Social performance indicators	Internal indicators which refer to the measurement of social issues. They supply information on what activities can be regarded as socially effective and efficient. They are represented by numerical measures (monetary and non-monetary) and they provide key information about employee health and safety, equal opportunities, diversity management and the social assessment of the products (Schaltegger et al, 2002)
Integrative tools	-
Eco-efficiency analysis	It develops and optimises product characteristics and operational activities concerning the relationship between their economic value added, the use of natural resources and the firm's objectives (Virtanen et al. 2013)
Sustainability report	It communicates a firm's environmental, social and economic results to external stakeholders in order to demonstrate the firm's commitment to sustainability issues and to increase its level of transparency (Joseph, 2012)
Sustainability balanced scorecard	It is an extension of the conventional Balanced Scorecard (BSC) to sustainability management, in that it integrates environmental and social aspects in the BSC. The aim is to identify, systematise and measure the strategic central economic, ecological and social objectives (Hansen and Schaltegger, 2016)

3.2.3 The Purpose of Sustainability Management Accounting Use

To investigate for what purposes sustainability management accounting was used in the companies, twelve specific purposes for decision-making presented by Passetti et al. (2014) were used (Table 2). The twelve purposes were further categorised into four classifications; "motivating continuous improvement, supporting managerial decision-making, external reporting and monitoring internal compliance". The four broad classifications were chosen since they are mergers of usage purposes presented in the accounting and environment literature (Henri and Journeault, 2008). Moreover, the purposes include both the external and internal contexts and can thus measure which perspective that mostly drives the use. The twelve specific purposes are derived from literature regarding business decisions in relation to sustainability management and accounting (Passetti et al. 2012) and were included to gain more detailed knowledge in relation to why the tools are used. The respondents were presented with the question "for what purposes are the previous sets of tools used in decision-making?". The twelve specific decision-making purposes were then presented to the respondents. Following each purpose, the respondents were presented with a Likert-scale ranging from one (not at all) to seven (to a very great extent). The four classifications and the twelve specific purposes are presented in Table 2.

Table 2.

Motivating continuous improvement	*Managerial decision-making*
Product 's environmental impact and efficiency	New market opportunities
Social risk assessment	Pricing policy
Control of environmental and social targets	Product positioning
Environmental risk assessment	Capital budgeting
	Competitive strategy
External reporting	*Monitoring internal compliance*
Accountability of environmental and social information	Compliance with national and international legislation
Customer loyalty	

3.2.4 Measurement of Contingency Factors

Three contingency factors are investigated in this thesis, *environmental strategy, firm size, and industry.* These three factors were chosen since literature suggests that they should have an influence on the adoption of the tools investigated in this paper while previous empirical studies have offered conflicting results whether this is the case.

To measure *environmental strategy*, an instrument used by Christ and Burritt (2013) was adopted and slightly adjusted. The instrument was originally designed to measure to what degree environmental concerns are integrated into the overall strategic planning in the company. The adjustment of the tool consisted of extending the concept of environmental strategy to also include social aspects in order to account for all three dimensions of sustainability. Accordingly, to measure the degree of sustainability being integrated into overall strategy in the companies the respondents were presented with four statements. Following each statement, the respondents were asked to indicate to what extent they agree to the statement on a Likert scale ranging from; one = strongly disagree to seven = strongly agree. An average was then calculated rendering an overall number between one and seven (ibid). The four statements were:

- *Our firm has integrated environmental and social issues into our strategic planning process.*
- *In our firm, quality includes reducing the environmental impact and increasing the positive social impact of products and processes.*
- *At our firm we make every effort to link environmental and social objectives with our other corporate goals.*
- *Environmental and social issues are always considered when we develop new products.*

Firm size was measured based by both the number of employees and annual turnover. Annual turnover was measured by providing the respondents with three options: “less than 1 billion, between 1 and 20 billion and more than 20 billion SEK”. The number of employees was measured by providing four options for answer: “less than 100, 100-249, 250-1000 and more than 1000”. Asking for a specific number regarding the turnover as well as the number of

employees might have given more precise results, however, such specific answers might have presented an obstacle for some respondents as it could have required respondents to search for information and therefore decreased the response-rate.

To measure if the companies' *industry* belonging influences the frequency of sustainability management accounting use, different industries were categorised in a binary segmentation to form two groups: more sensitive industry and less sensitive industry. Sensitivity in this case refers to sensitivity in relation to the environmental dimension of sustainability (Christ and Burritt, 2013). First, the responding companies' industry belonging was collected by using the retriever business database segmentation of industries. The companies were designated the correct industry by their classification in the database combined with answers collected from the respondents where they stated their industry belonging. Second, the industries were categorised into the two groups; more and less sensitive. The grouping of industries was made based on the segmentation by Christ and Burritt (2013. In the final classification, the industries that were categorised as more sensitive were, as denoted in the business retriever database: "*Manufacturing and industry"*, *"Construction, design and decoration"* and *"Agriculture, forestry, hunting and fishing".* Remaining industries were consequently classified as less sensitive and two groups were formed.

