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Original Research Article

Are the Dynamics of Diversification Strategies before the Corona Pandemic Still Useful Afterward? Case Study of Six Companies within the Fortune 500 Global Magazine

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Abstract: This study aims to examine whether the diversification-strategy dynamics implemented prior to the COVID-19 pandemic were beneficial afterward in six major global companies included in the Fortune 500 list: Apple, Shell, ExxonMobil, Amazon, Toyota, and Volkswagen. It also investigates whether the effects differ between interrelated and non-interrelated diversification strategies. The study assesses this by testing the correlation relationship between the companies' revenues in the twenty-first century, specifically for the period from 2010 to 2024, using Pearson's correlation coefficient. Data were collected from the Fortune magazine website. Using a case study approach, the research examines the revenues achieved by the selected companies during the specified period. The study reached several conclusions, most importantly that the diversification-strategy dynamics prior to the COVID-19 pandemic were generally not beneficial after the onset of the pandemic.

Keywords: Dynamics of Diversification Strategies, Corona Pandemic, Apple, Shell, Exxon Mobile, Amazon, Toyota, Volkswagen.

1. INTRODUCTION

The selection of a business portfolio in which a firm chooses to compete constitutes a fundamental component of corporate strategy. The managerial significance of this issue has stimulated an extensive body of research on corporate diversification over the past three decades. Despite the considerable academic attention devoted to this topic, many questions remain unanswered regarding the factors that distinguish successful diversification strategies from unsuccessful ones. Consequently, progress in this field appeared to have stagnated for a period of time (Shayne, 1998, p. 2). However, researchers soon renewed their interest in this important area through the conduct of further empirical investigations.

Issues related to corporate diversification have attracted substantial attention in empirical strategic management research over the past two decades (Alonso & Forcadell, 2010, p. 537; Dhir & Dhir, 2015, p. 569). Since diversification directly affects a firm's scope and boundaries, examining the factors that influence organizational scope has become increasingly important in strategic management research during the twenty-first century (Liu & Hsu, 2011, p. 1512). Diversification has also emerged as a common survival strategy adopted by firms seeking to outperform their competitors (Haug & Ulrich, 2013). In this context, Dhir and Dhir (2015) reviewed the diversification literature published between 2000 and 2010 and identified 25 studies on diversification type, level, and mode published in the Strategic Management Journal (SMJ), one of the leading journals in the field of strategic management, representing an average of 2.5 studies per year.

The relationship between firm performance and corporate diversification is among the most extensively examined topics in the strategic management literature (Park & Jang, 2013, p. 51). Nevertheless, empirical findings regarding the relationship between diversification and firm performance remain highly inconsistent (Singh *et al*., 2004, p. 491). Strategic management diversification is one of the most debated strategic management topics at present, with studies showing a variety of divergent results for its impact on organizational performance (Shen, 2018, p. 629).

For example, another study discovered that unrelated diversification inside a company's own industry negatively impacts the profit levels of companies for the short term (while having no impact on the rate of sales), whereas the long-term effects were found to be significantly positive with regards to profit levels, but continued to remain neutral as far as sales growth is concerned. In addition to these results, the same study showed that related diversification positively affected the profit levels of a company in the short term; however, the positive effect on profit levels became negative over time. Furthermore, the interaction model identified that using both methods at once creates synergy very rapidly because of the increase in operating efficiency. (Park & Jang, 2013, p. 51).

There is considerable consensus that related diversification enhances firm performance while unrelated diversification detracts from it; however, the empirical evidence has been inconsistent with regard to this proposition (Park & Jang, 2013, p. 51). For example, some research indicates that firms may benefit from related diversification even when their business units do not have a great deal of coordination among them. This suggests that a key factor in superior performance will be the ability of the firm to dynamically redeploy resources across its different businesses through time (Helfat *et al*., 2004, p. 1217). However, other research indicates that unrelated diversification may present a better strategy for firms competing in dynamic markets because it enables firms to develop enhanced dynamic capabilities (Cho, 2013, p. 1).

In addition to this, prior research has established that profitability has typically decreased in industries with a great deal of unrelated diversification. On the other hand, the increase in unrelated diversification has led to very high sales increases for Japanese firms (Gemba & Kodama, 2001, p. 1165).

