

**ASSIGNMENT TASK NO. –2**

**Research Methodology I**

QTTM509

**RESEARCH ON TOYOTA REVENUE**

**Submitted To – Dr. Tanimma Dutta**

SUBMITTED BY:GROUP 1

SEC-Q2240



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**U**NIVERSITY

(Master of Business Administration)

MITTAL SCHOOL OF BUSINESS

### **Annexure-V- Cover Page for Academic Tasks**

<b>Course Code: QTTM509</b>	
<b>Course Title: RESEARCH METHODOLOGY-I</b>	
<b>Course Instructor: DR. Tanim Dutta</b>	
<b>Academic Task No.: 02</b>	
<b>Academic Task Title: Correlation and regression Analysis</b>	
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<b>Student's Roll no: RQ2240A14</b>	<b>Student's Reg. no: 12202342</b>

### **SUBMITTED BY: GROUP 1**

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### **Declaration:**

I declare that this Assignment is my individual work. I have not copied it from any other student's work or from any other source except where due acknowledgement is made explicitly in the text, nor has any part been written for me by any other person.

Student's Signature- Nowneesh(RQ2240A14).

### **Evaluator's comments (For Instructor's use only)**

Evaluator's  
Signature and  
Date:

Marks Obtained: \_\_\_\_

Max.

Marks:.....

## **Introduction:**

Toyota has built a reputation for producing cars of the highest calibre in all nations around the world. This has been made possible through a method of quality assurance and control that is exclusive to Toyota and was developed over many years.

But the manufacturer of the Innova and Fortuner experienced its first loss in five years in fiscal 2021 as fewer vehicles were sold during the pandemic-stricken year, which also witnessed a rise in expenses. Even though it revised business strategies that involve cross-badging automobiles with Maruti Suzuki in India, the local division of Japan's Toyota Motor recorded a worse bottom line on year for the third year in a row.

According to the company's registration with the Ministry of Corporate Affairs, a net loss of Rs 55 crore was recorded for the fiscal year that ended March 31, down from a net profit of Rs 187 crore the previous year. 13,181 crore less in revenue, a 16% decrease.

Consequently, its market share fell to about 3%, the lowest in a decade, from 4.3% the year before. Still, Toyota Kirloskar overtook Honda Cars India as the sixth largest car maker in India, as the rival posted a steeper fall in sales volume.

## **Introduction of Research Analysis:**

The research we did to showcase our concept about statistical tools was that we have taken two sets of raw data i.e..., revenue which is having the relative factors of sales of revenue, vehicle production, vehicle sales. The data we were taken here is financial year from 2017 to 2021.

## **The statistical tools used in the case study:**

- Correlation
- Regression

## **Interpretative Analysis:**

We are using Correlation method to identify the absence or presence of a relationship between two variables. The findings can range from -1.00 to 1.00. And through Regression analysis we can confidently determine which factors matters the most, which factors can be ignored, and how these factors influence each other.

By applying Correlation and Regression methods in this data sheet, We will measure the increase/decrease as well as determine the degree to which particular independent variables are influencing dependent variables in sales revenue, operating income, net income, ROE, R & D expenses, capital investment due to overall vehicle production & sales.

## CORRELATION TABLE

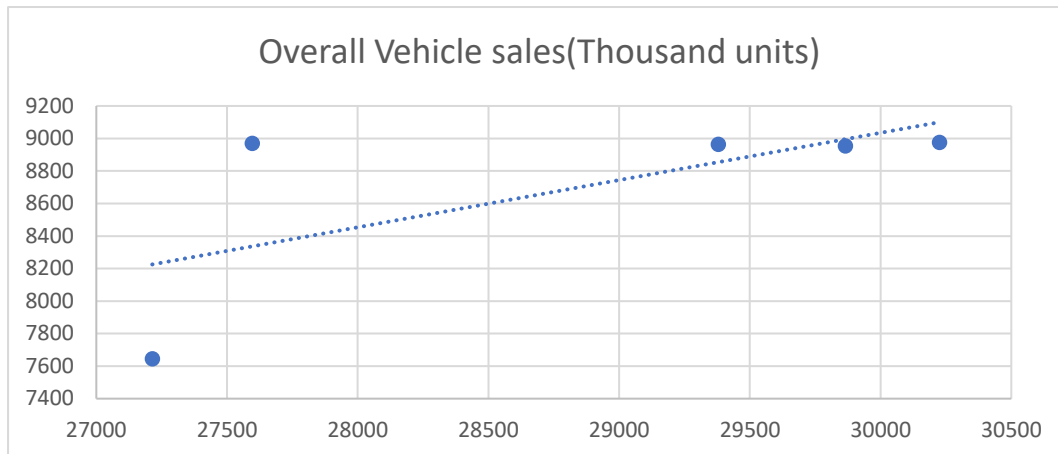
	<i>Sales Revenues(¥ Billion )</i>	<i>% of sales revenues</i>	<i>Operating Income(¥ Billion )</i>	<i>Net income(¥ Billion )</i>	<i>Return of Equity(%)</i>	<i>R &amp; D expense(¥ Billion )</i>	<i>Capital Investment(¥ Billion)</i>	<i>Overall Vehicle Production( Thousand Unit)</i>	<i>Overall Vehicle sales(Thous and units)</i>
Sales Revenues(¥ Billion)	1								
% of sales revenues	0.530474	1							
Operating Income(¥ Billion)	0.880552	0.868329	1						
Net income(¥ Billion)	-0.03672	0.572379	0.299404	1					
Return of Equity(%)	0.065599	0.182728	0.133705	0.779371	1				
R & D expense(¥ Billion)	0.098643	0.445863	0.328357	0.343972	-0.17823	1			
Capital Investment(¥ Billion)	0.815243	0.698487	0.864663	-0.15793	-0.32813	0.179491	1		
Overall Vehicle Production(Thousand Unit)	0.643888	-0.2258	0.244223	-0.30273	0.256281	-0.46817	0.196193	1	
Overall Vehicle sales(Thousand units)	0.671212	-0.21389	0.269124	-0.30627	0.225905	-0.38562	0.214572	0.9953511	1

