SCIENCE BASED TARGETS IN ENVIRONMENTAL REPORTING: EXPLANATIONS FROM E7 COUNTRIES AND TÜRKİYE[*]

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ABSTRACT

The Science Based Targets Initiative (SBTi) aims to reduce greenhouse gas emissions by companies to combat climate change, with a focus on limiting global temperature rise. More than 4,000 companies worldwide have committed to reducing carbon emissions in line with the Paris Agreement. Our study examines the SBTi index in E7 countries, including Türkiye, looking at the participation of 553 companies in climate targets such as net-zero and Business Ambition 1.5. The analysis includes BIST companies, assessing their CDP scores and disclosure levels through various reports. This research provides insights into the regional distribution and progress of companies in meeting climate targets.

Keywords: Climate Change, Sustainability Reporting, Science-Based Target

JEL Classification: M40, M41, Q56

ÇEVRESEL RAPORLAMADA BİLİMSEL HEDEFLER: E7 ÜLKELERİ VE TÜRKİYE'DEN AÇIKLAMALAR

ÖZ

Bilime Dayalı Hedefler Girişimi (SBTi), küresel sıcaklık artışını sınırlamaya odaklanarak iklim değişikliğiyle mücadele etmek için şirketlerin sera gazı emisyonlarını azaltmayı amaçlamaktadır. Dünya

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çapında 4.000'den fazla şirket Paris Anlaşması doğrultusunda karbon emisyonlarını azaltmayı taahhüt etmiştir. Türkiye'nin de aralarında bulunduğu E7 ülkelerinde SBTi endeksini inceleyen çalışmamız, 553 şirketin net-sıfır ve SBTi 1.5 gibi iklim hedeflerine katılımını incelemektedir. Çalışma, CDP puanlarını ve çeşitli raporlar aracılığıyla açıklama düzeylerini değerlendiren BIST şirketlerini içermektedir. Bu araştırma, şirketlerin iklim hedeflerini karşılamadaki bölgesel dağılımı ve ilerlemesi hakkında fikir vermeyi amaçlamaktadır.

Anahtar Kelimeler: İklim Değişikliği, Sürdürülebilirlik Raporlaması, Bilim Temelli Hedef

JEL Sınıflandırması: M40, M41, Q56

GENİŞLETİLMİŞ ÖZET

AMAÇ VE MOTİVASYON

Bilime Dayalı Hedefler Girişimi (*SBTi*), iklim değişikliğine neden olan riskleri belirleyerek ve bunların etkilerini azaltarak şirketlerin sera gazı (*GHG*) emisyonlarını azaltmayı amaçlayan bir girişimdir. Bu konudaki en önemli amaç, küresel ısınma artışını sanayi öncesi seviyelerden 2 santigrat derecenin altında tutmak ve ısınmayı 1,5 santigrat derece ile sınırlandırmaktır. Şirketlerin karbon emisyonlarını Paris Anlaşması hedefleri doğrultusunda azaltmalarına öncülük eden SBTi verileri, dünya genelinde 4.000'den fazla şirketin beyanlarını yansıtmaktadır. Bu çalışmada, gelişmekte olan yedi ülkenin bölgesel dağılımını ve yakın vadeli hedeflerini analiz ederek, E7 ülkelerindeki SBTi endeksinde yer alan şirket sayılarına ilişkin tanımlayıcı istatistikler sunulmaktadır. Ayrıca, Türkiye'de faaliyet gösteren ve bu endekste yer alan şirketlerin durumu ortaya konulmaktadır.

ARAŞTIRMA STRATEJİSİ VE YÖNTEMİ

2015 yılında Paris Anlaşması'nın kabul edilmesinden bu yana dikkatler şirketlerin iklim değişikliğini azaltmaya yönelik eylemlerine çevrilmiştir. Bu konuda Bilim Dayalı Hedefler Girişimi (*SBTi*) kurumsal karbon azaltım hedeflerini kamuoyuyla paylaşması ile dikkat çekmiştir. *SBTi* elde ettiği verileri kamuya açık olarak yayınlamaktadır. Ancak bu yayınlanan veriler sürdürülebilirlik konusunda çalışan profesyoneller ile akademisyenler tarafından her ne kadar dikkat çekici bulunsa da bu konudaki bilimsel çalışmalar henüz başlangıç aşamasındadır (Giesekam ve diğerleri, 2021). *SBTi* kapsamında şirketlerin sınıflandırılması için hedefler, taahhütler, yakın vadeli hedefler ve uzun vadeli hedefler olmak üzere çeşitli kategoriler oluşturulmuştur. Bu bağlamda "hedefler", şirketlerin ve finans kuruluşlarının sera gazı emisyonlarını azaltmalarına yönelik *SBTi* tarafından incelenen ve doğrulanan bilim temelli hedefleri ifade etmektedir.

Bu çalışmada E7 ülkelerinde *SBTi* endeksine dahil olan şirket sayısına ilişkin tanımlayıcı istatistikler sunulmuş ve yorumlanmıştır. Bu tanımlayıcı istatistikler kapsamında gelişmekte olan yedi ülkenin

bölgesel dağılımı yakın vadeli hedef durumuna göre analiz edilmiştir. Aynı zamanda *SBTi* endeksinde örneklemdeki 553 firmanın organizasyon yapısına göre dağılımı incelemiştir. Ayrıca firmaların *net-zero* ve *BA 1.5* katılımı değerlendirilmiştir. Daha sonra Türkiye'ye ait veriler bu tanımlayıcı istatistiklere göre ayrı ayrı analiz edilerek ilgili şirketler tespit edilmiştir. *SBTi*, kendi kapsamında CDP raporlama verilerini de değerlendirdiğinden, bu çalışma aynı zamanda CDP A Listesindeki şirketleri de analiz ederek en iyi örnekleri belirlemeyi amaçlamıştır. Dolayısıyla Türkiye'deki şirketler de bu endekslere dahil olmaları açısından değerlendirilmiştir. Son olarak *SBTi* endeksinde yer alan BIST şirketleri CDP puanlaması açısından da analiz edilmiştir.

