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Future of environmental reporting in the Finnish forest industry

Abstract

Despite decades of environmental reporting, quality problems remain and hinder reporting comparability between companies and reliability among stakeholders. To assess the problem, a Delphi panel on the measuring and reporting of the environmental impacts and aspects of the Finnish forest industry was arranged, of which one round focused on the future of environmental reporting. The aim is to discuss the experts' views on the future of environmental reporting from the point of view of the content of environmental reporting, reporting and stakeholders, and the schedule of reporting. The probable future of environmental reporting in the forest industry is expected to follow current environmental reporting. However, the reporting the experts consider preferable would improve the development of reporting, especially in relation to transportation, the use of water and the development of a supply-chain view on reporting. In addition, the quality problems of reporting could be solved with the standardisation of reporting in the forest industry and involvement of the external stakeholders in the reporting process.

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1. Introduction

1.1 Requirements for corporate environmental reports

A corporate environmental report (CER) is a tool of corporate environmental management [1,2] to be used inside and outside a company. Usually CER describes the results of the year's environmental management [2]. It also helps managers to structure the company's environmental work [2-5]. Externally, the aim of CER is to inform the stakeholders about a company's environmental performance [2,4,6-9].

Corporate environmental reporting has evolved over the two decades since publishing CERs began at the end of the 1980s and the beginning of 1990s [4,10-14]. Currently, the amount of companies publishing a CER is steadily increasing [2,14]. However, Milne and Gray [14] point out that there are still a vast number of companies as well as multinational corporations that do not publish an environmental report [15]. In general, reporting is relatively common among larger companies, companies from developed countries and companies from heavy industry [14,16].

CER can take many forms. The early reports were stand-alone environmental reports. Nowadays quite many companies publish environmental issues together with economic and social issues in a single report. Such reports are often termed sustainability or sustainable development, corporate (social) responsibility or corporate citizenship reports [9]. Some companies report environmental issues as a part of their annual report, while corporate webpages are an important part of current environmental reporting. In addition, staff magazines, press releases, newsletters, company brochures, booklets and leaflets, products labels and advertisements are used to report or promote environmental performance [10,17-20].

Although, the content of CER varies among companies (see sub-chapter "1.2 Current problems in environmental reports" for more detail) there are some features that a CER should contain. CER in general is understood to comprehend the issues of the natural environment, environmental protection and resource use [11]. The first environmental reports were just intended to present a company's commitment to the environment [11,21], but now companies focus on reporting their environmental performance [6,11,22]. In addition to this, companies disclose their environmental policies, practices and future plans [6,8,13].

Some general aspects of a good CER can be defined. In short, a good CER gives a complete, reliable picture (including positive and negative aspects) of a company's environmental work [2,13,23,24]. It also compares the performance against the set targets [20] and responds to the information needs of the stakeholders [2,6,23-25]. Due to differing stakeholder requirements, the content of the report can vary between companies [26,27]. A good CER consists of both quantitative and

qualitative data but also monetary data [2,20]. Data in the report should be correct, comparable and verified¹ [2,5,6,23,24,28].

1.2 Current problems in corporate environmental reports

Several problems have been identified in the quality of CERs, for example, many companies report only positive aspects, the reports do not meet the stakeholders' requirements for information and CERs are not comparable between companies. These issues are discussed in the detail below. Also, some solutions to the problems are offered.

According to Deegan and Rankin [29] and Gray [15] CER does not reflect the real situation. When corporate reports are compared to external sources – external from the company – the picture of the performance is different [13]. Furthermore, Milne and Gray [14] say that reporting has not advanced sustainable development because companies report only positive aspects [14], the so-called success stories. In fact, Deegan and Rankin [29] call the reports "self-laudatory". The reports should publish the results of the reporting year, although this is often not the case as several researchers point out, arguing that CER does not reflect real environmental performance [30-32]. This is why reports can be seen as only attempts to improve a company's image [32].

External stakeholders are also said not to find the CERs useful and do not use them, even though the reports should be published with the stakeholders in mind [6,13], or that the CERs do not meet information needs of the stakeholders [16,18,23,29,31]. For example, some stakeholders still regard environmental reports as "greenwashing" [33] or they judge the reports to have little credibility [18]. Also, the stakeholders do not find relevant information in the reports because they are often not consulted during the reporting process [13].

