ITF Symposium 1

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CREATING FINANCIAL INTELLIGENCE FROM ESG RATING AND SENTIMENT: A BIG DATA APPLICATION FOR HONG KONG LISTED FIRMS

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Presenters	Prof Louis Cheng, HSUHK Ms Vivi Hu, YoujiVest Mr Hauman Yeung, Ascent Partners Mr Chris Tse, The Institute of Financial Planners of Hong Kong and Macquarie Applied Finance Centre Dr Liane Lee, HSUHK

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1. Introduction
Prof Louis Cheng

Prof Louis Cheng started the Symposium 1 with a summary of key messages from the two seminars organised in 2023, which included the concepts of ESG integration, the i-Score development, the ESG sentiments and their impacts on companies, as well as the challenges encountered in the evaluation of ESG reports. Again, for meeting the expectations of participants from various disciplines and professional backgrounds, the topics of the Symposium covered the latest development of ESG in academic research and practical applications in companies. There is big emphasis on the discussions of ESG performance on alpha generations and the importance of ESG when using alternative data, which is different from the traditional financial data.

Prof Cheng explained again that based on media coverage of ESG and sustainability topics the sentiments could be found. The commercial data providers will employ Natural Language Processing (NLP) algorithms to capture the positive and negative sentiments from articles based on a prescribed list of ESG keywords. The measures of sentiment reflect on how professionals perceive ESG information from the media coverage within a given period of time. He shared an example of capturing ESG sentiments. Using NLP algorithm, a total of 203,777 news was examined. The biggest word shown in "E" area was "GHG EMISSION DECREASE". The biggest word presented the contingencies mostly mentioned in the news with either negative or positive connotations. ESG, as a non-financial aspect, is becoming more important for companies.

Stakeholders should be advised to have a clear understanding of their own ESG preferences (i.e. E-pillar, S-pillar, and G-pillar respectively) for their investment strategies and product choices. For institutional clients, the investment policy statement would document in detail how ESG should be integrated into the portfolio allocation and product selection process. The KPIs for evaluating the real impact and the financial impact (i.e. double materiality) should also be clearly specified.

With specific figures presented by different rating companies for a specific listed firm, Prof Cheng illustrated the issue of divergence of ratings from different data providers. As mentioned in one of the previous seminars, the "Aggregate Confusion Hypothesis" suggests that the rating divergence is

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caused by 3 factors: scope, rater, and weighting differences. The ESG analysts employed by different ESG data providers are subject to regional and corporate cultural influences in rating companies, leading to the rating divergence. It also leads to the importance of capturing locally relevant ESG data. Finally, the development of i-Score is expected to be a solution since it is created as a divergence-adjusted ESG performance rating for each firm.

2. Alpha generation using ESG sentiments and climate data

Ms Vivi Hu

YoujiVest is combining AI and deep learning techniques to build ESG ratings, carbon/environmental metrics and climate models native to China. The products are mainly about data and modelling. The presentation was about ESG ratings and pollutant discharge, together with several real-life case studies applying different ESG data collection strategies for alpha generations.

2.1 Two types of ESG ratings

According to Vivi, there are two types of ESG ratings. One is from the fundamental one which is mainly based on disclosure from consulting firms and their business is to do the disclosure and generate ESG reports for the listed companies. Such kinds of ESG reports mainly record what companies have done in the past one year and put emphasis on great things that have been doing, so it is hard to discern the greenwashing problems behind. Another type is the dynamics ESG ratings which do not look at what a company says, but what it does. This involves NLP, AI and the use of a lot of sentiment analysis, market news, regulatory filings etc. The dynamic ratings are frequently updated and relatively objective. YoujiVest favours the use of the combinations of fundamental and dynamic ratings.

2.2 Strategies for data collection

CERS (China ESG Risk Scores) vs CSI800

YoujiVest focuses on studying the negative sentiments as the information will be comparatively genuine while back-testing concerns bad issues of companies only. With the support of technologies and many partners, YoujiVest is ready to capture data frequently and from many sources as well as making smart adjustment for market cap since large companies will induce more negative news to a certain extent.