This research will also provide value to those who are looking for investments in large multinational corporations. In today's investment climate; specifically within developed markets, there are relatively few direct or indirect obstacles to international investing. Therefore, investors should experience significant returns through international diversification. (Baele & Inghelbrecht, 2009, p. 369).

Understanding how diversification strategies evolve can help firms identify the most productive method of diversifying their business (Alshamsi *et al*., 2018; p. 1). This is especially true today because of the Great Recession of 2008 that transformed the corporate environment. Although there are numerous studies about diversification, there is still an empirical knowledge gap regarding the relationships among diversification and competitive results (Wang, 2021; p. 272) as well as the ways that firms choose to diversify (Lin *et al*., 2020, p. 1).

This context is against which the current study aims to gain a better comprehension of the mechanisms through which diversification strategies are implemented by large companies in the Twenty First Century. This Study identifies some key strategic dynamics developed during the period of COVID-19 Pandemic and outlines practical implications for the diversification strategy of large businesses. In an empirical manner, this study was constructed using data collected from several sources and then analyzed with respect to each source. The next section of the paper will be used to review related literature, to develop and outline the theoretical model, and to formulate the research hypotheses. Section three of the paper will provide details on the research sample and variables and discuss empirically identified findings. Section Four of the paper will present the major findings of the study.

2. Theoretical Background

The study of how firms can expand their product lines through diversification, in terms of its type, level, and form is probably one of the most complicated and inter-related areas studied under Strategic Management in order to enhance firm performance (Dhir & Dhir, 2015, p. 569). Diversification primarily deals with the degree of similarity between the different things that an organization does. Product diversity relates to the degree to which the several products produced by a company are related to each other (Santarelli & Tran, 2016, p. 34). A corporation's diversification strategy describes the business units in which a corporation operates and therefore describes what it does (Pils, 2009, p. 9). Thus this could be developing new markets for goods presently being sold using the company's established resources; alternatively, developing new products for markets currently served by the company. (Helfat *et al*., 2004, p. 1218).

The use of diversification as an increasing number of managers' strategies to better firm performance (Oladimeji & Udosen, 2019, p. 121) is becoming much more prevalent for all companies, however it will be most beneficial when a company has many resources available because they are likely to produce greater benefits from diversification (Esanov,

2012, p. 2); The empirical evidence shows that firms with diverse portfolios, created through the use of specialized knowledge, have a significantly higher sales-growth rate compared to other similar firms (Kang *et al*., 2021, p. 653).

The research on corporate diversification offers a methodical explanation to both the cost and the benefit of utilizing product and geographic diversification as business strategies. There are many studies of the empirical nature which test the theory developed by the corporate diversification literature; these studies show that product diversification can offer many positive aspects, such as enhanced productivity and profitability, organizational synergy, and strategic advantage (p. 491) Singh, *et al*., 2004, in addition to other factors, particularly in a consistent environment.

Dynamic capabilities are now very important to an organization as we see in today's fast-changing markets. As stated by Hitt, Ireland & Hoskisson (2011) organizations will typically obtain competitive advantage from diversification; particularly during periods of significant environmental change or instability. Related diversification is commonly used by companies in unstable markets for market power and to achieve "economies of scope" within their various business units. Conversely, unrelated diversification is generally utilized by organizations for economic benefits resulting from the re-structuring of assets (Cho, 2013, p. 1).

Dynamic models are viewed as providing greater explanatory capability and potential in terms of addressing strategic questions than are static or non-dynamic models. However, there are relatively few applications of methodologies which would allow for a rigorous investigation of the types of dynamic issues involved with many strategic decisions (e.g., Shayne, 1998, p. 2) including examining the role and nature of a firm's diversification strategy at time prior to and subsequent to a severe, unplanned-for, and unanticipated event that changes its environment.

The study of this problem is important for further developing the perspective of the dynamic portfolio theory because it has been an increasingly researched area by both portfolio managers and academics with respect to dynamic portfolio selection. Portfolio managers are interested in dynamic portfolios because they can better manage their clients' money in extremely volatile environments than static portfolios. Static portfolio management strategies remain dominant in all academic and practically applied areas but there is growing evidence that portfolio revision/rebalancing will be used more frequently for managing risks. (Mroua & Abid, 2014, p. 538).

