

ESG Effect on the Corporate Value of Technology Companies

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Abstract. *Since ESG investment becoming popular, many researchers investigate ESG effect on the corporate value and found positive relationship between ESG activities and the corporate value. However, there are few research which focused ESG effect on the corporate value for technology companies. In this research historical prices of Japanese ESG focused companies were compared to Japanese total market and it was concluded that ESG have positive effect on the corporate value. In addition, historical prices of Japanese ESG focused technology companies were compared to Japanese total technology companies and it was concluded that ESG have positive effect on the corporate value of technology companies. Lastly the effect on the corporate value of Japanese technology companies was compared to the effect on the corporate value of Japanese total market and it was concluded that ESG performance provide more positive effect on the corporate value of Japanese technology companies compared to Japanese total market.*

Keywords: ESG, value driver, corporate value, technology.

Introduction

Increasing the corporate value is always one of the major management agenda. As such understanding the mechanism of how the value of company is created and identifying the key value drivers is needed for management executives.

Since the source of the corporate value is shifting from tangible assets to intangible assets, some researchers focused not only financial drivers but also non-financial drivers, such as customer base, intellectual property, business model, or human resources.

Among several and diverse non-financial information, the Environment / Social / Governance (ESG) aspects are becoming more important since many investors are considering ESG activities for their investment decision. As such, many researchers investigated the effect of ESG on corporate value. But there are a few research which focused on ESG effect on corporate value for technology companies.

Literature review

Corporate value and value drivers

Understanding the value drivers become harder in these days since the source of corporate value is shifting from tangible assets to intangible assets, such as customer base, intellectual property, business model, or human resources. Ocean Tomo LLC' annual study (2022) shows this shift. Based on this study, only 17% of market value of S&P 500 companies were tied to intangible assets in 1975 but jumped to 90% in 2020. This shift is making corporate valuation more difficult since valuation of intangible assets is more difficult than that of tangible assets.

Since valuation becomes harder, many researchers aimed to identify the key drivers which affect corporate value. Miloud et al. (2012) tested four types of qualitative value drivers, which are: 1) Industry structure, 2) Founder effects, 3) Management team effects, and 4) Network effects. Next, they conducted regression analysis between these drivers and pre-money value and showed positive correlation with each driver. Brusche (2016) sorted value drivers into three aspects, which are 1) Human, 2) Technological, and 3) Financial aspect. Then literature search was conducted to find out important factors, which venture capitalists rely on. Wessendorf, et al. (2020) researched determinants of Early-Stage technology companies by using Systematic Literature Review (SLR). They compared early-stage ventures with early-stage technology ventures and found differences between them. They concluded that early-stage technology venture valuation is more strongly driven by patents and application as well as alliances. Jayendrika Wanigasekara, et al. (2019) argued value is created by both financial and non-financial value drivers and researched both financial and non-financial value drivers by using SLR. The International Integrated Reporting Council (IIRC) (2013) proposed the International Integrated Reporting (IR) framework to report the value creation of company. It suggests that the market value of the equity consists of financial capital and non-financial capital. And that non-financial capital consists of Manufactured capital, Intellectual capital, Human capital, Social and Relationship capital, and Natural Capital. This framework can capture non-financial drivers as noted before and also capture the effect of ESG aspect.

ESG effect on the corporate value

One other aspect we need to think as value drivers in these days is ESG aspect. The term ESG was first used in the report titled "Who Cares Wins" in 2004. Its core concept is companies are asked to take a leadership role by implementing these three pillars, environment (E), society (S), and corporate governance (G). In recent years, ESG investment is becoming more popular.

Consequently, many researchers are trying to find out the effect of ESG activity on the corporate value. Dhaliwal et al. (2011) showed the cost of equity was reduced by voluntary disclosure of corporate social responsibility (CSR) activities in the first year. Schramade (2016) incorporated ESG effect into valuation and calculated the average target price impact of ESG is approximately 5% overall. Zheng, et al. (2022) showed that ESG performance significantly improved corporate value in the Chinese market. He (2023) also showed positive relationship between ESG performance and corporate value for Chinese listed companies. Chasiotis et al. (2023) showed that ESG reputational risk relates to higher payouts, and that ESG reputational risk can be an important factor in firm valuation. As such many researchers found that ESG can provide positive effect on corporate value.