3.3 Analysis and Presentation of Results

This thesis seeks describe the frequency and purpose of use of sustainability management accounting among listed Swedish companies. Further it seeks to investigate how various contingency factors affect the frequency of use. Therefore, both descriptive and inferential statistics will be used to fulfil the purpose. The results will be presented by using descriptive statistics that show, summarize and describe the findings in meaningful ways. Inferential statistics will be used as means for finding relationships between the frequency of use of the tools and the contingency variables. Comments from the respondents that are relevant for the analysis are presented in connection to the statistical findings. Most comments were originally in Swedish and have been translated by the author. The results and the discussion are presented together in one section in chapter four Results and Discussion.

3.3.1 Statistical Approach

Descriptive statistics are used to present the findings regarding the frequency and purpose of use (Table 3 and 4). To investigate the contingency relationships Cronbach's alpha was measured for each category of tools, the environmental tools, the social tools and integrative tools to construct three categories which each measure one dimension of sustainability management accounting. The values that were used for each construct was the average frequency of use for the tools that were included in each category (Passetti et al. 2014). The average frequencies of use for each construct were subsequently used to statistically investigate the contingency factors. The size contingency was investigated the same way for both variables, annual turnover and number of employees. The average values of the frequency of use for the constructs measuring environmental, social and integrative tools were used and compared to the size categories. One-way Anova post hoc Tamhane's t2 was used to compare the means of the tool categories within each size category to see if there were significant differences in the

frequency of use between the groups. Tamhane's t2 is an appropriate test to compare means between several groups when there are unequal sample sizes and unequal variances. The industry category is as mentioned above dichotomously segmented. To investigate industry belonging, a t-test for equality of means was used. Cronbach's alpha was also calculated for the construct measuring sustainability strategy and the average value was used to measure each company's sustainability strategy (Christ and Burritt, 2013). Sustainability strategy was then set in relation to the constructs of the tool-categories by using Pearson correlation.

3.4 Sample and Respondents

The final sample consists of 73 companies which equals a response rate of 14.6 % The response rate in this study is in line with what can be expected when conducting a web-survey. It is above the rates of Mokthar et al. (2016), who received 9.7 % and Christ and Burritt (2013) who received 6.8 %, however it is slightly below Passetti et al. (2014) who received 18.8 %. Additional resources in terms of time and incentives could possibly have increased the response rate. As the response rate of 14.6 % is in the same area and slightly above other studies, the response rate was considered acceptable. When comparing the results of the 53 first respondents, to the final results with all 73 companies included, the researcher found that the added 20 respondents altered the results to a very low degree. To ensure the quality of the answers and the understanding of the questions each respondent was asked to state the title of their position, how many years of professional working experience they had in their current line of work and their highest level of education. The results showed that none of the respondents had less than two years of working experience and that almost 90 % had five or more years' experience in their current line of work. None of the respondents had less than upper secondary diploma, around 90 % had a university degree and a few of the respondents had a doctoral degree.

3.5 Potential Limitations

According to Dillman (2009) there are four types of survey errors that can reduce the total quality of the survey; coverage error, sampling error, non-response bias and measurement errors. *Coverage error* occurs when all members of the population do not have an equal opportunity to answer the survey and be a part of the sample. In this case, all companies were contacted via email-addresses found on respective company's website and in a few cases via contact forms on the websites. All companies can therefore be expected to have received emails with an inquiry to participate in the survey. Hence coverage error should not propose a problem for the result. A weakness however is that many companies only had general info-email addresses available and thus the email was received by an employee who then had to forward to the appropriate person. Emails to all companies were nevertheless sent with a request for the survey to be forwarded to an appropriate employee. *Sampling error* is inherent when using random sampling to draw conclusions about a population and occurs since different samples might render different results. It is a natural part of conducting survey research without testing the entire population. The sample size was dependent on the response rate and was quite low in this case which is a limitation. A higher response rate would naturally have improved the quality of the results. *Non-response bias* or non-response error, occurs when those who answer the

survey and those who do not answer the survey are different from one another in a way which is significant for the results of the study (Dillman, 2009 p.17). To control for non-response bias, the answers from the first 20 % of the respondents that completed the survey were compared by t-test to the last 20 % of the respondents (Christ and Burritt, 2013). No significant difference between the groups was found.

To identify and measure the use of sustainability management accounting in Swedish firms a survey methodology is appropriate since such a method can provide general results for the companies. Choosing to survey Swedish listed firms meant that the studied companies were wide ranging in terms turnover, employees and industry belonging. Case studies could have rendered deeper knowledge as to how Swedish companies engage sustainability accounting practises and shed light on potential barriers of implementation, the knowledge of the tools and how they are used for decision-making et cetera. This study nevertheless contributes by looking at the big picture and map out practices within companies on an aggregated level. Further, analysis is conducted by looking at the respondents' comments to investigate potential reasons for the results. Due to the time limit and scope of this study a web-based survey was the best alternative. However, conducting a survey has its limitations primarily due to potential survey error and non-response bias as discussed above. For the survey, the nine tools chosen for investigation were chosen for their relevance in the literature but are still only a few of the tools that are available. That limitation was decreased by asking the companies if they use any other tools for sustainability management accounting. The choice of examining nine tools is however also a strength of this investigation as most research only focuses on one single tool. Another potential limitation is that the results are somewhat subjective and based on the respondents' opinions about the frequency and purpose of use.

