



The Impact of Sustainability Disclosures on Value of Companies Following Digital Transformation Strategies

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Abstract. Sustainable growth is the key global priority, and environmental, social and governance (ESG) objectives have become the main point of attention in companies' digital transformation strategies. ESG and digital transformation reinforce each other as they aim to improve efficiency and meet stakeholders inside and outside the company. This is true for telecommunication companies, where disruptive technologies such as artificial intelligence, big data or cloud computing are reshaping the industry. Assessment of the impact of sustainability disclosures on companies' value is a task of high interest for academics and practitioners from telecommunication companies. ESG disclosure serves as a key channel to inform investors about the efficiency of ESG risk management and control practices of the firm and thus can impact the firm's financial performance and market value. However, there are numerous controversies in the academic literature on this topic and a lack of research specifically for the telecommunication industry. We closed the research gaps and investigated the impact of ESG disclosure on Tobin-Q of 93 US-listed telecommunication service companies between 2011-2021. We found that aggregated ESG disclosure score positively impacted telecoms' Tobin-Q. Among individual ESG disclosure pillars, only corporate governance positively influenced Tobin-Q, while the impact of environmental and social pillars was statistically insignificant. We also found that CEO duality significantly and negatively impacted Tobin-Q. The presence of the corporate social responsibility (CSR) committee, greater gender diversity and a higher percentage of independent directors on the board positively affected the value of the telecoms. The result of the study can be applied in developing ESG rating methodologies for telecommunication companies. They can also assist telecom companies' managers and stakeholders to identify key value drivers of the ESG agenda.

Keywords: Corporate governance; ESG disclosure; ICT; Sustainable development; Tobin Q

1. Introduction

In the last decade, the global telecommunication industry has changed significantly and enabled a lot of digital innovations. These changes have been driven by the rapid dissemination of high-speed internet, mobile devices, big data, cloud technologies, over-the-top media services or 5G generation mobile networks (Santoso et al., 2019). The industry has reformatted into the info-communication space (ICT), where

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doi: [10.14716/ijtech.v13i7.6194](https://doi.org/10.14716/ijtech.v13i7.6194)

telecommunication and IT are intertwined to provide customers with a large variety of services: from “traditional” voice and data transmission to different kinds of digital services and users applications.

These new opportunities come with challenges which mute the market value of companies in the industry (Mohammad & Wasiuzzaman, 2021). One of these challenges is the dissemination of environmental, social and governance (ESG) investing. Investors are ready to provide long-term funding only to those companies that follow the principles of sustainable development. Moreover, studies showed that the successful integration of sustainable practices could affect the firms’ value (Schramade, 2016). The GSMA, the mobile operators’ industry association, conducted research which showed that ESG reduced companies’ capital cost and positively influenced stock prices (GCMA, 2020).

ICTs communicate with stakeholders on ESG issues via ESG disclosure. The latter reduces the informational asymmetry between stakeholders and the management; improves the firm’s reputation and demonstrates commitment to sustainability (Porter et al., 2019). Ultimately, the quality of ESG disclosure affects the market value of the firm. (Friede et al., 2020; Fatemi et al., 2017). However, there are numerous controversies in the literature. There is evidence that ESG disclosure had a neutral or even negative impact on a company’s cost of capital or performance (Buallay et al., 2020; Atan et al., 2018; Dhaliwal et al., 2011). There is a lack of research on this topic in the ICT industry.

The goal of this paper is to investigate the impact of ESG disclosure and its components on the value of ICT companies. We chose Tobin Q as a proxy for the market value of the firms. The sample included 94 telecommunication companies from 2011 to 2021 listed on USA stock exchanges. The paper contributes to the literature in various ways. It studies the relationship not only between ESG disclosure and the market value of the firms in the telecommunication industry, but also assesses to what extent individual ESG components affect the value. The paper addresses the previously under-explored ICT industry.

The rest of the paper is structured as follows. In section one, we analyzed the importance of the ESG agenda for the ICT industry and provided the literature review. Section 2 sets the hypothesis and describes the data, the methodology and the variables. The results, their interpretations and discussions are provided in section 3. Finally, section four presents the conclusions.