Methodology

Although any researchers tried to find how ESG affect corporate value, there are few research which focused on technology companies. As such, this research examines how ESG affect the corporate value of Japanese technology companies. Therefore, three research questions were proposed.

RQ1: Does ESG performance affect corporate value of Japanese companies?

RQ2: Does ESG performance affect corporate value of Japanese technology companies?

RQ3: Are there any differences between Japanese total market, in other words general companies, and Japanese technology companies, in terms of ESG impact on corporate value?

To answer the above mentioned RQs, historical prices of control group, which represent Japanese total market, in other words general companies, and historical prices of test group, which represent Japanese ESG focus companies, were extracted from <https://finance.yahoo.co.jp/> for five-year time frame, from January 4, 2019, to December 31, 2023. Then both groups were compared to find out whether Japanese ESG focused companies outperformed Japanese total market.

Secondary, historical prices of Japanese ESG focus technology companies were also extracted to find out whether Japanese ESG focused companies outperformed Japanese total market and Japanese technology companies.

And finally, the ESG effect on the corporate value of Japanese technology companies and the ESG effect on total market were compared to find out if there were any differences between Japanese total market and Japanese technology companies in terms of ESG impact on the corporate value.

Results and discussions

Firstly, historical price of TOPIX (Tokyo Stock Price Index) was used as a benchmark of Japanese stock market. TOPIX is a market benchmark with functionality as an investable index, covering an extensive proportion of the Japanese stock market. TOPIX was used as a control group of Japan stock market ("Control Group 1").

As for ESG test group, MSCI Japan ESG Select Leaders index was chosen as a test group of Japan ESG focused companies ("ESG Test Group"). MSCI (Morgan Stanley Capital International) (2024) is one of the well-known and major financial institution. The MSCI Japan ESG Select Leaders index (2024) is a weighted index based on the MSCI Japan IMI Index and is designed to represent the performance of companies that have high ESG performance. MSCI Japan IMI Index includes all the size of companies in the Japanese capital markets. Many companies or financial institution use this index for benchmarking. For example, GPIF (Government Pension Investment Fund), Japanese governmental pension fund, selected this fund for ESG investment (2017).

Historical price of Control Group 1 and ESG Test Group for five-year time frame, from January 4, 2019, to December 31, 2023, were extracted from <https://finance.yahoo.co.jp/> and were used for comparison purposes. All the prices were indexed where price of the first date (January 4, 2019) to become 1. Based on this comparison, ESG Test Group clearly outperformed Control Group 1 (see figure 1, below). As such, it can be concluded that ESG performance provide positive effect on the corporate value.