Following the **negative sentiment analysis**, a company will have a higher rating if it does not have records of bad issues. With CSI800 as a benchmark, the different risk portfolios of companies can be studied to evaluate their different levels of ESG performance. In the past five years, there were no bad issues found from those companies with good ESG performance. Those companies will always have good ESG performance when compared to the companies having bad ESG performance. Everyone likes to apply the strategy to pick the companies with good ESG performance to get the excess return.

2. Alpha generation using ESG sentiments and climate data

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2.2.1 High Dividend yield with ESG score enhanced.

Another investment strategy is to leverage on the high dividend yield which can be further enhanced. The fundamental is the dividend yield which is based on the C-score. A firm can use 30% of the YoujiVest's ESG ratings and combine this with 70% of the traditional high dividend yield strategy. The ESG score is made as a factor to enhance the traditional high dividend yield. Surprisingly, in the past 3 years, YoujiVes has experienced 70% enhanced traditional high dividend yield strategy. It can also be possible to combine with multi factors for the traditional quant strategy to enhance the dividend yield more. Due to the greenwashing issue, disclosure data only appears to be insufficient to present timely and real data for alpha predictions. A lot of traditional ESG rating companies also integrate sentiments into their new version of ESG ratings.

2.2.2 China Environmental Pollutant Discharge (CEPD)

CEPD is the data collected by sensors on both hourly and daily bases and it is monitored by the government. The data presents the intensity of the pollutant discharge of companies and the amount that exceeds the government prescribed limit will be subject to risk of penalty. The penalty will be serious and an extreme case was that the government just shut down the factory discharging pollutants but without the license to do so.

Another factory adopted the strategy did by YoujiVest. The factory had more alpha generation based on YoujiVest's feedback. The low emission portfolio contributed the excess return more both for the air pollutants and the solid particulates of the factory. The government will closely monitor the different types of pollutant discharge and once the national limit has been exceeded, regulators will investigate onsite, and this may take about four or five months. Therefore, fund managers will not care about how great the environmental protection measures are, but they really concern with whether their investment portfolios contain high emission pollutants and they will underweight those types of securities. YoujiVest got much feedback from the quant fund. They said they could rebalance on monthly basis to earn excess returns.

2. Alpha generation using ESG sentiments and climate data

Ms Vivi Hu

A study was conducted about the pollutant discharge data across top five industries (basic chemicals, machinery and equipment, automobiles, medicine and biology, and electronics) in China. The research is done in a short-term period (i.e. 2 months and 3 months) based on the growth of emission across the five industries. The high emission will be seen also contributing to higher excess returns but only within a very short-term period. It was found that if the companies have continued to have a very strong growth of emission, there was a high correlation with their orders of production. But normally, the companies will not continue their high emission outputs because they will be facing tightened regulatory pressure as the regulators will start to do investigations. That means if stakeholders want to invest in those companies which have a strong growth of pollutant emissions continuously, they probably will not get any good returns. In a nutshell, emissions are critical alternative data to address for alpha generation. Accordingly, the employment of alternative data can help companies to gain strategic advantages in the market.

3. Gaining strategic advantages by using alternative data

Mr Chris Tse

Alpha implies that the investment projects can outperform certain industry benchmarks and lead to their excess performances for making more money. There are several reasons for the emerging trend of adopting alternative data in the market. First, it is founded that more and more institutional investors, including the asset managers and hedge funds, are using alternative data nowadays. Alternative data is non-traditional data. Traditional data is normally composed of market data and those published or disclosed information.

Asset managers are integrating more alternative data into the investment. Historically, investment analysts will normally use the trading information or fundamental information disclosed by the listed companies to formulate their investment strategies. Everyone can obtain the same kind of traditional information. If people would like to achieve different outcomes with the same information, it will mainly rely on managers' skills. Besides, alternative data can provide additional insights for investors or asset managers other than the general traditional data in the market. The source of the alternative data may come from the proprietary research or other resources stored by different parties that are not evolved in any investment process yet. However, stakeholders can make use of those types of data to create their own sets of data and incorporate them into their investment process.

