

Analysis of the Environmental Solid Waste Management Industry Large Oversea M&A Motivation and Its Implementation Performance

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Abstract: The paper is based on the 2015-2017 environmental protection industry overseas M&A as the research object, makes a statistical analysis of the scale of industrial M&A and its sub-sectors; summarizes and elaborates the mainstream views of the motivations and performance of the scale of industrial M&A and its sub-sectors; and performance analysis of the status quo, characteristics and motivation of large-scale overseas M&A, five typical and representative large-scale overseas M&A cases in the solid waste industry were selected, and the short-term and long-term performance of overseas M&A were analyzed by using the event window method and financial index, with significant conclusions obtained, and relevant suggestions are made in the paper from the perspective of industry development and enterprise operation.

Keywords: Environmental Protection Enterprises; Oversea M&A; M&A Motivation; M&A Performance

1. Industry Background

In the background of economic globalization, cross-border M&A has become a shortcut to make companies become more powerful and stronger. Take the US. Garbage Giant company- Waste Management and Suez Group of France as the example, refer their development paths, we can clear see that horizontal, vertical and even hybrid industry chain expansion through M&A is a key step for environmental companies to achieve breakthrough growth. As a result, Chinese environmental protection enterprises with capital and operational experience have started to seek overseas high-quality corporate targets and layout global M&A, and have made a spurt of progress since 2015.

According to industry statistics, a total of 15 oversea M&A in the environmental protection sector were implemented in 2015, with a cumulative value of nearly RMB 8 billion; in 2016, the company number of oversea M&A increased to 20, with a total value of over RMB 16 billion; in 2017, the company number declined, with about 9 oversea M&A cases and a deal value of about RMB 10.9 billion. ^[1]

In terms of project size and amount, the environmental protection field involves a larger proportion of the total transaction amount of Chinese companies oversea M&A, of which solid waste-related projects again account for an absolutely larger proportion of the transaction amount of environmental protection field oversea M&A, 3.096 billion yuan, 12.104 billion yuan and 8.668 billion yuan from 2015-2017 respectively.

Oversea M&A in solid waste management industry grew sharply in terms of transactions number and transactions scale in 2015-2016, continuously breaking through to create new highs. since 2017, with the acts and regulation policies on overseas investment of Chinese state-owned capital, several EU member states strengthened investment control mechanisms and other overseas reviews ^[2], and the impact of global macroeconomic uncertainty, the pace of oversea M&A in China's solid waste industry has slowed.

Since the end of 2019, due to the global epidemic, economic and political factors, coupled with the introduction of

state-owned strategic investors in basically all of the domestic environmental protection industry mixed reform, subject to the tightening of policy control on the outward movement of state-owned capital, the overseas M&A in China's solid waste industry has entered a latent stagnation period. The number of overseas M&A transactions is at a record low in 2021, taking into account industry motives and investment returns, the solid waste industry overseas M&A will recover slowly after the epidemic.

2. Types, characteristics and motivations of overseas M&A in solid waste industry

The overseas M&A in the environmental protection industry is becoming a trend based on the background that the strong support from domestic environmental protection policies, rapidly increasing market concentration and a clear trend towards industry chain consolidation.

Due to the characteristics of the environmental protection industry projects such as state-owned capital background, utility attributes and large-scale capital volume, they are more complex and complicated than general overseas M&A transactions, and show a complex transaction structure, many uncertainties, many stakeholders, high potential risks in the transaction, high internationalization and specialization of the transaction process, and high requirements for the quality and ability of the transaction participants in the M&A process. The M&A motivation is also more complex and diverse than that of general cross-border M&A.

From the analysis of M&A corporate subjects, their M&A public logic can be basically divided into four categories: technology integration based on core competitiveness; industry chain extension based on upstream and downstream business expansion; globalization layout based on market expansion; and cross-border M&A based on business transformation. Depending on the characteristics of the subject enterprises, the M&A logic may be manifested as a combination of various factors.^[3-10]

	M&A motivation	Motivating key elements	Main definitions	Related Theories
Internal driving factors	Business Synergy	Market share	Economies of scale, competitive advantage	Efficiency theory Jensen and Ruback. Operating synergy theory Weston. Market Power Theory Mullin
		Production costs	Economies of scale and reduced costs	
		Industry Chain	Complementary Strengths	Incomplete Contract Theory Grossman
	Management Synergy	Organizational Structure	Management efficiency differences	Efficiency theory Jensen and Ruback. Differential efficiency theory R. Sherwin. Strategic restructuring theory Weston. Transaction cost theory Buckley, Casson (2003)
		Strategic Restructuring	Quick adjustment	
	Financial Synergy	Net Profit	Cash Flow	Financial Theory
		Investment and Financing Opportunities	1.The cost and size of financing 2.Differential taxation 3.Rational territorial tax avoidance	Implicit claim theory Klein and Leffler (1981). Information theory. Undervaluation theory Weston (1998) Diversification theory of business