BULGULAR VE TARTIŞMA

Çalışmada *SBTi* 1.5 veri tabanındaki E7 ülkelerine (Çin, Hindistan, Brezilya, Rusya, Endonezya, Meksika ve Türkiye) ait veriler öncelikle tanımlayıcı istatistiklerle değerlendirilmiştir. Asya Bölgesi'ndeki şirketlerin %82'sinin *SBTi'*ye katıldığını, Avrupa Bölgesi'nde ise yalnızca sekiz şirketin katıldığı görülmektedir. Diğer taraftan, endekse Çin en yüksek düzeyde bağlılık gösterirken, Rusya, Endonezya ve Meksika nispeten daha düşük düzeyde bağlılık gösterdiği izlenmiştir. Türkiye'de ise 40 şirket yakın vadeli hedef statüsünü taahhüt ederken, 16 şirket ise belirlenen hedefler kapsamında yer almıştır.

Çalışmamızda örneklem içerisinde yer alan 553 şirketin organizasyon yapısı, net-sıfır ve BA 1.5 katılımları da dahil olmak üzere incelenmiştir. Borsa İstanbul'da bu kapsama giren 19 şirketin ise faaliyet raporları, entegre faaliyet raporları, sürdürülebilirlik raporları ve entegre raporları SBTi ve CDP açıklamaları dikkate alınarak incelenmiştir. Türkiye'deki şirketler de analize dahil edilmiş ve BIST şirketleri CDP puanlaması ve finansal olmayan raporlar açısından incelenerek sektörel bazda açıklama düzeyleri analiz edilmiştir. Buna göre 19 şirket içerisinden, 7 şirketin yalnızca entegre yıllık rapor yayınladığı ve bu raporda SBTi ve CDP ile ilgili beyanlarını sunduğu görülmüştür. Ancak diğer şirketler bu bilgiyi hem yıllık raporlarında hem de entegre veya sürdürülebilirlik raporlarında yayınlamıştır. Çalışma bulgularımızda, yalnızca bir şirketin entegre rapor yayınlaması, diğer şirketlerin ise sürdürülebilirlik raporu yayınlaması ayrıca dikkat çekmiştir.

SONUÇ VE ÖNERİLER

Çalışma kapsamında sera gazı emisyonlarını azaltmak için bilime dayalı hedefler geliştirmeye kararlı olan şirketlerin SBTi kapsamında incelenmesi ve bu endeks veri tabanının kullanılması amaçlanmıştır. Girişim 2015 yılında kurulmuş olup, son üç yılda yayınladığı verilerde gözle görülür bir artış yaşanmıştır. SBTi verileri, CDP, BM Küresel İlkeler Sözleşmesi, Dünya Kaynakları Enstitüsü (*WRI*) ve Dünya Çapında Doğa Fonu (*WWF*) gibi kuruluşların iş birliği ile oluşturulması açısından dikkate değerdir. Şirketlerin hedeflerini raporlaması ve iklim değişikliğiyle mücadeleye katkı sağlaması; kritik önem taşıyan 1.5 santigrat derece sınırının korunmasını teşvik etmektedir. Türkiye'de de

sürdürülebilirlik ve iklim değişikliği konularının öneminin paydaşlara gösterilmesi açısından farklı sektörlerden şirketlerin *SBTi*'ye katılması ve raporlarında girişime atıfta bulunması önemlidir. CDP açıklamaları şirketlerin 1.5 santigrat derece hedeflerini takip etmede tek başına yeterli olmadığından, *SBTi* açıklamaları çevre raporlaması açısından da büyük önem taşımaktadır.

Bu çalışma kapsamında *SBTi* kapsamında E7 ülkelerinin durumu incelenmiş ardından, *SBTi* taahhüdünde bulunan BIST şirketleri değerlendirilmiştir. Bu incelemede, en iyi örneklerin seçilebilmesi amacıyla CDP 2022 A listesine giren şirketlerin 2022 yıllık raporları, sürdürülebilirlik raporları, entegre raporları ve entegre yıllık raporları incelenmiştir. Seçilen şirketlerin bir kısmı yalnızca entegre bir yıllık rapor yayınlamış ve bu raporda *SBTi* ve CDP ile ilgili beyanlarına yer vermiştir. Öte yandan diğer şirketler de hem yıllık raporlar hem de sürdürülebilirlik veya entegre raporlar yayınlayarak her ikisinde de *SBTi* hedeflerine ilişkin açıklamalarda bulunmuştur. Raporlar incelendiğinde şirketlerin yakın gelecekte net sıfır emisyona geçiş hedeflerini belirledikleri, ürün ve hizmetlerini buna göre güncelledikleri görülmüştür.

1. INTRODUCTION

Today, combating climate change is the main agenda of many organizations, such as the World Economic Forum, Global Reporting Initiative, Climate Disclosure Standards Board, Carbon Disclosure Project (CDP), and United Nations (UN) Greenhouse Gas Protocol. In 2021, an international environmental agreement was reached at the UN Climate Change Conference (COP26) to limit the global temperature increase to 1.5 degrees Celsius over the next century. The present study provides an analysis of the applicability and status of the Science Based Targets Initiative (SBTi), which originated in 2015, within the context of various sustainability reporting databases such as the CDP (climate change and water security), FTSE Russell, Corporate Governance Rating, Refinitiv, and Sustainalytics in empirical academic studies.

