Communicating the corporate social responsibility (CSR) of international contractors: Content analysis of CSR reporting

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A B S T R A C T

Corporate social responsibility (CSR) is gaining importance for international construction contractors and corporate reports are an effective tool in communicating their CSR efforts. However, CSR communication is a rare topic of discussion within the construction research field. This study establishes a systematic content analysis approach to compare CSR communication among contractors in different regions. It selected a sample of 310 international contractors from the Engineering News-Record list from 2009 to 2014 and collected data from their CSR-related reports. Significant disparities were found in CSR communication among the contractors in the four regions. European contractors showed the highest levels of CSR communication in both dimension- and issue-levels, while Chinese contractors ranked the lowest in CSR communication. Another interesting finding is that all four regions gave the highest priority to one CSR dimension, i.e. community involvement and development. This study serves as a starting point for research on CSR communication by construction contractors, including comparisons with companies in other industries. In addition, this study provides a useful tool for companies or scientific researchers to assess the status of CSR communication.

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1. Introduction

The importance of assuming corporate social responsibilities (CSR) is growing worldwide (Davis, 1960, 1973; Lehtonen, 2004). Corporations are expected to be good citizens to fulfill social roles and tackle social problems (Mattern and Crane, 2005; Mele, 2008). Construction activities impose substantial economic, environmental and social impacts (Sun and Zhang, 2011), and construction contractors face environmental and social challenges and obligations (Shen et al., 2010). Under these conditions, conveying CSR practices to relevant stakeholders gains importance. CSR communication is an effective technique to obtain social recognition (Wigley, 2008) and legitimacy as “right and proper” social citizens (Lindblom, 1994; Dawkins, 2005). However, to the best of the authors’ knowledge, no study has thus far investigated the CSR communication practices of international contractors.

This study attempts to fill this gap by using a content analysis method specifically capable of (a) analyzing CSR aspects that international contractors tend to emphasize in their CSR reports, and (b) investigating whether these aspects differ among contractors from four regions, i.e. Asia, European Union (EU), United States (US)/Canada and China. In addition to theoretical contribution, this study also has distinct practical implications. Evidence shows that construction contractors are rapidly expanding across the globe (ENR, 2014; Liu et al., 2016a, b; Lu et al., 2015). Projects are increasingly cross-cultural and complex, leading to differences in perception and understanding of situations (Fellows and Liu, 2015). Different perceptions result in different behaviors and give rise to different practices (Kim, 2007). Therefore, a better understanding of the differences and similarities in CSR communication of international contractors will benefit CSR practices of such contractors. It will also promote effective cross-cultural cooperation. Furthermore, the comparison will provide benchmarking, i.e., the best practices in the industry, highlighting areas in which the best companies in an industry perform CSR activities (Graafland et al., 2004; Sardinha et al., 2011), which can help contractors realize CSR performance improvement, especially those contractors planning to enter the international construction market.

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2. Content analysis of CSR communication

Various channels enable effective communication of CSR efforts, including CSR reports, annual reports, corporate websites, and social activities such as building relationships with NGOs (Montecchia et al., 2016; Tang and Li, 2009). Content analysis of CSR-related reports has long been acknowledged as a useful method in the study of CSR communication (Milne and Adler, 1999). This method is useful in analyzing various CSR issues, including motivations, themes, approaches, and corporate social disclosure (Tang and Li, 2009). Content analysis facilitates researchers in compressing huge data from various texts into fewer content categories according to organized and explicit standards (Bryman and Bell, 2003; Stemler, 2001; Weber, 1990). However, no such systematic content analysis approach exists for analyzing CSR communication among international contractors. Thus, this study first establishes an approach for content analysis of CSR communication concerning different CSR dimensions and issues.

Furthermore, to overcome the problems of physical examinations such as time-consumption and poor reproducibility (Jiang et al., 2016), this study adopts an alternative software “Python” to develop a semantic labeling program for content analysis. The stability of the program was tested adequate, which determines the reliability of content analysis (Neuendorf, 2002). Importantly, a keyword corpus was established specifically for the social activities of construction companies by referring to several international standards associated with CSR. Tilt (2001) proposed that the basic element of content analysis is to formulate a keyword corpus. We provided the systematic descriptions of this approach subsequently. This content analysis approach will bring abundant benefits in both theoretical and practical aspects.

