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# The patterns and determinants of sustainability disclosure in the global forest industry

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**Abstract**
Literature assessing the quantity and quality of voluntary social and environmental reporting has shown critical reflections regarding the quality and reliability, the (largely) qualitative nature of disclosure with lack of measurability, credibility or comparability, and information being biased and self-laudatory in nature with minimal disclosure of negative information. Among environmentally-sensitive sectors, forest-based industry has a crucial role in global sustainable development, not only because of its unique raw material basis, but also because of the ongoing industry globalization in the emerging and developing countries. The contribution of this study is important in at least two dimensions: first, providing empirical quantitative insight regarding the current patterns in responsibility disclosure of the forest-based sector at a global level; and second, by taking a quantitative approach in investigating determinants of the disclosure. Changing patterns in the economic, environmental and social performance of the forest-based industry were analyzed using the Global Reporting Initiative (GRI) framework, which represents an international cooperative effort to establish sustainability reporting guidelines for voluntary use by organizations worldwide. We seek to shed more light on what are the key responsibility or sustainability issues the global forest companies address, and which of the firm and industry level determinants are significant on the quality of disclosure? Sustainability disclosure of 66 top forest industry companies is first content analyzed based on the GRI framework, after which significance of industry and firm characteristics, including geographic location, business line and financial performance, will be used as testing the determinants influencing the quality and level of disclosure. Based on the content analysis, more emphasis was found to be placed on the environmental and economic responsibility in contrast to areas concerning human rights, labour practices, social and product responsibility in the forestry sector. Main findings from the regression modeling include a significant positive effect from company size on the quality and extent of

CR reporting practices in the forest industry; no effect from the financial performance; little regional variation; and illustration of difference in disclosure orientation between integrated forest industry companies and those with more narrowly focused business. From the managerial perspective, in the future, business leaders in the forest industry are expected to adopt a more proactive role not only in reducing the environmental footprint or promoting sustainable forest management, but also in furthering social goals.

## 1. Introduction

Accompanying the ever-growing public consensus of sustainable development, the recent corporate scandals have triggered the criticism of the conventional financial reporting (Guthrie and Boedker, 2006) and its ability and accountability to report business activities of a firm (Elkington, 1997). A number of reporting frameworks have been developed to integrate economic, environmental and social performances into a composite whole unified account (see, for example, Yongvanich and Guthrie, 2006), including different indicators, indexes, measurements and systems that vary and prevail from industry to industry, from region to region. To date there is no universal framework existing. Global Reporting Initiative (GRI) deserves most attention among the few most important drivers for the quality of sustainability reports, besides the Triple Bottom Line, Balanced Scorecard, Intellectual Capital, the award schemes by The Association of Chartered Certified Accountants (ACCA) etc.

Despite a growing wealth of disclosure literature in the area of many industries (e.g. oil and gas, financing, banking, mining etc.), research on CR/sustainability reporting (hereafter CR reporting) based on the GRI reporting framework has been scarce. This is so especially in the forest-based industry, which is believed to play a crucial role in global sustainability development. The growing public interest in and global consciousness of environmental and social issues has also intensified pressures on forest industry companies in their efforts to effectively balance potentially conflicting stakeholder demands, and forced to rethink their business strategies. Research in the field of CR reporting is motivated by a desire to see improvement in the sustainability performance of companies (Adams and Larrinaga Gonzalez, 2007), but assumptions have often been made on using a qualitative analysis.

This study aims to investigate the changing patterns of differences on the economic, environmental and social performances in the case of forest-based industry by using the GRI Reporting Framework. The findings of the

study can be compared with the earlier research in forest industry (e.g. Vidal and Kozak, 2008a, 2008b; Mikkilä and Toppinen, 2008). However, we also provide new insights into the state-of-art of CR reporting in the forest-based industry, particularly from quantitative perspective, by focusing on examining the patterns and determinants of CR reporting within the largest companies in the industry. The study also extends the current literature by providing a novel assessment of (voluntary) reporting guideline of the GRI Reporting Framework.