The previous section indicated that research has been limited to exploring the evolution of strategy of diversification and its effect on performance by comparing and contrasting environments as being either stable or unstable. No research has provided an examination of the impact of both the dynamics and statistical significance of strategy of diversification pre-COVID-19 and post-COVID-19 within the same environment but over two time periods (the period leading up to COVID-19 and the period subsequent to COVID-19). Therefore, the present study will test the following hypothesis:

Hypothesis One: Prior to and after COVID-19 there was no statistically significant difference in the relationship between the dynamics of diversification strategies.

3. RESEARCH METHODOLOGY

The method used was based on a descriptive- analytical method with a qualitative approach and case-study methodology which includes six large companies that are included in the Fortune 500. Sources of data for this research include Fortune.com (the official Fortune website) as well as some statistical databases. There is an overall dataset of the revenues of these six companies; Apple, Shell, Exxon Mobil, Amazon, Toyota, and Volkswagen. The time frame of this study covers the years 2010 through 2024.

To fulfill the aims of this research project and to provide an assessment of the data acquired in order to meet those aims, Pearson's correlation coefficient was used to determine the relationship among the various variables of this study. Additionally, normality testing was performed to confirm that the data complied with a normal distribution which is one of the requirements needed to be able to use parametric statistical analyses.

4. RESULTS

The study analyzed financial data for Apple, Shell, Exxon Mobil, Amazon, Toyota, and Volkswagen over a two-period time frame. In the initial period (years 2010 through 2019), the companies' revenues were studied in an environment prior to the onset of the COVID-19 pandemic; whereas, in the subsequent period (years 2010 through 2024) the companies' revenues were studied after the onset of the COVID-19 pandemic. As such, this time span has been used by other researchers in their studies as well. (Antonakakis *et al*., 2021, p. 281).

In order to determine whether the analyzed data is appropriate for a statistical analysis, and to confirm that there are no distortions from non-normality in the data, a normality distribution check has been performed. All variables have a normal distribution, as stated in Table (1), since the p-value for all firms examined with the use of Kolmogorov-Smirnov

Test, is above 0.05. Thus the normality condition has been fulfilled and therefore parametric statistical methods can be used in subsequent studies.

Table 1: Normality Test Results

Kolmogorov-Smirnov		
Company	**df**	**Sig.**
oxxon	15	.200*
apple	15	.200*
Amazon	15	.195
Volkswagn	15	.200*
Shell	15	.200*
TOYOTA	15	.200*

Source: Compiled by researchers based on the website https://fortune.com/ranking/global500/

Based upon prior discussion, it is possible to perform a dynamic analysis of diversification strategy based on the preceding information. Dynamic diversification refers to the extent that an organization adapts to environmental factors (Weiss and Briglauer, 2002, p. 2); therefore, this research explores how organizations' revenues are affected by external factors, such as the COVID-19 pandemic; as well as how these variables relate to one another in terms of correlation to each other.

The analysis was done in both ways:
First: Diversification Strategy Dynamics Prior to the COVID-19 Pandemic:-This can be examined across three sectors as follows:

1. The Dynamics of Diversifying in an Oil Industry Context; Exxonmobil and Shell

It seems like there are three different ways to approach this problem in terms of how important they will be based upon the dynamics of what you want to know from Markowitz's Diversification Theory; This theory shows us that if we have multiple investments in our portfolio with negative correlations, the amount of total risk associated with that portfolio will always be less than each separate investment. Additionally, by using the above formula (i.e., Koh, 2019, p. 820) we can build the most efficient portfolios to obtain the maximum potential return at a specific risk level:
A. Diversification Strategy Dynamics of Oil Companies (Exxon Mobil and Shell) Before the Pandemic toward Negative Correlation

Beginning with the data illustrated in Table (2), it is evident that the main focus for Exxon Mobil's diversification strategy before COVID-19, was on Apple. This can be attributed to the fact that there was a strong negative statistical correlation between Exxon Mobil revenue and Apple revenue at the .05 significance level. It should also be noted that this correlation was moderate, with a value of (-0.686). Such a relationship reduces the risk of revenue fluctuations, as a decrease in one company's revenues may be offset by an increase in the other's revenues.

