

The Impact of Environmental Sustainability Measures on The Global Influence of The German Auto Industry

Çevresel Sürdürülebilirlik Önlemlerinin Alman Otomotiv Sektörünün Küresel Nüfusu Üzerindeki Etkisi

Olçay ÖLÇEN¹

Aviation Consulting Group, ACG Global Associate, Istanbul, Turkey



ABSTRACT

After the Volkswagen AG Emission Crisis, the automobile industry took special measures in terms of marketing, business management and other managerial sides. This research aims to measure the after-crisis period and whether or not other companies take necessary financial measures toward environmental sustainability. Basic OLS Regression and OLS Regression with dummy variables are utilized on the market-adjusted financial returns of the companies. There are three important findings of this research. Volkswagen AG suffered from the emission crisis not only on the marketing side but also in terms of financial management. Secondly, Mercedes AG and BMW AG did not take the necessary financial lessons from the Volkswagen Emission Crisis because of the same results. And thirdly sustainability variables have an impact on financial management near reputation and brand management. According to findings and discussions, the behaviour of the investors toward the emission scandals is negative. They are comprehensively impacted by these events. The situation can be more complex if corporal investors are added to this equation. Also, it seems that Mercedes AG and BMW AG did not take the necessary lessons from the emission scandal of Volkswagen AG despite of 3 years between events in terms of corporal financial management and automobile-technical details. More interestingly, sustainability or environmental sustainability is one of the main elements not only for the marketing and branding sides of the business but also for the financial management side of corporal management. The sustainability policies of these brands should include financial management. This situation will help the investors and companies if a new sustainability crisis occurs in the market with exact information.

JEL Codes: C4, G12, L62

Keywords: Sustainability, Financial Return, OLS Regression Analysis.

Öz

Volkswagen AG Emisyon Krizi'nin ardından otomobil sektörü, pazarlama, iş yönetimi ve diğer yönetsel açıdan özel önlemler aldı. Bu araştırma, kriz sonrası dönemi ve diğer şirketlerin çevresel sürdürülebilirliğe yönelik gerekli finansal önlemleri alıp almadıklarını ölçmeyi amaçlamaktadır. Firmaların piyasaya göre düzeltilmiş finansal getirileri üzerinde Temel OLS Regresyon ve kukla değişkenli OLS Regresyon kullanılmaktadır. Bu araştırmanın üç önemli bulgusu var. Volkswagen AG, emisyon krizinden yalnızca pazarlama açısından değil aynı zamanda finansal yönetim açısından da etkilendi. İkincisi, Mercedes AG ve BMW AG, aynı sonuçlar nedeniyle Volkswagen Emisyon Krizinden gerekli finansal dersleri alamadılar. Üçüncü olarak sürdürülebilirlik değişkenleri itibar ve marka yönetiminin yanı sıra finansal yönetim üzerinde de etkiye sahiptir. Bulgulara ve tartışmalara göre yatırımcıların emisyon skandallarına karşı tutumu olumsuzdur. Bu olaylardan kapsamlı bir şekilde etkilenebilirler. Bu denkleme kurumsal yatırımcılarda eklenirse durum daha karmaşık hale gelebilir. Mercedes AG ve BMW AG, Volkswagen AG'nin emisyon skandalından kurumsal mali yönetim ve otomobil-teknik detaylar açısından da aradan geçen 3 yıla rağmen gerekli dersleri alamadığı görülmektedir. Daha da ilginç, sürdürülebilirlik veya çevresel sürdürülebilirlik, işin sadece pazarlama ve markalaşma tarafı için değil, aynı zamanda kurumsal yönetimin finansal yönetim tarafı için de ana unsurlardan biridir. Bu markaların sürdürülebilirlik politikaları finansal yönetimi de içermelidir. Kriz, üç şirket için mali açıdan iki gündür devam etmektedir. Kesin bilgilerle, piyasada yeni bir sürdürülebilirlik krizinin yaşanması durumunda bu durum yatırımcılara ve şirketlere yardımcı olacaktır.