4. Results and Discussion

The chapter presents and discusses the empirical findings from the survey and the statistical tests of the contingency factors. Descriptive and inferential statistics are used in combination with the information from the literature review and the comments found in the questionnaire in order to present and discuss the findings.

4.1 Frequency and Purpose of Use

Frequency of use

Table 3.

Frequency of use	**Mean**	**Std.Dev**	**% of companies that never use the tool**	**Passetti et al. (2014) Mean**
Environmental tools	**2,62**	**1.35**	**24.7**	***3.24***
Environmental budget	2,05	1.41	54.8	*2.92*
Environmental cost accounting	1,86	1.39	63.0	*2.72*
Environmental life cycle assessment	2,86	1.90	42.5	*3.62*
Environmental performance Indicators	3,71	2.28	30.1	*3.71*
Social tools	**3,19**	**1.91**	**26.0**	***3.19***
Social budget	2,74	2.10	50.7	*2.71*
Social performance indicators	3,63	2.11	26.0	*3.68*
Integrative tools	**2,92**	**1.53**	**17.8**	***2.98***
Eco-efficiency analysis	2,42	1.84	54.8	*2.68*
Sustainability report	4,04	2.28	20.5	*3.28*
Sustainability balanced scorecard	2,30	1.93	58.9	*n/a*
Average use of the tools	**2,85**	**1.35**	**9.6**	***3.16***

Description of the frequency of use

Table 3 presents the mean frequency of use for each of the tools, for the three categories of tools and the overall frequency for all of the tools combined. The standard deviations are also presented and, for each tool, the percentage of the responding companies that stated that they never use the tool. Additionally, the values found by Passetti et al. (2014) in their survey are included for comparison.

The overall adoption rates of the tools can be considered to be quite low with an average frequency of use of 2.85 for all of the tools combined. Four of the tools had mean frequency of use above the average of 2.85 and five tools had values below. The most frequently used tool was the sustainability report with a mean frequency of 4.04 followed by the performance indicators, both environmental and social, with mean user frequencies of 3.71 and 3.63 respectively. It can be noted that only 20.5 % of the responding organisations stated that they do not use the sustainability reporting tool at all which means that nearly 80 % of the companies engage in sustainability reporting. The fourth tool found above average is environmental life cycle assessment at 2.86.

The least frequently used tool was environmental cost accounting which had an average of 1.86, this tool was not used at all in 63 % of the responding organisations. Eco-efficiency analysis was also found below average with a mean value of 2.42. The budgeting tools, environmental and social had average usage values of 2.05 and 2.74 respectively, while the sustainability balanced scorecard had 2.30 in mean value. For the three categories of tools, the most frequently used tools were the social tools with a combined mean frequency of 3.19 followed by the integrative tools at 2.92 and the environmental tools at 2.62.

Analysis of the frequency of use

The overall low adoption rates are consistent with the findings in previous literature (Christ and Burritt, 2013; Ferreira et al. 2010; Mokhtar et al. 2016). The standard deviations in this study are quite high indicating that the use of each tool varies a lot among the companies. The results also show that when looking at the tools individually, many of the organisations state that they do not use them at all. However, by looking at the three tool categories it is evident that 75.3 % of the companies have at least one of the environmental tools in place in their organisation and 74.0 % t of the companies use at least one of the social tools. For the integrative tools the same number is 82.2 %. These numbers show that formal tools for all three categories are used in a majority of the companies that responded to the survey. The results show that most companies are using some tools for sustainability management accounting, however which specific tools each company uses and how frequently varies to a great extent. When it comes to analysing the different categories of tools, quite surprisingly, the results show that environmental tools are on average used less than both social and integrative tools despite the fact that the environmental side of sustainability has had the predominant focus in research (Bebbington and Thompson, 2013). Two of the least used tools were however found among the environmental tools which certainly lowered the average value for this category.

Comparison to the results from Passetti et als' (2014) survey

The results show slightly lower adoption rates in the Swedish setting at 2.85 compared to the Italian setting were the average was 3.16 (Passetti et al. 2014). An interesting result is that the same tools were found above and below the average frequency of use in both countries which shows that there are similarities between the two countries. It must also be kept in mind that the Italian study only investigated large and very large companies, whereas this study also includes small and medium sized enterprises. There is a possibility that this factor might have led their study to record slightly higher adoption rates. The size relationship is also supported by Crutzen et al. (2017) who found higher adoption rates when studying large firms. The impact of size is further discussed in the analysis of the contingency in section 4.2. In both the Italian case and in this study, the social tools were found to be the most frequently used. Both studies recorded exactly the same average frequency of use for social tools at 3.19. In the Italian study the environmental tools were the second most used (Passetti et al. 2014), while the integrative tolls were the second most used among the Swedish companies. These results can be explained by the high use of sustainability reporting among Swedish firms which raises the average for the integrative tools along with comparatively low use of some of the environmental tools.