Therefore, Exxon Mobil may consider acquiring or integrating business units within the technology sector. This conclusion is further supported by the correlation between Exxon Mobil's revenues and Amazon's revenues, which also demonstrated a statistically significant negative correlation at the 0.05 significance level, as indicated by the correlation coefficient of (-0.651*). Amazon ranked second among the diversification alternatives.

In contrast, the results for Shell revealed no statistically significant negative correlations at the 0.05 significance level with any of the companies included in the study. This indicates the absence of diversification dynamics in this direction.

B. Diversification Strategy Dynamics of Oil Companies (Exxon Mobil and Shell) Before the Pandemic toward Zero Correlation.

The results in Table (2) indicate that Exxon Mobil's diversification strategy dynamics before the COVID-19 pandemic were directed toward Toyota and Volkswagen, as no statistically significant correlations were found at the 0.05 significance level.

As for Shell, the results presented in Table (2) show that its diversification strategy dynamics before the COVID-19 pandemic were directed toward all sectors examined in the study, except for the oil sector. Specifically, diversification opportunities were identified with Apple, Amazon, Toyota, and Volkswagen due to the absence of statistically significant correlations at the 0.05 significance level. This represents the second most important diversification option pursued within the oil sector.

C. Diversification Strategy Dynamics of Oil Companies (Exxon Mobil and Shell) Before the Pandemic toward Positive Correlation.

The results shown in Table (2) indicate that the diversification strategy dynamics of Exxon Mobil and Shell before the COVID-19 pandemic were directed toward each other only. This is because the correlation between Exxon Mobil's revenues and Shell's revenues was statistically significant and positive at the 0.05 significance level, as reflected by the correlation coefficient of (0.818**).

This relationship contributes only to reducing the unsystematic (firm-specific) risk of the two companies and does not provide substantial diversification benefits compared with diversification based on negative or zero correlations. Therefore, this represents the third most important diversification option within the oil sector.

Table 2: Correlation Relationships among the Revenues of the Companies under Study during the Period 2010–2019

Exxon mobile	**Exxon mobile**	**shell**	**apple**	**Amazon**	**Toyota**	**Volkswagen**
Pearson Correlation	1	.818**	-.686-*	-.651-*	-.245-	-.208-
Sig. (1-tailed)		.004	.014	.021	.248	.282
N	10	10	10	10	10	10
shell	shell	Exxon mobile	apple	Amazon	Toyota	Volkswagen
Pearson Correlation	1	.818**	-.461-	-.250-	.150	.062
Sig. (1-tailed)		.004	.180	.486	.679	.864
N	10	10	10	10	10	10

Source: Compiled by researchers based on the website https://fortune.com/ranking/global500/.

2-Dynamics of Diversification Strategies in the Technology Sector (Apple & Amazon)

This can be addressed through three trends, ranked according to their dynamic importance based on Markowitz's diversification model, as follows:

A. Dynamics of Diversification Strategies in the Technology Sector (Amazon & Apple) Before the Pandemic: Inverse Correlation: Table (3) shows that the diversification strategy dynamics in Amazon & Apple before the COVID-19 pandemic were unidirectional, towards Exxon Mobile. This is because the correlation between the revenues of Amazon & Apple and the revenues of Exxon Mobile is a significant inverse correlation at a significance level of (0.05). The strength of the relationship is moderate, as reflected in the correlation coefficient values of (-0.686*) for Apple and (-0.651*) for Amazon. This reduces the risk of revenue stream volatility, as a decrease in one revenue stream is offset by an increase in another. Therefore, we advise Amazon & Apple to acquire or merge new business units in the oil sector.

B. Dynamics of Technology Sector Diversification Strategies (Amazon & Apple) Before the Pandemic: The results in Table (3) show that the diversification strategy dynamics of Amazon & Apple before the COVID-19 pandemic were geared towards Shell, as there was no significant correlation at the 0.05 level. Therefore, we recommend that Amazon & Apple also acquire or merge new business units from the oil sector.