		Enterprise Risk	Risk sharing	(Adler, Dumas, 1983)
	Other factors	Business Goodwill	1.Intangible assets such as goodwill and information pathways. 2.Undervaluation due to differences in market perception.	Agency theory Jensen, Meckling (1976); Shleifer (1989). Managerialist theory Mueller. A theory of arrogance Roll (1986), Berkovitch (1993). Speculative Motivation Theory Gort (1969)
		Private Profit Purpose	1.Manager control realization 2.Power rent seeking	"Managerial empire building" (Jensen , Meckling, 1976; Jensen, 1993; Grossman , Hart, 1988; Stulz, 1990
External potential factors	Macro Perspectives	Socio-economic Technology Development	1.Significant inventions of new technologies. 2.Government support or deregulation of certain industries. 3.The industry is in boom or recession	M&A wave theory Mitchell and Mulherin (1996). Neoclassical theory Harford (2005, Holmstrom (2001)) Industry cycle theory Lambrecht (2004), Toxvaerd (2004), Bernile and Zhdanov (2007)

According to diversification theory, the wide disparity in marginal tax rates in different countries around the world allows large firms to shift profits through global operational adjustments and thus gain arbitrage; Shleifer and Vishny argue that the market valuation of firms influences the incentive for highly valued firms to acquire relatively undervalued firms; Garzella, Stefano et al.(2017) argue that more attention is focused on M&A as an area in firms' external growth strategies, mainly due to the synergies generated by M&A in M&A decisions and performance assessment play a key role.

In addition to the above mentioned internal drivers, the factor of performance evaluation has special importance for SOEs in China's economic environment. Since the State-owned Assets Supervision and Administration Commission (SASAC) Measures for Business Performance Evaluation of Heads of Central Enterprises and the previous interim measures require that the compensation performance of heads of enterprises is closely related to the net profit and economic value added of the enterprises, the management of enterprises has a more sufficient internal driver to implement large corporate M&As. Some statistical studies have shown that SOE management power is positively correlated with the size and number of M&As, especially after management re-election, there is a significant increase in corporate M&A behavior.^[11]

In terms of external inducements, China's environmental protection industry support policies; the rapid development of industry trends scale effect, and the pressure of internal volume prompting major groups to focus on overseas business all contributed to the large-scale cross-border M&A wave in the environmental protection solid waste industry during the period of 2015-2018.^[12]

3. Analysis of overseas trading entities and M&A performance

In this paper, five representative M&A cases ^[13] were selected for analysis in terms of asset size, corporate nature, industry capability of the acquiring entities, as well as deal size and industry value during 2015-2017, the analysis is to explore M&A motivation and performance in the solid waste industry. The five cases are: Beijing Capital Group's acquisition of ECO in Singapore in 2015; Capital Environment Holdings Limited's acquisition of BCG in New Zealand in 2015; Beijing Enterprises Holdings Ltd.'s the acquisition of EEW in Germany; China Everbright's the acquisition of NOVAGO in Poland in 2016; and the acquisition of Urbaser in Spain by China Tianying Inc. in 2017.

The initiators of the five M&A cases are all head enterprises in the environmental solid waste industry, ranked among

the top in the industry, with state-owned backgrounds, their assets are generally above 10 billion, and they all have a large number of successfully acquired and operated solid waste projects in the territory. All four group companies chose to participate in the overseas M&A market competition and make large horizontal M&A in 2015-2017, indicating that this M&A wave has a certain representativeness and universality.

Regarding the research on M&A performance, Feng Genfu (2001) studied that horizontal M&As may be negatively affected by short-term performance after M&As, but show an upward trend in terms of long-term performance;^[14] Ye Zhangli (2013), on the other hand, concluded that the short-term performance benefits of horizontal M&As are significant, but the long-term upside is limited; Xue Anwei (2017) conducted a study on the 2013-2016 PSM method was used to study the performance of cross-border M&A of listed companies from 2013 to 2016. concluded that there was a significant causal effect between cross-border M&A and domestic firm performance, but the positive effect of cross-border M&A on firm performance gradually weakened over time. ^[15] In general, due to the differences in research subjects, research methods, and performance modeling, the results of the current academic research are fragmented and no unified consensus has been formed.