Researchers have noticed that companies' environmental performances cannot be compared through the reports [5,16,30,34]. This is because companies use different indicators [35-37], different units of measurement [35,38] and define system boundaries differently [36]. Lenzen et al. [39] also point out that using environmental reports in the benchmarking of environmental performance has the problem that the reporting period is often too short compared to the lifespan of an environmental impact. One solution would be that the companies themselves would do the comparison. However, Milne and Gray [14] state that companies do not benchmark themselves in the reports.

Several specific problems about the quality of data in the CERs have been raised. The data is said to contain low amounts of quantitative data [1,2,14,40], low amounts of global data [40], low amounts of data about the long-term environmental impacts of companies [5] and low amounts of data related to future performance [7]. Companies also publish only a very limited amount of monetary data in connection with their environmental issues [2,14,31] and often only data from company's home country [40]. In short, it can be said that quality of the CERs differs [5,24,29,41]. Milne and Gray [14] argue that poor reporting is a trend. Their report is based on different assessments, leading to the conclusion that the quality of the reporting has not risen and in fact many companies' reports are decreasing in quality.

¹ Although verification is usually considered as an increase in the quality of CER, Owen [65] lists the problems of verification.

The problems of the environmental (and social) reports are encapsulated in this quotation from Milne and Gray [14]:

“Corporate ‘sustainability’ reports are typically attempts by organizations to provide some sort of a (largely favorable) account for (some of) their impacts on the environment and society.”

One solution for the quality problems would be the development of a strict standardisation of reporting. Most of the problems of reports can be explained by the lack of a mandatory framework for reporting [12,17,21,28,42]. Although there are guidelines² [2,39] and some regulation of CER [2,9,19,43], they allow companies to select what to report and what not [26]. Brown et al. [34,34] point out that a vast number of reporting frameworks work against their purpose and actually allow companies to report what they want at the expense of comparability. Kolk [9] adds that broad reporting frameworks and multiple selections regarding reporting, for example, whether the type of report is environmental or sustainability, can be confusing, especially for new reporters. Nonetheless, the standardization of environmental reporting is difficult because the target groups for CER vary and so do their requirements [26,27].

Another solution for the problems would be a legal requirement to report [14,23,41]. It would also solve “the problem of non-reporting”³. The legal requirement would also ease the economically less powerful stakeholders’ access to information [23]. However, there are similar problems with the legal requirements as there are in the standardisation of the reporting. It would be difficult to enforce a similar law of environmental reporting worldwide. In the EU, it could work but different laws would end up with multinational companies preparing a different report according to the different requirements of each country in which they operate.

Good environmental reporting requires actions from companies as well. A prerequisite for good environmental reporting is the maturity of corporate environmental management [40]. Larsen [44] explains that companies need to have a system to produce validated environmental data. The existing corporate information systems might not register environmental data [28]. Line et al. [40] point out that it is especially challenging to gather global environmental performance data. Therefore, differences in reporting may actually reflect the different levels of environmental management in companies [6]. However, companies are able to produce the financial reports according to strict requirements and it is hoped that CERs could reach this high level as well [23]. The different level of quality between environmental and financial reporting has also been wondered about and considered by researchers [13,26]. Also, companies assess the costs and benefits of their actions. One reason for the low quality of the reporting is said to be the costs of the reporting as gathering the information for a multinational company’s environmental performance is expensive [29]. The costs can also be a reason for not reporting as Kolk [9] mentions.

1.3 Aim, motivation and the structure of the paper

² The Global Reporting Initiative (GRI) [66] is the best known reporting framework [16,34,50]. List and evaluation of the reporting guidelines can be found e.g. from Adams and Narayanan [67] and Dixon et al. [28].

³ Milne and Gray [14] strongly criticize the quality of the reporting. They say e.g. that only “0.2% of the multinationals provide credible and reasonable accounts of their vast impacts on society and the environment.”

The aim of this paper is to discuss the future of environmental reporting in the forest industry. The results are based on a Delphi panel and are presented from the viewpoint of the probable and preferable future of environmental reporting in 2030 in the Finnish forest industry. This paper concentrates only on environmental reporting, although companies now publish environmental information together with economic and social information⁴. Here environmental reporting refers to the reporting of environmental issues and does not make distinctions between types of report. In other words, environmental reporting can refer here to a company's sustainability report and annual report as long as it includes a description of the company's environmental performance.