Due to this emergent growth of alternative data, investment managers would subject to a strategic disadvantage if not adopting it in their investment process. This strategic disadvantage can be highlighted by three types of risk, which are the position risk, execution risk and consequence risk that asset managers may encounter in the long run. In the financial market, people have to establish strategic advantageous position for taking speedy actions instead of waiting for general information passively when making investment decisions. Taking a large supermarket as an example. Due to the technological advancement, some private satellites can capture daily sales and note the number of visitors through the number of trolleys of products and proxies of daily sales even from the underground carpark. Late comers will incur position risk when they cannot gain access to such kinds of information if exclusive

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agreements have been established earlier by other parties. If companies lose experienced and professional ESG talents to the market, they will be subject to execution risk. It is problematic if ESG experts are not available in the labour market, under the situation that ESG is becoming more important in the financial market. With the emerging growth of alternative data providers, the traditional data providers may be subject to reputational risk (consequence risk) as they are latecomers to the innovative space.

To strike a balance and to minimize these risks, the professional investors will mostly combine the traditional data and the alternative data to make a better-informed decision. First, when referencing to the ESG performance, they will look into the ESG ratings or scorings, but those are static data which will be subject to quarterly, half-yearly or annually reviews, dependent on MSCI, Sustainalytics or other providers. Another important piece of data, which will normally be given by data vendors or data rating agencies, is called controversies score which represents a record of the ESG sentiments.

3.1 Challenges of accessing alternative data

There are four challenging factors when creating own sets of alternative data. First is the "Viability", which is about whether people can find or own their own data sets that are instrumental and important for achieving good performance. Companies need to identify relevant data but not just any sets of data. It is just like different industries which will have different emphases on E, S, or G. The second factor is the "Usability". The flooding of data may be scattered and unstructured, causing it difficult to be used directly. There should be a process converting data from unstructured to structured one. The third factor is the "Actionality". It is about whether the data will be impacting on the stock performance. This is a complicated process. The data scientists will look into the current used cases by the financial markets or asset managers and try to tap and link (through linkage analyses) the outcomes to a particular factor.Finally, it is the "Accessibility" factor by the market. As the alternative data can be valuable for making money considerably, it may not be easily accessed by everyone in the public. Therefore, the alternative data

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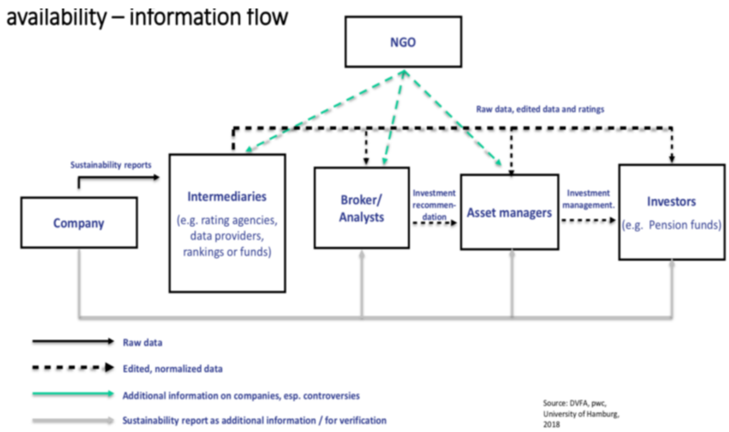
providers will create ready-for-use data together with, e.g. a very simple API (Application Programming Interface) to access into it. Therefore, before adopting any ESG data, there should be evaluation process as advised by Hauman.

Today, many ESG data vendors have increasingly been incorporating alternative data sources into their analysis and reporting. For those ESG data vendors, they are not only using the disclosed data, but they also conduct interviews to gather more information from companies. Most of the ESG data vendors will try to use an outside-in approach which is gathering data from the outside sources and not from inside the listed companies. The outside data may come from NGOs and media which can be used to counter check or cross check, based on certain channels, the validity about statements, e.g. the amount of carbon emission made by the listed companies. That is why the alternative data becomes a common adoption within the ESG data vendor market. The current growth of the alternative data business signals the usefulness of it in generating returns and is attracting many asset managers to subscribe it. The proprietary data can easily be shared with others whenever disclosed. Similarly, the value of alternative data will go down once shared to the public and therefore alternative data is still highly non-transparent.