Mainly, the indicators commonly used to evaluate the cross-border M&A performance of listed companies can be divided into two dimensions: 1) short-term performance, which is mainly an indicator to judge the market valuation and investment value of listed companies before and after M&A from the perspective of market investment; 2) long-term performance, which is mainly financial-related indicators, including corporate profitability indicators, capital liquidity indicators, operating capacity indicators and value growth indicators, etc. and value growth indicators, etc.^[16-17]

In this paper, we develop a brief financial model based on the indicators of the above two dimensions to analyze the comprehensive performance of overseas M&A in solid waste industry in terms of market response, profitability, capital health and value growth.

4. Short-term performance

In this paper, we adopt the market model of event window method to analyze the public market reaction to M&A of listed companies, and select the daily real return and its reference index return ^[18] for the announcement date and the eight days before and after the announcement date of the four cases, respectively, and exclude market factors such as general market shocks to calculate their daily excess return and cumulative excess return of stocks.

The following are the specific calculation formulas with the meaning of each indicator.

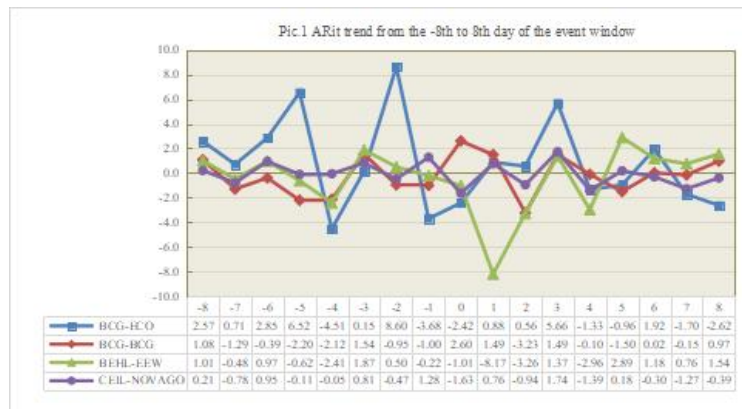
$$CAR_{it} = AR_{it} - (R_{it} - R_{mt})$$

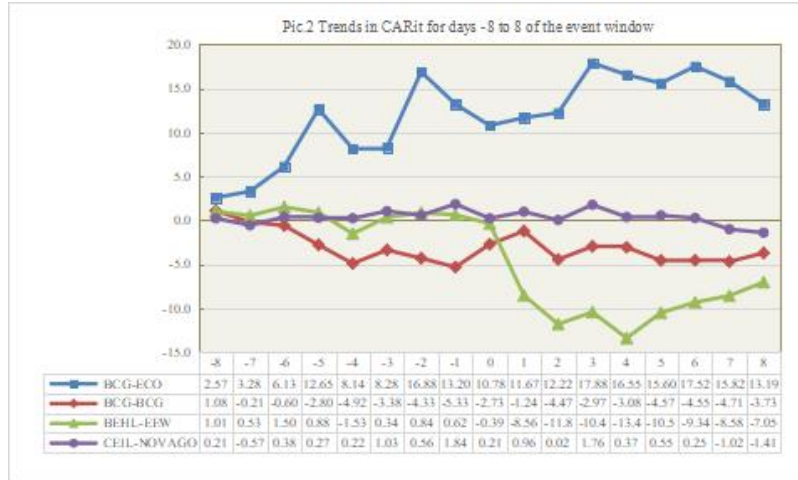
where: CAR_{it} : represents the cumulative excess return of stock i at day t .

AR_{it} : represents the excess return of stock i at day t .

R_{it} : represents the real rate of return of stock i on day t .

R_{mt} : represents the daily return of the broad market index (SSE, Hang Seng, etc.) on day t .





All four cases experienced relatively significant fluctuations in their stock excess returns around the M&A window period. The short-term excess return of BCG-ECO was significantly higher during the M&A window period and had multiple peaks; BCG-BCG peaked on the day of the M&A announcement and was significantly stronger after the announce day; But the stock price of BEHL-EEW came out of the low point continuously after the day, which was consistent with the bearish trend of the market opinion questioning the high acquisition premium at that time; about the CEIL, the excess return was high in the short term before window period which is due to the dissemination of relevant information, and return back after a period of time.

It indicates that in the long run, oversea M&A is not a decisive factor for corporate performance in the capital market, and the market's evaluation of oversea M&A behavior tends to be rational.

4.1 Long-term performance

Discussion of the long-term performance of oversea M&A can be divided into three main modules for analysis, and representative indicators of the corresponding modules are selected to briefly construct a performance evaluation index system as shown in Table 1 [19].