The following explains why it is important to research 1) the future of environmental reporting, 2) environmental reporting and 3) the forest industry and the Finnish forest industry in particular.

First, this paper researches the future of environmental reporting due to the fact that the historical and current aspects of environmental reporting in the Finnish forest industry have been researched⁵. Previous research has focused either on reporting in the Finnish forest industry [37,45,46] or on the Finnish forest industry within the leading global forest industry companies [47-52]. This research helps to evaluate how probable it is that environmental reporting will be improved in the future. As the previous chapter showed, the problems in environmental reporting are not new but well-documented. This raises the question of how to improve environmental reporting in the future. This research helps to target the development of environmental reporting in the forest industry.

Second, the long tradition of environmental reporting has reasoned its selection as a research topic. As mentioned, companies have been reporting of environmental issues for about two decades now. The forest industry companies were among the first companies to publish environmental reports in Finland. In general, Sinclair and Walton [12] found the Nordic forest industry companies good reporters, while Li et al. [50] found large forest industry companies, in general, willing to improve their reporting. Despite the long tradition, some problems in their reporting have been noticed [37]. This is why this research looks two decades into the future and attempts to evaluate the future of environmental reporting in 2030. Additionally, a focus on environmental reporting is called for as previous research has found that the main focus of forest industry reporting remains environmental issues and not balanced sustainability reporting [47-50].

Third, the role of the forest industry is significant both environmentally and socially [52]. Many people have a direct connection to the forest [47] and many people use forest industry products daily. In addition, as Vidal and Kozak [49] point out, forests have cultural and spiritual significance to people and provide economic and environmental services. Also, the forest industry as an extractive industry has direct and very visible impacts on the natural environment which makes it an easy target of public criticism [49]. Li and Toppinen [52] argue that the topicality of the forest

⁴ Based on her data, Kolk [9] sees the trend towards sustainability reporting: The share of reports titled "environmental reports" has decreased during the same time as the share of reports titled "sustainability reports" has increased.

⁵ This applies to research on CER in general: The majority of the research focuses on the content analysis of CER, i.e. the past of the reporting, and, to the best of our knowledge, the only research on the future of environmental reporting is Lee and Hutchison [32]. If the perspective is widened to sustainability reporting, a few more studies are available. For example, Adams and Whelan [68], who analyse the role of external stakeholders in influencing the future of sustainability reporting in Anglo-American countries; Milne and Gray [14] who cast light on past and future trends of sustainability reporting; and O'Dwyer et al. [23] who review CSR disclosure and its future from the point of view of NGOs.

industry, due to its current on-going globalisation, puts pressure on the management of the environmental and social aspects of production. Moreover, Sinclair and Walton [12] point out that the forest industry is often under-represented in research on environmental reporting and Li et al. [50] say this is true of sustainability reporting as well.

Lastly, the selection of the Finnish forest industry is appropriate due to its global role in the industry. The Finnish forest industry is among the largest producers and exporters of forest industry products [53]. About 90% of Finnish forest industry sales are outside Finland [53], about 80% of the paper and board production is exported [54] and about 60% of the paper production capacity of Finnish companies is located outside Finland [53]. In Europe in 2011, Finnish forest industry was the second largest pulp producer and third largest paper and board producer [55]. In the global scale in 2011, Finnish forest industry was sixth largest producer of both paper and board, and pulp [56].

This paper is structured in the following manner. The next chapter introduces the Delphi method application regarding the future of environmental reporting in the Finnish forest industry. The results chapter will review the expert discussion on the probable and preferable future of environmental reporting. The paper will end with a comparison of this study with earlier research on the issue.

2. Material: Application of Delphi method in measuring and reporting environmental impacts and aspects in the Finnish forest industry

2.1 Description of the Delphi panel

The Delphi method had three rounds in this application. The rounds were executed as web-based surveys during year 2010. The three rounds had three distinct topics which developed from the previous rounds and previous literature on the topic. In general, the topic of the Delphi survey was the measuring and reporting of environmental aspects and impacts in the Finnish forest industry. More precisely, the topic of the first round was the measurement of environmental aspects and impacts within the Finnish forest industry. The suggested environmental impacts and aspects to be measured are reported in Koskela [45]. The topic of the second round was the measurement of eco-efficiency in the Finnish forest industry [57].