JEL Kodları: C4, G12, L62

Anahtar Kelimeler: Sürdürülebilirlik, Finansal Getiriler, En Küçük Kareler Regresyon Analizi

Geliş Tarihi/Received 14.08.2024
Kabul Tarihi/Accepted 04.12.2024
Yayın Tarihi/Publication Date 08.01.2025

Sorumlu Yazar/Corresponding author:

Olçay ÖLÇEN

E-mail: olcay.olcen@gmail.com

Cite this article: Ölçen, O. (2025). The Impact of Environmental Sustainability Measures on The Global Influence of The German Auto Industry. *Trends in Business and Economics*, 39(1), 80-86.



Content of this journal is licensed under a Creative Commons Attribution 4.0 International License

Introduction

The results of the environmental sustainability activities can be observed in many different ways. Especially, the industrial world witnessed the deep waves after the new developments in electronic systems on the auditing side like the research and development sides of industries such as automobile, petro-chemistry, metallurgy and metal. On the other hand, the world also has social protests against the giant industries and the volume of people who joined these events is increasing trend. Thus, the only way is to develop new detection methods or change the current state of the measurement or calibration methods against the devastating impacts of the pollutants for some industries such as the automobile industry.

The German automobile industry has a different structure. Three industrial giants dominate this industry. They are BMW AG, Mercedes AG and Volkswagen AG. Also, these three automobile giants and their affiliates have a word over almost all of the industry not only in Germany but also in the world with their branches, sub-branches and sub-industries.

The market cap of these three automobile giants can give more insights into the importance of the research. According to the revenue scale, Volkswagen AG is the twelfth biggest brand in the world with \$321.24 Billion, Mercedes AG is the thirty-fifth biggest brand in the world with \$160.61 Billion, BMW AG is the thirty-sixth biggest brand in the world with a revenue of \$159.61 Billion within 7972 companies¹. If it is concentrated on the industrial competitive structure, there are 63 automobile brands around the world. Mercedes AG is the fifth largest automobile brand in the world, BMW AG is the sixth and Volkswagen is the seventh. In Germany, they are three giants and represent almost %90 of the all of the German automobile industry with their affiliates².

Nonetheless, without a clear and distinct crisis vision, it's hard to understand their position in the market. It should concentrate here on the main impacts of Emission Scandals which hit, especially these three important giants.

This analysis investigates the reaction of investors towards these Emission Scandals, it expects that these negative events which occurred at different times but

measured with the same time interval for these three giants have relatively the same impacts on the minds of the investors.

In light of the arguments above, Emission scandals will be argued in the literature review, and time intervals and data will be explained in the methodology and data section. The main findings, discussions and conclusions will be made in the next chapter.

Literature Review

“On September 18, 2015, the U.S. Environmental Protection Agency (EPA) served a Notice of Violation to the Volkswagen AG Group alleging that approximately 500,000 VW and Audi diesel-engine cars sold between 2009 and 2015 in the United States contained a defeat device that allowed these cars to comply with emissions regulations in the test box while having higher on-road emissions (Ruediger et al., 2017. p. 1)”

There is a huge literature about this specific issue. Jung and Sharon (2019. s. 12) state that the related regulations on the matter of environmental sustainability have a spirit and the environmental crime of Volkswagen is unacceptable. On the other side, Markowitz et al. (2017. s. 754) underline that public pressure and governmental and institutional decisions are determined on the subjects of clean air and elimination of the pollutants from roads in the near future. The findings of Schiermeier (2015) are interesting depending on the statement that clearly states, that this event was a shame and mistake brand management activity. Besides these, Jacobs and Singhal (2020) maintain that shareholder value is in a sharp decreasing trend in the post-crisis period of the event. It is also a clear finding that of Alchner et al. (2021. s. 187), this event undermines not only the reputation of Volkswagen but also has destructive and diminishing impacts on the great reputation of German engineering, the German Automobile Industry and image of the Germany as a whole. The negative sentiments and thoughts towards the whole of the German system in the post-crisis period are subjects of the article by Bachman et al. (2021). In their analysis, they state that German brands are especially hit by event in terms of sales with a 34.6% decrease in total. The event should be examined from different perspectives, the findings and conclusions of Strittmater and Lechner (2020) emphasize the negative impacts of the event on the second-hand or used-car market.