Table 1 Environmental protection enterprises oversea M&A performance evaluation index system^[20-21]

Indicator Type	Indicator Name
Profitability Indicators	Return on equity (ROE); Return on Assets (ROA)
Financial Health Indicators	Current ratio; debt to asset ratio; Total assets turnover ratio
Value Growth Indicators	Total revenue growth rate; Net profit growth rate; Total assets growth rate

In terms of profitability analysis, both ROE and ROA of the BCG-ECO&BCG case decreased significantly after the completion of the M&A, and then rebounded steadily, but did not reach the premerger level; the ROE and ROA of the BEHL-EEW case increased slightly after the M&A, but the logical connection of this increase was not significant because the solid waste industry was not the main operation business of BEHL; only CEIL achieved an increase in ROE and ROA in the year of the M&A (2016), after that ROE remained at a high level and ROA decreased slightly; the CTI-Urbaser case had little impact on ROE, but due to the excessive scale of its M&A relative to the original assets, ROA was greatly affected and was below 1.7% in 2020. From the four cases, oversea M&A due to its large amount of occupied capital and the cost of capital, can increase stable cash flow, but the profitability of the main body is not significantly improved after the M&A.

Table 2 ROE and ROA before and after the four subject companies M&A

BCG	BEHL	CEIL	CTI
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	ROE	ROA	ROE	ROA	ROE	ROA	ROE	ROA
2013	8.62	3.67	7.42	4.78	9.90	6.81		
2014	8.82	2.78	7.94	4.63	9.89	6.46	10.79	6.60
2015	5.94*	2.10*	8.68	4.79	12.03	6.50	12.33	5.95
2016	4.75	1.71	9.76*	4.93*	15.30*	6.74*	10.27	4.07
2017	4.10	1.55	9.08	4.55	14.15	6.61	7.38	3.18
2018	3.43	1.36	9.80	4.59	12.95	6.26	6.75	2.62
2019	3.87	1.47	9.85	4.76	14.24	5.94	6.58*	2.74*
2020	4.53	1.78	5.80	2.89	13.01	5.21	6.63	1.70

Note: * denote that the year is which the M&As took place and the financial statements were consolidated.

From the liquidity analysis, the debt to asset ratio of BCG has been maintained between 0.6-0.7, indicating that the scale of M&A is controllable compared with the original enterprise, but the current ratio has dropped significantly after successive M&As, indicating that the operating cash flow has been negatively affected to a certain extent; the debt to asset ratios of the remaining three enterprises have increased significantly after M&As, among which BEHL, due to the small percentage of solid waste section in its main business of public utilities, has a relatively better control, and has been maintained between 0.4-0.54. CTI's debt to asset ratio increased significantly to over 0.75 after the merger, which brought significant pressure on the enterprise's capital operation, and its current ratio increased 111.54% to 0.91 in 2019, indicating that the cash flow benefits and capital cost pressure brought by its M&A are both obvious, which also became its one of the reasons for selling Urbaser two years after the acquisition.

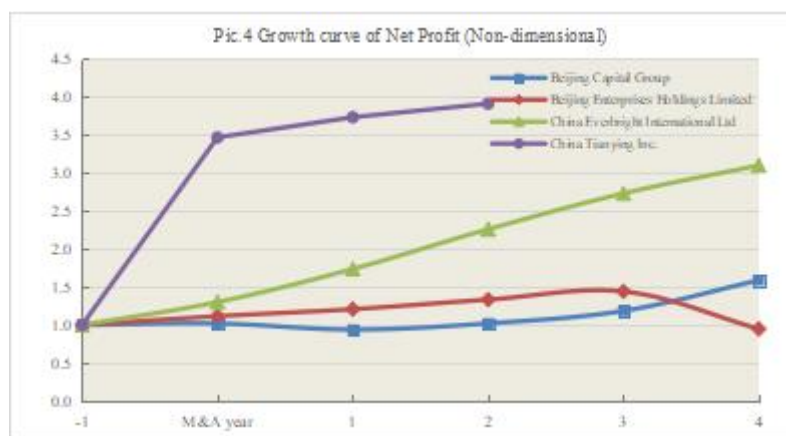
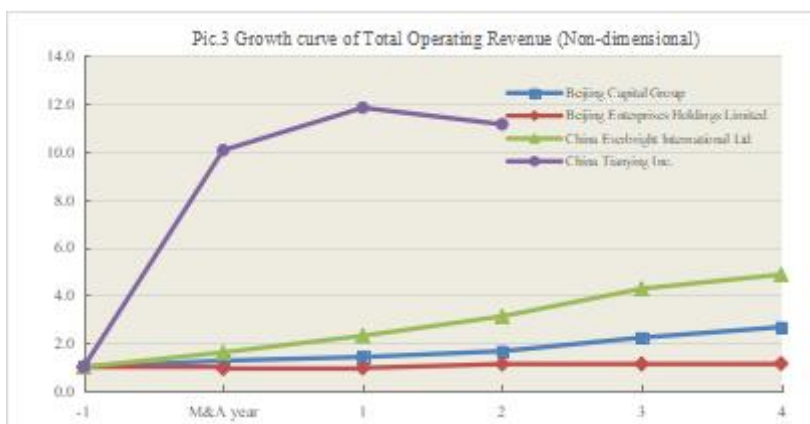
Table 3 CR and D/A before and after the four subject companies M&A