C. Dynamics of Technology Sector Diversification Strategies (Amazon & Apple) Before the Pandemic: The results in Table (3) show that the diversification strategy dynamics of Amazon & Apple before the COVID-19 pandemic were geared towards the transportation and technology sectors. This is because the correlation between their revenues and the revenues of transportation and technology companies (Apple, Amazon, Toyota, and Volkswagen) was a significant positive correlation at the 0.05 level, as indicated by the correlation coefficient value. (0.857**, 0.747*, 0.821**,) with Apple, respectively, and correlation coefficients of (0.857**, 0.761*, 0.695**,) with Amazon, respectively. This only reduces the unsystematic risk for the two companies, and this is the third most important option in terms of the dynamics of diversification strategies in the technology sector.

Table 3: Correlation between the revenues of the companies studied from 2010 to 2019

apple	**apple**	**shell**	**Exxon mobile**	**Amazon**	**Toyota**	**Volkswagen**
Pearson Correlation	1	-.461-	-.686-*	.857**	.747*	.821**
Sig. (1-tailed)		.180	.028	.002	.013	.004
N	10	10	10	10	10	10
Amazon	Amazon	shell	Exxon mobile	apple	Toyota	Volkswagen
Pearson Correlation	1	-.250-	-.651-*	.857**	.761*	.695*
Sig. (1-tailed)		.486	.042	.002	.011	.026
N	10	10	10	10	10	10

Source: Compiled by researchers based on the website https://fortune.com/ranking/global500/.

3- Dynamics of Diversification Strategies in the Automotive Sector (Volkswagen & Toyota)

This can be examined through three trends, ranked according to their dynamic importance based on Markowitz's diversification model:

A. Dynamics of Diversification Strategies in the Automotive Sector (Volkswagen & Toyota) Before the Pandemic in the Direction of Inverse Correlation: Table (4) shows that the diversification strategy dynamics in Volkswagen & Toyota before the COVID-19 pandemic did not follow any direction, as there was no significant inverse correlation at the 0.05 level with any of the companies studied.

B. Dynamics of Diversification Strategies in the Automotive Sector (Volkswagen & Toyota) Before the Pandemic in the Direction of No Correlation:

Table (4) shows that the diversification strategy dynamics in Volkswagen & Toyota before the COVID-19 pandemic were directed towards Exxon Mobile & Shell, as there was no significant correlation at the 0.05 level. This is the second most important option. The dynamics of the diversification strategy in the automotive industry.

C. Dynamics of Diversification Strategies in the Automotive Industry (Volkswagen & Toyota) Before the Pandemic: A Direct Correlation: Table (4) shows that the diversification strategy dynamics in Volkswagen and Toyota before the COVID-19 pandemic were in three directions. The first was towards each other, the second was Toyota's direction towards Amazon and Volkswagen's direction towards Apple. This is because the correlation between the revenues of Volkswagen and Toyota and the revenues of Amazon and Apple is a significant direct correlation at a significance level of (0.05). The strength of the relationship was good and very good, as reflected in the correlation coefficient values of (0.761*) for Toyota and (0.821**) for Volkswagen, respectively. The third direction of the diversification strategies dynamics in Volkswagen and Toyota was the same with respect to the sector (i.e., both towards the technology sector) and different in other respects. This pertains to the companies themselves, as the specific trend of Toyota towards Apple and Volkswagen towards Amazon is significant. The correlation between the revenues of Volkswagen and Toyota and the revenues of Amazon and Apple is a positive correlation at a significance level of 0.05. The strength of this relationship is considered good to very good, as reflected in the correlation coefficient values of 0.747 for Toyota and 0.695 for Volkswagen.

Table 4: Shows the correlation between the revenues of the companies studied from 2010 to 2019.