3. Methods

This study chose a sample of 310 international contractors from the top 225 or 250 international contractors issued by Engineering News-Record (ENR) from 2009 to 2014. This sample was categorized into four regions as per company locations, i.e., Asia, European Union (EU), US/Canada and China. Table 1 shows that Chinese international contractors constituted a large proportion in the global construction industry. Statistics show that the Chinese had ventured into more than 180 countries by 2014 (NBSC, 2014). However, their CSR awareness and practices were poor (Wu et al., 2015). Zhu (2006) further contended that a major barrier for Chinese contractors in the international market is their poor understanding of CSR. In addition, the CSR performance of Chinese enterprises has long been a global concern (Tang and Li, 2009) and the construction industry constitutes a major foundation of Chinese economics (Zou et al., 2007; NBSC, 2014). Thus, an investigation of the CSR practices of Chinese international contractors can have global implications, including the international construction industry. We separate the Chinese ones from the Asian region and hereafter, “Asian contractors” do not contain the Chinese if there is no specific mention.

Multiple sources of CSR issues were referred to. Some organizations did not issue individual CSR or sustainability reports, but included CSR information in their corporate annual reports or other forms. Thus, we first searched CSR reports; if a company did not issue a CSR report, we checked its sustainability report for relevant information. If we did not find the relevant information (or the company did not issue a sustainability report), we searched their annual reports, and so on. Finally, we obtained 464 reports from CSR/sustainability reports and corporate annual reports and 125 documents from CSR policies and news.

Fig. 1 depicts a systematic framework that consists of four phases showing the stepwise employment of the content analysis approach.

Table 1 Distributions of the selected contractors in regions (2009–2014).

<table>
<thead>
<tr>
<th>Regions</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td>41</td>
<td>40</td>
<td>41</td>
<td>40</td>
<td>45</td>
<td>41</td>
<td>147</td>
</tr>
<tr>
<td>EU</td>
<td>96</td>
<td>95</td>
<td>98</td>
<td>93</td>
<td>90</td>
<td>91</td>
<td>43</td>
</tr>
<tr>
<td>US/Canada</td>
<td>27</td>
<td>24</td>
<td>26</td>
<td>29</td>
<td>26</td>
<td>27</td>
<td>55</td>
</tr>
<tr>
<td>China</td>
<td>50</td>
<td>54</td>
<td>50</td>
<td>52</td>
<td>52</td>
<td>55</td>
<td>75</td>
</tr>
</tbody>
</table>

Note: The total sum is not equal to the preceding columns as certain international contractors were listed in more than one year in the top 225 or 250 international contractors issued by ENR.

Fig. 1. Content analysis approach for evaluation of CSR communication.
3.1. Developing the initial framework for evaluating CSR perceptions (phase 1)

This study adopted the seven dimensions proposed by Wu et al. (2015), which were developed based on comprehensive CSR-related standards, guidelines and literature, stakeholder theory, and practices in the construction industry. These dimensions include labor practices, the environment, fair operating practices, community involvement and development, human rights, shareholders’ rights, and organizational governance. Furthermore, this research extends the original 26 issues included in the seven dimensions (Wu et al., 2015) to 113 issues. This extension is mainly based on the publications listed in Table 2. Due to space limitations, Table 3 only presents partial information, including definitions of the dimensions and three sample issues under each dimension.

3.2. Developing a semantic labeling program for the content analysis (phase 2)

The next phase is to develop a semantic labeling approach for the content analysis of CSR reporting. First, we established a keyword corpus for the 113 issues using a linguistic approach to categorize words based on their characteristics (Auger and Barrière, 2008; Daille et al., 1996). In particular, we categorized the keywords into three groups: objects (O), i.e., entities (e.g., corporations, stakeholders, provisions); actions (AD); and situations (SD). AD and SD refer to the descriptions of an object. Actions are measures and activities in which an organization engages. Some examples include “sign (contracts),” “give priority to,” and “disease precaution.” Situations refer to norms, adjectives, or combinations of norms and adjectives. Examples of situations include “construction site” and “potential threat.” After generating the basic terms of each keyword type, we expanded them by including their synonyms derived from GRI A+ reports and dictionaries (Longman, 1987; Merriam-Webster, 2004). To avoid nominal and tense differences, we applied the concept of stem and added the character “*” to mark a keyword. During the information extraction process by coding, we use only stem (letters before ***) as a matching condition. The maximum keyword distance within a phrase is 100 characters (approximately 10–15 words) to avoid syntax differences.