3.2 Actors in the ESG Information Flow Related to Data Availability



There are different actors in the ESG information collection process, and they have close relationships. The **listed companies** will offer the raw data only, and everyone can access this raw data since information from listed companies is transparent to the public. Stakeholders can evaluate if this homogeneous market data is very useful when everyone may possibly make the same decisions.

For **intermediaries** (e.g. rating agencies, those ESG data providers), they are collecting the public information from the listed companies and add values by

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conducting their own research and interviews, and incorporate some alternative data collected from NGOs and media into the reports. They will sell these normalized data results in the form of scoring, ratings, signals to the asset managers, brokers, or traders for their earnings. Those rating agencies and data providers are making use of alternative data to counter check or create their own sets of products called ESG data controversies. They would like to capture the ESG sentiments for listed companies.

Now, those mainstream ESG providers also use alternative data to compose their core ratings. From their institutional websites, they claim that they are using alternative data from media and NGOs to compose the controversies to offer additional insights for listed companies. They are also using a number of alternative channels, e.g. satellite imagery or web sensors, to gather information. They will also outsource to third parties to collect data. People have different benchmarks and so do the different risk-taking levels. In the alternative data market, normally people are just making use of alternative data as peer comparison rather than a proxy to compare with a particular benchmark.

Alternative data providers will obtain data from different sources which show the advantage of having rich information from diverse perspectives.

3.3 Sources of ESG data:

As mentioned, alternative data providers will collect data from multiple sources and the following are some details:

3.3.1 **Satellite Imagery:** ESG data vendors can analyse satellite imagery to monitor a company's environmental impact. They can track deforestation, pollution levels, changes in land use, and other environmental indicators. This data helps to assess a company's compliance with environmental regulations and its commitment to sustainable practices.

3.3.2 **Media and News Sentiment**: ESG data vendors leverage social media and news sentiment analysis to gauge public perception and sentiment towards a company's ESG practices. By monitoring online conversations and news articles, they can identify potential reputational risks and assess stakeholder sentiment (driven by controversies).

3.3.3 **Web Scraping**: ESG data vendors employ web scraping techniques to extract data from various online sources

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such as corporate websites, regulatory filings, industry reports, and NGO publications. This allows them to gather information on a company's ESG policies, initiatives, and performance metrics.

3.3.4 **Sensor Data**: Some ESG data vendors utilize sensor data collected from IoT (Internet of Things) devices and other monitoring systems. For example, they can gather data on energy consumption, water usage, air quality, and waste management processes. This data provides insights into a company's resource efficiency and environmental impact.

3.3.5 **Supply Chain Data**: Alternative data sources like supplier and third-party data can provide visibility into a company's supply chain and help to assess potential ESG risks. ESG data vendors may collect data on suppliers' labour practices, human rights records, and environmental compliance to evaluate a company's supply chain sustainability.

4. Challenges of Evaluating ESG Disclosure of Hong Kong Listed Firms
Mr Hauman Yeung

Although there are international standards for ESG reporting format, different companies, large or small, have reported ESG performance with different formats, making comparisons difficult. Hauman shared evaluation issues which include wrong calculations of reporting items, missing important reporting items, wrong use of reporting unit, incomplete information, and irrelevant data. With the various types of reporting issues, there will be questions regarding the objectivity, meaning and accuracy of the report content.Therefore, when reading the ESG reports, investors or regulators can pay special attention to the accuracy, completeness, relevancy, the meaning, and the quality of the figures presented in the ESG reports. In such regard, Hauman shared guidelines for identifying and addressing problems in ESG disclosure so as to improve the quality of ESG reporting.