The SBTi empowers global businesses to set emission reduction goals based on current climate science. Initiated by the collaboration between the CDP, UN Global Compact, World Resources Institute (WRI), and World Wide Fund for Nature (WWF), the SBTi is a pivotal pledge in the "We Mean Business Coalition", showcasing these organizations' joint dedication. The SBTi's mission is to instill assurance among global companies to drive the economy toward a 50% emission reduction by 2030 and achieve net-zero status by 2050 (SBTi Annual Progress Report, 2021). A total of 19 companies that operate on the Borsa Istanbul stock exchange (BIST) in Türkiye have joined the SBTi; thus, the present study examines these companies specifically to gauge the movement of Turkish companies toward these emissions targets. This review was conducted by following the climate, forest, and water security topics categorized in CDP's A List, 2022.

The approaches used in the study in combating climate change are aimed at understanding how companies are guided in the context envisaged by the Science-Based Targets Initiative, to what extent the targets set here are complied with, and how these targets work in real-world conditions. This study analyses the SBTi 1.5 database with descriptive statistics in the context of E7 countries, including Türkiye, as key actors in shaping the global economic order. The main motivation is to assess the environmental commitments of these countries, and Türkiye in particular, and how these commitments are compatible with global efforts. Furthermore, a special focus of this study is the performance of Turkish companies listed on the BIST and participating in the SBTi. A detailed analysis of the integrated reports, sustainability reports, and investor presentations of these companies reveals the approach of the Turkish companies to sustainability and environmental responsibility. Finally, the inclusion of companies in the BIST sustainability index, which was created to measure the importance they attach to sustainability, is also analyzed.

2. LITERATURE

The following section outlines the literature on the following topics: SBTi methodology questions, case studies, and sectoral reviews; the role of green investment funds in SBTi practices; corporate social responsibility reporting and carbon accounting; and empirical studies that examine the relationship between carbon performance and the SBTi.

Previous research has employed keyword counting and quantitative content analysis to develop a reliable set of indicators for assessing the methodology of the SBTi (Giesekam et al., 2021) and to measure corporate communication about climate science (Thaker, 2020). In terms of case studies and sectoral studies, Moshrefi et al. (2022) examined the use of SBTi and life cycle assessment methodology by Apple Inc.; Grabs and Garrett (2023) presented a case study on deforestation reset commitments and environmental, social, and economic sustainability goals in the palm oil sector; and Maia and Garcia (2023) described GHG reduction and carbon reduction in the electricity sector, in accordance with adaptation to SBTi and sustainable development goals.

Regarding the role of green investment funds in SBTi applications, Immink et al. (2021) analyzed the budgets required for the realization of SBTi and carbon emission reduction targets for both developed and developing countries; Tuhkanen and Vulturius (2022) examined the relationship between green bonds and climate targets; Vulturius et al. (2022) studied the importance of sustainability-linked bonds in net zero carbon emissions; and Popescu et al. (2021) reviewed and evaluated the methods for measuring sustainability investment funds. On the subject of corporate social responsibility reporting and carbon accounting, Gibassier et al. (2020) provided a literature review on climate change and carbon

accounting, and Bjorn et al. (2017) analyzed the role of environmental boundaries in corporate social responsibility reporting.

In empirical studies examining the relationship between carbon performance and SBTi, Bendig et al. (2023) investigated the relationship between corporate carbon emission performance and financial performance; Rekker et al. (2021) studied how sustainability ratings reflected corporate performance in achieving the 2 degrees Celsius target; and Kuo and Chang (2021) assessed the impacts of science-based targets and internal carbon pricing. Despite the breadth of these previous studies, this review also indicates the clear gaps in the literature in this regard.

3. MATERIALS AND METHODS

Since the 2015 adoption of the Paris Agreement, attention has turned to the actions of corporations to reduce climate change, which have ramped up accordingly. The Science Based Targets Initiative (SBTi), which was created in this context and has since publicly shared corporate carbon reduction targets, has attracted particular attention. While this publicly published initiative is considered remarkable by sustainability professionals, scholarly studies on the movement are still in their infancy (Giesekam et al., 2021). Various categories for classifying companies have been established within the scope of the SBTi, including targets, commitments, near-term targets, and long-term targets. In this context, the "targets" refers to science-based pathways, reviewed and validated by the SBTi, for companies and financial institutions to reduce their GHG emissions.

The present study presents and interprets descriptive statistics regarding the number of companies included in the SBTi index in E7 countries. Within the scope of these descriptive statistics, the regional distribution of the seven developing countries is analyzed according to near-term target status. At the same time, the distribution of the 553 companies in the sample is examined by organizational structure in the SBTi index. In addition, the net-zero and BA 1.5 participation of the companies are provided. Next, the data pertaining to Türkiye are separately analyzed according to these descriptive statistics, and the relevant companies are identified. Since the SBTi also evaluates CDP reporting data within its scope, this study also aims to analyze the CDP A List companies to determine the best exemplars. Therefore, companies in Türkiye are also included in the scope of the analysis to the extent of their inclusion in these indices. Finally, BIST companies included in the SBTi index are also analyzed in terms of CDP scoring.

4. RESULTS

In this study, the data in the SBTi 1.5 database on the E7 countries (i.e., China, India, Brazil, Russia, Indonesia, Mexico, and Türkiye) are first evaluated with descriptive statistics. The SBTi classifications of the companies and their corporate carbon reduction targets are presented in Table 1.

Table 1. Numerical Distribution of Regions and Countries According to Near-Term Status*

	Near-Term Target Status			
Region	**Committed**	**Removed**	**Targets Set**	**Total**
Asia	267	13	175	455
- India	93	1	81	175
- Türkiye	40	1	16	57
- China	114	10	76	200
- Indonesia	23	1	2	26
Latin America	60	0	30	90
- Brazil	37	0	21	58
- Mexico	23	0	9	32
Europe	8	0	0	8
- Russia	8	0	0	8
Total	**335**	**13**	**205**	**553**

* Countries are classified based on the SBTi website.