This paper concentrates on the third round of the Delphi. The topic was to evaluate the future of corporate environmental reporting in the Finnish forest industry. This round was organized in winter 2010 and it was open for five weeks (the non-respondent received three reminder emails). The content of the third round was based on three main sources: first, the previous literature on the problems of environmental reporting; second, the previous two rounds of the Delphi; third, the expert interviews from the topic of environmental impact measurement [58]. The third round had three broad topics: the content of the reporting in 2030, the stakeholders and reporting in 2030 and the schedule of the reporting in 2030. Fifty-nine experts were invited to the third round. Eighteen experts responded, giving a 31% response rate.

2.2 The selection and the background of the experts of the Delphi panel

The process of selecting the experts to participate in the Delphi included several steps. Firstly, the experts were selected based on their assumed expertise from the topic of measuring and reporting environmental impacts and aspects in the Finnish forest industry. The author listed experts or organisations where experts could be found and the list was commented on by the other researchers in the project and by the author's colleagues. Also, the experts interviewed [58] previously in the project were asked to recommend other experts. The listed experts were contacted by email and were asked to participate in the panel. Alternatively, the expert could name another person to participate from inside his/her own organisation (some experts also recommended experts from outside their organisation).

The selected experts were divided into six groups: environmental management researchers or experts, forest (industry) researchers, forest industry representatives, economics researchers, the representatives of authorities and the representatives of environmental non-governmental organisations (NGOs). The distribution of the invited experts' (N=62) background information is shown in Table 1.

Table 1 The background of the invited experts (N=62)

Background information	Amount of experts
Environmental management researchers or expert	14
Forest (industry) researcher	13
Representative of the forest industry	16
Economics researcher	8
Representative of an authority	6
Representative of environmental non-governmental organisations (NGOs)	5

In the survey, the experts were asked to themselves describe their background. The available choices and the distribution of the responses are shown in Table 2. Interestingly, the distribution of the background (Table 2) differs from original distribution (Table 1) of the experts. Many of the experts labelled themselves primarily as experts and not representatives of the forest industry, even if they also were.

Table 2 The self-reported background of the participated experts (N=18) in the third round of the Delphi panel

Background	Third round
Expert	10
Researcher	5
Representative of the forest industry	2
Representative of an authority	1
Representative of NGOs	2

2.3 Non response

In total 35 experts choose not to answer to any of the three rounds. These experts were sent two questions about the non-response: the first one asked for the reason for the non-response (Table 4) and the second was about their background (Table 3). Twenty-two experts responded, yielding a 63% response rate. Most of the respondents labelled themselves experts. The second largest group termed themselves researchers.

Table 3 The background of non-responding experts (N=22)

Background	Amount of responses
Expert	12
Researcher	7
Representative of the forest industry	4
Representative of an authority	3
Representative of an NGO	1

The biggest reason for not responding to the survey was lack of time i.e. they were too busy. Twelve respondents said that they receive too many surveys in general. What is notable among the reasons for the non-response is that six (plus two respondents in the other category) respondents said that the topic of the survey was not part of their expertise. Based on this, the response rate of the Delphi panel in practise is therefore somewhat higher than that which is calculated above.

Table 4 Experts responses for not responding (N=22)

Reason for not responding	Amount of responses
The area of the survey was not my expertise	6
The content of the survey was poor.	0
The realization of the survey was poor.	0
I did not have time to respond.	14
I receive too many surveys.	12
Other reason ^a	4

^a The other reasons for not responding varied. The respondents wrote reasons: “Too many questions;” “I do not see the point of the survey and this is not a relevant way to influence anything;” “The forest industry is not a significant environmental emitter anymore and this does not concern me anymore;” “I have changed jobs.”