¹ <https://companiesmarketcap.com/largest-companies-by-revenue/>, 9.10.2023,

² <https://companiesmarketcap.com/automakers/largest-automakers-by-market-cap/>, 9.10.2023.

This event was a starting point for a special understanding of the automobile industry and also the science of marketing, economics and finance. How can we measure the total behaviours of the investors and consumers? What will be the situation of the financial assets structure of firms? What will be the intangible and tangible assets' structure? Naturally, how can investors value these events? Ruediger et al. (2017) find that these negativities have impacts on the image and reputation of the investors by analysing sales of Volkswagen and underline that the externalities of this event are also responsible for image loss in different countries such as the United States. Although these results, Che et al. (2019) underline the difference in price drops between the violating and non-violating diesel cars is statistically insignificant. According to Poier (2020), this extraordinary event is a result of a vulnerability in the German corporate governance structure and reclaimed the differences between the United States and German auditing mechanisms. On the other side, Majlath and Ricordel (2021) examine this event as a crisis of the automobile industry's Corporate Social Responsibility (CSR) and conclude even though they defend the idea that after-event-period should have a positive impact on the score and understanding of the CSR, in reality, it did not make any impact. Besides these, Ding et al. (2023) investigate social media in this sustainability fraud crisis and try to understand public attitudes. Strong condemnation, negative sentiment and significant public concerns are the main factors after this scandal. The timeline of the crisis can be summarised in Table 1,

Table 1. *The Timeline of the Volkswagen Crisis*

Date	Events
2002	Volkswagen stated the largest corporate social responsibility initiative to promote sustainability ("Forging ahead with sustainability").
2013-2014	A research project by the International Council on Clean Transportation (ICCT), in collaboration with West Virginia University, found that Volkswagen AG's diesel Jetta was producing 15 to 35 times the US legal amount of NOx emissions.
May 2014	The California Board of Air Resources Board (CARB) and the Environmental Protection Agency inquired to the Volkswagen AG Group about the emission discrepancy. CARB continued to investigate the issue
June 2015	CARB went to the EPA and Volkswagen AG about the emission problem again. This time the EPA wanted proof that Volkswagen AG had identified and fixed the problem. After inquiring about the issue, Volkswagen admitted to using a defeat device
September 2015	The US government launched a criminal probe into Volkswagen AG (Bomey, 2015). Volkswagen AG's CEO, Martin Winterkorn, resigns from his position after apologising for the scandal. Matthias Mueller takes his place as CEO of Volkswagen AG.

Resource: Cue, 2015. s. 12

Nonetheless, suppose it is focused on the financial spillover impacts of the crisis. In that case, there are

negative spillover impacts on the European firms depending on the event, although non-European firms witness a positive spillover (Barth et al., 2019. S. 33 - 34). The United States, European countries and emerging economies such as India and China impacted this negative event economically, financially and socially (Eger & Schafer, 2018). According to the analysis by Jung and Sharon (2019), this event can be examined with different dimensions. First of all, its main impact is felt by consumers, investors and the industry as a whole. Painter and Martins (2017) discussed the situation of Volkswagen AG in terms of communication science. Crisis management, image restoration and information orientation gain importance for both the stakeholders and consumers in this context. For Merenda and Irwin (2018), the structuring and renovating of the company have also great importance for restoring market confidence and trust after this unethical event. At the same time, Mansouri (2016) shows a great drop in the stock prices of Volkswagen following its sales and reputation. To eliminate the negative impacts of these unethical and deceptive practices, Volkswagen issued a specific "Goodwill package" including gift cards, credits for services or products and a three-year extension of roadside assistance for customers. However, the main relationships with other stakeholders diminished largely (Blackwelder et al, 2016).

The same crisis characteristics can be seen in the emission scandals of BMW AG and Mercedes AG. Therefore, the crises are felt by all of the stakeholders of these industrial giants. Corporal structures, communication infrastructure, financial services and marketing-related activities such as branding, and image management are damaged.