Table 1 demonstrates that while 82% of the companies in the Asian Region participated in the science-based target initiative, only eight companies in the European Region did so. In this context, “near-term targets” refer to the targets of companies to reduce carbon emissions in the next 5–10 years, while “commitments” refer to the companies’ desire to achieve these targets and submit them for approval within 24 months (Science Based Targets, accessed 10/7/2023). China demonstrated the highest level of commitment, while Russia, Indonesia, and Mexico showed relatively lower levels of commitment. In the case of Türkiye, 40 companies had committed to near-term target status, while 16 companies were within the scope of targets set.

There are concerns about the applicability of the science based target methodology in terms of its relevance and necessity. Climate change is understood to be a systemic and societal issue, based on previous studies of the topic and carbon accounting. Moreover, a positive link exists between a corporation’s carbon emissions and its financial performance. Managers of companies with high carbon emissions are advised to embrace both SBTi and internal carbon pricing to address climate change. However, for firms with lower carbon emissions, implementing both these strategies can be costly; thus, it might be more advantageous for them to focus on the SBTi. A study of Turkish companies’ voluntary participation in the CDP survey over nearly a decade showed an increasing trend, yet participation has yet to reach the desired levels (Bendig et al., 2022; Gibassier et al., 2020; Giesekam et al., 2021; Kuo & Chang, 2021; Sultanoğlu & Özerhan, 2020).

Table 1 also displays the distribution of companies in the SBTi among E7 countries. In this context, most companies in this initiative are from China and India—with companies from these nations comprising 31% and 36% of the E7 sample, respectively—while Russia has the fewest companies, with only 0.9%. Türkiye and Brazil have a similar share, each accounting for around 10%.

In Table 2, companies in the SBTi are grouped into three different categories according to their organization types: companies, financial institutions, and small- and medium-sized enterprises. In this context, our sample consists of 401 companies; however, it should be noted that some of these 401 companies are not listed on the stock exchange.

Table 2. Distribution of Companies by Organization Type

	Overall		**Türkiye**	
Organization Type	**Freq.**	**Percent**	**Freq.**	**Percent**
Company	401	72,51%	40	70,17%
Financial Institution	17	3,07%	8	14,04%
Small or Medium Enterprise	135	24,41%	9	15,79%
Total	**553**	**100**	**57**	**100**

The Business Ambition 1.5 (BA 1.5) can be defined as an emergency call made in collaboration with UN agencies, industry leaders, and more than 1,000 companies (Science-Based Targets, n.d.). Table 3 details and compares the net-zero commitments and BA 1.5 status of the 401 companies (Business Ambition For 1.5°C). Accordingly, 178 companies in the E7 countries are in both categories, while 306 companies are not included in either.

Table 3. Numerical Distribution of Companies According to Net-Zero and BA1.5

	Overall			**Türkiye**		
	BA1.5			**BA1.5**		
Net-Zero Committed	**Yes**	**No**	**Total**	**Yes**	**No**	**Total**
Yes	178	40	218	18	2	20
No	29	306	335	4	33	37
Total	**207**	**346**	**553**	**22**	**35**	**57**

The CDP A score refers to the score companies receive for their disclosures on their environmental performance according to the categories of BA 1.5, maintaining deforestation-free business practices, and safeguarding water security. The Leadership A score indicates that companies are taking disclosure action on these issues. Additional conceptual frameworks adopted by companies to work towards these

ends include Task Force on Climate-Related Financial Disclosures (TCFD) reporting and the Accountability Framework Initiative (AFi) (CDP, n.d.).

Although the SBTi is an initiative that regulates carbon emission reduction targets for climate change, it was established in cooperation with organizations such as the CDP and UN Global Compact. Therefore, these organizations are also used as the basis for their data. In this context, the CDP A list is also included in the scope of the present study to identify the best examples, and companies in Türkiye are also evaluated in this respect. Table 4 displays the sectoral breakdown of the companies we have selected in Türkiye. According to Table 4, the manufacturing sector ranks first, with the highest number of companies.

Table 4. Sectoral Breakdown of BIST Companies in the SBTi

Main Sector - Subsector	Name of Business
Manufacturing- Metal Goods Machinery Electrical Equipment and Transportation Vehicles	Anadolu Isuzu Inc. Arçelik Inc. Ford Otosan Inc. Klimasan Inc. Tofaş Inc. Türk Traktör Inc. Vestel White Goods Inc. Vestel Elektronik Inc.
Manufacturing- Stone and Soil-Based	Akçansa Inc. Çimsa Inc. Oyak Cement Inc.
Electricity, Gas, Water- Electricity, Gas, Steam	Aydem Renewable Energy Inc. Zorlu Energy Inc.
Manufacturing- Chemicals, Pharmaceuticals, Oil, Rubber, and Plastics	Brisa Bridgestone Inc. Sasa Inc.
Retail Trade- Wholesale, Retail, and Trade	Mavi Inc. Migros Inc.
Manufacturing- Textile, Apparel, and Leather	Kordsa Inc.
Information and Communication- Telecommunications	Turkcell Inc.

Among the companies included in the CDP's A Company List 2022, 299 reported on climate change efforts, 25 on deforestation, and 107 on water security (CDP, n.d.). Table 5 shows that 19 companies listed on the BIST and participating in the SBTi were included in the 2022 CDP Company List. Regarding the sectoral distribution of these companies, 14 were in manufacturing; 2 were in electricity, gas, and water; 2 were in retail; and 1 was in the information and communication sector.