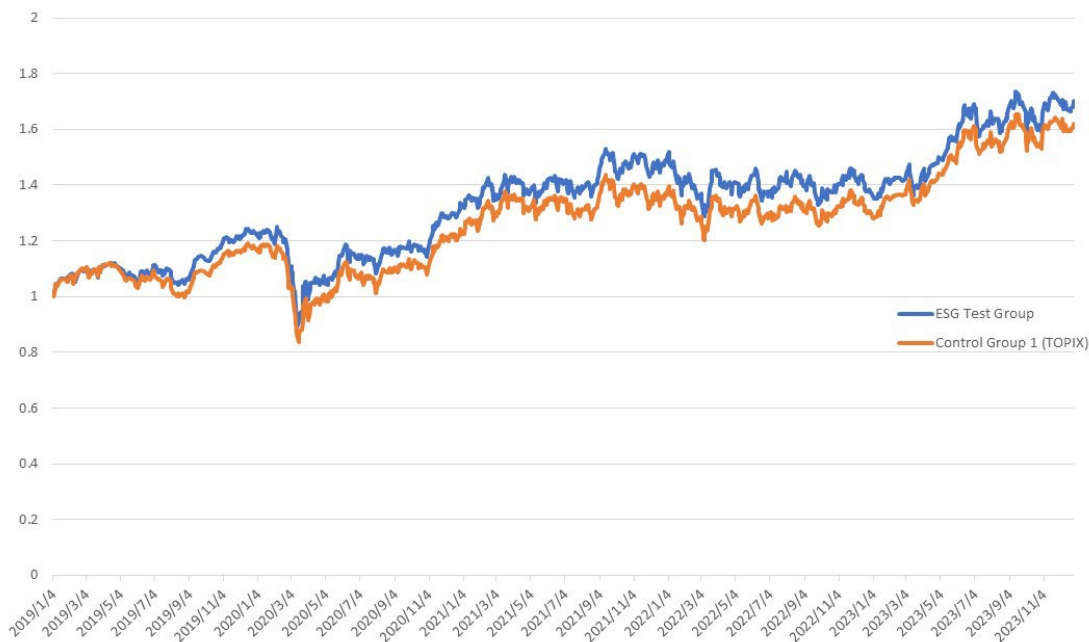


Figure 1. Stock Price of Control Group 1 and ESG Test Group (indexed price of January 4, 2019 = 1)
Source: Author's own research.

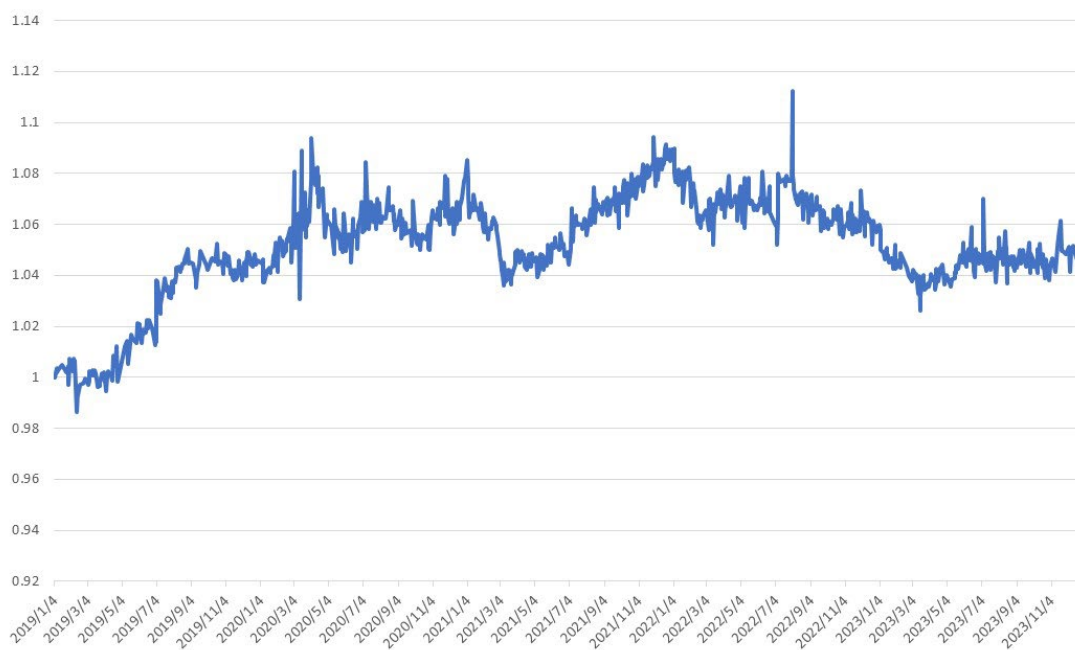


Figure 2. Stock Price of ESG Test Group / Stock Price of Control Group 1 (indexed price of January 4, 2019 = 1)

Source: Author's own research.