Method

Data

In the data and methodology section, we should focus on the development of pre-crisis, crisis and post-crisis periods. The timeline of the process is given in Figure 1.

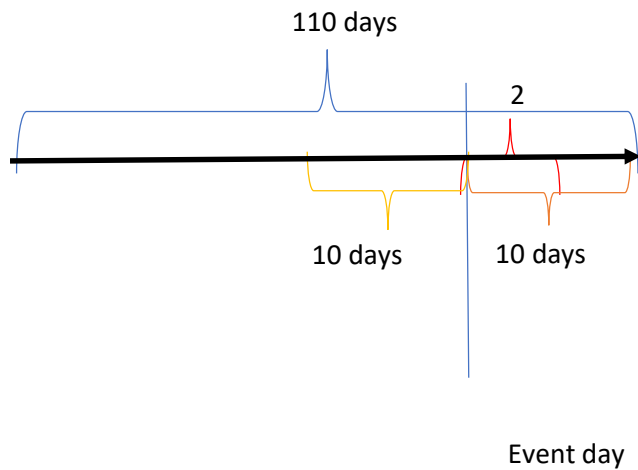


Figure 1: Timeline of Event Studies

According to this, the research timeline is 110 days. Our event days are 03.04.2018 for BMW AG, 19.02.2018 for Mercedes AG and 18.09.2015 for Volkswagen AG. To calculate the impacts of the returns, total event day numbers are 110 days, before and after 10 days are added to the sample to make OLS regression with dummies. Especially, utilization of dummies on regression analysis gives detailed information on specific event, it is simple and generous method if it is utilized in correct time and true place. Two days after the event is our main aim for this paper. We utilise the formula on the stock prices below,

$$R_i = (R_t - R_{t-1}) / R_{t-1}$$

Equation 1.

To reach market-adjusted returns that clear stock returns from the impacts of the market return, we utilize the formula below.

$$R_a = R_i - R_m$$

Equation 2.

The research data are selected from investing.com and yahoofinance.com for determined periods.

$$Y_t = \beta_0 + \beta_1 Y_{n,0,0-n} + \epsilon_i$$

$$n = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$$

Equation 3.

Where,

β_0 = constant of the model,

β_1 = coefficient of dates [10, 0, -10] days

Results

The findings formed with BMW AG, Volkswagen AG and Mercedes AG market returns can be seen in Table 2. Market returns of the German Companies [-10,0,10].

Table 2. Market returns of the German Companies

<u>Days</u>	<u>BMW AG</u>	<u>Mercedes AG</u>	<u>Volkswagen AG</u>
-10	0.0045	0.0003	0.0025
-9	0.0052	0.0048	-0.0011
-8	0.0016	0.0006	0.0121
-7	0.0005	0.0209*	0.0161
-6	0.0074	0.0089	0.0008
-5	0.0035	-0.0032	0.0109
-4	0.0199*	0.0013	-0.0034
-3	-0.0091	0.0016	0.0094
-2	-0.0010	0.0031	0.0012
-1	0.0165**	-0.0013	-0.0086
0	0.0132**	-0.0159	0.0009
1	-0.0112***	-0.0144*	-0.1867*
2	-0.0148**	-0.0032*	-0.1577*
3	0.0076	-0.0042	0.0499*
4	-0.0093	0.0028	0.0275*
5	0.0070	-0.0067	-0.0684*
6	0.0063	0.0041	-0.0509*
7	-0.0097	0.0051	-0.3534*
8	0.0127**	-0.0015	0.0070
9	-0.0034	-0.0021	0.0053
10	-0.0100	-0.0161*	-0.450*
Constant	0.0006	0.0005	-0.0034

0.001 significance=*; 0.05 significance=**; 0.01 significance=***

According to the results, the German automobile industry suffered from the emission declarations deeply. The three unwanted and unexpected declarations, which are dated 03.04.2018 for BMW AG, 19.02.2018 for Mercedes AG and 18.09.2015 for Volkswagen AG, have dramatic impacts within two following days of the returns of these automobile brands and this relationship is significant statistically. The research findings include only the information that is from stock prices. Because they are distilled from marketing - financial impacts with Equation 2.