## 2. Theoretical background
### 2.1 GRI Guidelines for corporate reporting
The availability of environmental and social performance data is critical in current business environment, providing a basis for social and environmental analysis. It is also a key component of financial performance analysis, because current financial disclosure requirements do not reveal all of the risks, liabilities, or advantages associated with a corporation's activity. Disclosures on corporate environmental and social performance are also viewed as a commitment to transparency and efforts to address social and environmental risks as indicators of strong corporate governance. Overall, there are indications (e.g., Freeman, 1984) aligning with resource-based view (RVB) that company's strong performance in addressing primary stakeholder (e.g., shareholder, employee, customer and supplier, and communities) benefits can create long-term shareholder value through the development of intangible valuable assets into competitive advantage.

The GRI guidelines are considered the most comprehensive reporting framework available, and they have gained broad credibility through a rigorous, global multi-stakeholder feedback process. The GRI guidelines provide a standard for report content, including suggested performance indicators. Beyond these specific indicators, at the heart of the GRI is a commitment to eleven reporting principles: transparency, inclusiveness, auditability, clarity, completeness, relevance, sustainability context, accuracy, neutrality, comparability, clarity and timeliness (each of these is explained in detail within the GRI guideline document). These principles can be viewed as bedrocks for all credible corporate sustainability reporting. The good faith efforts to apply these principles result in reports that are more valuable for report users and the companies engaged in reporting alike.

The GRI was developed, in part, to reduce the number of different ways companies are asked to report on their performance (i.e., survey fatigue). The World Business Council for Sustainable development (WBCSD) estimates that the GRI covers 80 percent of the data asked for across the range of standard SRI-related screening and benchmarking surveys. A growing number of companies have declared their adoption of GRI in their

reporting. Companies are also encouraged to work towards reporting "in accordance" with the GRI guidelines, this status gives companies the flexibility to choose which performance indicators to use, but requires them to include an explanation if they do not report on all of the core GRI indicators.

## 2.2 Previous research on corporate disclosure and research hypotheses

Studies on assessing the quantity and quality of voluntary social and environmental reporting have shown critical reflections on corporate reporting regarding the quality and reliability (Gallhofer and Haslam, 1997); the (largely) qualitative nature (annual report disclosures in particular) (Deegan and Gordon (1996); and the measurability, credibility or comparability (Gray, 2006; Elkington, 1999; Deegan & Gordon, 1996; UNEP, 1996); and being biased and self-laudatory in nature, with minimal disclosure of negative information (Deegan & Rankin, 1996; Deegan & Gordon, 1993).

Research on CR in the forest-based industry is, however, heavily dominated by qualitatively oriented studies, often based on a limited number of regional case companies. Recent CR research in the forest-based industry (see e.g. Vidal and Kozak, 2008a, 2008b; Mikkilä and Toppinen, 2008) has raised doubts whether CR still remains part of business communication with the principal aim of improving corporate reputation, constraining rhetoric from reality.

While CR disclosure studies focused on forest-based industries are scarce, the literature in general is rich. Studies on the relationship between the extent of corporate disclosure in annual reports and corporate characteristics show that companies may increase social or environmental disclosures in response to societal pressure (Hogner, 1982) and various corporate characteristics may influence the extent of the disclosures (see e.g., Roberts, 1992; Patten, 1991, 1992; Cowen et al., 1987; Trotman and Bradley, 1981).

Several empirical studies have found that the size of the firm or the industry sector has influence on the scale and quality of the disclosure and larger firms tend to have more extensive disclosures (e.g., Reverte 2009; Brammer and Pavelin, 2008; Branco and Rodrigues 2008; Cormier and Magnan, 2003; Hacston and Milne, 1996). Additionally, factors such as being on the stock market (e.g., da Silva Monteiro and Aibar-Guzmán, 2009), having a higher media exposure (Reverte, 2009; Branco and Rodrigues, 2008), perceived firm risk (volatility) and ownership (Cormier et al., 2005) among others seem to be related to the extent of CR disclosure.