Analysis of the comments and possible reasons behind the results

Possible reasons as to why the adoption rates were overall low among Swedish companies can be found in the comments. Two of the least frequently used tools were eco-efficiency analysis and environmental cost accounting. Virtanen et al. (2013) showed that eco-efficiency is a tool associated with technical difficulties which may impede implementation and cause lower adoption rates. Indications of technical difficulties could also be found in the comments. For instance, the following comment was made by one of the respondents:

> *"…we have used carbon-reporting, but we don't think it gave us as much information as we would have wanted..."*

This citation stands to prove the point that some of the measurements can be complex and difficult to read. Another comment indicated that social performance indicators also can be difficult to implement, just like eco-efficiency analysis (Virtanen et al. 2013), as described in this comment:

> *"We work at developing such indicators, but we have to admit that it is a big and difficult challenge for us as a company."*

A potential reason for the low use of environmental cost-accounting in particular can be that sustainability issues are included in the overall investment calculation. As one respondent explained:

> *"No separate calculation, environmental aspects are included in the overall investment calculation."*

This in turn may have lead some companies to state that such tools are not used even though sustainability aspects are included in the overall investment calculation. The social and environmental budgeting tools were also found below the average frequency of use. Similarly, the reason for the low adoption of the two budgeting tools may be due to sustainability issues being incorporated in the ordinary budgets instead (Wilmshurst and Frost, 2001), like the following two comments touch upon:

> *"We do not have a separate budget for environmental issues. Actions and impacts are handled within the frame of our ordinary budget."*

> *"Handling environmental requirements is a part of the normal budgeting process."*

Another respondent stated that their company has an overall sustainability budget, but no individual environmental and social budgets. The comments indicate that some companies may include environmental and social issues in their ordinary budgets and therefore there are no independent environmental and social budgeting tools in place. When sustainability issues are incorporated into conventional tools it can be difficult to handle trade-offs in the three

sustainability dimensions (Epstein et al. 2013). The sustainability balanced scorecard was also found to be below average which is in line with the argument that sustainability integration into corporate strategy is still at its infancy (Maas et al. 2016) and previous studies showing low adoption rates for this tool (Tung et al. 2011).

The most used tools were the performance indicators and the sustainability reporting. The higher adoption rates for these tools could be explained by the need to comply to regulations related to sustainability reporting (Bebbington et al. 2012) which was also evidenced in the comments:

"Complies with requirements according to IFRS."

Windolph et al. (2014) found that the awareness of and the usefulness of the tools were key drivers of adoption. Their study found that awareness of the tools was the factor with the largest effect on the frequency of use. This might be the case among Swedish companies as well. Even tough conventional budgeting, performance indicators and balanced scorecards are widely used tools, knowledge about how to apply them in the environmental and social dimensions may be lacking and hence causing low adoption rates. In addition, low awareness of the tools may be the reason as to why sustainability issues are incorporated into conventional budgeting and investment calculation tools. One respondent expressed that it is important to gain clarity in these issues.

Evidence of lacking knowledge was found in the comments where another respondent expressed that he or she did not know what the difference was between the sustainability balanced scorecard and other tools. This comment may indicate that the knowledge of the tools is low among the firms causing lower adoption rates. The discussion of Windolph at al (2014) about awareness of these tools can be related to the findings of Bebbington et al. (1994) and Wilmshurst and Frost (2001) that accountants do not participate in sustainability work and do not understand the role that accounting could and should play in increasing sustainability performance. It must also be kept in mind that some of the tools are predominantly oriented towards manufacturing companies that produce physical products e.g. environmental cost accounting and life cycle assessment. Since not all companies within the sample are manufacturing companies the results must be interpreted with some caution as adoption rates for some of the tools might be lower due to this issue. This could also be observed in some of the comments were respondents expressed the following:

"This question is not relevant in our organisation."

"We do not manufacture products."

Nevertheless, even though some companies will not use certain tools, all companies have some degree of social and environmental impact. Hence, other tools could be more relevant to use.

Indications for increased use in the future

Evidence supporting Christ and Burritts' (2013) findings that the use of environmental management accounting was more likely in the future could also be found in some of the comments. One respondent commented below the question regarding the use of environmental life cycle assessment:

"This is a question which is on our agenda to implement in the next few years."

Another responded this below the social budgeting tool:

"This is perhaps something that will be relevant in the future."

Comments regarding the use of sustainability balanced scorecard included:

"Not yet but will possibly be started this year."

"Just started."

"We have the ambition to use a BSC for our sustainability work."

Several similar comments could be found which reveals that there is an aspiration among the companies to increase the use which might lead to higher adoption rates in the future.

Purposes of use

Table 4.