Table 5. CDP Reporting Content of Companies Listed in The SBTi in Türkiye

	Climate	Forest	Water Security	BIST Sustainability Index
Anadolu Isuzu Inc.				
Arçelik Inc.			**A**	√
Ford Otosan Inc.	**A**		**A**	√
Klimasan Inc.				
Tofaş Inc.				√
Türk Traktör Inc.				√
Vestel White Goods Inc.				√
Vestel Elektronik Inc.				√
Akçansa Inc.				√
Çimsa Inc.				√
Oyak Cement Inc.				
Aydem Renewable Energy Inc.	**A**		**A**	√
Zorlu Energy Inc.				√
Brisa Bridgestone Inc.	**A**			√
Sasa Inc.				
Mavi Inc.	**A**			√
Migros Inc.				√
Kordsa Inc.			**A**	√
Turkcell Inc.				√

To be included in the CDP's A Company List, companies must provide disclosures on climate, forest, and water security. In Türkiye, however, companies tend to report on climate and water security, but not forestry. In this context, the research found that four Turkish companies reported on climate and four reported on water security. The companies making disclosures on climate included Ford Otosan Inc., Aydem Renewable Energy Inc., Brisa Bridgestone and Mavi while the companies making disclosures on water security included Arçelik Inc., Ford Otosan, Aydem Renewable Energy, and Kordsa.

Table 6 shows how the SBTi and CDP disclosures of the 19 BIST-traded companies with SBTi commitments were evaluated by examining each company's 2022 annual report, integrated annual report, and sustainability reports.

Table 6. Reports of Listed Companies on Disclosures of SBTi and CDP Commitments

	Integrated Report 2022	Sustainability Report 2022	Integrated Annual Report 2022	Annual Report 2022
Anadolu Isuzu Inc.				**SBTi**
Arçelik Inc.		**SBTi, CDP**		**SBTi, CDP**
Ford Otosan Inc.		**SBTi, CDP**		**SBTi, CDP**
Klimasan Inc.				**SBTi**
Tofaş Inc.				**SBTi, CDP**
Türk Traktör Inc.		**SBTi**		
Vestel White Goods Inc.			**SBTi, CDP**	
Vestel Elektronik Inc.			**SBTi, CDP**	
Akçansa Inc.			**SBTi, CDP**	
Çimsa Inc.			**SBTi, CDP**	
Oyak Cement Inc.	**SBTi**			**SBTi**
Aydem Renewable Energy Inc.		**SBTi, CDP**		**SBTi, CDP**
Zorlu Energy Inc.			**SBTi, CDP**	
Brisa Bridgestone Inc.		**SBTi, CDP**		**SBTi, CDP**
Sasa Inc.		**CDP**		
Mavi Inc.				**SBTi, CDP**
Migros Inc.			**SBTi, CDP**	
Kordsa Inc.				**SBTi, CDP**
Turkcell Inc.			**SBTi, CDP**	

The data in the table demonstrates that 7 companies solely published an integrated annual report and presented their statements regarding SBTi and CDP in this report. Other companies, however, disseminated this information in both their annual reports and either integrated or sustainability reports. What stands out is that only one company published an integrated report, while the rest published sustainability reports.

4.1. Manufacturing: Metal Goods, Machinery, Electrical Equipment, and Transportation Vehicles

4.1.1. Anadolu Isuzu Inc.

Anadolu Isuzu collaborates with international platforms such as the SBTi and the Drive to Zero initiative on sustainability and climate change. The company plans to reduce its Scope 1, 2, and 3 greenhouse gas emissions in line with the 1.5 degrees Celsius target of the Paris Agreement. From 2019 to 2030, the company has set a target of a 46.2% reduction in Scope 1 and 2 emissions. In this context, renewable energy investments and projects focused on a low-carbon economy are being realized. As a result of the CDP's evaluation, the company received an A- rating in the CDP Climate Change Program and came in first place among Turkish manufacturers of commercial vehicles. Anadolu Isuzu will

continue to report to CDP in the future by raising its sustainability targets (Anadolu Isuzu Annual Report, 2022, p. 96).

4.1.2. Arçelik Inc.

Arçelik adopts a highly effective approach to sustainability and combating climate change. Within the scope of the commitments approved by the SBTi, the company plans to reduce Scope 1 and 2 greenhouse gas emissions by 30% and Scope 3 greenhouse gas emissions from the use of products sold by 15% between 2018 and 2030. These targets were set in line with the Paris Agreement's 1.5 degrees Celsius climate scenario. Moreover, the company aims to achieve a net zero emissions target by 2050 (Arçelik Annual Report, 2022, p. 172).

In addition to these goals, Arçelik plays an active role in the international arena. The company reports to major sustainability indices such as the CDP, Dow Jones Sustainability Indices, Corporate Knights, FTSE, and MSCI. Arçelik aims to make a difference in its sector and gain a competitive advantage with the results it achieves in these indices. (Arçelik Annual Report, 2022, p. 380).

There are also significant risks and opportunities within the framework of the company's sustainability goals. Possible increases in energy and production costs, carbon taxes, and sustainability conditions in the supply chain are among the risk factors that may directly affect Arçelik's operations. In addition, the increasing interest of investors and B2B customers in sustainable products is considered an opportunity to strengthen the company's reputation and market position (Arçelik Annual Report, 2022, p. 32).

The analytical tools and scenario analysis that Arçelik uses to measure and assess its sustainability performance also support the company's broad strategy and commitments. The company adopts a comprehensive analytical approach to assess carbon pricing risk, create emission projections for the coming years, and ensure decarbonization of the supply chain. Finally, Arçelik plans to communicate all these commitments and strategies in detail to its stakeholders and shareholders through General Assembly meetings and corporate reports. This open and transparent approach aims to reinforce the company's leadership in sustainability and create value for all stakeholders.

4.1.3. Ford Otosan Inc

In 2021, Turkish automotive manufacturer Ford Otosan set its own carbon reduction targets independently from the American Ford Motor Company for the first time and shared these targets with the public. These targets were formulated in accordance with the European Union Green Deal and SBTi norms. Between 2017 and 2023, the company aims to reduce carbon emissions per vehicle by 18%, with a 50-55% total reduction by 2030. The company is also committed to achieving a carbon-neutral operational structure by 2050 (Ford Otosan Investor Presentation, 2022, p. 91).

