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Does carbon disclosure converge across different geographical contexts? A qualitative study of the Guangdong-Hong Kong-Macao Greater Bay Area in China

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Abstract:

This paper aims to find disclosure differences in carbon accounting information for companies operate in Guangdong-Hong Kong-Macao Greater Bay Area (GBA). Based on the study of companies in service sectors, we find companies in Guangdong may vary disclosure format by year and are more likely to show their effort in responding government policies, but companies in Hongkong and Macao follow a constant disclosure standard and prefer to show how they cooperate with disclosure standards. By the model we construct to analyze disclosure quality, we find companies in Hongkong and Macao are better in disclosure quality,

while companies in Guangdong has a relatively low quality but is increasing by year. The inconsistency in accounting laws, regulations and standards are the main problems lead to these differences. We also give suggestions on how to build a unified and practical carbon accounting disclosure system.

Keywords : carbon disclosure, content analysis, Guangdong-Hong Kong-Macao Greater Bay Area

1. Introduction

Under pressure from global warming and climate change, governments the world over is paying increasing attention to the low-carbon economy. In 2020, China's carbon emission intensity was 48.4% lower than that in 2005, exceeding the target of 40-45% reduction promised to the international community in 2009[1]. During this period, China has taken a series of measures, such as adjusting the industrial structure and starting carbon emission trading. Low carbon economy has developed rapidly in China. At the 75th United Nations General Assembly, China set a new target of achieving emission peak by 2030 and carbon neutrality by 2060[2]. Building a green and low-carbon circular economic development system is still China's development priorities over the next decade.

Guangdong-Hong Kong-Macao Greater Bay Area covers 9 cities, 2 special zones and has a great population, is one of the highest construction density and strongest economic vitality areas in China. Achieving carbon neutrality in Guangdong-Hong Kong-Macao Great Bay area is not only a necessary way to deal with the global climate and environmental crisis, but also an important measure to achieve high-quality development in the future. However, China has not yet formed unified carbon accounting information disclosure regulations and standards, government supervision is also inefficient.

Against such a background, how to build a farsightedness and feasibility carbon disclosure system that is conducive to the development of low-carbon technology and economy is still an

urgent problem to be solved. Our study makes contributions in the following ways. First, Carbon disclosure is one of the most cutting-edge research projects in accounting, and is less examined in previous literature. Paper can provide a guideline for enterprises in Guangdong-Hong Kong-Macao on how to disclose carbon accounting information. Second, it can offer enterprises thoughts on how to determine environmental costs, promote relevant legislation, and urge the carbon disclosure synergy mechanism in Guangdong-Hong Kong-Macao Greater Bay Area.

The main purpose of this paper is to find the differences in disclosure, give recommendations for building a unified and practical carbon disclosure system, and make contributions on high quality disclosure in Greater Bay Area and other districts in Mainland. Information users, especially institutional investors[3], can make better decision makings, and the environment will be beneficial from the Carbon Reduction Act.

2. Research Method

2.1 Samples and Data

The following table lists the samples' name, main operation region, stock code and listing time. In this paper, seven samples are selected. Three samples are from Guangdong, three samples are from Hongkong, and one is from Macao. They all operate in service sectors, which have strong relationship between environment and human being, helping researchers investigate carbon disclosure. Hence, their 2019-2021 relevant reports are selected to find out the existing circumstance of carbon disclosure. This paper will focus on disclosure form, disclosure format and disclosure content, three aspects to discuss the quality of the carbon disclosure.

Table 1 sample information

No.	Company name	Region	Stock code	Listing time
1	China Southern Airlines Company Limited	Guangdong	600029.SH	2003-07-25

2	S.F. Holding Co., Ltd.	Guangdong	002352.SZ	2010-02-05
3	Ping An Insurance (Group) Company of China, Ltd.	Guangdong	601318.SH	2007-03-01
4	The Hongkong and Shanghai Hotels, Limited	Hong Kong	00045.HK	1921-01-01
5	Shangri-La Asia Ltd.	Hong Kong	00069.HK	1993-06-17
6	Cathay Pacific Airways Ltd.	Hong Kong	00293.HK	1986-05-15
7	Melco International Development Limited	Macao	00200.HK	1927-01-01

Data source: eastmoney.com

2.2 Content analysis

Content analysis is a research method which mainly takes all kinds of literature as the research object[4]. This method originates from the quantitative analysis of the contents of historical documents by using the methods of natural science research in social sciences. Content analysis describes the content of communication objectively, systematically and quantitatively. Its essence is the analysis of the amount of information contained in the communication content and its changes, that is, the process of inferring the exact meaning from the meaningful words and sentences.