Purpose of use:	**Mean**	**Std.Dev**	**Passetti et al. (2014) Mean**
Motivating continuous improvement	**3.47**	**1.93**	***4.11***
Product 's environmental impact and efficiency	3.26	2.18	
Social risk assessment	3.34	2.08	
Control of environmental and social targets	3.82	2.15	
Environmental risk assessment	3.44	2.03	
Managerial decision-making	**3.42**	**1.97**	***4.17***
New market opportunities	3.41	2.14	
Pricing policy	2.96	2.00	
Product positioning	3.64	2.25	
Capital budgeting	3.12	2.11	
Competitive strategy	3.95	2.23	
External reporting	**4.08**	**2.13**	***3.91***
Accountability of environmental and social information	4.25	2.27	
Customer loyalty	3.92	2.17	
Monitoring internal compliance	**4.66**	**2.18**	***5.31***
Compliance with national and international legislation	4.66		

Description of the purposes of use

Table 4 shows the mean values for each of the purposes of use. The standard deviations are presented and the findings from Passetti et al. (2014) for each category of purposes are included for comparison. The results for what purposes the tools are used show that they are predominantly used for monitoring internal compliance with an average of 4.66 and external reporting with an average of 4.08. The tools are less used for motivating continuous improvement at 3.47 and for managerial decision-making purposes at 3.42. The two single items with the highest value was "compliance with national and international legislation" at 4.66 followed by "accountability of environmental and social information" at 4.25. Those two were the only items scoring above 4, while "Pricing policy" was the only item scoring below 3 at 2.96. In general, the results show that there are very small differences between the items. The standard deviations are quite large for all measures which means that the reasons for using the tools varies a lot among the responding companies.

Analysis of the purposes of use

The results indicate that the sustainability management accounting tools are used more for ensuring compliance to legislation (Bebbington et al. 2012) and for external reporting reasons and less for internal decision-making purposes. The use of the tools does not seem to be well integrated into active decision-making which according to Milne et al. (2009) implies that the sustainability management accounting usage is not promoting sustainable development. The results can also be connected to Owen's (2008) argument that using tools for environmental accounting does not change priorities in decision-making hence the tools are mainly used for external purposes. Among the comments there was evidence of tools being used for cost saving reasons which suggests that these tools are being used because there is a business case for sustainability management (Carrol and Shabana, 2010) and to create "win-win" situations which are unlikely to lead to sustainable development (Milne et al. 2009). Comments included that some of the tools are used only when there is a customer demand to use them and further that the environmental performance indicators that are used are often associated with financial performance. E.g. this comment suggests a "win-win" or "halfway" view on sustainability;

"…we use many different indicators that are linked to financial performance…"

However, by taking on the managerial perspective the comment also shows that the use of environmental performance indicators does actually affect decision-making and hence improves sustainability performance (Adams and Frost, 2008; Morioka and Carvalho, 2016).

Comparison to the results from Passetti et als' (2014) survey

Just like the findings in this survey, monitoring internal compliance was the main purpose also in the Italian case (Passetti et al. 2014). However, external reporting was the least reported reason for using the tools in Passetti et als' (2014) survey, while it was the second most important reason in the survey conducted in this thesis. The main difference between the two surveys regarding the purpose of use is that public disclosure seems to be more important among the responding organisations in the Swedish setting.

Reflection on the critical and managerial perspectives on sustainability accounting

The frequencies of use of the tools surveyed were found to be relatively low among Swedish listed firms. Further, the tools were stated to be used predominantly for the two external reasons; external reporting and monitoring external compliance and consequently less for motivating continuous improvement and managerial decision-making. Adams and Frost (2008) argue that environmental performance indicators must be integrated into decision-making if the data collection is to have any positive impact on sustainability performance. The overall low usage of the tools along with the predominantly external purposes of use implies that the use of the tools does not have a large impact on decision-making in Swedish listed companies. The results are thereby in line with Owen's (2008) argument that implementing sustainability accounting tools does not change priorities in decision-making. The findings also suggest that the tools are often used to create "win-win" situations where the tools are linked to financial performance. Therefore, the survey provides support for the critical perspective on the use of sustainability accounting tools which states that companies use the tools mainly for economic reasons and not to pursue sustainable development. The critical stance further suggests that the use of sustainability accounting tools is mainly a method to justify corporate operations and is unlikely to support actual sustainable development in the sense of improving environmental and social outcomes (Milne, Tredidga and Walton, 2009). With the findings in mind, Swedish listed companies could be argued to have a relatively narrow scope on sustainability (Bebbington and Thomson, 2013; Gray, 2006) and that the use of the tools does not significantly affect sustainability performance.

The managerial perspective on the other hand suggests that companies should integrate sustainability into business activities and decision-making for economic and ethical reasons (Hopwood et al. 2010). To accomplish such integration, it is necessary for organisations to have formal control systems in place (Epstein and Buhovac, 2010). The low adoption rates along with the findings regarding the purposes of use suggests that there is a low understanding of the importance of sustainability issues in the responding companies. Sustainability and accounting do not seem to be well connected in accordance with the managerial perspective within Swedish listed companies, at least not at this point in time.

Reflection on external sustainability reporting

The relationship between external sustainability reporting and sustainable development has been discussed in the literature. Studies have shown that external reporting can ignite the use of sustainability management accounting and induce the use of sustainability issues in decision-making (Adams and McNicolas, 2007; Bouten and Houzée, 2013). As the results in this survey show, external reporting seems to present in most of the companies and the new European Union directive will increase the use even more (Globalreporting.org, 2017). High values in external reporting could be a leading indicator for organisational change towards more sustainable operations. It will be interesting to follow the evolution in the future to see if increased legislation on external sustainability reporting can increase the use of the tools presented in this study.