In addition to that the larger firms disclose more information than smaller firms (see, e.g., Purushothaman et al., 2000; Adams et al., 1998; Neu et al., 1998; Meek et al., 1995; Patten, 1991), larger firms are also

significantly more adept at communicating their investment (Knox et al., 2005). Rowley et al. (2000) observes that firm size is related to stakeholder actions. Market leaders in terms of revenues, market share, or total assets are more likely attacked by stakeholder action.

In the line of thinking based on the prior research discussed above, we expect that size plays an influencing role in determining corporate disclosure.

> *Hypothesis 1: There is positive effect of the size of company on the corporate disclosure in the forest-based industry.*

Good management theory and slack resource theory both support the assumption that corporate social performance (CSP) is positively associated with financial performance (see, e.g., Orlizky et al., 2003; Waddock and Graves, 1997). Proponents of good management advert that high levels of CSP are indicators of superior management competence, which will lead to improved stakeholder relationships and better performance (Waddock and Graves, 1997; Freeman, 1984). Furthermore, positive customer perceptions on the company (i.e., product nature and quality, environmental awareness, public relations, and community involvement (Prahalad and Hamel, 1994) have become important sources of competitive advantage (McGuire et al., 1990; McGuire et al., 1988). Proponents of slack resources argue, alternatively, that higher financial performance would be indicator of better CSP (McGuire et al. 1988; 1990). On the other hand, both behaviour theory and empirical studies on publicly traded companies suggest that slack resources have positive influence on financial performance (George, 2005), which in turn enables the company to pursue desirable CSP.

A meta-analysis based on 80 samples from 66 studies by Daniel et al. (2004) supports the slack resource theory. By limiting their investigation to financial slack (e.g., liquidity) and performance (e.g., profitability), the authors found that all the three types of slack resources (available, recoverable, and potential) are positively associated with financial performance. However, it should be noted that a number of recent studies on the relationship between disclosure and firm profitability did not find significant relationship (e.g., da Silva Monteiro and Aibar-Guzmán, 2009; Reverte, 2009; Brammer and Pavelin 2008; Branco and Rodrigues, 2008; Cormier et al. 2003; Hackston and Milne, 1996).

> *Hypothesis 2: There is positive effect of profitability on the CR disclosure.*

Concern about corporate responsibility has become a worldwide phenomenon, but the focus and degree of concern varies regionally. A range

of institutional factors can influence corporate decision-makers in different countries to pay more - or less - attention to particular CR-related issues, for example governmental policies, national culture, the economic development, legal requirements, type of industry, and the level of process technology. A combination of all these factors will likely determine to what extent CR strategies or practices are voluntary or mandatory. For example, literature suggests that North American companies typically adopt the neo-liberal approach to CR, which is prevalent in stimulate a relatively narrow approach to the efficiency-ethics trade-off. In the continental Europe, corporate volunteering is often much less advanced, and more process oriented; participation and membership is more important than output (Meijs and Bridges Karr, 2004). Previous research suggests that CR practices in Asia are not very well advanced and primarily aim at the efficiency and international competitiveness of the industry itself (Tulder and Zwart, 2006). CR-related regulation has been developed primarily in environmental protection, which directly affects the internationalization strategies aimed at markets of developed countries. On the other hand, the Asian companies generally exhibit an inactive orientation on labour and human rights and working conditions (Tulder and Zwart, 2006). In Latin America, CR promotion and public advocacy is well established by a range of external agents through cooperation and CR is particularly associated with social commitment. The large contrast between rich and poor and the discrimination against minorities in the labour market lead to a number of specific priorities, such as labour welfare, discrimination. The subject of health and safety in the work place also deserves a great of attention.