### Table 2

<table>
<thead>
<tr>
<th>Compacts &amp; initiatives</th>
<th>Standards</th>
<th>Indices</th>
<th>Academic papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Reporting Initiative (GRI)</td>
<td>ISO 9001 Quality Management system</td>
<td>Dow Jones Sustainability Index (DJSI)</td>
<td>Castka and Balzarova (2008)</td>
</tr>
<tr>
<td></td>
<td>ISO 14000 Environment Quality Management System</td>
<td>Domini 400 Social Index</td>
<td></td>
</tr>
<tr>
<td>United States Global Compact (UNGC)</td>
<td>ISO 36000 Social Responsibility Standard</td>
<td>Ethibel Sustainability Index</td>
<td>Ciliberti et al. (2008)</td>
</tr>
<tr>
<td></td>
<td>OHSAS 18000 (Occupational Health and Safety Assessment Series 18,000)</td>
<td></td>
<td>Kolb and Pinkse (2006)</td>
</tr>
<tr>
<td></td>
<td>SA8000 Social Responsibility Standard</td>
<td></td>
<td>Wu et al. (2015)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Zhao et al. (2012)</td>
</tr>
</tbody>
</table>

### Table 3

CSR dimensions and sample issues of CSR communication.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Sample Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension 1: Labor practices</td>
<td>This dimension covers management issues related to employees including policies, employment and employment relationships, workplace health and safety, and human development and training. Provide fair equitable job opportunities Ensure all employees are under official labor contract Promulgation of human resources policy to attract and retain quality talent</td>
</tr>
<tr>
<td>Dimension 2: The environment: This dimension gauges the positive/negative impacts of business operations on the natural environment. During the project lifecycle, environmental impact assessments are conducted Compliance with environmental laws and regulations Devote to technological innovation in green building design and apply the technology in construction process</td>
<td></td>
</tr>
<tr>
<td>Dimension 3: Fair operating practices. This dimension mainly addresses clients, business partners, competitors and governments. It examines the impact of corporate ethical behavior (such as fair competition, protection of property rights and involvement in politics) on other organizations. Avoid improper political contributions Ensure building materials meet safety standards Ensure building materials meet safety standards Sound project financial analysis to ensure that projects do not overspend</td>
<td></td>
</tr>
<tr>
<td>Dimension 4: Community involvement and development. Community involvement is a process in which an enterprise participates in the development of local communities, thereby creating shared values with the communities. Community development focuses on the practical improvement of a community’s welfare and living standards via the enterprise’s participation. Maintain effective communication and timely handle complaints from the community Provide assistance in public disease control and prevention Increase charitable donations to help and support disadvantaged groups in society</td>
<td></td>
</tr>
<tr>
<td>Dimension 5: Human rights. This dimension focuses on the protection and guarantee of basic human rights, specifically addressing employees and local communities. It involves two major aspects: civil and political rights (including respect for the cultures and customs of the local people, equitable job opportunities and onsite safety of employees); and economic, social, and cultural rights (including proper wages, allowances and basic insurance for employees). The stakeholders involved in this category are employees and local communities. Company shall not force employees engaged beyond their legal duties Right to freedom of assembly and association Not interfere with personal beliefs and customs of employees</td>
<td></td>
</tr>
<tr>
<td>Dimension 6: Shareholders’ rights: This dimension assesses the measures undertaken by an enterprise to generate profit for and build trust among shareholders. Disclosure of accurate information about the company’s operations and financial performance Disclosure of accurate information about the company’s vision of sustainable development Shareholders participate in the decision-making process on major corporate affairs and income distribution</td>
<td></td>
</tr>
<tr>
<td>Dimension 7: Organizational governance: This dimension gauges the extent to which an enterprise incorporates CSR into its operational decisions in the pursuit of profits. Set strategies, goals and indicators to report CSR/HSE commitment Establish an incentive system related to CSR/HSE performance Employees at all levels are encouraged to effectively participate in corporate socially responsible activities</td>
<td></td>
</tr>
</tbody>
</table>
Second, we coded and ensured the stability of the code using Python v2.0 software to extract information from the semantic data. We specified a number of search and identification rules for extracting this information. The paragraph served as the range for keyword detection and only when all the three groups of keywords, i.e., O, AD, and SD, were detected simultaneously would it be recognized as a hit on that specific issue (Yeh and Liao, 2015).

Fig. 2 shows the logistic rule used to build the semantic labeling program (Yeh and Liao, 2015). The program dictates that each paragraph is set as a reading unit and records the frequency of the addressed issue. A carriage return indicates the end of a paragraph. The function appearKW judges whether a keyword exists within a certain group. Only if all the three groups that pertain to an issue appear within the paragraph is the issue determined to have appeared in that paragraph. We then counted the number of paragraphs in which the issue appears and stored the result in XLS format. We performed this step to determine the frequency with which an issue appeared. To ensure stable results in relation to content analysis based on Krippendorff’s (2012) methods, we requested two individuals to code using the same logic. The results produced by the two coders were the same, thereby validating the stability of the semantic labeling program.

Finally, we used the semantic labeling program to analyze the CSR documents of the 310 international contractors.