2. Literature review

2.1. Importance of ESG agenda and practices in info-communication industry

ESG is an important measure of sustainable corporate development and an extension of the socially responsible investment concept (Nekhili et al., 2021; Khorin & Krikunov, 2021; Koroleva et al., 2020; Rodionov, et al., 2018). Companies in the ICT industry can impact global sustainability via complex, indirect effects on energy consumption, data privacy and security as well governance and transparency (Berawi, 2020). The carbon emissions in ICT come mainly from power consumption and bandwidth usage and currently exceed 0.8 gigatons. In 2021 the industry used approximately 4% of total global power demand. This share can increase to 10% by 2025. The shift toward green info-communication is now observed by adopting energy-efficient and renewable energy technologies (Mohanty & Moreira, 2014). Social factors which should be of concern in ICT firms are workplace conditions, diversity, employee engagement and belongingness. This is due to harmful stereotypes and a lack of digital confidence on the part of women. Others issues such as human rights violations at ICT companies’ vendors or leakages of private data of consumers. ICT firms following the best ESG practices demonstrated better financial

performance (Sutherland, 2016). Corporate governance is the most influential factor for ICTs; its impact on the firms' performance can reach around 60% (Rittenhouse et al., 2011).

2.2. Review of academic and practical literature

a) Impact of ESG pillars on firms' value

The outcome of studies which have tested the impact of the following ESG agenda on the value of the firms is controversial. Some argue that the firms which follow good ESG practices improve their non-financial indicators such as consumer and supplier satisfaction, market acceptance, employees' management skills etc. (Mohammad & Wasiuzzaman, 2021; Atan et al., 2018). As for G-component, many studies showed that good governance increased investors' confidence. This positively affects the firm's value (Miroshnychenko et al., 2017; Siagian et al., 2013). In some cases, E-pillar harmed the firm's value, indicating that ESG activities' payoffs did not exceed their costs (Verbeeten et al., 2016). Several industrial studies have found either a negative or a nonsignificant association between ESG performance and firm value or performance (Horváthová, 2010; Fisher-Vanden & Thorburn, 2008). The results significantly varied among industries.

b) The relationship between ESG disclosure and firms' value and performance

Many papers stated that companies engaged in high-quality ESG disclosures were associated with lower systematic and idiosyncratic risks. That should result in higher market value. This effect is the most pronounced for the listed firms in developed markets (Porter et al., 2019). Firstly, a firm's ESG disclosure is a predictor of its ESG score: firms with positive ESG performance would report their ratings fully, and those with negative ESG performance would choose to report minimally. ESG disclosure is associated with a competitive advantage, a society-oriented product offering and a high reputation (Cho & Patten, 2007). However, there are controversies in research. Cai and He (Cai & He, 2014) found a positive correlation between following ESG practices and companies' values using 20 years of data from 1992 to 2011 (Cai & He, 2014). Dhaliwal et al. examined the relationship between ESG disclosure and the equity cost of capital in an international sample of 31 countries. They found a negative association between ESG disclosure and the cost of equity capital (Dhaliwal et al., 2014). Plumlee et al., found no significant association between the overall level of voluntary ESG disclosure and the value of the firm, its component cash flows, or its cost of capital (Plumlee et al., 2015). Fatemi (Fatemi, 2018) showed that ESG disclosure, per se, decreases firms' valuation.

2.3. Conclusion from the literature review

There is no generally accepted framework which explains the contradictions in the literature. The gaps are the lack of research which explored different patterns of ESG practices and disclosure in various industries and how they impacted firms' performance. Some papers used short datasets. Conversely, the research indicated a U-shaped relationship between the impact of ESG practices and value (Trumpf & Günther, 2017). This confirms that investments made in ESG bring results only in the future.

3. Methods

3.1. Development of the research hypotheses

Due to the conflicting results found in the literature, the hypotheses are as follows:

H1: In the telecommunication sector, firm value is positively associated with ESG disclosure

H2: In the telecommunication sector, the value of the company is positively associated with E-component disclosure

H3: In the telecommunication sector, the value of the company is positively associated with S-component disclosure

H4: In the telecommunication sector, the value of the company is positively associated with G-component disclosure

H5: Selected components of E, S or G components of disclosures have a significant impact on the financial performance of telecommunication companies

3.2. The data

We used the annual panel data for telecoms listed on the USA stock exchanges between 2011-2021. The period covers almost the entire history of the development of ESG financing and the availability of ESG disclosure ratings (Ivashkovskaya & Mikhailova, 2020). We chose the US financial market due to its high liquidity and long history of listing of telecoms. The screening of the companies was performed on Capital IQ. We applied the following selection criteria: the firm's earnings before interest, taxes, depreciation and amortization (EBITDA) are greater than 0; and the total enterprise value (TEV) is greater than 0. The screening resulted in a dataset of 306 companies, from which the top 100 were chosen by their market value. We used Bloomberg ESG disclosure scores (the ESG score and E, S and G components scores) as a proxy for the quality of ESG disclosure. It tracks about 800 different disclosure metrics that cover all aspects of ESG, from emissions to shareholder rights. The companies in the ranking are ranked from 0 to 100, with 100 being the best score. We normalized the Bloomberg ESG disclosure score to [0;1].