Accordingly, we expect that corporate attention, as expressed in the CR reporting, will vary across continents. Based on previous literature, the environmental reporting in Europe and North America could be expected to be higher than in other continents. On the other hand, Latin and African companies are expected pay more attention to a number of priorities, such as discrimination, inequality, corruption, and democracy.

> *Hypothesis 3: Country of origin has an impact on CR disclosure in the forest-based industry.*

The characteristics of an industry can make the nature of corporation unique based on different internal characteristics and external demands (Griffin and Mahon, 1997), and the nature of stakeholder actions appears to be an important influence on CSP and different industries face different portfolios of stakeholders with different degrees of activity in different areas (Griffin and Mahon, 1997; Rowley and Berman 2000). Industries within environmentally sensitive industries were found to report more on environmental (see, e.g., Roberts, 1992; Polonsky and Zeffane, 1992) and

social responsibility (Clark and Gibson-Sweet, 1999; Adams et al., 1998; Patten, 1991) than their counterparts.

Prior research has also observed interesting and substantial differences in reporting practices by different industries (see e.g., Campbell et al. 2003; Cormier and Magnan, 2003; Roberts 1992; Harte and Owen 1991; Cowen et al., 1987; Dierkes and Preston, 1977). More specifically, Dierkes and Preston (1977) found that companies in industries where economic activities modify the environment, such as extractive industries, are more likely to disclose information about environmental impacts than are companies in other industries. Roberts (1992) found that corporations with a high profile (with consumer visibility, high level of political risk, or concentrated intense competition) are more likely to disclose social and environmental responsibility activities than low profile industries. Following the idea that consumers are one conduit to affect corporate economic performance, industries closer in the value chain to (final) consumers would be more likely to face higher levels of stakeholder action, because stakeholders with interests tied to these industries tend to have greater incentive to take action, and important stakeholders such as media, government, non-governmental organizations (NGOs), and class action layers likely get attracted to enable broader stakeholder action.

We expect that the more diversified the company is and with the possession of own forest resources, the greater the pressure from the stakeholders. Accordingly, the following can be hypothesized:

> *Hypothesis 4: Integrated forest industry companies will disclose more overall than their counterparts which have narrower business focus.*

## 3. Data and methodology

The initial samples used in this study included the top 100 forest industry companies listed by Pulp and Paper International (PPI), and the corporate disclosure of 2006 or of the most corresponding years (2005 or 2007) were scrutinised. The reports could be either a separate sustainability or CR reports or, if not available, the annual report (also called 'integrated report') if it contained information dealing with environmental, social responsibility and other sustainability issues. A final sample of 66 forest companies met the criteria of this study, which consists of 44 CR/or sustainability reports and 22 annual (integrated) reports. The corresponding figures of financial performance indicator return on capital employed (ROCE) were collected from PricewaterhouseCoopers' database (PWC, 2008).

Following the GRI reporting framework, this study aims to measure the level of CR-related information disclosed by the sample companies by detecting the presence or absence of items defined by the GRI reporting

guidelines. Content analysis was used to measure the CR reporting profile by the sample companies in this study. The content of corporate reports of the sample companies were classified into six categories to capture the aspects based on the GRI reporting framework, including economic, environmental, labour and employment, human rights, social, and product and service. In order to transform words of the target reports into quantitatively measureable data, first of all, original texts were classified into analyzable data language according to classification frame based on GRI framework, where each indicator consisted of several exact clauses explaining it more clearly and precisely. In this study, a total of 79 indicators were identified to measure the six domains of sustainability under the GRI reporting framework. There are various clauses pertaining to each indicator defined by the framework. Each item of disclosure pertaining to any of the categories is treated equally important in coding by being assigned a point. An item appearing more than once will not receive a second point. To ensure the coding accuracy and improved reliability and validity, a two-tier independent coding was conducted, and to improve reliability, results were cross-checked by both researchers so that the classification of the texts would correspond to the same standard. The final scores of each indicator are divided into a range of scales (1-5), where 1 means that no information is disclosed and 5 stands for complete information are provided.