3.3. Developing and validation the CSR communication index (phase 3)

After Phase 2, we can obtain the global frequency of the total 113 issues mentioned in the selected documents issued by the 310 contractors. However, in reality, a corporation has limited sources for CSR activities. It is important to investigate the most critical issues; therefore, we developed an index for the evaluation of CSR perceptions based on the most critical issues. As recommended by Yang and Pedersen (1997), Chi-square tests are effective in eliciting the most critical issues. The value of Chi-square of a certain issue can be calculated by Eq. (1).

\[
X^2 = \frac{N \times (AD - CB)^2}{(A + C) \times (B + D) \times (A + B) \times (C + D)}
\]

where \( i \) represents the CSR issue \( i \in [1, 113] \). \( N \) represents the total number of contractors among all the 310 contractors that mention issue \( i \). \( A \) represents the number of contractors that mention issue \( i \) in their reports and are accredited; \( B \) is the number of contractors that are accredited but fail to mention issue \( i \); \( C \) is the number of contractors that mention issue \( i \) but are not accredited; and \( D \) is the number of contractors that do not mention issue \( i \) and are not accredited. Accreditation is based on the international standards listed in Table 4.

Based on Chi-square tests, 51 critical issues were produced: 13 of which were related to labor practices, 6 to the environment, 7 to fair operating practices, 9 to community involvement and development, 7 to human rights, 3 to shareholders’ rights, and 6 to organizational governance. Then, we developed an index for evaluating CSR communication in each dimension in Eq. (2).

\[
CSRindex_{jm} = \frac{\sum_{i=1}^{j} K(x_j) \times Weight_i}{\text{CSRindex}_{n}}
\]

\[
K(x) = \begin{cases} 
1, & x \geq 1 \\
0, & x = 0
\end{cases}
\]

\[
Weight_i = IG_i \times OR_i
\]

\[
IG_i = \frac{H(i) - H(i, C)}{\sum_x i(x) \log_2 i(x) - \sum_x i(x) \log_2 C(x)}, IG \geq 0
\]

\[
OR_i = \frac{A \times D}{B \times C}
\]

where \( CSRindex_{jm} \) represents the level of emphasis that contractor \( j \) puts on the CSR dimension \( m (m \in [1, 7]) \), and \( x \) represents issue frequency. The weight of each issue can be calculated by multiplying information gain (\( IG \)) and odds ratio (\( OR \)) as recommended by Aizawa (2003). \( H(i) \) represents the entropy of issue \( i \) among all the 310 contractors, while \( H(i, C) \) represents the entropy of issue \( i \) among all the certified contractors. A–D in the formula of \( OR \) has the same definitions in Eq. (1). The global value of CSR communication of a specific region in a certain dimension is the sum of the \( CSRindex \) possessed by all the contractors in that region.

3.4. CSR communication comparisons between contractors in different regions (phase 4)

Based on \( CSRindex \) established in Phase 3, we compared the similarities and differences in the communication of each CSR dimension between the four different regions. In addition, we discussed the key issues in each dimension focusing factors with significant differences among regions. Before the comparison, we demonstrated the validity of the established \( CSRindex \) by examining the correlation between \( CSRindex \) and third-party accreditation state.

4. Results

4.1. Preliminary analysis of the validity of CSR index

The exclusive use of \( OR \) is likely to omit the respective effects of reporting stability and information content, thereby generating overqualified CSR performance compared to the Global Reporting Initiative GRI 2000 sustainability reporting guidelines (2000) and the ISO14031 (ISO, 1999) environmental performance evaluation standard (Morhardt et al., 2002). Results show that the combined value of \( IG \) and \( OR \) indexes fall after normalization (see Fig. 3 and Table 5). This suggests that the proposed evaluation technique will not overestimate CSR perceptions.

To further test the validity of \( CSRindex \), we examined its...
correlation with the contractor’s accreditation status. The Global Reporting Initiative (GRI) provides a voluntary CSR reporting guideline that most companies have accepted. However, the GRI does not propose specific evaluation standards like the AA1000 (published by AccountAbility) or the ISAE3000, published by International Federation of Accountants (IFAC). The AA1000 adopts the “open scope approach,” evaluating a company’s reporting performance primarily on the basis of stakeholders’ perspectives. It ranks companies as “high” or “moderate” in terms of reporting performance according to the comprehensiveness and priority of their disclosure. In contrast, the ISAE3000 uses the “pre-determined scope approach.” In this approach, the corporation determines the issues to be evaluated in advance and classifies them as “reasonable” or “limited.”