Discussion

Stock prices, naturally, returns are indispensable parts of financial analyses, they directly give some tips on investors' behaviours toward a financial asset. They include some specific information about risk and time-related behaviours of investors. Fama and Macbeth (1973) underline the impacts of risk aversion, the effects of transaction costs and information costs in these behaviours to achieve optimum results. Besides these, book equity and market equity ratios cannot describe the relationships between company stocks and investors' minds (Fama & French, 1995). Therefore, the risk is an anomaly from the average return and must be added to all of the financial market activities (Fama & French, 1996). Nonetheless, it is not clear if simple risk calculations will be enough to explain the asset returns or earnings (Fama & French, 1996). However, the strategic behaviours of investors in governing and directing portfolios (active or passive) can be a direct cause of false calculations of risk (Fama & French, 2004). In the analysis of this paper, it should be concentrated on the main relationships between returns and time. As it is expected, the returns are negative and statistically significant. This means that investors of the German Automobile Giants find these events risky in financial understanding within the following 2 days.

Conclusion and Recommendation

According to findings and discussions, the behaviour of the investors toward the emission scandals is negative. They are comprehensively impacted by these events. The situation can be more complex and chaotic if corporal investors are added to this equation. On the other hand, It seems that Mercedes AG and BMW AG did not take the necessary lessons from the emission scandal of Volkswagen AG despite of 3 years between events in terms of corporal financial management and automobile-

technical details. More interestingly, sustainability or environmental sustainability is one of the main elements not only for the marketing and branding sides of the business but also for the financial management side of corporal management. The sustainability policies of these brands should include financial management.

For the next research, it is suggestable to make some more complex analyses with more complex financial models. Also, new research models and analyses can develop in light of the current research in financial management, marketing and branding management or researchers can make hybrid works on this issue.

Hakem Değerlendirmesi: Dış bağımsız.

Çıkar Çatışması: Yazar, çıkar çatışması olmadığını beyan etmiştir.

Finansal Destek: Yazar, bu çalışma için finansal destek almadığını beyan etmiştir.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The author have no conflicts of interest to declare.

Financial Disclosure: The author declared that this study has received no financial support.

References

- Aichner, T., Coletti, P., Jacob, F., & Wilken, R. (2021). Did the Volkswagen emissions scandal harm the "Made in Germany" image? A cross-cultural, cross-products, cross-time study. *Corporate reputation review*, 24, 179-190. [\[CrossRef\]](#)
- Bachmann, R., Ehrlich, G., & Ruzic, D. (2017). Firms and collective reputation: The Volkswagen emission scandal as a case study (No. 6805). CESifo Working Paper. [\[CrossRef\]](#)
- Barth, F. (2019). Spillover effects from the Volkswagen emissions scandal: An analysis of stock, corporate bond, and credit default swap markets. In *Spillover Effects from the Volkswagen Emissions Scandal: An Analysis of Stock, Corporate Bond, and Credit Default Swap Markets*: Barth, Florian. [SI]: SSRN.
- Blackwelder, B., Coleman, K., Colunga-Santoyo, S., Harrison, J. S., & Wozniak, D. (2016). The volkswagen scandal. [\[CrossRef\]](#)
- Che, X., Katayama, H., & Lee, P. (2020). Willingness to pay for brand reputation: Lessons from the volkswagen diesel emissions scandal. *City Research Online*, 20(2) [\[CrossRef\]](#)
- Cue, A. (2015). Volkswagen's Diesel Emission Scandal "Dieselgate". *Opgehaald van The University of North Texas*. [\[CrossRef\]](#)