2.4 The content and the analysis of the third round: The future of corporate environmental reporting

The third round of the Delphi survey focused on the future of corporate environmental reporting in the forest industry. The survey included three rather broad themes: the content of the reporting in 2030, stakeholders and reporting in 2030 and the schedule of the reporting in 2030. Every aspect in the survey was asked both from the point of view of the probable future and a hoped for, preferable future. The probable future was asked about with the response option “probably

will be reported,” as well as by use of a scale that ranged from “extremely unlikely to extremely likely”. The preferable future was asked about with option that something “preferably will be reported,” as well as by use of a scale ranging from “extremely undesirable to extremely desirable”.

The content of the reporting was asked from three perspectives. First, the experts were asked to rate which environmental aspects will be reported (see Figure 1). Second, they were asked which environmental impacts will be reported (see Figure 2). Third, a vast set of statements covered different aspects of the content of the environmental reporting (see Table A.1). The stakeholders in the reporting covered two issues. First, experts evaluated to which stakeholders companies will report (see Figure 3). Second, the statements covered the role of the stakeholders in the reporting (see Table A.2). The last aspect of the survey was the schedule of the reporting, which was addressed with the statements in Table A.3.

The responses were analysed according to the probable and preferable future. The issues of environmental aspects, environmental impacts and which stakeholders were to be reported to are presented according to the amount of responses they received. The most probable environmental impacts, aspects, and which stakeholders were to be reported to were options that 60% or more of the respondents agreed with. The most preferable, on the other hand, were options which 40% or more agreed with. In cases where there was a variety of statements, the analysis is based on the average of the responses. Statements that yielded 5.0 or higher on average are considered to describe a most probable or preferable future.

The analysis also examines the least probable and least preferable future of reporting. When a statement received an average lower than 3.0 it is considered to represent a least probable or least preferable future. The least probable to be reported environmental aspects, and least probable stakeholders to be reported to are considered to be those that received agreement of 50% or lower from the respondents and the least preferable those that produced agreement of 30% or lower from the respondents.

3. Results: Experts views on the future of environmental reporting

3.1 Probable environmental reporting in the forest industry in 2030

Based on the experts' views, probable environmental reporting in 2030 can be described as follows: Companies will report the use of wood and recycled fibre, the production of electricity and heat, the use of renewable and non-renewable fuels, emissions to water and air and solid waste (see Figure 1). The environmental aspects will be reported with both absolute and relative figures and they will be accurately reported at mill- and corporate-level (see Table A.1). Significant environmental aspects will be reported in long time series. Regarding environmental impacts, companies will report on climate change, the consumption of non-renewable resources, eutrophication, noise, smell and the use of fossil fuels (see Figure 2). Environmental impacts will be reported with several indicators and companies will report both positive and negative environmental impacts. Authorities, consumers, customers, directors, employees, financiers, insurance companies, media and owners will be the main stakeholders for the reporting (see Figure 3). Furthermore, the reports will be verified by an external party and the knowledge of the

external stakeholders will be used in environmental reporting (see Table A.2). Lastly, reports will be published annually (see Table A.3).

Figure 1 Environmental aspects and whether they probably will be reported or preferably should be reported in 2030

Figure 2 Environmental impacts and whether they probably will be reported or preferably should be reported in 2030

Figure 3 The stakeholders and whether they probably will be reported to or preferably should be reported to in 2030

3.2 Preferable environmental reporting in the forest industry in 2030

The experts were also able to suggest what a preferable environmental report would look like in 2030. Regarding environmental aspects, the use of process water and cooling water and the transportation of raw materials and the products will be reported (see Figure 1). For the experts, it would be preferable if environmental aspects were to be reported with relative figures and accurately at every possible level (mill-, corporate- and supply chain-level) (see Table A.1). Environmental aspects are easy to compare and significant environmental aspects are expected to be reported in long time series. The reporting of environmental aspects would also be expected to fulfil the current requirements of financial reporting. Regarding environmental impacts, it would be preferable to report acidification, the consumption of non-renewable resources, the environmental impacts of the use of chemicals, the loss of biodiversity, the overconsumption of renewable resources, oxygen deficit in waterworks and soil contamination (see Figure 2). Furthermore, it was seen as preferable that environmental impacts would be reported accurately at every possible level (mill-, corporate- and supply chain-level). Environmental impacts would hopefully be easy to compare and significant environmental impacts are expected to be reported in long time series. Companies would preferably be expected to report the changes in environmental impacts caused by structural changes. In addition, in the ideal or preferred 2030 reporting of environmental impacts was seen as fulfilling the current requirements of economic reporting and that companies would report both positive and negative environmental impacts. In addition, the target groups for the reporting were hoped to be companies from their own business sector, companies from their supply chain, environmental organisations and students (see Figure 3). Preferably, the reports would be verified by an external party and the knowledge of the external stakeholders would be used in environmental reporting (see Table A.2). Furthermore, there would be a standard for reporting environmental impacts and aspects in the forest industry. Lastly, it was preferred that companies publish information on environmental impacts and aspects on a yearly basis (see Table A.3).