We analyze the quality of carbon disclosure by investigating the disclosure form, disclosure format and disclosure content. If an entity wants to present high-quality carbon disclosure, above three aspects should be included to inform information users. The analysis period is from 2019 to 2021, the latest three years. 2019 is an important time point, since Chinese Ministry of Finance issued ‘Interim Provisions on Accounting Treatment of Carbon Emissions Trading’. Guangdong entities have start to be aware to be socially responsible. Hence, the analysis period starts from 2019.

3. Results

3.1 The form of the disclosure

all samples disclose carbon information in the form of Environment, Society and Governance Report (ESG report)/ Sustainability Development (SD Report) Report/ Corporate Social Responsibility Report (CSR report). The rate maintains in 100% from 2019 to 2021. It indicates entities in Guangdong-Hong Kong-Macao Greater Bay Area are aware the environmental issues and willing to disclose their effort in an independent report. They will keep continue disclose in an independent report.

In addition, all samples make carbon information disclosure in ESG report/ SD Report/ CSR report. Unlike other reporting form, reporting in ESG report/ SD Report/ CSR report can help board of director (BoD) concentrate on emphasizing their strong will in reducing greenhouse gas emission and how to provide economic-friendly service for customers. Customers and investors can be persuaded more directly by ESG/SD/ CSR brochures in reception desk and in the internet. It can be a good advertising for samples to build up impressive image in customer's mind, and therefore enhance reputation.

The principle of consistency is followed by the samples, except for the S.F. Holding Co., Ltd.. Information users are able to compare a sample 's carbon accounting information with its previous ESG report/ SD Report/ CSR report to confirm the sample do make effort to reduce carbon, but it is tough to compare company by company, since their standards are various and therefore the result is different.

S.F. Holding Co., Ltd. has inconsistent disclosure standards, for example its report name is various [6]. It publishes CSR report, SD report and carbon target white paper in 2019,2020,2021 separately. It's disclosure range shrink from wide aspects (including staff, governance, society and so on) to the certain carbon target aspect. S.F. Holding Co., Ltd might be easy to achieve its target since it concentrates its powder on the single carbon target.

3.2 The format of the disclosure

We have noticed that some entities mention one or two carbon related data and describe how they reduce carbon emission roughly; while other entities not only mention carbon emission

data with detailed content, but also compare with previous ten years (present a downward trend), proving they do make effort to be socially responsible. Obviously, when there are more data, the description is more extensive and detailed. Hence, based on the content and the data provided by entities, if the related data supplied less than three, is considered to be “Sentence-based description”, while the data supplied over three, is considered to be “Number-based description”.

According to table 2, the rate of disclosing with number-based description is increasing, from 71.43% to 100%. It means, the number of samples use more sufficient data and proper description to deliver higher-quality carbon disclosure is increasing. More carbon indexes have been used by samples in 2021 than those in 2019. More effort made by entities are quantified in how many tones of greenhouse gas emission are reducing, making it achievable.

Table 2 : Analysis of the disclosure format (by time)

Year	Sentence-based description	Number-based description
2019	28.57%	71.43%
2020	14.29%	85.71%
2021	0	100%

According to table 3, samples which located in Hong Kong and Macao would like to use number-based description to explain the carbon accounting information in their 2019-2021 ESG report, which is required by Hong Kong listing regulation, “ESG guideline”[7]. They also disclose that the trend of the carbon emission is going down within 10 years.

S.F. Holding Co., Ltd., which located in Guangdong, has started to provide more detailed indexes and explanation in disclosure in 2020 [6]. Ping An Insurance (Group) Company of China, Ltd. did not give sufficient data and explanations regarding to the carbon accounting until 2021 [8]. It indicates that samples in Guangdong just start to provide high-quality carbon accounting information, while samples located in Hong Kong and Macao have been already done so recent year. Guangdong government start to be aware the importance of the carbon disclosure.

Table 3: Analysis of the disclosure format (by firm)

Company name	Sentence-based description	Number-based description
China Southern Airlines Company Limited	0	100%
S.F. Holding Co., Ltd.	33.33%	66.67%
Ping An Insurance (Group) Company of China, Ltd.	66.67%	33.33%
The Hongkong and Shanghai Hotels, Limited	0	100%
Shangri-La Asia Ltd.	0	100%
Cathay Pacific Airways Ltd.	0	100%
Melco International Development Limited	0	100%

3.3 The content of the disclosure

Based on table 4, content related to government policy/ law/regulation, related to green house gas and related to actions of reducing green house gas, are three common parts considered by the seven samples. Almost all samples mention the three kinds of content in their ESG report/ SD Report/ CSR report.