The regression formula (Eq. (3)) was developed to validate whether the CSRindex (contractors’ overall CSR scores from 2009 to 2014 regardless of annual difference) is correlated with third-party assurance.

\[ \text{Cer}_{it} = \beta_0 + \beta_1 \text{CSRindex}_{it} + \beta_2 \text{Size}_{it} + \beta_3 \text{LEV}_{it} \]

(3)

where the dependent variable (Cer) takes the value of 1 if a report is certified by AA1000 or ISAE3000, and 0 otherwise. Independent variables in this equation include CSRindex (information disclosure of the contractor), Size (the logarithm of the company’s size in millions of dollars of total assets), and LEV (the ratio of net assets to total liabilities).

Pearson correlation coefficients between 0.3 and 0.5 indicate moderate correlation, while larger than 0.5 signify a strong correlation (Cohen, 1992). Thus, the correlation analysis shows that CSRindex is strongly correlated with the AA1000 (\(r = 0.551\)) and moderately correlated with the ISAE3000 (\(r = 0.332\)). The regression results (Table 6) further demonstrate such correlations. To conclude, the CSRindex established in this study has adequate validity of measuring the social responsibility perceptions of a company.

4.2. Dimension comparison

This section discusses the differences and similarities, if any, between the four regions, i.e., Asia, EU, US/Canada and China, in different dimensions of CSR communication with the CSRindex. Due to limited information on CSR communication of contractors and similar comparative research, the discussion is primarily based on the results of this study. The radar map (Fig. 4) illustrates the average scores of the seven dimensions of CSR communication among the four regions between 2009 and 2014. Clearly, significant differences existed between them in all dimensions. We further demonstrated such differences through a one-way analysis of variance (ANOVA).

Obviously, the international contractors in EU had the highest CSR communication in all seven dimensions. This may be attributable to the high awareness and effective practices of social responsibilities in EU. More than half of the established international CSR standards or campaigns have their roots in EU nations, such as

### Table 4
List of international standards.

<table>
<thead>
<tr>
<th>Publication Year</th>
<th>Standards/Campaigns</th>
<th>Fields</th>
<th>Third Party Assurance (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>Corruption Perception Index</td>
<td>Anti-corruption</td>
<td>No</td>
</tr>
<tr>
<td>1997</td>
<td>ISO 8000</td>
<td>CSR</td>
<td>Yes</td>
</tr>
<tr>
<td>1998</td>
<td>LEED</td>
<td>Green Construction</td>
<td>Yes</td>
</tr>
<tr>
<td>1999</td>
<td>DJSI</td>
<td>Sustainability</td>
<td>No</td>
</tr>
<tr>
<td>1999</td>
<td>OHSAS 18000</td>
<td>Occupational Safety &amp; Healthy</td>
<td>Yes</td>
</tr>
<tr>
<td>2000</td>
<td>ISO 9000</td>
<td>Quality Management</td>
<td>Yes</td>
</tr>
<tr>
<td>2000</td>
<td>GRI</td>
<td>Reporting Guideline</td>
<td>No</td>
</tr>
<tr>
<td>2000</td>
<td>The Ten Principles</td>
<td>CSR</td>
<td>No</td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td>Environment Management</td>
<td>Yes</td>
</tr>
<tr>
<td>2004</td>
<td>ISO 14000</td>
<td>CSR</td>
<td>No</td>
</tr>
<tr>
<td>2010</td>
<td>ISO 26000</td>
<td>Energy Management</td>
<td>Yes</td>
</tr>
<tr>
<td>2011</td>
<td>ISO 50001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 5
Average topic CSR indices.

<table>
<thead>
<tr>
<th>Topic/Average Score</th>
<th>OR</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor Practices</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>The Environment</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Fair Operating Practices</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Community Participation and Development</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Human Rights</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Shareholders’ Rights</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Organizational Governance</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

### Table 6
Regression analysis.

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Mean</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA1000</td>
<td>45.248</td>
<td>28.522*** (2.60)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(7.31)</td>
</tr>
<tr>
<td>ISAE3000</td>
<td></td>
<td>9.084*** (1.70)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.70)</td>
</tr>
<tr>
<td>Size</td>
<td>9.177</td>
<td>0.024* (0.381**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.381**)</td>
</tr>
<tr>
<td>LEV</td>
<td>0.707</td>
<td>-0.046 (-0.381**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.381**)</td>
</tr>
<tr>
<td>Constant</td>
<td>45.248</td>
<td>-0.145 (-0.046</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.046)</td>
</tr>
<tr>
<td>F</td>
<td>25.68</td>
<td>11.27</td>
</tr>
<tr>
<td>Adj R²</td>
<td>0.303</td>
<td>0.153</td>
</tr>
</tbody>
</table>

Note: ***mean p < 0.01; **mean p < 0.05; *mean p < 0.10.
the Corruption Perception Index, the DJSI, ISO indices, the AA1000, and the ISAE3000. Increasing awareness of issues related to CSR has prompted EU corporations to enact practices that pursue CSR (Idowu and Towler, 2004). In an environment that promotes CSR, construction companies in the EU are likely to have high CSR awareness and disclose CSR information.