- Ding, J., Xu, M., Tse, Y. K., Lin, K. Y., & Zhang, M. (2022). Customer opinions mining through social media: insights from sustainability fraud crisis-Volkswagen emissions scandal. *Enterprise Information Systems*, 2130012. [\[CrossRef\]](#)
- Eger, T., & Schäfer, H. B. (2018). Reflections on the Volkswagen Emissions Scandal. Available at SSRN 3109538. [\[CrossRef\]](#)
- Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of financial economics*, 33(1), 3-56. [\[CrossRef\]](#)
- Fama, E. F., & French, K. R. (1995). Size and book-to-market factors in earnings and returns. *The journal of finance*, 50(1), 131-155. [\[CrossRef\]](#)
- Fama, E. F., & French, K. R. (1996). The CAPM is wanted, dead or alive. *The Journal of Finance*, 51(5), 1947-1958. [\[CrossRef\]](#)
- Fama, E. F., & French, K. R. (2004). The capital asset pricing model: Theory and evidence. *Journal of economic perspectives*, 18(3), 25-46. [\[CrossRef\]](#)
- Fama, E. F., & MacBeth, J. D. (1973). Risk, return, and equilibrium: Empirical tests. *Journal of political economy*, 81(3), 607-636. [\[CrossRef\]](#)
- <https://companiesmarketcap.com/automakers/largest-automakers-by-market-cap/> , 9.10.2023.
- <https://companiesmarketcap.com/largest-companies-by-revenue/>, 9.10.2023,hi
- Irwin, M. (2018). Case study: Volkswagen's diesel emissions control scandal. *J. Strateg. Innov. Sustain*, 13, 53. [\[CrossRef\]](#)
- Jacobs, B. W., & Singhal, V. R. (2020). Shareholder value effects of the Volkswagen emissions scandal on the automotive ecosystem. *Production and operations management*, 29(10), 2230-2251. [\[CrossRef\]](#)
- Jung, J. C., & Sharon, E. (2019). The Volkswagen emissions scandal and its aftermath. *Global business and organisational excellence*, 38(4), 6-15. [\[CrossRef\]](#)
- Majláth, M., & Ricordel, P. (2021). European Motor Vehicle Manufacturers' CSR Trends—The Effect of the Emission Scandal. *Acta Polytechnica Hungarica*, 18(11), 29-48. [\[CrossRef\]](#)
- Mansouri, N. (2016). A case study of Volkswagen's unethical practice in diesel emission test. *International Journal of Science and Engineering Applications*, 5(4), 211-216. [\[CrossRef\]](#)
- Markowitz, E. M., Chapman, D. A., Guckian, M. L., & Lickel, b. (2017). A corporate scandal that hits close to home: examining owners' responses to the Volkswagen diesel emissions scandal. *Environmental communication*, 11(6), 740-755. [\[CrossRef\]](#)
- Painter, C., & Martins, J. T. (2017). Organisational communication management during the Volkswagen diesel emissions scandal: A hermeneutic study in attribution, crisis management, and information orientation. *Knowledge and Process Management*, 24(3), 204-218. [\[CrossRef\]](#)
- Poier, S. (2020). Clean and Green—The Volkswagen Emissions Scandal: Failure of Corporate Governance?. *Problemy Ekorozwoju*, 15(2), 33-39. [\[CrossRef\]](#)
- Schiermeier, q. (2015). The science behind the Volkswagen emissions scandal. *Nature*, 9, 24. [\[CrossRef\]](#)
- Strittmatter, A., & Lechner, M. (2020). Sorting in the used-car market after the Volkswagen emission scandal. *Journal of environmental economics and management*, 101, 102305 [\[CrossRef\]](#)