The dependent variable is the Tobin Q metric (TQ) which represents the sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets. It is a good proxy for the firm value and allows investors to assess the justification of an investment in a firm: if its market value is higher than the accounting value (that is, q -Tobin > 1), then the investment is justified and vice versa (in the case when q -Tobin < 1). Tobin Q is a good indicator of investors' expectations. This metric is the most widespread in studies of the impact of sustainable practices on financial results (Nirino et al., 2021). The set of independent variables consists of complex ESG scores, individual E, S and G scores and control variables: (1) debt ratio; (2) tangibility; and (3) return on assets (ROA) (Table 1). ROA was chosen as it is an indicator to assess the quality of the company's management, namely the efficiency of the use of capital. The tangibility ratio measures the importance of non-financial capital in creating value and indicates a firm's internal competitive advantage. Telecoms with a smaller proportion of tangible assets grow faster (Lei et al., 2018). The debt ratio measures financial leverage. The studies showed that leverage is positively related to a firm's value as the returns earned

Table 1 Dependent variables and their descriptive statistics.

Variable	Calculation	Notation	Expected sign	Mean	Standard deviation	Minimum	Maximum
ESG score	Bloomberg	ESG _{it}	"+"	0.882	0.323	0	0.96
E score	Bloomberg	E _{it}	"+"	0.748	0.435	0	0.92
S score	Bloomberg	S _{it}	"+"	0.806	0.396	0	0.93
G score	Bloomberg	G _{it}	"+"	0.882	0.323	0	0.97
ROA	Net income/Average assets	ROA _{it}	"+"	0.061	0.179	-0.32	5.320
Tangibility ratio	Net fixed assets/Total assets	TANG _{it}	"-"	0.790	0.092	0.220	0.990
Leverage	Debt/Equity	DEBT _{it}	"+"	0.395	0.403	0	9.860

Source: calculated by authors

For all our analyses, Variance Inflation Factor (VIF) is below 10, signifying no sign of multicollinearity and the correlation between the dependent variables is below 0.4.

3.3. The model

The regression model to test the H1 is as follows:

$$TQ_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 ROA_{it} + \beta_3 TANG_{it} + \beta_4 DEBT_{it} \quad (1)$$

The regression model to test H2-H4 is as follows:

$$TQ_{it} = \beta_0 + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 ROA_{it} + \beta_5 TANG_{it} + \beta_6 DEBT_{it} \quad (2)$$

To regression model to test H5 is as follows:

$$\ln(TQ_{it}) = \beta_0 + \sum_{j=1}^K \beta_j f_{it} \quad (3)$$

where: f_{it} – factors describing some individual components of ESG disclosure score (see Results section); K – the number of explanatory variables. For our panel data, we used three methods based on which it is possible to estimate the relationship between Tobin Q and dependent variables: pooled OLS regression, fixed effect (FE) linear model and random effect (RE) linear model. To select the best model between fixed and random effect specifications, we used Durbin–Wu–Hausman test.

To control for multicollinearity, we calculated VIF (variance inflation factor), the literature showed that if VIF is below 10 then the multicollinearity is moderate. For pooled OLS, FE and RE models the value of determination coefficients typically is not large. To demonstrate the strength of the linkage between dependent and independent variables we used F-test (Ratnikova & Furmanov, 2014). If the p-values of F-statistics is below 5% than the hypothesis that all coefficients are equal to zero is rejected. To select the best model between pooled OLS and RE regressions, we used the Breusch-Pagan LM test.

4. Results and Discussion

Table 2 shows the results of the estimation of regressions (1) and (2). The constant is not significant for all specifications, and thus, it is not shown in the table. The Durbin–Wu–Hausman test and c Breusch-Pagan LM test confirm that the fixed effect (FE) estimator is the most efficient. Thus, the study focuses on the FE estimators to explain the results. According to the F-statistic value, all models have the predictive capability: p-values are lower than 1%, meaning that the null hypothesis of all regression coefficients being equal to zero is rejected.