	<i>BCG</i>		<i>BEHL</i>		<i>CEIL</i>		<i>CTI</i>	
	CR	D/A	CR	D/A	CR	D/A	CR	D/A
2013	1.29	59.55	1.01	41.56	2.31	41.29		
2014	1.47	69.01	0.95	45.15	1.70	42.81	0.93	50.43
2015	1.22*	67.33*	1.28	44.98	1.82	52.19	0.70	57.94
2016	1.24	65.65	0.86*	52.98*	1.32*	59.93*	0.37	65.62
2017	0.51	66.40	1.05	53.85	1.40	60.83	0.76	62.51
2018	0.81	65.53	1.12	53.57	1.95	57.22	0.43	62.60
2019	0.74	64.68	0.96	53.17	1.22	62.53	0.91*	75.26*
2020	0.65	64.81	0.93	52.43	1.33	64.89	0.83	75.20

Due to the differences in asset volumes of the four M&A entities, the total operating income, and net profit of the companies before and after the M&A were dimensionless for the value growth analysis. The value base point for the year before the M&A (-1 point) was defined as 1, and the ratio of the value of each year to -1 year was taken for comparison.

The changes in total operating income and net profit show that the financial performance of BEHL before and after the acquisition of EEW did not change much and was not significantly related to the acquisition; BCG and CEIL saw significant growth in various indicators after the acquisition, with CEIL slightly higher than BCG, and the synergy between the acquired business and its original main business was high, producing a more obvious scale effect.

CTI's operating income increased by 906% and net profit increased by 246% in the year of the merger, indicating that the merger had a significant impact on CTI. The 'snake swallowing an elephant' type of merger rapidly improved the asset strength and financial performance of the enterprise in the short term. After the sale of Urbaser's assets in 2021, CTI's total asset size has been reduced, but the beneficial impact of this acquisition continues.



5. Conclusion.

Due to policy and technology external promotion, sufficient large state-owned group decision-making internal motivation, as well as acceptable performance after the merger and acquisition, oversea M&A in the field of environmental protection solid waste still has sufficient momentum to advance in the coming period.

Europe and the United States and other developed regions with relatively perfect regulatory systems are still the first choice for oversea M&A, in where the project's ordinary financial returns are relatively high and stable, the risk index is low, and its performance is relatively stable and high quality in terms of capital market operations, financial indicators reflecting and actual project operations.

The cases analyzed in this paper are all representative large-volume M&A transactions in the solid waste industry in recent years, the M&A subjects belong to the head enterprises in the industry with government background, capital scale and operational experience, and the M&A transactions are relatively smooth. Even under these premises, cross-border M&A still reflects the instability of performance.

Capital market reaction depends on factors such as the quality of the M&A target, the M&A premium, the operational expectations of the M&A target, and mainly has an impact on short-term performance.

In terms of long-term performance, the increase in asset volume after M&A may adversely affect both capital liquidity and operating capacity, especially debt to asset ratio and cost of capital are under greater pressure on enterprises. Whether the profitability index grows depends mainly on whether the M&A target can operate effectively in synergy with the main business of the original enterprise.

CTI and BCG announced the sale of Urbaser and New Zealand assets in 2021 and early 2022, respectively. Among them, CTI sold Urbaser after holding it for only two years, which alleviated a series of financial pressure, significantly

reduced its asset and liability ratio, reduced its goodwill from 5.6 billion yuan to 0.4 billion yuan, effectively adjusted its capital structure, and made a profit of 2.786 billion yuan in the open market. It is a good available option from the perspective of capital operation. However, the state-owned group is likely to be restricted by administrative approval and policy control, and not free to sell this part of the assets, which is constrained in capital operation.

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