Content related to risk and opportunity become increasingly important and its rate raise from 71.43% to 100%. It indicates that an increasing number of samples have find that carbon accounting information assist them with detecting future risk and potential opportunity. In other words, there will be risk and opportunities in relation to environmental issues in the future, which may affect their future operation.

Some companies even make detailed carbon strategy to reduce the risk from carbon emission and attempt to utilize the opportunity from the carbon emission. For example, China Southern Airlines Company Limited has noticed that there is a risk the carbon emission will affect the weather and therefore affect the operation in the flight[9]. The opportunity is, by taking biomass fuels, the cost can be cutdown and obtain customers' favorable impression, which brings positive impact to reputation.

Table 4: Analysis of the disclosure content (by time)

Year	Related to Government Policy/ law /regulation	Related to risk and opportunity	Carbon strategy	Green house gas emission	Actions to reduce green house gas
2019	100%	71.43%	100%	100%	100%
2020	100%	85.71%	100%	100%	100%
2021	100%	100%	100%	100%	100%

Based on table 5, all samples carbon accounting content contain Government Policy/ law/regulation, green house gas emission and actions to reduce green house gas. Samples located in Guangdong prefer to disclose how they response to government policies while those located in Hong Kong and Macao prefer to disclose how they apply to Hong Kong listing regulation.

Meanwhile, companies in Hong Kong and Macao have taken notice to the risks and opportunities from the global warming, and they are ready to reduce greenhouse emission, representing well-considered and practicable strategy; while China Southern Airlines Company Limited [9], located in Guangdong, just started to consider the risk and opportunities in 2021, and attempts to deal with them. This is because there is a lack of guidance in Mainland and there is no systematic approach to guide entities to response the challenge from the carbon disclosure.

Table 5: The content of the disclosure (by firm)

Company name	Related to Government Policy/law/ regulation	Related to risk and opportunity	Carbon strategy	Green house gas emission	Actions to reduce green house gas
China Southern Airlines Company Limited	100%	33.33%	100%	100%	100%
S.F. Holding Co., Ltd.	100%	66.67%	100%	100%	100%
Ping An Insurance (Group) Company of China, Ltd.	100%	100%	100%	100%	100%

The Hongkong and Shanghai Hotels, Limited	100%	100%	100%	100%	100%
Shangri-La Asia Ltd.	100%	100%	100%	100%	100%
Cathay Pacific Airways Ltd.	100%	100%	100%	100%	100%
Melco International Development Limited	100%	100%	100%	100%	100%

3.3 The quality of the disclosure

This paper assumes the impact of disclosure form, disclosure format, and disclosure content are the same, so the weight is 1. Considering the ESG report/ SD Report/ CSR report is a single report with high quality, so the weight is 2. The green house gas emission is disclosed in data, which is high quality, so the weight is also 2. The information disclose with number-based description is also high quality, and therefore the weight is 2 as well. Other events' weight is 1[5].

The quality of the carbon disclosure considers three aspect, form, format and content, to calculate the score.

The formula is:

$$\sum_{j=1}^{10} EDI_{ij}$$

EDI_{ij} =the i^{th} sample and the j^{th} event.

If there is no event, the score is 0; if there is , then add up the score as the table 6 shown. The total score is 10 marks, and the score is as table 10 shown.

Table 6 Carbon disclosure index and score

Carbon disclosure index	Score
Report of Board of Director	1
Important matter	1

ESG report/ SD Report/ CSR report	2
Related to Government Policy	1
Related to risk and opportunity	1
Carbon strategy	1
Green house gas emission	2
Actions to reduce green house gas	1
Sentence-based description	1
Number-based description	2

Through the table 7, samples located in Hong Kong and Macao have maintained high quality of the carbon disclosure. Samples located in Guangdong provide relatively low-quality carbon disclosure but these samples get start to improve the disclosure quality, urged by government. Meanwhile, the mainland government begins to emphasize the carbon disclosure in current years, and the carbon disclosure system is now in process.