One of the main limitations of this form of content analysis is that, according to Zéghal and Ahmed (1990), it does not enable the researcher to fully measure the extent of information disclosed and the emphasis attached to each item by the company. On the other hand, the use of the GRI reporting framework in this study is considered to provide not only a comprehensive coverage of the CR/ or sustainability-related aspects, but also a detailed list of items which are most concerned in measuring CR performance.

Multiple linear regression modelling was also conducted in this study to analyse the relationship between CR reporting profile and the determining factors discussed in the theoretical section. The same explanatory factors for year 2007 were used in all regression models. Instead of evaluating the overall reporting profiles of the company under the GRI reporting framework, for the sake of simplicity at this stage, we decided to concentrate on three disclosure dimensions (environmental, social, and product and service), and present results based on the primary analyses. The three dependent variables (environmental, social, and product and service disclosure) are summative variables indicating the completeness of provided information within each category. There are four independent variables: total sales, ROCE_2007, head quarter location, and business line. Total

sales was used as the indicator of size of company, whereas ROCE was considered as the indicator of profitability.[1]

The general form of the regression models to be examined in this empirical study can be denoted as the following:

$$DISC_i = \beta_{0i} + \beta_{1i}Size_i + \beta_{2i}Proft_i + \beta_{3i}NAvsEU_i + \beta_{4i}NAvsASIA\&OCEA_i + \beta_{5i}NAvsLAT\&AFR_i + \beta_{6i}P\&PvsINTE_i + \beta_{7i}P\&PvsP\&P_i + \epsilon_i$$

where, for company i: $DISC_i$: CR reporting index (Environmental$_i$, Social$_i$, Product & Service$_i$); $Size_i$: total sales in $ million; $Proft_i$: return on capital employed in 2007; $NAvsEU_i$: North America vs. Europe; $NAvsASIA\&OCEA_i$: North America vs. Asia + Oceania; $NAvsLAT\&AFR_i$: North America vs. Latin America + Africa; $P\&PvsINTE_i$: paper + packaging vs. integrated; $P\&PvsP\&P_i$: paper + packaging vs. pulp + paper + packaging; $\epsilon_i$: the error which models the unsystematic error of the Y from the predicted Y.

## 4. Results
### 4.1 Descriptive analysis
Summative variable environmental responsibility represents the most significantly emphasized indicators under the GRI framework, followed by labour and employment responsibility, and economic responsibility, while human rights responsibility and social responsibility received the least attention from the sample companies, followed by product and service Responsibility. Environmental measurement is still a dominant in assessing CR performance, and there are a greater number of environmental indicators under the GRI reporting guidelines.

TABLE 1 depicts the divergence of CR reporting profiles between different groups. T-test was used for the pair-wise comparison of means between the groups under the GRI reporting framework in this very study.

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[1] Due to their qualitative nature, the two independent variables, head quarter location, and business line, were transformed into dummy variables for further analysis. Head quarter location was categorized into three dummy variables (North America vs. Europe, North America vs. Asia + Oceania, North America vs. Latin America + Africa), whereas business line was classified into two dummy variables (paper + packaging vs. integrated, paper + packaging vs. pulp + paper + packaging). plus the other two independent variables (total sales, ROCE_2007), a total number of seven independent variables were thus used in our regression analysis.