Toyota	**Toyota**	**Volkswagen**	**apple**	**Amazon**	**Exxon mobile**	**shell**
Pearson Correlation	1	.863**	.747*	.761*	-.245-	.150
Sig. (1-tailed)		.001	.013	.011	.495	.679
N	10	10	10	10	10	10
Volkswagen	**Volkswagen**	**Toyota**	**apple**	**Amazon**	**Exxon mobile**	**shell**
Pearson Correlation	1	.863**	.821**	.695*	-.208-	.062
Sig. (1-tailed)		.001	.004	.026	.565	.864
N	10	10	10	10	10	10

Source: Compiled by researchers based on the website https://fortune.com/ranking/global500/**.**

Second: The Dynamics of Diversification Strategies after the Coronavirus Pandemic:

This can be examined through three sectors as follows:-

1-The Dynamics of Diversification Strategies in the Oil Sector (Exxon Mobile & Shell)

This can be addressed through three trends according to their dynamic importance based on Markowitz diversification, as follows:

A. The Dynamics of Diversification Strategies for Oil Companies (Exxon Mobile & Shell) After the Pandemic in the Direction of Inverse Correlation: Table (5) shows that the diversification strategy dynamics in Exxon Mobile & Shell after the Coronavirus pandemic did not follow any direction due to the absence of a significant inverse correlation at the (0.05) level with any of the companies studied.

B. The Dynamics of Diversification Strategies for Oil Companies (Exxon Mobile & Shell) After the Pandemic in the Direction of No Correlation: Table (5) shows that the diversification strategy dynamics in Exxon Mobile & Shell after the Coronavirus pandemic are directed towards all sectors covered by the study except the oil sector, i.e., they are directed towards companies (Apple, Amazon, Toyota, and Volkswagen showed no significant correlation at the 0.05 level. This is the second most important option for the diversification strategy dynamics in the oil sector.

As for Shell, the results in Table (5) show that its diversification strategy dynamics before the COVID-19 pandemic were directed towards all sectors covered in the study except the oil sector, specifically towards Apple, Amazon, Toyota, and Volkswagen. This is due to the lack of a significant correlation at the 0.05 level. This is the second most important option for the diversification strategy dynamics in the oil sector.

C. Diversification Strategy Dynamics of Oil Companies (Exxon Mobile and Shell) After the Pandemic: A Direct Correlation: The results in Table (5) show that the diversification strategy dynamics of Exxon Mobile and Shell after the COVID-19 pandemic continued to move towards each other. The correlation between Exxon Mobile's revenues and Shell's revenues is a significant direct correlation at the 0.05 level. (0.05) This is indicated by the correlation coefficient value of (0.812**), which is slightly lower than the pre-pandemic value. This only reduces the unsystematic risks for the two companies, and this is the third most important option for the diversification strategy dynamics in the oil sector after the pandemic.

Table 5: Correlation between the revenues of the companies studied from 2010 to 2024

Exxon mobile	**Exxon mobile**	**shell**	**apple**	**Amazon**	**Toyota**	**Volkswagen**
Pearson Correlation	1	.812**	-.231-	-.153-	-.016-	.001
Sig. (1-tailed)		.000	.407	.586	.956	.997
N	15	15	15	15	15	15
shell	**shell**	**Exxon mobile**	**apple**	**Amazon**	**Toyota**	**Volkswagen**
Pearson Correlation	1	.812**	-.390-	-.317-	-.070-	-.103-
Sig. (1-tailed)		.000	.150	.250	.804	.715
N	15	15	15	15	15	15

Source: Compiled by researchers based on the website https://fortune.com/ranking/global500/

2-Dynamics of Diversification Strategies in the Technology Sector (Apple, Amazon & Apple)

This can be addressed through three trends according to their dynamic importance, based on Markowitz's diversification model, as follows:

A. Dynamics of Diversification Strategies in the Technology Sector (Amazon & Apple) after the Pandemic towards Inverse Correlation: Table (6) shows that the diversification strategy dynamics in Exxon Mobile & Shell after the COVID-19 pandemic did not move in any direction due to the absence of a significant inverse correlation at the (0.05) level with any of the companies studied.

B. Dynamics of Diversification Strategies in the Technology Sector (Amazon & Apple) after the Pandemic towards No Correlation: Table (6) shows that the diversification strategy dynamics in Amazon & Apple after the COVID-19 pandemic are moving towards Shell & Exxon Mobile due to the absence of a significant correlation at the (0.05) level. Therefore, we recommend that Amazon & Apple) also acquired or acquired new business units from the oil sector.