To examine ESG effect on the corporate value of Japanese technology companies, it was needed to create Japanese ESG focus technology group since no such index was available. As such, technology ESG leaders index ("Technology-ESG Test Group") was created by author for

comparison purposes. For this purpose, technology companies were chosen from companies which are included in the MSCI Japan ESG Select Leaders. As for technology companies, 30 companies, which are classified as information technology industry in the MSCI Japan ESG Select Leaders, were chosen. Historical prices of these 30 companies for five-year time frame, from January 4, 2019, to December 31, 2023, were extracted from <https://finance.yahoo.co.jp/>. Then index values were calculated based on market values of equity of all the companies as of January 13, 2024. Table 1 shows the list of companies, which were chosen as Technology-ESG Test Group and their weights to calculate index values. Estimated values of Technology-ESG Test Group were calculated and indexed where price of the first date (January 4, 2019) to become 1. Then index prices of Technology-ESG Test Group were compared to Control Group 1. Based on this comparison, Technology-ESG Test Group clearly outperformed Control Group 1, see Figure 3, below. As such, it can be concluded that ESG performance provide positive effect on the corporate value of technology companies.

Table 1. List of the Companies of “Technology-ESG Leaders” and calculated their weight

Name	Weight	Name	Weight	Name	Weight
Tokyo Electron Limited	0.20827	NTT Data Group Corporation	0.05054	SCSK Corporation	0.01590
Murata Manufacturing Co., Ltd.	0.10445	Shimadzu Corporation	0.02138	SHIFT Inc.	0.01091
Advantest Corporation	0.06632	TIS Inc.	0.01405	ULVAC, Inc.	0.00571
Fujitsu Limited	0.07458	IBIDEN Co., Ltd.	0.01982	BIPROGY Inc.	0.00848
Fujifilm Holdings Corporation	0.06364	RICOH Company, Ltd.	0.01220	Money Forward, Inc.	0.00409
Renesas Electronics Corporation	0.08163	SEIKO EPSON Corporation	0.01464	ALPS ALPINE Co., Ltd.	0.00485
TDK Corporation	0.04570	Yokogawa Electric Corporation	0.01329	KONICA MINOLTA, Inc.	0.00371
NEC Corporation	0.04132	Azbil Corporation	0.01228	ANRITSU Corporation	0.00321
OMRON Corporation	0.02404	TAIYO YUDEN co., Ltd.	0.00834	Canon Marketing Japa, Inc.	0.00965
Nomura Research Institute, Ltd.	0.04515	BROTHER INDUSTRIES, Ltd.	0.01047	Nissha, Co., Ltd.	0.00137

Source: Author’s own research based on <https://finance.yahoo.co.jp/>.



Figure 3. Stock Price of Control Group 1 and Calculated Price of Technology-ESG Test Group (indexed price of January 4, 2019 = 1)

Source: Author's own research.



Figure 4. Calculated Price of Technology-ESG Test Group / Stock Price of Control Group 1 (indexed price of January 4, 2019 = 1)

Source: Author's own research.

Although Technology-ESG Test Group clearly outperformed Control Group 1, the value of technology companies may or may not behave differently compared to value of total market. In

addition, many indexes, including Control Group 1, were periodically rebalanced based on market prices of constituents, although Technology-ESG Test Group was not rebalanced for this five-year time frame.

In order to make apple-to-apple comparison, Japanese technology company group was created by author as a second control group, which represent total technology companies. As a population of total Japanese market, the companies, which were included in the MSCI Japan IMI Top 700 index, were selected. The MSCI Japan IMI Top 700 index consists of top 700 companies of the MSCI Japan IMI Index, which also represent Japanese total market, in terms of market value of equity. As for technology company group, 85 companies, which are classified as information technology industry in the MSCI Japan IMI Top 700 index, were chosen. Historical prices of these 85 companies for five-year time frame, from January 4, 2019, to December 31, 2023, were extracted from <https://finance.yahoo.co.jp/>. Then index values were calculated based on market values of equity of all the companies as of January 13, 2024. This index values were used as a control group of Japan technology companies (“Control Group 2”). Table 2 shows the list of companies and their weights to calculate index values. Estimated values of Control Group 2 for five-year time frame, from January 4, 2019, to December 31, 2023, were calculated and indexed where price of the first date (January 4, 2019) to become 1. Same calculation methodology was used to calculate both Technology-ESG Test Group and Control Group 2. As such comparison becomes apple-to-apple. Then both prices were compared using same methodology where ESG Test Group was compared to Control Group 1. Based on this comparison, Technology-ESG Test Group clearly outperformed Control Group 2 (see Figure 5, below). As such, it can be concluded that ESG performance provide positive effect on the corporate value of technology companies.