5. The effect of employee's opinion on corporate ESG performance

Dr Liane Lee

5.1 The research design

A survey was conducted in 2023 with the employees in the USA and Hong Kong. It is to study how Corporate Social Responsibility (CSR) and green behaviours of companies will affect the green consumption behaviour of employees. The constructs under study are **perceived corporate social responsibly, perceived corporate environmental behaviour and perceived mutuality** (i.e. How do the employees see their companies? Do companies and employees agree with each other in terms of their CSR information? For example, do companies ask for the opinions of as well as sharing their CSR information with their employees?) and consumer's environmental purchasing behaviour (i.e. employee's green purchasing behaviour).

The findings show that perceptions of companies' CSR alone are not sufficient to drive employees' green purchasing behaviour. Employees' perception of how a company behaves in environmental protection, known as perceived corporate environmental behaviour, partially affects their green purchasing behaviour. Further analysis suggests that high levels of perceived mutuality will strengthen the relationship between perceived corporate CSR behaviour and consumer's green purchasing behaviour.

This interaction effects of Perceived Mutuality on CSR and consumer environmental purchasing behaviour imply that the more the companies communicate with their staff and have their agreements, the employees will like companies' activities more (positive effect). They will believe and trust what companies are doing are genuine and it will also affect the green purchase behaviour of employees.

5.2 Comparison between Hong Kong and the USA

When the origin of the employees is considered, the relationship between perceived corporate CSR and employees' green consumption behaviour is more prominent among Hong Kong employees when compared to their US counterparts. One possible explanation could be that CSR knowledge is still a relatively new concept among Hong Kong employees (e.g. recycled paper), leading to a stronger initial effect that may diminish over time. In the USA, it will probably be more advanced in terms of the CSR and green initiatives. Liane believes that

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there is an opportunity for Hong Kong companies to start doing a lot more work in terms of engaging their employees to contribute more to CSR.

5.3 Implications

Socialization (e.g. education) occurs when a company's CSR and environmental behaviour are positively viewed by its employees, leading to increased engagement in green consumption behaviour. The more the employees feel being consulted on companies’ CSR activities and their opinions are considered with more access to companies’ CSR information, the more likely they will opt for green goods. These results suggest that there are ample opportunities for employers in Hong Kong to align their CSR efforts with their staff and turn them into advocates for CSR and green initiatives of the company, thus building green culture together as a result.

6. The i-Score universe for visualizing the relationship between ESG performance and sentiment

Prof Louis Cheng

Following the launch of i-Score scorecard 1.0 and 2.0, this version 3.0 was updated on 20 March 2024, the day before the Symposium. Interested parties can visit https://www.bigdata-esg.com where both sentiment and ESG rating can be found. The key messages of this version 3.0 are presented with the following table where Prof Cheng showed graphs for participants to read the relationship between ESG performance and sentiment and to obtain insights for financial performance.

The relationship between ESG rating and Media Sentiment

Objective	Findings	Implications
Comparing the sentiment performance of i-Score and non i-Score entities	There are no significant differences between the two groups of firms, in terms of sentiment performance.	It means that companies with high ESG performance ratings do not mean that they have more positive comments from newspaper articles. The media, KOLs and the newspapers would not give more credits to those companies with high ESG performance. Therefore, money may be wasted in generating high ESG performance ratings.
Which industry has higher industry sentiment?	Health care sector (the solid orange circle) is obviously better.	Different industries have different levels of performance. It is not company-based but industry-based.
How market cap affects i-Score and sentiment?	Large-cap entities are more condensed in the positive zones.	The large cap entities are more condensed in the positive zone. In addition, there are some small-cap and mid-cap entities locating in the negative zone. Larger firms, when compared with small firms, performed differently. Therefore, it may be worth looking into market capitalization and observing how the sentiment, the newspaper articles have actually been reacting overall.
Comparing E and S pillar on all universes (i and non-i)	Overall pattern strongly indicates that there's a positive correlation between E Senti and S Senti.	There are different reactions and there are different performances. Overall pattern strongly indicates that there's a positive correlation between E sentiment and S sentiment. It indicates that both E and S are good for the society. If you do good for the environment, there is a tendency you also do good for the social engagement. It is unusual (unlikely) for firms to just focus on environmental protection like carbon reduction but do not care about employees. It is obvious that if a company engage in E, normally they also engage in S. The coverage of the social media and mainstream media confirms that phenomenon.
Comparing the ESG sentiment of i and non i-Score universes under mainstream and social media news	This pattern indicates that i-Score universe has more negative social media sentiment than the non-i universe.	This pattern indicates that i-Score universes have more negative social media sentiment than the non-i universes. In other words, the good companies with high ESG ratings, which are also the top 511 and large companies in Hong Kong. These different industries cluster in the negative zone means that they are bad-mouthed by social media. There is no proof that this social media negative sentiment is true or is referring to big news. The speculation is that KOLs like people to subscribe their channels and would say something that can attract more audiences and therefore will say something bad about some prominent or well-known companies. This is because of human nature in which people like to hear bad things such as large companies will manipulate everything.