The logistics and supply chain divisions have also set sustainability targets. Ford Otosan aims to make its logistics operations carbon neutral by 2035 and ensure that more than 300 of its suppliers are carbon neutral by 2035. At the same time, in terms of its product portfolio, the company aims to sell fossil fuel-free trucks by 2040 (Ford Otosan Annual Report, 2022, p. 87).

Furthermore, Ford Otosan has established new sustainability targets with plans for completion in 2023. In this context, the company plans to analyze climate-related risks and opportunities, formulate strategies to reach a net zero emission target by 2050, and ensure compliance with climate-related policies and practices. In line with these goals, the company aims to achieve net zero emissions and accelerate the transition to a low-carbon economy.

4.1.4. Klimasan Inc.

Klimasan stands out for its significant commitments and successful practices regarding energy and emission management in the commercial refrigeration sector. In addition to being the first in its sector to hold the ISO 50001 Energy Management System Certificate, the company has been regularly calculating Scope 1 and Scope 2 emissions since 2011, in accordance with the Greenhouse Gas (GHG) Protocol, before adding Scope 3 emissions to these calculations in 2020.

In 2022, Klimasan committed to set targets to reduce its carbon footprint in cooperation with the SBTi. The process of setting emission reduction targets is ongoing, with the company aiming to submit its plans for SBTi approval in the first quarter of 2023. During this process, Klimasan participated in the Supplier Leadership on Climate Transition (S-LoCT) Program, sponsored by important customers such as Heineken and Coca-Cola, and received training on emission reduction strategies (Klimasan Annual Report, 2022, p. 10).

Klimasan's energy and carbon management activities were presented as an exemplary case by Carbon Clear at the Istanbul International Carbon Summit Conference, and the company's efforts were selected as a "case study" by Coca-Cola Enterprises (Klimasan Annual Report, 2022, p. 11). With this broad and comprehensive approach, Klimasan aims not only to improve its own sustainability performance but also to spread sustainability understanding in its relations with suppliers and customers.

4.1.5. Tofaş Inc.

Automotive manufacturer Tofaş Inc. has adopted a strategy centered on sustainability and combating climate change. In this context, the company has undertaken important initiatives to integrate international climate change agreements such as the European Union's Green Deal into its strategic business plan. In 2023, the company completed its integration with the SBTi and developed further plans to reduce energy intensity and reduce greenhouse gas emissions from production by 22.6% by 2026 (Tofaş Annual Report, 2022, p. 78).

Tofaş also takes a comprehensive approach to supply chain sustainability. The manufacturer has developed action plans to align all of its domestic direct material suppliers with environmental and social issues by 2025 and has committed to reducing the carbon footprint of its suppliers by 55% by 2030 (Tofaş Annual Report, 2022, p. 87). In this context, the company's green purchasing policies include more than 100 actions to improve the environmental and energy performance of selected suppliers, 80% of which have already been completed.

This holistic approach demonstrates that Tofaş INC seeks to create a sustainable business model that considers not only its own operational sustainability but also its supply chain. The company aims to accelerate the transition to a sustainable business structure by setting measurable and achievable targets in various dimensions such as energy efficiency, carbon emission reduction, and supplier sustainability. These commitments indicate that Tofaş is taking an active role in the fight against global climate change, and in this context, aims to comply with national and international sustainability standards.

4.1.6. Türk Traktör Inc.

Türk Traktör Inc. continues to create value for all stakeholders with their operations covering various products of different brands, from engine production to heat treatment and tractor assembly, using strong production technology. Within the scope of combating climate change, Koç Holding, Türk Traktör's parent company, launched the Carbon Transformation Program and Future Impact Strategy in parallel with its goal of becoming carbon neutral by 2050. In 2022, Türk Traktör calculated its Scope 1, 2, and 3 carbon footprints; accordingly, it aims to reduce its Scope 1 and 2 greenhouse gas emissions by 42% between 2021 and 2030 (Türk Traktör Sustainability Report, 2022, p. 4). In this context, the company is committed to obtaining 100% of its electricity from self-generated renewable sources by the end of 2026. Finally, in 2022, the company reviewed all these targets in terms of risks and opportunities and committed to prioritize the management of climate-related issues as its focus.

4.1.7. Vestel White Goods Inc.

In order to play an important role in the fight against climate change, appliance manufacturer Vestel White Goods Inc. is taking important steps to achieve net zero carbon emissions by 2050. Within the framework of the SBTi, the company aims to reduce its carbon footprint and thus make both its own operations and its entire value chain sustainable. In 2021, the company intensified its efforts to calculate Scope 3 emissions and initiated a detailed data collection process in line with this goal. In addition, Vestel has regularly reported to the Carbon Disclosure Project (CDP) since 2012 and received a Climate Change score of A- and a Water Program score of C in 2022. To minimize its environmental impact, the company has adopted strategies such as switching to low-carbon technologies, increasing renewable energy investments, and producing energy-efficient products (Vestel White Goods Integrated Annual Report, 2022, p. 107).

4.1.8. Vestel Elektronik Inc.

Vestel Elektronik Inc., a home appliance and electronics company specializing in television manufacturing, assumes a significant role in addressing the climate catastrophe with its proactive measures aimed at transitioning towards a net-zero emission economy. Vestel Elektronik is currently engaged in the development of a decarbonization strategy aligned with the SBTi commitment, with the ultimate objective of attaining net zero emissions by 2050.

Aligned with a worldwide environmental agenda, Vestel Elektronik endeavors to attain carbon neutrality by 2050, beginning with its internal activities and subsequently extending to encompass the entirety of its value chain. Vestel Elektronik, in its pursuit of adopting environmentally sustainable practices, has demonstrated its dedication to mitigating climate change by endorsing the SBTi and committing to establish Science Based Targets. This strategic move aligns with Vestel's objective of transitioning into a climate-friendly organization and promoting the widespread use of low-carbon technology, ultimately aiming to achieve net-zero emissions.