4.2 Results – Contingency Factors

To analyse the relationships between frequency of use and the three contingency factors Cronbach's alpha was calculated for each category of tools, the environmental tools, the social tools and integrative tools. Cronbach's alpha was calculated to confirm construct validity for the three categories which each measure one dimension of sustainability management accounting. The alpha values were 0.8 for the environmental tools, 0.8 for the social tools and 0.7 for the integrative tools which are within the generally accepted criteria of alpha-values above 0.7 (Christ and Burritt, 2013). To raise the alpha value for the integrative tools, eco-efficiency was omitted from the construct and was thus not part of the construct. The values that were used for each construct was the average frequency of use for the tools that were included in each category (Passetti et al. 2014). The average frequencies of use for each construct were subsequently used to statistically investigate the contingency factors. Cronbach's alpha was also calculated for the four questions related to measuring sustainability strategy to assess construct validity resulting in alpha of 0.9. Sustainability strategy was further calculated as the mean value for each company based on the four questions (Christ and Burritt, 2013).

Size

The size contingency was investigated the same way for both size variables, annual turnover and number of employees. The average values of the frequency of use for the constructs measuring environmental, social and integrative tools are used and compared to the size categories. One-way Anova post hoc Tamhane's t2 was then run to compare the means of the tool categories within each size category to see if there were significant differences in the frequency of use depending on size. The frequency of use was also tested for differences between all combinations of the groups.

Table 5.

Annual Turnover (SEK)	< 1 Billion (1)	1 - 20 Billion (2)	> 20 Billion (3)	Tamhane's T2 Post Hoc Comparison			
	Mean	Mean	Mean	1–2	1–3	2–3	Anova Sig.
Tools							
Environmental tools	2.03	2.94	4.19	0.012*	0.000*	0.018*	0.000*
Social tools	2.46	3.85	4.33	0.011*	0.012*	n.s	0.002*
Integrative tools	2.30	3.65	5.44	0.006*	0.000*	0.005*	0.000*
Number of companies	*38*	*26*	*9*				

** = Significant at the 0.05 level, n.s = not significant at the 0.05 level*

Table 5 shows that the size categories for annual turnover varied in number of companies. The groups consisted of 38, 26 and 9 companies respectively. The Anova's are significant at the 0.05 level for all three constructs. Further, the results show that based on annual turnover, there were significant differences between all combinations of the three groups for the environmental and integrative tools. The larger the annual turnover, the higher was the mean of the constructs. For the social tools, there was a significant difference between the group with the lowest annual

turnover, group 1, and the group with the highest annual turnover group 3, however there was no significant difference between group 2 and 3.

Table 6.

Employees	< 100 (1)	100-249 (2)	250-1000 (3)	>1000 (4)	Tamhane's T2 Post hoc Comparison						
	Mean	Mean	Mean	Mean	1–2	1–3	1–4	2–3	2–4	3–4	Anova Sig.
Tools											
Environmental tools	1.85	2.25	2.65	3.47	n.s	n.s	0.000*	n.s	0.047*	n.s	0.000*
Social tools	1.95	3.75	3.03	3.98	n.s	n.s	0.001*	n.s	n.s	n.s	0.002*
Integrative tools	1.88	2.86	2.97	4.56	n.s	n.s	0.000*	n.s	0.013*	n.s	0.000*
Number of companies	*20*	*14*	*15*	*24*							

** = Significant at the 0.05 level. N.s = not significant at the 0.05 level*

In Table 6, size is instead categorised by number of employees. The Anova's shows that there are significant differences between the groups for all three tool categories. The test shows that when size was categorised by number of employees instead of annual turnover, similar results were found. The Anovas show that there is a significant difference in use the more employees the organisation has. The two groups with the lowest number of employees were both each significantly different compared to the group with the highest number of employees regarding the environmental and integrative tools. For the social tools, a significant difference was found between the group with the smallest number of employees and the group with the largest number of employees. The findings are in line with Christ and Burritt's' (2013) results and contrary to the results of Mokhtar et al. (2016). Abdel-Kader and Luther (2008) argue that larger organisations use more intricate control systems because smaller organisations do not have the resources required to engage in these types of practices. Evidence of this could be found in these two comments:

"…too small of a company, we do not have the possibility to choose…"

"…we have few employees and cannot measure everything…"

The results show that the use of formal tools for sustainability management accounting is related to company size. This relationship may also provide an explanation to why the frequency of use of the tools was slightly higher in the Italian context as their study included only large and very large companies (Passetti et al. 2014). An interesting result is that there were significant differences also between the two groups with the highest annual turnover for the environmental and integrative tools. One could argue that there might be other reasons behind the increase between these two groups other than lack of resources as the companies in group 2 have an annual turnover between 1 and 20 billion SEK. Possible reasons for the increased frequency of use may be that large companies are more visible and more critically assessed which is an incentive to engage in sustainability management (Patten, 2002). Another

reason may be that there are other kinds of institutional and legitimacy pressure the larger the organisation is (Windolph et al. 2014). This thesis does not investigate these factors further.

Industry

Table 7.