Conclusion

There are continuous developments for ESG concepts and reporting in both academic and practitioner fields. With the advancement of technologies, there are more data collection methods for alternative data, leading to emerging growth of this alternative data market. The stakeholders would be dragged to a strategic disadvantageous position if not joining the market at this moment of time.

The traditional annual ESG information will always be perceived as good things and will be easily interpreted as having greenwashing problems behind because companies will tend to say good deeds and positive measures on ESG. However, the alternative data, using an outside-in approach, helps to provide more objective and updated data for what the companies do for their ESG performances. For a balanced view, a combination of fundamental traditional data and dynamic non-traditional data can be used to evaluate the ESG performance of a company. Sometimes, companies can even use ESG data to leverage on high dividend yield as a strategy to improve alpha generation. The focus on reporting negative sentiment is also a strategy to realize the alpha generation of a company. For genuine bad issues, it will affect stock price negatively.

A graph shows that the poor sentiment of a company will drag down the overall performance of the company. Both top 100 and bottom 100 companies (out of the 511 listed companies) indicate that bad sentiment will drag down the overall performance of the company in investors' perception of ESG. However, for the top 100 companies, it seems that few of those companies' overall performance will be dragged down. According to Vivi's results that the overall media will impact the stock price, the companies' PR and IR divisions should manage media exposure on ESG performance. Similarly, if companies do not manage their ESG performance, it is not useful to gain high ESG ratings, especially for large cap companies. Accordingly, if institutional investors and shareholders do not want to see negative news about their invested firms, managing the ESG sentiment from news and social media have become an important issue for professionals of investors relations and corporate communication.

Conclusion

Prof Cheng remarked that there will be a tendency for the social media to exaggerate the negative level of the ESG news of a company. This also leads to the understanding that those non-i-Score companies may not have bad news for the reason that the social media does not care about them as long as social media will attack large companies so as to appeal to more followers.

From Chris' presentation, by incorporating alternative data sources, ESG data vendors aim to enhance the accuracy and depth of their analysis. Complementing traditional financial data, alternative ESG data provides investors with a more holistic view of a company's ESG performance, thus enabling them to make more informed investment decisions that align with their financial goals and sustainability objectives.

Liane's research has provided insights for developing leadership in cultivating green culture in companies so as to develop the green behaviours of employees. That might be a new function for HR to pay more attention during their recruitment and selection process. Strategically speaking, companies can think and design about what they want to drive their niche e.g. the UN's 17 SDGs to achieve. Companies can select goals that they are compassionate about and obtain the agreement of staff. There are lists of actions that can be taken in this relatively infancy stage in Hong Kong. Her findings seem also to echo with the one of the i-Score's overall patterns about the positive correlation between E sentiment and S sentiment. The companies' green behaviours will indirectly benefit the society through employees. For leadership's ESG performance, it contributes to the 'G' element of ESG of a company.

Finally, no matter how good the ESG reports looks, as illustrated by Hauman there are areas that companies or investors can pay attention to, making sure that quality ESG reports with accurate, meaningful and objective data are in hand.