**TABLE 1**. Pair-wise comparison of means between groups and CR reporting profiles

| | Economic | Environmen-tal | Labour & Employment | Human Rights | Social | Product & Service |
|---|---|---|---|---|---|---|
| **Business Line** | | | | | | |
| *Integrated* (n=24) | 17.00 (5.53)* | 70.42 (21.18)* | 27.08 (8.30)** | 11.71(4.90) | 12.54 (7.28)** | 14.17 (8.20)* |
| *Pulp+Paper+Packaging* (n=12) | 14.08 (3.26) | 57.42 (17.52) | 20.75 (5.29) | 9.50 (1.24) | 8.25 (0.62) | 8.25 (0.45) |
| *Paper + Packaging* (n=30) | 14.89 (4.80) | 49.73 (18.19) | 19.27 (6.00) | 9.87 (3.06) | 9.03 (2.30) | 9.37 (4.17) |
| **HQ Location** | | | | | | |
| *Europe* (n=15) | 15.47 (5.95) | 61.40 (25.24) | 25.27 (7.41) | 10.27 (2.28) | 10.27 (5.66) | 10.40 (4.14) |
| *North America* (n=23) | 14.61 (5.57) | 56.04 (19.95) | 20.30 (8.02) | 9.48 (1.53) | 10.04 (5.73) | 11.17 (7.02) |
| *Asia + Oceania* (n=18) | 13.50 (2.64) | 55.28 (21.76) | 19.94 (5.58) | 10.44 (3.88) | 8.89 (2.35) | 9.50 (4.19) |
| *Latin America+Africa* (n=10) | 17.20 (3.50) | 66.60 (15.62) | 27.20 (7.52) | 13.10 (6.89) | 12.60 (5.17) | 13.60 (8.97) |

[a] The figures in the table are mean values with standard deviations in parentheses
* Significant at the 0.01 level, ** Significant at the 0.05 level

A number of significant differences were observed between business line and the six summative variables. Integrated forest companies with ownership of forest resources seemed to emphasize more on economic-related issues, as well as on environmental-related issues than those companies which are within the paper and packaging category ($p = 0.021$, $p = 0.001$). In terms of labour & employment responsibility, integrated forest industry companies placed more comprehensive attention on the corresponding issues than those companies which are in the pulp and paper and packaging category ($p = 0.029$), as well as those companies within paper and packaging category ($p < 0.01$). No significant difference was found between groups under human rights summative variable. Integrated forest industry companies emphasized more social responsibility disclosure than those companies within pulp and paper and packaging category ($p = 0.031$) and paper and packaging category ($p = 0.021$). Similar differences were also observed under product and service responsibility, where integrated forest companies placed significant attention on the corresponding issues than those companies of pulp and paper and packaging category ($p = 0.013$), as well as those companies within paper and packaging category ($p = 0.009$).

According to our data, the geographic location of the firm shows in the level of their CR disclosure. Latin American and African companies seem to perform better that their international counterparts in all six reporting

domains. However, no statistically significant difference between companies in terms of head quarter location was observed between economic, environmental, social, product and service responsibility, respectively, whereas significant differences were found under labour and employment responsibility, and responsibility for human rights.

In terms of labour and employment responsibility, Latin American companies and African companies seemed to emphasize most on labour- and employment-related issues, while Asian and Oceania companies were identified to be least interested in addressing the corresponding issues. In terms of human rights responsibility, North American companies were identified to pay most attention to human rights-related issues, whereas the corresponding issues were least emphasized by Latin American companies and African companies ($p = 0.049$).

## 4.2 Regression models
In Table 2 below the results of the regression analyses are presented.

**TABLE 2.** Results of the regression models for environmental, social, and product and service disclosure under the GRI reporting framework

| Independent variables | Environmental | Social | Product & Service |
|---|---|---|---|
| **(Constant)** | 36.068 (6.074)[a] | 9.433 (5.389) | 7.083 (3.652) |
| **Total sales in $ million** | 0.003 (5.31)* | 0.000 (1.595) | 0.001 (3.298)* |
| **ROCE_2007** | 2.117 (0.035) | -29.537 (-1.64) | -6.448 (-0.323) |
| **North America vs. Europe** | 1.305 (0.216) | -0.725 (-0.407) | -2.167 (-1.097) |
| **North America vs. Asia + Oceania** | -0.419- (-0.071) | -0.935 (-0.536) | 0.507 (0.262) |
| **North America vs. Latin America + Africa** | 12.251 (1.625) | 1.78 (0.801) | 0.473 (0.192) |
| **Paper + Packaging vs. Integrated** | 13.531 (2.282)* | 4.339 (2.483)* | 4.869 (2.515)** |
| **Paper + Packaging vs. Pulp + Paper + Packaging** | 13.499 (2.061)* | -0.321 (-0.166) | 0.633 (0.296) |
|  | $R^2 = 0.562$; Adj. $R^2 = 0.493$; Durbin-Watson = 1.416; F = 8.232; $P < 0.01$ | $R^2 = 328$; Adj. $R^2 = 0.223$; Durbin-Watson = 2.151; F = 3.135; $P = 0.009$ | $R^2 = 0.406$; Adj. $R^2 = 0.314$; Durbin-Watson = 2.038; F = 4.393; $P = 0.001$ |