C. Dynamics of Diversification Strategies for the Technology Sector (Amazon & Apple) After the Pandemic: A Direct Correlation: Table (6) shows that the diversification strategy dynamics in Amazon & Apple after the COVID-19 pandemic were trending towards the transportation and technology sectors. This is because the correlation between their revenues and the revenues of transportation and technology companies (Apple, Amazon, Toyota & Volkswagen) is a significant direct correlation at a significance level of (0.05). This is indicated by the correlation coefficient values of (0.942**, 0.839**, 0.879**) with Apple, respectively, and the correlation coefficient values of (0.942**, 0.851**, 0.843**) with Amazon, respectively. This only reduces the unsystematic risks for the two companies. This is the third most important option for the diversification strategy dynamics in the sector. Technology.

Table 6: Correlation between the revenues of the companies studied from 2010 to 2024

apple	**apple**	**shell**	**Exxon mobile**	**Amazon**	**Toyota**	**Volkswagen**
Pearson Correlation	**1**	-.390-	-.231-	.942**	.839**	.879**
Sig. (1-tailed)		.150	.407	.000	.000	.000
N	**15**	15	15	15	15	15
Amazon	**Amazon**	shell	Exxon mobile	apple	Toyota	Volkswagen
Pearson Correlation	**1**	-.317-	-.153-	.942**	.851**	.843**
Sig. (1-tailed)		.250	.586	.000	.000	.000
N	**15**	15	15	15	15	15

Source: Compiled by researchers based on the website https://fortune.com/ranking/global500/

3-Dynamics of Diversification Strategies in the Automotive Sector (Volkswagen & Toyota):-This can be addressed through three trends, ranked according to their dynamic importance based on Markowitz's diversification model:

A. Dynamics of Diversification Strategies in the Automotive Sector (Volkswagen & Toyota) after the Pandemic towards Inverse Correlation: Table (7) shows that the diversification strategy dynamics in Volkswagen & Toyota after the COVID-19 pandemic did not move in any direction, as there was no significant inverse correlation at the (0.05) level with any of the companies studied.

B. Dynamics of Diversification Strategies in the Automotive Sector (Volkswagen & Toyota) after the Pandemic towards No Correlation: Table (7) shows that the diversification strategy dynamics in Volkswagen & Toyota after the COVID-19 pandemic moved towards Exxon Mobile & Shell, as there was no significant correlation at the (0.05) level. This is the second option. Regarding the importance of diversification strategy dynamics in the automotive industry.

Table (7) shows that the diversification strategy dynamics of Volkswagen and Toyota, following the COVID-19 pandemic, are shifting towards Exxon Mobil and Shell, as there is no statistically significant correlation at the 0.05 level. This is the second most important option in terms of the importance of diversification strategy dynamics in the automotive industry.

C. Dynamics of Diversification Strategies in the Automotive Industry (Volkswagen & Toyota) After the Pandemic: A Direct Correlation: Table (7) shows that the diversification strategy dynamics in Volkswagen and Toyota after the COVID-19 pandemic followed three directions. The first direction was towards each other. The second direction was Toyota's towards Amazon and Volkswagen's towards Apple. This is because the correlation between the revenues of Volkswagen and Toyota and the revenues of Amazon and Apple is a significant direct correlation at a significance level of (0.05). The strength of the relationship was good and very good, as reflected in the correlation coefficient values of (0.761*) for Toyota and (0.821**) for Volkswagen, respectively. The third direction of the diversification strategies dynamics for Volkswagen and Toyota was the same with respect to the sector (i.e., both towards the technology sector) and different in other respects. This pertains to the companies themselves, as the specific trend of Toyota towards Apple and Volkswagen towards Amazon is significant. The correlation between the revenues of Volkswagen and Toyota and the revenues of Amazon and Apple is a positive correlation at a significance level of 0.05. The strength of this relationship is considered good to very good, as reflected in the correlation coefficient values of 0.747 for Toyota and 0.695 for Volkswagen.

Table 7: Shows the correlation between the revenues of the companies studied from 2010 to 2024.