Industry	More sensitive	Less sensitive	t-test for Equality of Means
	Mean	Mean	Sig. (2-tailed)
Environmental tools	3.06	2.28	0.015*
Social tools	3.20	3.17	0.94
Integrative tools	3.20	3.15	0.90
Number of companies	*32*	*41*	

**=significant at the 0.05 level, equal variances not assumed*

Industry is as mentioned above dichotomously segmented. A t-test was run to find differences in the frequency of use between the companies in the two industry categories according to the average values in the three tool categories. In the industry segmentation, 32 companies belong to the more environmentally sensitive industry and 41 to the less environmentally sensitive industry. Table 6 shows that environmental tools are used more in the companies that are present in the more environmentally sensitive industry at a significant level. For the social and integrative tools, they are used slightly more in the more sensitive group, however these differences are very small and not significant. Previous investigation of industry effect on sustainability management accounting had rendered conflicting results. Wilmshurst and Frost (2000) argue that industry sensitivity should affect the use since companies in environmentally sensitive industries have more use of such activities. Their results showed that it did not, Mokthar et al. (2016) had the same results in their study. Christ and Buritt (2013) and Ferreira et al. (2010) found that industry did have an effect while Windolph et al. (2014) found that companies in sensitive industries use less sustainability accounting. This factor is troublesome to draw conclusions from as the industry segmentation itself is a quite rough estimate. Comments regarding the industry factor included:

"We don't produce anything so it is not relevant in our industry."

"…our operations are almost completely digital…"

The segmentation was based on environmental sensitivity and as the results show the environmental tools was the only category which differed significantly between the industries. All companies have employees and a social impact even though they do not have a large negative impact on the environment due to manufacturing activities. Social tools are thus not industry dependent in the same way. It should be kept in mind that the industry segmentation in this this thesis is based on environmental sensitivity of the industry. Another type of segmentation investigating the variation in social impact of companies may have rendered a different result in the use of social tools.

Sustainability Strategy

Table 8.

Correlation	Environmental tools	Social tools	Integrative tools
Sustainability Strategy	0.404	0.397	0.491
Sig. (2-tailed)	0.000*	0.001*	0.000*

**=Significant at the 0.01 level*

Pearson's correlation test was run to test the correlation between the strategy and the frequency of use of each tool category. The results show that there is weak to moderate positive degree of relatedness (Colins and Hussey, 2014) between the three constructs of tools and sustainability strategy at the 0.01 significance level. The results show a weak to moderate, positive correlation for all three tool constructs. The integrative tools have a slightly stronger correlation to sustainability strategy which is what can be expected according to the nature and purpose of the integrative tools which is to integrate sustainability into the management control system (Schaltegger et al. 2002; Morioka and Carvalho, 2016). Parker (1997) and Christ and Burritt (2013) argue that the implementation of an environmental strategy increases the use of sustainability management accounting practices. Comments from the survey can further enlighten reasons for these findings. Following the question regarding the eco-efficiency tool one respondent commented:

"This is the core of our operations, to constantly help our customers to produce more environmentally friendly products."

The results from this study seem to be moderately in line with that assumption. The results are in line with those of Henri and Journeault (2008) and Christ and Burritt (2013), but contradict the findings of Mokhtar et al. (2016) who found no such relation.

5. Conclusion

This chapter will conclude the research considering the findings, contributions and limitations of the study. Finally, suggestions for further research will be presented.

5.1 Conclusion

The purpose of this thesis was **to investigate how frequently tools for sustainability management accounting are used by Swedish listed companies and to examine for what purposes the tools are used.** The analysis further investigated how three factors; industry belonging, size and strategy affected the frequency of use of the tools. The survey results revealed that tools for sustainability management accounting are used at a low to moderate frequency among Swedish listed companies, however the frequency of use was found to vary a lot among the firms. The results are in line with previously reported low adoption rates in other countries (Christ and Burritt, 2013; Ferreira et al. 2010; Mokhtar et al. 2016; Passetti et al. 2014). Even though the adoption rates for each individual tool was low, most of the companies were found to use at least one tool from each category; environmental, social and integrative. External reporting was the most widely used tool while environmental cost accounting was the least used. By category, social tools were most frequently used followed by integrative and lastly environmental tools. Possible reasons for the low adoption rates were found based on the literature review and comments from the respondents and included technical difficulties, low awareness of the tools and the fact that sustainability issues are sometimes incorporated into conventional tools such as budgets and investment calculations. The main purposes for using the tools were found to be monitoring internal compliance and external reporting which means that the tools are used more for external purposes and less for internal decision-making purposes. The tools were further found to be used to create "win-win" scenarios which may not be optimal for creating sustainable development (Milne et al. 2008). The low adoption rates along with the predominantly external focus of use provides support for the critical perspective regarding the relationship between sustainability and accounting which states that organisations adopt tools primarily for economic reasons and not to pursue sustainable development. It can further be concluded that Swedish listed companies do not seem to have well developed formal control systems for incorporating issues regarding social and natural capital in their operations.

When investigating the relationship between company size and how frequently the tools were used, a positive relationship was found. When size was measured based on annual turnover, there were significant differences between all three groups for the environmental and integrative tools. For the social tools, there was a significant difference between the group with the lowest annual turnover and the group with the highest annual turnover. The results were consistent when size was categorised by number of employees. The findings regarding the size contingency provides a possible explanation for why Passetti et al. (2014) recorded slightly higher frequencies of use as their study only investigated large and very large companies. Further, the fact that there were significant differences also between the two groups with the highest annual turnover implies there may be underlying reasons other than the amount of available resources that affect the frequency of use. Industry belonging was found to have an impact on the use of environmental management accounting tools, but not on the social and

integrative tools. Strategy was found to have a moderate to weak positive correlation with the use of all three tool categories. The social tools were found to be slightly less dependent on size and were also not affected by the companies' industry belonging.