[a] The figures in the table are regression coefficients with $t$ values in parentheses
*Significant at the 0.10 level, **Significant at the 0.05 level

As can be seen in TABLE 2, the adjusted $R^2$'s of the three regression models were in the range of 0.22 to 0.49, and being highest in the environmental disclosure model. Confirming H1, the size of the firm is positive related to the scale of both environmental and product and service disclosures, this result is consistent with previous studies. Country of origin or profitability was not significant in any of the models, and therefore both the hypotheses H3 and H2 were rejected. As for the importance of the dummy variables in explaining variation between companies' disclosure, business line dummy on paper + packaging vs. integrated was positive and significant in each model; on the other hand, confirming our hypothesis 4. However, paper + packaging vs. pulp + paper + packaging dummy were significant only in the social disclosure model.

## 5. Conclusions and discussion

The results of our study mirror the overall patterns of CR disclosure in the global forest industry under the GRI reporting framework. Based on the values of summative disclosure domains of our data environmental responsibility represents the most significantly emphasized area (measured by the average value of summative indicators) under the GRI framework, followed by labour and employment responsibility and economic responsibility. Human rights and social responsibility received the least attention in the 66 largest companies of our sample, followed by product and service responsibility. These findings are supporting the previous literature, for example, Vidal and Kozak (2008a, 2008b) and Mikkilä and Toppinen (2008), where it has been found that especially disclosing social responsibility is still developing towards more comprehensive metrics in the sector. No regional differences (based on headquarter location) were found in terms of disclosure with the exception of labour and employment responsibility and responsibility for human rights

In conclusion to the results of regression modelling, forest industry companies seem to be sensitive to media exposure (as proxied by their size) but are insensitive to profitability (as measured by ROCE) when determining their CR strategies /reporting or disclosure strategies. Regional differences between the disclosure determinants in the large forest-based industry companies seem to be insignificant. These finding are in line with the previous literature (e.g., Reverte 2009; Brammer and Pavelin, 2008; Branco and Rodrigues 2008; Hacston and Milne, 1996) that the company size of the firm or the industry sector has positive influence on the scale and quality of the disclosure. Also, by analyzing French firms' environmental practices, Cormier and Magnan (2003) suggest that as a result of strong impact of globalised stock markets on fostering convergence in corporate

practices, companies have increasingly realized the importance of corporate disclosure and thus adopted corresponding disclosure strategies in responding to the growing demands from stakeholders.

A limitation to the study is that we strictly followed the GRI reporting framework when measuring the level of CR-related information disclosed by the companies and detected thereby only the presence or absence of items defined by the GRI reporting guidelines. Using some other guideline or framework, different dimensions and disaggregation of CR could be found. Nevertheless, our empirical findings, for example, in terms of the effect of company size and regional differences, were in line with the previous literature that were not using GRI frame. In addition, it should be noticed that our modelling results are preliminary since the set of explanatory variables measuring industry and firm characteristics was limited to company size, geographic location, business line, and financial performance only. In the future studies, more profound analysis should be targeted, for example, to analysing the impacts of demand conditions and consumer proximity on the CR disclosure of in the forest-based industry. Since we only focused on three disclosure dimensions (environmental, social, and product and service disclosure), future analysis should concentrate on the dimensions of labour and employment, and human rights disclosure as well.

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