Table 7 the score of Carbon disclosure

Company name	2019	2020	2021
China Southern Airlines Company Limited	9	9	10
S.F. Holding Co., Ltd.	8	10	10
Ping An Insurance (Group) Company of China, Ltd.	9	9	10
The Hongkong and Shanghai Hotels, Limited	10	10	10
Shangri-La Asia Ltd.	10	10	10
Cathay Pacific Airways Ltd.	10	10	10
Melco International Development Limited	10	10	10

4. Discussion and Conclusions

Inconsistency is the main problem for companies in Guangdong-Hong Kong-Macao Greater Bay Area to report carbon information. Hong Kong Government has published “Environmental, Social and Governance Reporting Guide” since 2011, and has revised the guide for several times based on the feedback from information users. Hence, the guide is relatively mature and comprehensive. Companies in Macao also followed the guide set by Hong Kong Government. So, it is very convenient for companies in Hong Kong and Macao to disclose carbon accounting information accurately and standardly, investors or other users to compare carbon disclosure between companies as well [10].

But as the most essential member in Guangdong-Hong Kong-Macao Greater Bay Area, Guangdong lack of regulation and guide in carbon disclosure. There is no official regulation or law to require listed companies disclose carbon disclosure, the current policies are to encourage entities voluntarily disclose relevant information. Hence, there is no consistency in the carbon disclosure in Greater Bay Area, and entities in Guangdong, which do not disclose or disclose in low quality, are normally unwilling to disclose sufficient information [5].

For instance, the independent report in Guangdong does not have consistent title and the content is also various every year. It makes information user difficult to compare entities’ current performance with previous years. In addition, still there are some entities disclose carbon accounting in the notes, other matters or BoD report, without an independent report. The carbon disclosure is hard to be found and understand. A possible reason for such phenomenon can be because entities worry such disclosure can undermine confidence in investor and market, thereby ultimately discouraging disclose carbon information [11].

Meanwhile, there is inconsistency in accounting standard. The accounting standard of Hong Kong and Macao is close to the International Financial Reporting Standards (IFRS), and International Sustainability Standards Board (ISSB), the publisher of IFRS, have published exposure drafts of General Requirements for Disclosure of Sustainability-related Financial Information and Climate-related Disclosures, which indicates that disclosure of carbon information became a material statement in the financial statements in Hong Kong and Macao,

and it will determine information users' (especially institutional investor) decision making in Hong Kong and Macao.

However, Chinese Accounting Standards have not included the disclosure mention above, and hence, BoD of Guangdong entities do not pay sufficient attention on the carbon disclosure. Some Guangdong samples do not employ accounting firm to review their ESG report/SD report/ CSR report, and their truthfulness of carbon disclosure is doubtful. Data and description disclosed in some of the Guangdong companies is inadequate, the emphasis is on the corporate governance and contents which has a positive effect. Thus, the quality of the ESG report/SD report/ CSR report is comparatively low.

4.1 Implications

Firstly, set up carbon disclosure system. Guangdong-Hong Kong-Macau Greater Bay Area will be built into an innovative economy which will guide China's deep opening up to the outside world. So, it is important to build a brand-new version of carbon disclosure guidelines. When setting up, it should consider not only the capitalist nature of Hong Kong and Macao, but also the socialist characteristics of the cities in the Pearl River Delta, and establish a unified carbon disclosure system in line with the development of the Greater Bay area. At the same time, the formulation of accounting information in the Greater Bay area can also help other Chinese mainland areas to establish a carbon disclosure system, in order to connect with international context.

Secondly, enhance cooperation in Accounting Industry. As mentioned above, China has not yet established a systematic and official carbon disclosure system. The only requirements related to carbon disclosure issued by Chinese government are extensive generally and difficult for companies to operate. Carbon disclosure has been neglected by Guangdong and other districts in mainland China for years, and that is the main factor that causes the inconsistency in Guangdong, Hong Kong and Macao.

Carbon disclosure is relatively mature in Hong Kong and Macao, accountant and other accounting practitioners also have more experience in understanding and cooperate with IFRS and Environmental, Social and Governance Reporting Guide. To take that advantage,

Guangdong should enhance communication and cooperation in accounting firms and accounting practitioners with Hong Kong and Macao.

In addition, the boost of commutation in universities, accounting firms and companies are also necessary in Guangdong-Hong Kong-Macao Greater Bay Area. Real needs and problems faced by the accounting firms and companies related to carbon accounting can be delivered directly to universities and accounting research institutions. It's a way to gathering all the thoughts and help accounting practitioners solve practical problem. Meanwhile help universities to optimize talent training plan, and create a labor pool for the future carbon accounting development.