This study contributes to the literature by illuminating how frequently and for what purpose a number of tools for sustainability management accounting are used in Swedish companies, something that has not previously been investigated. The low adoption rates contribute to the literature by showing that sustainability is not very well integrated into the accounting systems of Swedish listed companies and that the use of such tools is unlikely to contribute to sustainable development. Additionally, potential reasons behind the numbers are discussed based on the comments provided by the respondents. Further, the study contributes by investigating the relationships between size, industry and strategy and the frequency of use. In this study, both the environmental and social sides of sustainability are explored which is a strength since most literature has a primarily environmental focus. The thesis is however subject to several limitations. Firstly, the survey method has its limitations due primarily to potential survey error and non-response bias. Secondly, the results are based on a rather small sample size. Thirdly, it measures only a few of all available tools for sustainability management accounting.

5.2 Further Research

More research is needed to investigate how significant and useful various tools are to different specific sectors or tasks to create a better understanding for the tools. Such research could develop the understating as to how useful the various tools are. Case studies could be purposeful to deeper investigate how these tools are used and what barriers there are to adoption. The awareness of the tools could also be investigated further. The usage of informal controls such as belief and values systems could also be meaningful to investigate. The environmentally sensitive industry was shown to use more tools within the environmental management category. If one could categorise industries according to social sensitivity it would be interesting to see if such companies use more social tools than other industries. Based on the findings regarding the size contingency, it would be relevant to study more specifically how large organisations use sustainability management accounting tools and try to assess if they are contributing to sustainable development. Moreover, it could be interesting to follow the development of the new European Directive on sustainability reporting to see if the legislation can induce the use of sustainability accounting tools.

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Appendix

Translation of tools

Miljöverktyg	
Miljöbudget	Bugetering av framtida miljömässiga utfall. Ett framtidsinriktat planeringsverktyg som bestämmer tillgängliga medel för miljöfrågor i kommande period. Verktyget hjälper att fastställa miljömål. En budget som uttrycker strävanden, förväntningar och åtaganden för en organisation, gällande miljömässiga konsekvenser för en kommande period (Ax, Johansson and Kullvén, 2015)
Självkostnadskalkylering avseende miljöfrågor	Verktyget registrerar och mäter direkta och indirekta miljökostnader för att bestämma produktionskostnader för olika produkter/tjänster. Självkostnaden utgör summan av samtliga miljömässiga kostnader för en vara/tjänst till dess den är levererad och betald. (Ax, Johansson and Kullvén, 2015)
Livscykelanalys	Sammanställning och utvärdering av inflöden till och utflöden från ett produktsystem över hela dess livscykel liksom utvärdering av de potentiella miljöeffekterna hos ett produktionssystem över hela dess livscykel. (Rydh, Lindahl & Tingström 2002)
Miljöprestationsmått	Interna prestationsmått som mäter miljöfrågor (vattenanvändning, utsläpp av växthusgaser, avfallshantering, etc.) och länkarna mellan företagets verksamhet och miljön. De representeras av finansiell och icke-finansiell numeriska data som ger viktig information om organisationens miljöfrågor såsom verksamhetens miljöpåverkan
Verktyg för sociala frågor	
Budget för sociala frågor	Ett framtidsinriktat planeringsverktyg som bestämmer tillgängliga medel för sociala frågor i kommande period. Verktyget hjälper att fastställa sociala mål. En budget som uttrycker strävanden, förväntningar och åtaganden för en organisation, gällande sociala konsekvenser för en kommande period
Sociala prestationsmått	Interna indikatorer som avser mätning av sociala frågor. De levererar information om vilka aktiviteter som kan betraktas som socialt effektiva och ändamålsenliga. De representeras av numeriska mått (monetära och icke-monetära) och ger viktig information om anställdas hälsa, lika möjligheter, mångfaldshantering och social bedömning av produkter etc.
Integrativa verktyg	-
Eko-effektivitetsanalys	Ekoeffektivitet är en strategi, främst inom industrin, att producera varor som kräver så lite energi och material som möjligt, vid både tillverkning och användning. Analysen utvecklar och optimerar produkters egenskaper samt den operativa verksamheten runt produkter angående förhållandet mellan dess ekonomiska mervärde, användningen av naturresurser och företagets mål (Nationalencyklopedin, ekoeffektivitet)
Hållbarhetsrapport	Hållbarhetsredovisning innebär mätning och avrapportering av hållbarhetsprestanda avseende ekonomiska, sociala och miljömässiga ansvarsfrågor till interna och externa intressenter. (Larsson och Ljungdal, 2008)
Hållbart balanserat styrkort	Det är en utökad variant av ett konventionellt balanserat styrkort (BSC) som även integrerar miljömässiga och sociala aspekter. Verktyget identifierar, systematiserar och mäter, strategiskt viktiga ekonomiska, miljömässiga och social mål