Table 2 shows that the ESG disclosure score is significant at 10% confidence level. A positive sign means that ESG disclosure increases the market value of telecommunication firm. Thus, the hypothesis H1 is confirmed. On the one hand, this conclusion agrees with those of (Servaes & Tamayo, 2012) but on the other hand, this outcome contradicts the finding of (Buallay & Marri, 2022; Velte, 2017) who found a negative relationship between Tobin Q and sustainability disclosure. We explain this by the differences in explored markets, sample size and timespan. Additional further research is necessary to explore these contradictions.

Table 2 The results of the estimation of regressions (1) and (2)

Variable	Pooled OLS	FE	RE	Pooled OLS	FE	RE
ESG	0.117* (0.116)	0.149* (0.088)	0.152* (0.089)			
E				-0.056 (0.161)	-0.274 (0.167)	-0.217 (0.160)
S				0.054 (0.204)	0.102 (0.163)	0.089 (0.182)
G				0.169* (0.175)	0.273** (0.136)	0.244* (0.137)
Debt ratio	0.914*** (0.094)	0.984*** (0.092)	0.964*** (0.089)	0.916*** (0.945)	1.006*** (0.093)	0.978*** (0.090)
Tangibility	-1.582*** (0.458)	-2.073*** (0.549)	-1.996*** (0.508)	-1.567*** (0.460)	-2.046*** (0.549)	-1.970*** (0.508)
ROA	1.669*** (0.212)	0.476*** (0.160)	0.629*** (0.161)	1.673*** (0.212)	0.470*** (0.160)	0.623*** (0.161)
Observations	1 034	1 034	1 034	1 034	1 034	1 034
R-squared	0.140	0.306	0.146	0.140	0.309	0.148
p-value (F-test robust)	0.0023	0.001	0.036	0.0024	0.000	0.039.
p-value Hausmann test			0.1588			0.1645
Breusch-Pagan LM test. (F p-value_	0.000			0.0000		

***, **, * indicate the value is significant at 1%, 5% and 10% level

Source: author's calculation

The individual disclosure pillars: environmental (E) and social (S) are both statistically insignificant in influencing the Tobin's Q. Therefore, hypotheses H2 and H3 are rejected. Conversely, governance pillar (G) is significant at a 5% confidence level. Hence, hypothesis H4 is confirmed.

These results coincide with that of (Rittenhouse et al., 2011), that the share of corporate performance (G-factors) in the investors' expectations of ICT companies equalled around 60%. This is also confirmed by practical studies, for example (Derue, 2021), which state that unlike investors in other industries with the severe influence of environmental factors (oil and gas or metals and mining) or social factors (e.g. banking or mining) the impact of these factors in telecommunication sector (especially in large established corporates) is marginal. Moreover, the insignificance of these factors may be explained by the fact that these factors have a more significant impact on the value of the firm in markets with weak development of financial institutions (Ge & Liu, 2015), but we studied the US market. Conversely, the governance has a first-order impact on telecommunication companies as it increases investors' confidence, which results in larger firm's value (Siagian et al., 2013). All control variables are significant at 1%, and signs of the variables coincide with the previous findings and our expectations. The higher the company's profitability, the higher its market value and the increase in the company's leverage also positively affect its value. Tangibility has an opposite effect, it negatively and significantly decreases Tobin Q. This agrees with the findings of (Lei et al., 2018). These results indicate that the model is correctly specified.

Let's now test the H5. G-factor appeared to be the only ESG pillar influencing the Tobin-Q of telecommunication firms. For our research, we selected first-order G-impact factors (Table 3) cited in the literature (Velte, 2017; Malik & Makhdoom, 2016). To get information about individual corporate governance practices we used data from the Refinitive Thomson Reuters terminal.

Table 3 G-factors considered in the research and their descriptive statistics

Variable	Calculation	Notation	Expected sign	Mean	Standard deviation	Minimum	Maximum
Independence policy	0/1	IP _{it}	“+”	0.522	0.5	0	1
Percentage of independent director in the board	%	NED _{it}	“+”	59.098	31.242	0%	100%
CEO Chairman Duality	0/1	CD _{it}	“-”	0.524	0.5	0	1
Existence of Corporate Social Responsibility (CSR) Board committee	0/1	CSR _{it}	“+”	0.74	0.439	0	1
Women in board	%	WB _{it}	“+”	11.422	12.072	0%	100%

Source: calculated by authors

For all our analysis, Variance Inflation Factor (VIF) is below 10, signifying moderate multicollinearity and the correlation between the dependent variables is below 0.2.