Table 2. List of Technology Companies and calculated their weight

Name	Weight	Name	Weight	Name	Weight
Tokyo Electron Limited	0.10834	NTT Data Group Corporation	0.02629	SCSK Corporation	0.00827
Murata Manufacturing Co., Ltd.	0.05433	Shimadzu Corporation	0.01112	SHIFT Inc.	0.00568
Advantest Corporation	0.03450	TIS Inc.	0.00731	ULVAC, Inc.	0.00297
Fujitsu Limited	0.03879	IBIDEN Co., Ltd.	0.01031	BIPROGY Inc.	0.00441
Fujifilm Holdings Corporation	0.03310	RICOH Company, Ltd.	0.00635	Money Forward, Inc.	0.00213
Renesas Electronics Corporation	0.04246	SEIKO EPSON Corporation	0.00762	ALPS ALPINE Co., Ltd.	0.00252
TDK Corporation	0.02377	Yokogawa Electric Corporation	0.00691	KONICA MINOLTA, Inc.	0.00193
NEC Corporation	0.02150	Azbil Corporation	0.00639	ANRITSU Corporation	0.00167
OMRON Corporation	0.01250	TAIYO YUDEN co., Ltd.	0.00434	Canon Marketing Japa, Inc.	0.00502
Nomura Research Institute, Ltd.	0.02348	BROTHER INDUSTRIES, Ltd.	0.00545	Nissha, Co., Ltd.	0.00071
KEYENCE Corporation	0.14210	Fuji Soft, Inc.	0.00385	TOWA Corporation	0.00157

Name	Weight	Name	Weight	Name	Weight
CANON, Inc.	0.04475	MARUWA, Co., Ltd.	0.00325	Freee K.K.	0.00153
DISCO Corporation	0.03438	Dexerials Corporation	0.00239	Mitsui high-tec, Inc.	0.00252
KYOCERA Corporation	0.02915	Nippon Electric Glass, Co., Ltd,	0.00285	DTS Corporation	0.00159
Lasertec Corporation	0.02978	Daiwabo Holdings, Co., Ltd.	0.00272	Japan Aviation Electronics Industry, Ltd.	0.00264
OBIC, Co., Ltd.	0.02243	RAKUS, Co., Ltd.	0.00394	Ferrotec Holdings Corporation	0.00116
Trend Micro Inc.	0.01022	OBIC Business Consultants, Co., Ltd.	0.00460	DENTSU Soken Inc.	0.00350
ROHM Company Limited	0.00988	NSD, Co., Ltd.	0.00223	Sansan, Inc.	0.00170
Screen Holdings, Co., Ltd.	0.01090	Net One Systems, Co., Ltd.	0.00181	Digital Garage, Inc.	0.00154
Hamamatsu Photonics K. K.	0.00893	Amano Corporation	0.00238	Justsystem Corporation	0.00188
SUMCO Corporation	0.00668	Sanken Electric, Co., Ltd.	0.00164	Wacom, Co., Ltd.	0.00098
OTSUKA Corporation	0.01033	Japan Material, Co., Ltd.	0.00239	TOSHIBA Tec Corporation	0.00151
HIROSE Electric. Co., Ltd.	0.00570	Citizen Watch, Co., Ltd.	0.00198	Systema Corporation	0.00128
Socionext Inc.	0.00451	GMO Internet Group, Inc.	0.00253	Ai Holdings Corporation	0.00122
ORACLE Corporation Japan	0.01327	RORZE Corporation	0.00233	Oki Electric Industry Company. limited	0.00076
SHINKO Electric Industries, Co., Ltd.	0.00675	NS Solutions Corporation	0.00394	IRISO Electronics, Co., Ltd.	0.00079
HORIBA, Ltd.	0.00429	NEC Networks & System Integration Corporation	0.00319	ELECOM, Co., Ltd.	0.00142
MACNICA Holdings, Inc.	0.00423	TOPCON Corporation	0.00155	CHANGE Holdings, Inc.	0.00093
TOKYO SEIMITSU, Co., Ltd.	0.00344				

Source: Author's own research based on <https://finance.yahoo.co.jp/>.