3.3 The least probable and the least preferable reporting

In general, only a few aspects emerged as not probable or not preferable in the analysis of environmental reporting in the year 2030.

The environmental aspects found least probable to be reported were evaluated as the transportation of raw materials and products, and the use of cooling water (see Figure 1). The experts also doubted whether it would be possible to compress environmental impacts into one indicator (see Table A.1). They did not believe that companies would publish only information on negative environmental impacts. It was seen as not probable that companies would publish a report less than once a year or that they would not publish a report on environmental issues at all (see Table A.3). The least probable stakeholders to report to were students, researchers, environmental organisations and neighbourhoods (see Figure 3).

The least preferable environmental aspects to be reported were considered to be solid waste, use of renewable fuels and the production of heat (see Figure 1). The experts did not see it preferable that environmental impacts should be compressed into one indicator (see Table A.1). In addition, they did not prefer that companies would concentrate on reporting by use of only positive or only negative environmental impacts. Similarly, as with least probable, it was not seen as preferable for companies to publish a report less than once a year or that they would not publish environmental issues at all (see Table A.3). Lastly, customers were considered to be the least preferable stakeholder to be reported to in 2030 (see Figure 3).

4. Discussion and conclusions

The aim of the article was to discuss the experts' views on the future of environmental reporting in the forest industry. The experts' views were gathered from a Delphi panel. The results will be discussed here from five perspectives. First, the rigour of the research is evaluated. Second, the limitations of the research are discussed. Third, the results are compared with previous literature. Fourth, the interesting aspects of this research are highlighted. Lastly, the contribution of this study is defined.

The rigour of research is traditionally evaluated by assessing its validity and reliability [59]. Validity is understood to comprise a method's ability to measure the phenomenon being researched [60] and reliability refers to the method's ability to produce the same results over time [61]. Validity is discussed here from the point of view of the validity of the method used; in this research the Delphi panel⁶. The aim was to study the future of environmental reporting, thus there was a need for a method from futures research. In the field of futures studies, this research is more qualitative than quantitative since quantitative future research often uses modelling [62]. The possible futures research methods for this research were futures workshops and Delphi [62]. There are two main reasons for choosing Delphi method for this research. First, futures workshops require experts to agree to meet in one place at one time. The structure of three rounds would have meant the organisation of at least three workshops. Since lack of time was the most common reason for non-response in this Delphi it is doubtful whether the workshops would have yielded a

⁶ A discussion of the validity and the reliability of the Delphi method in general can be found in Hasson and Keeney [63].

much higher response. Second, the Delphi method promises anonymity for the respondents. In the use of futures workshops, anonymity would have been lost and the respondents might have been more circumspect with their responses. A possible method for gathering expert views would have been interviews and those most likely would have yielded a higher “response rate”. However, there was no possibility to interview the 62 experts three times during the research project and to analyse their responses. For the above mentioned reasons, the use of Delphi was evaluated as the most suitable method for researching the future of environmental reporting in this research.

The evaluation of reliability is more difficult when using a Delphi panel, as Hasson and Keeney [63] point out. They state, “Delphi results...offer a snapshot of expert opinion, for that group, at a particular time.” These results, therefore, are a snapshot of these experts’ opinions in winter 2010.

This research has a few limitations. First, the response rate of the panel was somewhat low. However, some of the original experts (when asked in the non-response survey) stated that the topic was not their area of expertise. Therefore, one could argue that the actual response rate was somewhat higher than the one calculated. Second, a limitation of the Delphi survey is said to be the selection of the experts who participate. The selection of the experts was carefully made in this research. The author asked for recommendations for a list of possible experts from several sources and the list evolved after the recommendations. Thirdly and lastly, the obvious limitation of the research is that it targets the future. Currently, there is no way of saying how accurate the descriptions of the future provided by the experts are. Nevertheless, the aim of futures research is not to forecast the future as such, but to help make better decisions in the present, in order to reach a better or more desirable future in the future.