Genişletilmiş Özet

Çalışma Volkswagen AG otomotiv işletmesinin, yaşamış olduğu emisyon krizi sonrasında kurumsal ya da bireysel yatırımcıların, Volkswagen AG hisselerini nasıl değerlendirdiğini ve diğer Alman otomobil işletmeleri olan Mercedes AG ve BMW AG'nin de daha sonra meydana gelen emisyon krizlerinden nasıl etkilendiğini ortaya koymaktadır. Günümüzde endüstriyel yapılar, sürdürülebilirlik açısından sıkı bir denetim içindedir. Özellikle global dünyada küresel emisyon değerlerinin daha stabil daha kontrol edilebilir seviyelerde tutulabilmesi için bu denetimin gücü ve şiddeti artmaktadır. Ancak gerek iş hacmi, gerekse de marka olması sebebiyle Volkswagen AG işletmesinin yaşamış olduğu emisyon krizi, küresel olarak otomotiv dünyasını derinden sarsmıştır. Müşterilerin krize tepkileri olması muhtemeldir. Ancak müşterilerden bağımsız olarak yatırımcılar da emisyon krizine tepki göstermişlerdir. Mercedes AG ve BMW AG otomotiv işletmeleri de benzer emisyon krizleri yaşamışlardır. Çalışmada da belirtilen basit bir en küçük kareler regresyon işlemi ve kukla değişkenlerin etkinleştirilmesi ile Volkswagen emisyon krizine yatırımcıların tepki verme süresi 2 gün olarak bulunmuştur. Aynı regresyon işlemi Mercedes AG ve BMW AG için de yapılmış ve sonuç yine 2 gün olarak bulunmuştur. Buradan Mercedes AG ve BMW AG otomotiv işletmelerinin, Volkswagen emisyon krizinden yeterli dersi almadığı finansal olarak ortaya konulabilir. Öte yandan, Volkswagen emisyon krizi, Volkswagen AG işletmesinin bütün iş süreçlerini, pazarlama ve marka politikalarını derinden etkilemiştir. Çalışma finansal olarak da bu olumsuz krizin etkileri olduğunu açıkça ortaya koymaktadır. Finansal getiriler riskin, yatırımcıların ve işletmelerin finansal riske karşı tutumunun yegâne göstergeleridir. Bu düşünceden hareketle, ortaya atılan finansal vaka çalışmalarında Volkswagen emisyon krizi gibi önemli olaylar Amerika Birleşik Devletleri, Çin ve Avrupa Birliği ülkelerinin yaptığı önemli açıklamalar ve bu bölgelerde yaşanan önemli olaylar istatistiksel olarak değerlendirilir, meydana gelen sapmalar tespit edilerek, finansal olay, açıklama ve haber gibi finansal sonuçlar üretebilecek olguların analizi yapılabilir. Bu çalışma bu yönüyle bir finansal vaka analizidir. Ayrıca, işletmelerin bünyesinde gelen getiri temelli büyük finansal krizler, işletmeleri kurumsal yönetim bünyesinde incelenebilecek, şeffaflık, adil olma, hesap verebilirlik ve sosyal sorumluluk gibi uygulamalara zorlamaktadır. Volkswagen emisyon krizinde yaşanan olumsuzluklar bu nedenle otomotiv dünyasında ve Alman otomotiv sanayiinde büyük yankı yapmış olmasına rağmen, belirli zaman aralıkları sonunda, Mercedes AG ve BMW AG otomotiv işletmelerinin emisyon değerlerinin, küresel limitlerin üzerinde olması bir diğer skandaldır ve finansal olarak kurumsal ve bireysel yatırımcılar bu emisyon vakalarını beklenildiği üzere olumsuz değerlendirmişlerdir. Bu yönü ile Alman otomotiv endüstrisinin küresel bazda nüfuzunu etkileyen finansal krizlere dönüşen emisyon krizleri daha derinlemesine incelenmesi gereken vakalar olarak karşımıza çıkmaktadır.

Bu yüzyılda, özellikle çevresel, sosyal ve ekonomik sürdürülebilirlik konuları üzerinde birçok farklı vaka, olay ve haber görülmesi mutlak bir realite öngörüsüne sahip olmak doğrudur. Bu nedenle, bütün boyutlarda sürdürülebilirlik konusunun finansal yönünün de daha geniş bir bakış açısıyla ele alınması ya da pazarlama ve marka, kurumsal yönetim dinamikleri ile birlikte sürdürülebilirlik literatüründe yer alması, etkin ve etkili bir işletme yönetimi için elzemdir. Volkswagen AG, Mercedes AG ve BMW AG işletmelerinin yaşamış olduğu emisyon krizleri yol gösterici özellik taşımaktadır.