Figure 5. Calculated Price of Control Group 2 and Calculated Price of Technology-ESG Test Group (indexed price of January 4, 2019 = 1)

Source: Author's own research.



Figure 6. Calculated Price of Technology-ESG Test Group / Calculated Price of Control Group 2 (indexed price of January 4, 2019 = 1)

Source: Author's own research.

Finally, ESG effect on total market and ESG effect on technology companies were compared to find out there were any differences between Japanese total market and Japanese technology companies in terms of ESG impact on corporate value.

Index values of stock price of ESG Test Group divided by stock price of Control Group 1 (indexed price of January 4, 2019 = 1) were selected which represent ESG effect on the corporate value of Japanese total market, in other words general companies. Index values of calculated price of Technology-ESG Test Group divided by calculated price of Control Group 2 (indexed price of January 4, 2019 = 1) were also selected which represent ESG effect on the corporate value of Japanese technology companies. Both index values were compared using same five-year time frame to examine ESG effect for Japanese total market and Japanese technology companies. Based on this comparison, effect on the corporate value of Japanese technology companies clearly outperformed effect on the corporate value of Japanese total market (see Figure 7, below). As such, it can be concluded that ESG performance provide more positive effect on the corporate value of Japanese technology companies compared to Japanese total market.



Figure 7. Comparison of Stock Price of ESG Test Group / Stock Price of Control Group 1 and Calculated Price of Technology-ESG Test Group / Calculated Price of Control Group 2 (indexed price of January 4, 2019 = 1)

Source: Author's own research.

Conclusion

Based on data analysis performed in this research, it can be concluded that ESG may provide positive effect in terms of corporate value for both Japanese total market, in other words general companies, and technology companies.

Historical prices of Japanese ESG focused companies clearly outperformed historical prices of Japanese total market for five-year time frame from January 4, 2019, to December 31, 2023. As such it can be concluded that ESG performance provided positive effect on the corporate value of Japanese companies. In addition, calculated index values of Japanese ESG focused technology

companies clearly outperformed calculated index values of Japanese technology companies for the same time frame. Thus, it can be concluded that ESG performance provide positive effect on the corporate value of Japanese technology companies. Data analysis also showed that effect on corporate value of Japanese technology companies clearly outperformed effect on corporate value of Japanese total market. As such, it can be concluded that ESG performance provide more positive effect on the corporate value of Japanese technology companies compared to Japanese total market.

Although many researchers studied the effect of ESG on corporate values, there are few researches which focused for technology companies. This study provided data evidence which shows ESG provide positive effect on the corporate values of Japanese technology companies.

In addition, based on this study, we conclude that ESG activities have a positive effect on the corporate value of Japanese companies. As such it can be said that management team of Japanese companies can increase corporate value by working on ESG activities.

However, limitations of this study include the definition of technology companies. Since there is no clear definition of technology companies, companies which were classified as information technology industry by MSCI were selected as test group of technology companies. However, there may be other companies, which can be treated as technology companies based on their business model and products or services. Another limitation is this study was that is focused only on Japanese companies. There may or may not be different ESG effect on companies other than Japanese companies. Increasing the number of technology companies based on their business model and products or services and increasing target countries could offer clear ESG effect on the corporate value for future research.

Another aspect of limitation of this study is data from historical stock of index prices were used for research purposes. However, many of the listed companies are somehow well-matured companies and are not start-up companies. There may or may not be different ESG effect on start-up companies. Also, other qualitative research methods including individual or focus groups interview may be needed for future research.

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