Many of the issues in the probable future of reporting represent, more or less, current reporting in the forest industry. For example, when reporting environmental aspects so-called traditional emission measurements were cited by the experts and presented as a success factor of the Finnish forest industry [58]. Maybe only the use of external stakeholders as a part of the reporting process is seen as being different in 2030 compared to the current reporting situation. The knowledge of external parties is not so widely used in reporting, though perhaps the exception is the use of consultants in the design of the report. The emphasis on the role of external stakeholders is an important aspect here. The role of external stakeholders is highlighted in the GRI framework [16], while elsewhere [64] the cooperation of the Finnish forest industry with its stakeholders is emphasised. In short, the probable future of reporting can be argued as representing current rationality and the traditional thinking of the experts. Based on earlier scientific literature (see “1.2 Current problems in environmental reports”) it can be said that environmental reporting has been rather slow in its evolution and that the expert views presented here follow this tradition.

In contrast, the description of the preferable future of reporting can be called a wish list for the development of the reporting. Many aspects mentioned here differ from the current situation, for example, the Finnish forest industry does not report the use of transportation in detail [45]. Also, the reporting of the use of water is hoped for as a new issue for the (forest) industry. Also, the current CERs of the forest industry are not comparable [37]. Thus, the experts hope for a reporting standard that would probably increase comparability. Li et al. [50] have also called for a standard of reporting in the forest industry. Additionally, it is interesting that the experts wish that the reporting of environmental impacts and aspects will occur at the supply chain level, which is an issue that has been raised previously [58]. The Finnish forest industry is said to be good at

measuring environmental performance in its own mills but neglectful of measuring the supply chain. The desire for ideal reporting – as asked for by the experts – is positive, especially as the Delphi panel includes individuals who will probably produce reports on the forest industry in the future.

The experts stated that the effects of structural changes on environmental issues should be reported in a preferable future. The experts' emphasis on this issue is easily understood in the light of the current situation in the Finnish forest industry where mills are closing in Finland but opening up in e.g. South America.

The results presented here also revealed a couple of interesting issues among those that the experts did not consider very probable or preferable. The schedule for reporting was one of those issues. The most probable and preferable schedule was once a year. Yet, the companies need information on environmental issues more frequently – if they are to be able to take environmental issues into account in the operative management of the company. Quite evidently, companies do collect this data more often than once a year. So why not publish it more often as well? Also, external stakeholders would probably need the up-to-date environmental information as a basis for their decision-making.

The second interesting aspect here is that customers were considered to be the least preferable stakeholder to be reported to. The author must confess to being puzzled by this result. The role of environmental issues can hardly be said to diminish as part of the buying decision. The Finnish forest industry has had problems with the environmental demands of foreign customers in the past but this result indicates that lessons have not been learned.

The contribution of this research relates to the probable future and the preferable future of environmental reporting. The aspects listed in the preferable future of environmental reporting can be used as framework to improve reporting. As many studies have pointed out the quality problems or other weaknesses of environmental reporting multiple times [5,24,29,41], so it can be considered an appropriate time to initiate processes to improve quality. Standardization could be one solution, involving the external stakeholders in the process another.

This research leaves a few questions open. The focus of the study here was on the forest industry, so it would be interesting to find out whether other business sectors have the same improvement needs as the forest industry in environmental reporting. Also, as was mentioned in the introduction of this paper, the main focus of corporate reporting is currently on sustainability reporting. Previous research has shown that the forest industry is reporting its social responsibility in greater detail [47,49,50], hence an interesting research area would be the future of sustainability reporting.