In 2021, the company achieved a significant milestone related to its objective to transition towards technologies that result in reduced greenhouse gas emissions throughout the production process. This entails augmenting investments in renewable energy sources and manufacturing products that exhibit high energy efficiency, little water use, diminished carbon emissions, and limited environmental effects. A comprehensive data gathering procedure was undertaken in 2021 to quantify Scope 3 emissions as part of the studies conducted by the SBTi. As an integral component of this undertaking, a comprehensive strategy is currently being formulated to achieve the reduction of carbon emissions in both operational activities and the entirety of the value chain.

Vestel Elektronik has been providing regular reports to the Carbon Disclosure Project (CDP) since 2013. According to the 2022 CDP report, which assessed the year 2021, Vestel Elektronik attained a climate change score of B and a water program score of C (Vestel Elektronik Intergrated Report, 2022, p. 128).

4.2. Manufacturing: Stone and Soil-Based

4.2.1. Akçansa Inc.

In 2022, cement manufacturing company Akçansa Inc. joined the United Nations Global Compact Climate Goal Acceleration Program and the SBTi to combat climate change. The company is committed to setting targets in line with the 1.5 degrees Celsius scenario and plans to collaborate with business and industry leaders on climate action in the future. The company's direct (Scope 1) and indirect (Scope 2 and 3) emissions from operations are calculated in accordance with the World Business Council for Sustainable Development (WBCSD) Cement Sustainability Initiative (CSI) protocols. In this context,

the company has its Scope 1 emissions verified by independent auditors every year and submits them to the Ministry of Environment, Urbanization, and Climate Change. In addition, Akçansa prepares international environmental product declarations for its cement and ready-mixed concrete products and transparently presents the carbon footprint and other environmental impacts of its products to customers. The company aims to expand this practice to other product ranges in the coming years. These initiatives demonstrate the importance the company places on combating climate change and its commitment to sustainability (Akçansa Integrated Annual Report, 2022, p. 47).

4.2.2. Çimsa Inc.

Another cement producer, Çimsa Inc. is implementing a comprehensive decarbonization initiative that establishes short, medium, and long-term science-based goals to combat climate change. This initiative supports short-term action plans through 2030 and an ultimate goal of reaching net zero emissions by 2050. Initiatives including sectoral emission comparisons, facility-based technology assessments, product portfolio analyses, and climate crisis scenarios are covered within the project's purview. In 2023, Çimsa intends to submit formal applications to the SBTi.

The decarbonization project's primary action phases include utilizing alternative resources and decarbonized raw materials, optimizing processes, promoting energy efficiency and renewable energy use, supporting technical advancement, and creating a portfolio of sustainable products. Çimsa's decarbonization efforts began in 2020 and yielded initial results in 2022. In comparison to the base years of 2020 and 2021, the company reduced its specified net CO2 emissions from gray cement by 11% and 8%, respectively. Consolidated cement specific net CO2 emissions were 7% and 5% lower in 2021 than in the base year, respectively. These cuts led to a 21% reduction in absolute emissions. The Carbon Disclosure Project (CDP) results for 2022 show that Çimsa continues its leadership in the Turkish cement industry with a B score in water reporting (Çimsa Integrated Annual Report, 2022, p. 69).

4.2.3. Oyak Cement Inc.

In its 2022 integrated report, cement manufacturer Oyak Cement emphasized that it has achieved a 24.7% completion rate for its Thermal Transformation project, aimed at using alternative fuels in its factories to reach a net-zero target. In addition, it drew attention to waste management and energy efficiency projects, and by joining the SBTi in the context of climate science, it became the first cement company in Türkiye to announce a net-zero commitment. Moreover, under the "Other Considerations" section in its 2022 annual report, the company provided a similar statement related to the SBTi disclosure published under the category of "Social and Environmental Activities" in its integrated report (Oyak Cement Annual Report, 2022, p. 20).

4.3. Electricity, Gas, and Water

4.3.1. Aydem Renewable Energy Inc.

In its 2022 Annual Report, Aydem Renewable Energy Inc. announced its commitment to the SBTi by signing the net-zero pledge. Additionally, the report stated that the company would also participate in the Business Ambition 1.5 and Race to Zero campaigns. Within the "Sustainability Principles and Compliance Framework" of the annual report, under the heading "Combatting the Climate Crisis Strategy," the company outlined its joint strategy with the SBTi (Aydem Renewable Energy Annual Report, 2022, p. 80). The company also emphasized that it increased its Water Security and Climate Change scores under the CDP framework from the "B Level" in 2021 to the "A Leadership Level" in 2022 (Aydem Renewable Energy Annual Report, 2022, p. 13). The company has included similar statements regarding SBTi and CDP in its 2022 Sustainability Report (Aydem Renewable Energy Sustainability Report,, 2022, p. 7).

4.3.2. Zorlu Energy Inc.

Zorlu Energy, in its 2022 Integrated Annual Report, highlighted that it became the first company in the energy sector to publish an Integrated Annual Report and made a net-zero commitment with a focus on SBT determination. In its report, it also stated its intention to develop net-zero emission goals for 2030 and 2040 within the scope of "Restorative Operations & Value Chain" as part of its efforts to combat the climate crisis. The report further emphasized that Zorlu was the first energy company from Türkiye to join the CDP in 2010 (Zorlu Energy Inc. Integrated Annual Report, 2022, p. 127).