Toyota	**Toyota**	**Volkswagen**	**apple**	**Amazon**	**Exxon mobile**	**shell**
Pearson Correlation	**1**	.953**	.839**	.851**	-.016-	-.070-
Sig. (1-tailed)		.000	.000	.000	.956	.804
N	**15**	15	15	15	15	15
Volkswagen	**Volkswagen**	Toyota	apple	Amazon	Exxon mobile	shell
Pearson Correlation	**1**	.953**	.879**	.843**	.001	-.103-
Sig. (1-tailed)		.000	.000	.000	.997	.715
N	**15**	15	15	15	15	15

Source: Compiled by researchers based on the website https://fortune.com/ranking/global500/

5. DISCUSSION

The changes that have occurred in the dynamics of diversification strategies after the COVID-19 pandemic can be discussed as follows:

1-**Changes in the Dynamics of Diversification Strategies in the oil Sector (Exxon Mobile & Shell):**

The COVID-19 pandemic changed the dynamics of diversification strategies for Exxon Mobile, shifting its focus from the technology sector with companies like Apple and Amazon to a lack of direction. This means that the pandemic negatively impacted (i.e., the lack of benefit from movement) the dynamics of diversification strategies at Exxon Mobile. However, the pandemic did not change the dynamics of diversification strategies for Shell; they remained unchange

2-**Changes in the Dynamics of Diversification Strategies in the Technology Sector (Apple and Amazon):**

The direction remained stable for both Apple and Amazon, as did the direction of all other companies studied except Exxon Mobile. The direction for Exxon Mobile before COVID-19 was negative, and after COVID-19, there was no direction (i.e., no correlation). This means that the pandemic The Coronavirus pandemic negatively impacted the diversification strategies of Apple and Amazon.

3-**Diversification Strategies Dynamics for the Automotive Sector (Toyota and Volkswagen):**

Stability in direction, with no shift in any direction (no directional diversification strategies dynamics) across all directions. This means that the Coronavirus pandemic did not change the diversification strategies dynamics of Toyota and Volkswagen (neither positively nor negatively).

6. CONCLUSION

The Coronavirus pandemic poses a systemic risk, as changes in diversification strategies dynamics have proven that they cannot be avoided through diversification.

Changes in diversification strategies dynamics in large companies were beneficial before the pandemic in companies like Apple, ExxonMobil, and Amazon, but not beneficial in companies like Toyota, Volkswagen, and Shell. Furthermore, the impact of the Coronavirus pandemic on diversification strategies dynamics in large companies was negative in Apple, ExxonMobil, and Amazon. In other words, the diversification strategies dynamics before the pandemic were not beneficial after the pandemic. This means that the acquisition or integration of business units from the oil, technology, or automotive sectors into the portfolios of the companies studied before the pandemic will not significantly reduce the risks posed by the COVID-19 pandemic. This implies that the changes in diversification strategies at major companies before the pandemic were ineffective and futile.

The impact of the COVID-19 pandemic on the diversification strategies of major companies resulted in stability and no change in direction for companies like Toyota, Volkswagen, and Shell. This means that the diversification strategies implemented before the pandemic are no longer beneficial after its onset. This also means that the acquisition or integration of business units from the oil, technology, or automotive sectors into the portfolios of the companies studied before the pandemic will not significantly reduce the risks posed by the COVID-19 pandemic. This implies that the changes in diversification strategies at major companies before the pandemic were ineffective and futile.

Furthermore, changes in diversification strategies can be categorized into two directions: firstly, towards increased diversification, and secondly, towards decreased diversification. We suggest conducting several more in-depth and comprehensive studies on the changing dynamics of diversification strategies within this topic, as it is a large subject requiring extensive research to establish its validity and potentially qualify as an independent theory.

Nevertheless, the results showed an inverse correlation at a significance level greater than 0.05. This finding could be beneficial, and even if not, it doesn't preclude the possibility of diversification strategies shifting first towards the technology sector and then towards the retail sector. The dynamics of diversification strategies in the automotive industry (Volkswagen and Toyota) ranked third. This suggests that Exxon Mobil should pursue diversification in the automotive sector by acquiring or merging with car manufacturing businesses. This would be the second most viable diversification strategy option, as there is no significant correlation between the oil and automotive sectors at a significance level of 0.05.

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