Among the studies that examined the impact of the mentioned individual corporate governance factors on financial indicators, controversial estimates were obtained. The high presence of independent directors on the board usually positively influences Tobin-Q (Malik & Makhdoom, 2016). Impact of Board diversity on firm value can be either positive (Smith et al., 2006) or negative (Adams & Ferreira, 2009). The empirical evidence of the relationship between CEO duality and policy independence is also inconclusive. For example, Harris and Helfat (Harris & Helfat, 1998) in a literature review, showed that out of 13 studies, three indicated negative effects, while ten exhibited either positive or absence of effects. The results of the estimation of regression (3) are presented in the Table 4.

The Durbin–Wu–Hausman test confirms that the fixed effect (FE) estimator is the most efficient; thus, the study focuses on the FE estimators to explain the results. Moreover, p-values in F-test were lower than 1%, meaning that the null hypothesis of all regression coefficients being equal to zero is rejected.

Table 4 The results of estimation of regressions (1) and (2) for G factor in telecoms firms

Variable	Pooled OLS	FE	RE
Independence policy	-0.078 (0.059)	-0.008 (0.023)	0.039 (0.065)
Percentage of independent directors in the board	0 (0.002)	0.001* (0.001)	0.002* (0.001)
CEO Chairman Duality	-0.053 (0.042)	-0.045*** (0.017)	-0.088* (0.046)
Existence of Corporate Social Responsibility (CSR) Board committee	-0.119* (0.062)	0.04* (0.021)	0.053 (0.048)
Women in board	0.011*** (0.002)	0.007*** (0.001)	-0.053 (0.048)
Constant	0.194 (0.589)	0.174 (0.489)	0.201 (0.514)
Observations	1 034	1 034	1 034
R-squared	0.121	0.180	0.115
p-value (F-test robust)	0,0000	0,00031	0,000573
p-value Hausmann test			1,0
Breusch-Pagan LM test. (F statistics p-value)*	0,00000		

***, **, * indicate the value is significant at 1%, 5% and 10% level, standard errors are stated in parenthesis

Source: author's calculation

Therefore, hypothesis H5 is partially confirmed as factors of corporate governance affect the value of telecommunication companies. CEO duality has a significant (at a 1% level) and negative impact on a company's value. This result suggests that if these posts are separated, the investment attractiveness of the telecommunication company increases. This result coincides with that of (Rhoades et al., 2001). Consequently, Tobin Q for companies in which CSR committees exist is higher than for those organizations without a committee. Thirdly, greater gender diversity increases the market's assessment of the company's prospects reflected in Tobin Q. This result coincides with (Smith et al., 2006). Lastly, the percentage of independent directors has a significant (but only at a 10% level) but the marginal effect on Tobin Q. This finding agrees with that having a moderate number of independent directors can increase a firm's value. On the contrary, firms with "supermajority-independent boards can be less profitable than their counterparts. Moreover, independent directors can give little value to telecommunication companies because in this industry director's technical expertise can be more valuable than their outsider status.

5. Conclusions

We closed the research gaps and investigated the impact of ESG disclosure on Tobin-Q of US-listed telecommunication service companies between 2011-2021. We showed that the ESG disclosure score positively affects the value of the company. Among individual ESG disclosure pillars, only corporate governance positively affects Tobin-Q and is statistically significant (at a 5% level). Environmental and social pillars are both statistically insignificant in influencing Tobin Q of the telecoms. We also identified individual corporate governance factors which influence the value of telecoms. We found that CEO duality significantly and negatively impacts a company's value. On the contrary, the presence of corporate social responsibility (CSR) committee, greater gender diversity on the Board and the percentage of independent directors on the Board positively affect the value of the telecoms. The study's limitations are the following: (1) it does not address the issue of the U-shaped link between the value of the firm and ESG disclosures; (2) the limited number of years used in modelling. These limitations will be addressed in further studies. Also, further research directions include exploring the impact of ESG disclosures on both companies' performance and value in various industries in emerging markets.

Acknowledgments

The research was partially funded by the Ministry of Science and Higher Education of the Russian Federation under the strategic academic leadership program 'Priority 2030' (agreement 075-15-2021-1333, dated 30 September 2021).

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