Numerous studies reveal that international contractors from China have poor CSR perception and performance (Shen et al., 2010; Urban et al., 2013; Wu et al., 2015). This study finds that Chinese contractors communicate less information in their CSR reports compared to contractors in other regions. This may be due to inadequate awareness of Chinese contractors in performing CSR, as values and perceptions are the leading indicators of external reports compared to contractors in other regions. This may be due to the weak enforcement of CSR in China. In 2015, the Chinese Academy of Social Science (CASS) issued “Guidance on social responsibility reporting”. However, using these guidelines is voluntary and not enforceable. Thus, without legislative control, it is likely that some companies would not volunteer to release CSR-related information if they cannot fully understand the underlying benefits of CSR disclosure. Namely, inadequate awareness and enforcement of CSR may result in the low volume of CSR information disclosure by Chinese contractors. Compared to poor CSR communication of China’s international contractors, Asian international contractors largely possess an equivalent level of CSR communication with those in the United States and Canada.

We also find that all four regions put the greatest emphasis on community involvement and development. Construction activities exert direct social impact on communities that are critical external stakeholders with substantial influence on project outcomes (Aaltoten, 2011; Olander, 2007). If potential negative impacts were not appropriately dealt with, social tension or group incitement would arise and threaten the achievement of project objectives (Liu et al., 2016a, b). Community involvement and development can enable two-way communication conditions, where the decision makers and the public can express and communicate opinions freely, thereby enhancing the accountability of the decision-making process, benefiting the community, and improving the project’s long-term viability (Zheng et al., 2016). All these will in turn enhance public’s positive perceptions of the social responsibilities of the company, and subsequently, social support to the company will increase. Considering the increasing social risks from the affected communities, it is understandable that international contractors in different regions generally reached a consensus that community-related issues were the greatest priority.

4.3. Issue comparison

Overall, the four regions also showed significant disparities in almost all of the key issues included in the seven CSR dimensions.

4.3.1. Labor practices

The construction industry is labor-intensive (Ng and Tang, 2010) and workers are the central human resources of a contractor (Lu et al., 2008). Good practices in labor issues will improve job satisfaction and strengthen a contractor’s competitiveness. As shown in Table 7, 10 critical issues showed significant differences across regions. Consistent with the trend in the dimension-level, contractors in EU had the best CSR communication on almost every issue of labor practices. In addition, European contractors focused on “1.1.1: Provide fair equitable job opportunities” (Mean = 1.279), “1.1.2: Ensure all employees are under official labor contracts” (Mean = 1.070), “1.7.1: Employees can be present and participate in company decision-making process” (Mean = 1.421) and “1.7.3: The company is capable of providing the necessary support for employees undergoing life challenges” (Mean = 1.041) the most. The communication of labor-related issues by Asian contractors was similar to that of contractors in the United States and Canada.

One significant finding is that communication of Chinese international contractors on labor practice issues was the lowest. In particular, “1.1.2: Ensure all employees are under official labor contracts,” “1.3.3: Create an employee professional training and development plan, provide staff training and development guidance,” “1.5.4: Establish a social security/insurance system for workers according to national laws,” “1.6.2: The company supports labor unions and their function and is willing to conduct exchange and dialogue,” “1.7.2: Establish a quick and convenient information transmission channel to keep employees informed of organizational changes and reforms,” and “1.7.3: Company is capable of providing the necessary support for employees undergoing life challenges” were at a low level. Thus, various aspects of employee interests require enhancement, including professional development, employee welfare, timely resolution to worker concerns, and caring for life challenges, such as work-life conflicts. Previous research also demonstrated that Chinese contractors poorly addressed certain issues of labor practices, such as safety training (Sha and Jiang, 2003; Tan et al., 2004). Notably, we do not present the ANOVA results of the remaining CSR communication dimensions because their statistical procedures are the same as the labor practices dimension and considering the length of the paper.

4.3.2. The environment

According to the ANOVA results, international contractors in the EU and US/Canada ranked the first and second among the four regions and their disparities were insignificant. By contrast, contractors in China and other Asian areas conveyed less information about environmental issues. Studies have demonstrated that the environmental issue has been emerging as a key criterion for project success (Alzahrani and Emsley, 2013). It is every contractor’s obligation to preserve the environment when conducting construction activities (Petrovic-Lazarevic, 2008; Shen et al., 2010). China’s construction practitioners advocated environmental preservation (Jiang and Wong, 2016); however, unfortunately, the practices reflected in the CSR-related documents were not promising. Thus, Asian (including Chinese) international contractors should focus on negative environmental impacts of construction activities. Effective measures may include performing separate environmental impact assessments, conserving water resources, reducing emissions of greenhouse gas and carbon, decreasing fuel consumption, and preventing damage to local climate conditions.