Thirdly, accelerate carbon emission trading. Guangdong-Hong Kong-Macao Greater Bay Area has a modern transportation system, excellent infrastructure and a good investment environment. Industries like advanced manufacturing, biotechnology, high-end equipment manufacturing, new materials, cultural creativity and other emerging industries also will gather in that area in future. With such natural advantages, the area can be a perfect market for emission trading. It's possible for energy and emission reduction to be financialized and market-oriented.

On the other side, Government should offer economic incentives to the entities who actual operate emission reduction. Furthermore, induce companies and industries with a low carbon advantage to move to Greater Bay Area, to give play to the supplementary, regulatory role of the market [12].

Fourthly, Increase public's understanding to carbon accounting information disclosure. Carbon accounting is the cutting-edge in accounting industry, it is not the prior issue public may consider comes to investment. Some investors even treat detailed carbon information as a negative signal instead. Now only listed companies or companies with strong social responsibility disclose carbon accounting information voluntarily. It takes time to build a farsightedness and feasibility carbon accounting information disclosure system. So, before the system came out, the government should first promote companies' social responsibility and public's understanding of carbon accounting information. Except the government and other regulator, public can be a good supervisor for companies to disclose carbon information.

4.2 Limitations and Future Research

This paper is not free of limitations. First, the sample size is insufficient, our study only covers 7 companies and it is all in service sectors. Second, the study has a relatively short span of time, it only covers 3 years of research. Third, this paper does not consider all aspects of information. The disclosure quality factor only contains disclosure form, format and content. other figures also may contribute disclosure factor are ignored. For further research, we need extend the research span, more studies on other sectors, such as financial and manufacturing are also necessary. Furthermore, to explore disclosure difference and give suggestions on how to improve carbon disclosure system to other geographical contexts.

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Reference

- [1] Xie, F. X., & Zhuang, G. Q. (2021). Special issue on carbon peaking and carbon neutrality. *Annual Report on Actions to Address Climate Change*.
- [2] Xi Jinping 's speech at the general debate of the 75th session of the United Nations General Assembly Available at:
<http://www.mofcom.gov.cn/article/i/jyj/1/202012/20201203020929.shtml>
- [3] Kolk, A ; Levy, D; Pinkse, J, 2008. Corporate Responses in an Emerging Climate Regime: The Institutionalization and Commensuration of Carbon Disclosure. *European Accounting Review*, 17(4), p. 719-745.
- [4] Krippendorff, K, 2004. *Content Analysis: An Introduction to Its Methodology* . 2nd ed. Thousand Oaks, CA: Sage.
- [5] Fanglei, Yang, 2018. Research on Carbon Accounting Information Disclosure of listed companies in High pollution Industry. *Study and Innovation*(16), p. 91-92.

- [6] S.F. Holding Co., Ltd., Social responsibility report. [Online] Available at: https://www.sf-express.com/cn/sc/investor_relations/periodic_report/social_responsibility_report/ [Accessed 18th, June, 2022].
- [7] Hong Kong Stock Exchange, Index 27-Environment, Society and Governance Guide. [Online] Available at: <https://cn-rules.hkex.com.hk/%E8%A6%8F%E5%89%87%E6%89%8B%E5%86%8A/%E9%99%84%E9%8C%84-%E4%BA%8C%E5%8D%81%E4%B8%83-%E7%92%B0%E5%A2%83%E3%80%81%E7%A4%BE%E6%9C%83%E5%8F%8A%E7%AE%A1%E6%B2%BB%E5%A0%B1%E5%91%8A%E6%8C%87%E5%BC%95> [Accessed 20th, June, 2022].
- [8] Ping An Insurance (Group) Company of China, Ltd., Sustainable development report. [Online] Available at: <https://www.pingan.cn/sustainability/reportsandnews/reports.shtml> [Accessed 18th, June, 2022].
- [9] China Southern Airlines Company Limited, Social responsibility report. [Online] Available at: <https://www.csair.com/cn/about/shehuizerenbaogao/> [Accessed 18th, June, 2022].
- [10] Hong, Zhang; Weiyang, Sun, 2020. Problems of Carbon Accounting Information Disclosure in China and Suggestions for improvement. *Commercial Accounting*(16), p. 140-141.
- [11] Ascui, F ; Lovell, H, 2011. As frames collide: making sense of carbon accounting. *Accounting Auditing & Accountability Journal* May, 24(8), p. 978-999.
- [12] Yuan, L; Chen, YY; He, WJ; Kong, Y; Wu, X; Degefu, DM ; Ramsey, TS, 2022. The influence of carbon emission disclosure on enterprise value under ownership heterogeneity: evidence from the heavily polluting corporations. *Environmental Science And Pollution Research* May