4.4. Manufacturing: Chemicals, Pharmaceuticals, Oil, Rubber, and Plastics

4.4.1. Brisa Bridgestone Inc.

In its Annual Report, Brisa, a company affiliated with multinational tire manufacturer Bridgestone Tires, emphasized in the "Sustainability Approach" section that it was the first company in Türkiye to officially endorse SBT goals. This section also detailed the company's participation in an online seminar that aimed to promote the understanding and adoption of the SBTi in Türkiye to reduce greenhouse gas emissions (Brisa Annual Report, 2022, p. 47). Moreover, the company emphasized its inclusion in the "Global A List" of the CDP's "Climate Change" category, as well as its recognition in the "Water Security" category for addressing the water crisis (Brisa Annual Report, 2022, p. 43). In its Sustainability Report, Brisa disclosed that its corporate emission reduction targets for 2030 were approved by the SBTi in 2021. The company also stated its aim to reduce Scope 1 and 2 direct emissions by 56% by 2030 and to achieve net-zero emissions by 2050 (Brisa Sustainability Report, 2022, p. 30). Brisa has made similar statements in relation to the CDP in its annual report.

4.4.2. Sasa Inc.

Sasa Inc., a fiber and textile manufacturer, did not provide any comments on SBT or CDP in its 2022 Annual Report. While Sasa has joined the SBTi, there is no mention of SBT in the company's 2022 Sustainability Report. However, setting science-based targets under the Sustainability Committee's activities has been outlined within the committee's sustainability strategies. In 2022, the company announced its inclusion in the CDP for Climate Change and Water Security Reporting, receiving a "B" grade in the Climate Change report and a "B-" score for Water Security, respectively (Sasa Sustainability Report, 2022, p. 70).

4.5. Retail Trade: Wholesale, Retail, and Trade

4.5.1. Mavi Inc.

Turkish denim manufacturer Mavi stated in its 2022 Annual Report that it became the first and only ready-to-wear clothing brand to receive approval after complying with SBTi criteria for greenhouse gas inventories, assumptions, and emission reduction rates (Mavi Sustainability Report, 2022, p. 70). The company has committed to reducing Scope 1 and 2 emissions by 70% between 2019 and 2030, and Scope 3 emissions in the purchased goods and services category per unit of added value by 55% (Mavi Sustainability Report, 2022, p. 219). In the report where it mentioned its inclusion in the CDP Climate Change Program A List, Mavi also provided information related to combating the climate crisis (Mavi Sustainability Report, 2022, p. 119).

4.5.2. Migros Inc.

In its 2022 Integrated Annual Report, supermarket chain Migros disclosed that through its efforts to reduce its carbon footprint between 2015 and 2021, it achieved a 38% reduction in emissions per square meter in its stores. The company also updated its 2030 target for reducing Scope 1 and 2 carbon emissions by 42% and announced its participation in the SBTi initiative (Migros Integrated Report, 2022, p. 96). It reiterates this statement under the heading of "Combating the Climate Crisis." The company has also disclosed that it has been reporting on Water Security to the CDP since 2017 and that it entered the Water Leaders for the second time with an A- score in both 2020 and 2022 (Migros Integrated Annual Report 2022, p. 104).

4.6. Manufacturing: Textiles, Apparel, and Leather

4.6.1. Kordsa Inc.

In its 2022 Annual Report, textile manufacturer Kordsa set a target date of 2027 for aligning goals from its suppliers under the SBT initiative for its Scope 3 Category 1 emissions, which account for 64% of its total emissions. The company, which declared its commitment to the SBTi in 2021, has stated its

aim to achieve net-zero emissions by no later than 2050. Additionally, in 2022, the company announced that it made it to the CDP Water Program A List for the second time and received a Climate Change score of B (Kordsa Annual Report, 2022, p. 15).

4.7. Information and Communication: Telecommunications

4.7.1. Turkcell Inc.

Turkcell, Türkiye's leading mobile phone operator, disclosed in its 2022 Integrated Annual Report that it is in the application phase for the SBTi net-zero plan within the context of Climate Change. Additionally, the company has stated that it received an A- rating from the CDP score and is a sector leader in Türkiye (Turkcell Integrated Annual Report, 2022, p. 185). Furthermore, the "Operational Risks" section of Turkcell's report explains how the company has revealed environmental, sustainability, and ecology-related risks through CDP Climate Change Reporting; the company further describes how it is sharing these risks and opportunities with stakeholders and declaring its commitment to achieving net-zero carbon emissions by 2050 (Turkcell Integrated Annual Report, 2022, p. 80).

5. CONCLUSION

This study used the Science Based Targets Initiative (SBTi) database of companies and financial institutions that have set science-based goals or are committed to developing science-based goals for reducing GHG emissions. The initiative was founded in 2015, and it is worth mentioning that there has been a notable increase in the data over the past three years. SBTi data from 2015 is notable for the collaboration of organisations such as CDP, the UN Global Compact, the World Resources Institute (WRI), and the World-Wide Fund for Nature (WWF). It is also important for promoting the 1.5-degree Celsius limit, which is critical for companies to report their targets and contribute to combating climate change. In Türkiye, it is also important that companies from different sectors participate in the SBTi and refer to the initiative in their reports, in order to illustrate to stakeholders the importance of sustainability and climate change issues. Since CDP disclosures alone are insufficient for monitoring the 1.5 degrees Celsius targets of companies, SBTi disclosures have become very important for environmental reporting.

Within the scope of this study, BIST companies that have committed to the SBTi are examined. In this examination, in order to select the best examples, the 2022 annual reports, sustainability reports, integrated reports, and integrated annual reports of the companies that made it to the CDP 2022 A-list were reviewed. Some of the selected companies only published an integrated annual report, mentioning their statements regarding the SBTi and CDP in this report. On the other hand, other companies published both annual reports and sustainability or integrated reports, and thus provided statements on

SBTi targets in both. Upon reviewing the reports, it is clear that the companies have set targets to transition to net-zero emissions in the near future and have updated their products and services accordingly.

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AUTHORS' DECLARATION

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