![Fig. 4. Average CSR perceptions in the seven dimensions in the four regions. Note: The closer to the outside of the radar map, the higher of the values in CRS perceptions.](image-url)
4.3.3. Fair operating practices
According to the ANOVA results of fair operating practices, both European, American and Canadian international contractors prioritize fair operating practices, while Asian (including Chinese) contractors communicate little information about this CSR dimension. The fair operating practices dimension refers to a company addressing its operating practices dimension refers to a company addressing its business activities and entire value chain to accumulate the economic resources and promote the social relations. To influence on local communities. Community issues include reducing negative impacts on local residents, utilizing local resources such as techniques and materials, and conducting charitable activities to promote local welfare. According to Fig. 5, it is obvious that contractors in EU and US/Canada posed more messages of “4.2.1: Support public school education by participating in activities to improve quality and access to education” and “4.4.1: Increase charitable donations to help and support disadvantaged groups in society” than Asian contractors, including the Chinese. If construction projects are located in developing countries, caring for “4.2.4: Promote the use of local techniques and materials in implementing the project under appropriate circumstances” can help contractors to obtain easy access to local materials, reducing the cost of materials significantly (Motwani et al., 1998). In addition, Asian and Chinese contractors communicate less than European, American and Canadian in other issues of community participation and development. These findings are consistent with previous studies, which found that public participation in construction projects in the East (e.g., China) was less prevalent than in Western societies (Li et al., 2012).

4.3.4. Community participation and development
As construction projects are tightly associated with local communities, it is necessary for contractors to consider their influence on local communities. Community issues include reducing negative impacts on local residents, utilizing local resources such as techniques and materials, and conducting charitable activities to promote local welfare. According to Fig. 5, it is obvious that contractors in EU and US/Canada posed more messages of “4.2.1: Support public school education by participating in activities to improve quality and access to education” and “4.4.1: Increase charitable donations to help and support disadvantaged groups in society” than Asian contractors, including the Chinese. If construction projects are located in developing countries, caring for “4.2.4: Promote the use of local techniques and materials in implementing the project under appropriate circumstances” can help contractors to obtain easy access to local materials, reducing the cost of materials significantly (Motwani et al., 1998). In addition, Asian and Chinese contractors communicate less than European, American and Canadian in other issues of community participation and development. These findings are consistent with previous studies, which found that public participation in construction projects in the East (e.g., China) was less prevalent than in Western societies (Li et al., 2012).

4.3.5. Human rights
European contractors conveyed more information about their protection of human rights compared to contractors in the other three regions. This finding is consistent with previous research. For example, European contractors seem to disclose more information related to child labor to eradicate it, although child labor is much more common in the Middle East, India and Africa (Cigno et al., 2002). Another investigation of the income of normal and disabled employees in EU companies showed that discrimination did not exist and income differences were based solely on productivity (Malo and Pagan, 2012).

4.3.6. Shareholders’ rights
Chinese contractors should disclose more information about company operations. The ANOVA results show that Chinese contractors' reporting is consistent with previous research. For example, European contractors seem to disclose more information related to child labor to eradicate it, although child labor is much more common in the Middle East, India and Africa (Cigno et al., 2002). Another investigation of the income of normal and disabled employees in EU companies showed that discrimination did not exist and income differences were based solely on productivity (Malo and Pagan, 2012).
contractors ranked the lowest among all regions in disclosing information about financial statements, operations and sustainable development. This result may be attributable to the lack of variety among organizational shareholders, as information disclosure is closely associated with shareholder composition (Gamerschlag et al., 2011). Most Chinese organizations in our sample were state-owned corporations with few large shareholders. Companies that lack large shareholders have little motivation to disclose information, as there is weak demand for such types of disclosure (Chau and Gray, 2002).

4.3.7. Organizational governance

Knox and Maklan (2004) argued that the development of CSR could well be inhibited by “the lack of a systematic framework linking investment in these responsibilities to social or business outcomes” (Knox and Maklan, 2004, p. 514). Specifically in construction companies, a well-arranged institution of CSR performance paved the way to achieve social objectives (Jiang and Wong, 2016). This institutional aspect is presented by issues such as establishing the economic and non-economic incentive system related to CSR performance, ensuring that the company establishes the economic and non-economic incentive system for CSR procedures. Furthermore, prior studies have shown that organizational governance practices should not be based exclusively on company procedures, but also consider company culture and moral standards (Wieland, 2005). This aspect of organizational governance for fulfilling CSR can ensure that top management are committed to and take responsibility for CSR and create fair opportunities for underrepresented groups (females, minorities, and other ethnic groups), and encourage employees at all levels to participate in CSR activities. According to the ANOVA results, corporations from EU, United States and Canada reached a consensus on disclosing issues including ensuring that top management are committed to and take responsibility for CSR and establishing economic and non-economic incentive systems for CSR performance, while European contractors surpassed all other regions in the remaining issues of achieving CSR objectives through organizational governance.