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Appendix

Table A.1 Statements on the content of environmental reporting in 2030

Statement	Probability (average / standard deviation)	Preferability (average / standard deviation)
Environmental aspects are reported with absolute figures.	5.0 (1.9)	4.3 (2.5)
Environmental aspects are reported with relative figures (e.g. in relation to amount of production).	5.5 (1.7)	6.0 (1.7)
Environmental impacts are compressed into one indicator.	2.7 (1.4)	2.3 (1.9)
Environmental impacts are reported with several indicators.	5.1 (2.3)	5.3 (2.2)
Environmental impacts are illustrated with daily life examples (e.g. consumption of energy equals the energy consumptions of N one-family-houses heated with electricity or the amount of CO ₂ emissions equals N flights between Finland and Thailand)	4.3 (2.1)	4.4 (2.3)
Environmental impacts are presented in relation to the amount of production.	4.4 (1.9)	4.7 (2.2)
Companies report environmental aspects accurately at the mill-level.	5.1 (2.0)	5.8 (1.8)
Companies report environmental aspects accurately at the corporate-level.	5.2 (1.7)	5.6 (1.9)
Companies report environmental aspects accurately at the supply chain-level.	4.6 (1.9)	5.7 (2.0)
Companies report environmental impacts accurately at the mill-level.	4.7 (2.2)	5.8 (1.8)
Companies report environmental impacts accurately at the corporate-level.	4.7 (2.0)	5.3 (2.2)

Companies report environmental impacts accurately at the supply chain-level.	4.4 (1.7)	5.7 (1.9)
Environmental aspects of different companies are easy to compare.	4.5 (1.6)	6.3 (0.9)
The significant environmental aspects are presented in long time series.	5.1 (1.7)	5.9 (1.2)
Environmental impacts of different companies are easy to compare.	3.5 (1.6)	6.2 (0.9)
The significant environmental impacts are presented in long time series.	4.4 (2.1)	5.7 (1.7)
Companies report the changes in the environmental impacts caused by structural changes.	4.2 (2.1)	5.7 (2.2)
The reporting of environmental impacts and aspects fulfils the current requirements of economic reporting.	4.6 (1.6)	6.2 (1.0)
Companies report only positive environmental impacts.	3.1 (2.1)	1.8 (1.0)
Companies report both positive and negative environmental impacts.	5.2 (1.9)	6.5 (0.8)
Companies publish only negative environmental impacts.	1.3 (0.9)	1.8 (1.2)

In probability, the scale was from 1–7 (1=extremely unlikely, 7=extremely likely)

In preferability, the scale was from 1–7 (1=extremely undesirable, 7=extremely desirable)

Table A.2 Statements regarding stakeholders and environmental reporting in 2030

Statement	Probability (average / standard deviation)	Preferability (average / standard deviation)
The reports are verified by external party.	5.6 (1.6)	6.5 (0.5)
The knowledge of the external stakeholders is used in environmental reporting.	5.1 (1.6)	6.2 (0.7)
The external stakeholders actively take part in the reporting of environmental impacts and aspects.	4.1 (1.8)	4.9 (1.7)
Environmental impacts and aspects are reported in one report that covers the requirements of all of the stakeholders.	3.4 (1.7)	4.6 (1.8)
Environmental impacts and aspects are reported differently to different stakeholders.	4.7 (1.7)	4.6 (1.9)
The legislation guides the reporting of environmental impacts and aspects.	4.8 (1.9)	4.6 (2.1)
There is a standard of reporting environmental impacts and aspects in the forest industry.	4.5 (1.7)	5.8 (1.5)

In probability, the scale was from 1–7 (1=extremely unlikely, 7=extremely likely)

In preferability, the scale was from 1–7 (1=extremely undesirable, 7=extremely desirable)

Table A.3 Statements regarding the schedule of environmental reporting in 2030

Statement	Probability (average / standard deviation)	Preferability (average / standard deviation)
The reporting of environmental impacts and aspects happens in real time (e.g. statics that are updated daily or weekly).	3.7 (1.8)	4.6 (1.6)
The reporting of environmental impacts and aspects occurs quarterly.	4.4 (2.3)	4.9 (1.6)
Companies publish information about environmental impacts and aspects yearly.	5.6 (1.8)	5.6 (1.3)
Companies publish a wide report on environmental aspects and impacts seldom less than once a year.	1.9 (1.0)	1.8 (1.2)
Companies do not publish information about their environmental impacts and aspects.	1.2 (0.7)	1.1 (0.2)

In probability, the scale was from 1–7 (1=extremely unlikely, 7=extremely likely)

In preferability, the scale was from 1–7 (1=extremely undesirable, 7=extremely desirable)

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