5. Discussion

5.1. Major implications

CSR communication has long been focused on both in academic and practical areas (Lindblom, 1994; Dawkins, 2005). However, despite the increasing attention to construction firms, few studies investigated CSR communication among international construction contractors. This study explores the CSR dimensions emphasized by international contractors in their CSR-related reports and compares such communications among contractors from four regions, i.e., Asia, EU, US/Canada, and China. The results reveal that CSR communication varied significantly among the four regions in both dimension- and issue-levels. The differences in the two levels were identical across all regions. European international contractors had the highest level of CSR communication in all seven dimensions. CSR communication of contractors in US/Canada and Asia showed an equivalent level and ranked the second and third, respectively. In contrast, the Chinese contractors had the lowest level of CSR communication in both dimension- and issue-levels. This indicates that Chinese contractors disclose limited CSR information, although previous research demonstrated they had strong awareness of the activities of a socially responsible contractor (Jiang and Wong, 2016). This study serves as a starting point for future investigations of CSR communication in the construction industry.

Future research should attempt to identify the mechanisms that create such communication differences in CSR reporting among international contractors in the four regions.

This study established a content analysis approach specifically to analyze the CSR reports of contractors. This approach bears several benefits. First, we design a systematic framework to use the content analysis approach in evaluating CSR communication. This framework can adapt to different types of contractors in various countries/regions and help them identify their CSR communication levels and make proactive adjustments. This clear framework also contributes to comparative studies on CSR communication among different types of contractors and between contractors and companies in other industries. Industry is another important determinant of how companies report their CSR activities (Wanderley et al., 2008; Tang and Li, 2009). Importantly, instead of merely counting the frequency of CSR issues, based on the weighted sum of 51 critical CSR issues, we established a more comprehensive index for assessing CSR communication levels. We demonstrated the validity of the CSR index through its correlations with the A11000 and the ISAE3000.

5.2. Limitations and future research

The research method employed in the present study also has several limitations. First, this research only examines CSR communication with a sample selected from the ENR list between 2009 and 2014. There may be a sampling bias as those contractors included in the lists are large ones. Future research can explore CSR communication among middle-size and small-size companies, and compare their practices with the findings in this research. Also, future samples can be expanded to contain a longer period. Second, different cultural and social contexts have long been considered to influence the definitions, practices, and subsequent communication of CSR (Chapple and Moon, 2005; Jiang and Wong, 2016). In the current analysis, English words and phrases were adopted, which may not be capable of grasping the exact meanings in diverse contexts. Also, contractors in English speaking countries are likely to disclosure more detailed information, while Asian contractors may present obligatory information. This language problem may bias the results here. In addition, the CSR dimensions were derived mainly from international standards, while certain countries, such as China (Tang and Li, 2009), may adopt their own CSR principles and standards that can emphasize different local CSR aspects which were neglected in the present study. Finally, although this research proposed a comprehensive CSR index considering 51 issues covering seven dimensions, and different weights were distributed to each issue according to their information gain and odds ratio. Only the qualitative semantic context was explored, future research may further devote to clarifying quantifiable targets and/or indicators that deserve more weights compared to those unquantifiable ones.

6. Conclusions

International contractors are subject to social responsibility requirements for worldwide social impacts of construction projects. CSR communication and disclosure is an effective means to present the society their efforts in CSR, thereby meeting social expectations and establishing a good reputation. However, CSR communication of contractors has rarely been investigated by the extant literature. The present study contributed to filling this gap and helping corporations meet social demand by developing a content analysis approach specifically to analyze CSR communications of contractors, thereby providing an initial understanding of the status of CSR communication among them. Furthermore, a comparative analysis
was conducted among Asia, EU, US/Canada and China. It was found that there were significant differences in CSR communication of the selected contractors among those regions. European contractors tended to present the highest levels of CSR communication at both dimensional- and issue-levels, whereas Chinese contractors ranked the lowest. This finding can serve as a starting point for future research to explore the factors that cause such significant differences. In addition, the content analysis approach utilized in this study can be specifically used in the construction context, contributing to the future research that is interested in exploring issues related to CSR communication. From a practical perspective, this modified approach can help contractors understand their CSR communication status and make adjustments, and thus finally to improve their CSR communication to the public.

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