## REGRESSION TABLE

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.671212							
R Square	0.450525							
Adjusted R Square	0.267367							
Standard Error	505.6159							
Observations	5							
ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	628831	628831	2.459759	0.214801			
Residual	3	766942.2	255647.4					
Total	4	1395773						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	320.5196	5349.263	0.059918	0.955989	-16703.2	17344.26	16703.2	17344.26
Sales Revenues(¥ Billion)	0.290474	0.185208	1.568362	0.214801	-0.29894	0.879889	0.29894	0.879889
	$Y=a+bX+e$							
	Interpret => a							
	Slope => b							
RESIDUAL OUTPUT								
Observation	Predicted Overall Vehicle sales(Thousand units)	Residuals						
1	8336.719	634.2805						
2	8854.634	109.3661						
3	9100.375	-123.375						
4	8995.804	-40.804						
5	8225.468	-579.468						

### Data taken for setting trendline

Sales Revenues(¥ Billion)	Overall Vehicle sales(Thousand units)
27597	8971
29380	8964
30226	8977
29866	8955
27214	7646



### Interpretation of the correlation and regression data:

1. From the above data we can see that sales of Toyota where overall vehicles sales is independent variable and sales revenue is dependent variable and we have also shown operating income, net income ,return of equity, R&D expenses and capital investment.
2. After correlating the data we can see that the correlation between sales and other variables are strongly positive correlation.
3. As we can see that as sales is increasing revenue is also increasing.
4. The correlation between overall vehicle sales and overall vehicle production is 0.9953511.
5. There is a highest correlation between overall vehicle sales and overall vehicle production.
6. There is a lowest correlation between sales revenues and Net income.
7. Percentage of sales revenue is dependent upon operating income which is 88.0552%.
8. The regression in my company is 0.671211 which means it has a strong positive relation. It means it has a better relationship with other variables.

9. **R Square** is the **coefficient of determination**, which currently has its value 0.4505. It represents the low of fit. Round off the first to digits which will be 45% that is fair enough to fit in our regression model. It means 45% of dependent variables are explained by independent variables. Generally, high values are better for R Square.
10. **Adjusted R Square** is advanced of R square, which is adjusted for the number of independent variables. It is used for multiple analyses. The adjusted r square is 0.2673.
11. **Standard Error** is also a goodness-of-fit measure. The regression equation will be more certain for the smaller number. The small se is an indication that the sample is a more accurate reflection of the actual population mean.

### **Conclusion:**

In the nut shell, Toyota Motor business enterprise is a terrific employer and should have to be revered as such. Toyota has one of the strongest brands in the international automotive industry. The corporation's global deliver chain is likewise an electricity that permits resilience and marketplace-based risk minimization. They have outperformed the industry over the past 5 12 months and it genuinely cannot be denied. because the agency that provides the product, they'd exclusive manner to arrange and deal with supply chain management. Operating successfully, calls for becoming lots more involved with their providers and patron that loyal with Toyota Motor organization because the company that produce and supply product to the customers, they need to recognize how and when they can purchase and manage their shares.

## Reference Links

1. <https://global.toyota/en/ir/finance/>
2. Created Dataset available in this link:  
[https://docs.google.com/spreadsheets/d/17baiPxx5dCm62fS5pxagsnHOMFvWBRNhJk\\_W6oDw7OE/edit?usp=sharing](https://docs.google.com/spreadsheets/d/17baiPxx5dCm62fS5pxagsnHOMFvWBRNhJk_W6oDw7OE/edit?usp=sharing)
3. [https://www.pdfprof.com/PDF\\_Image.php?id=109765&t=40](https://www.pdfprof.com/PDF_Image.php?id=109765&t=40)
4. <https://global.toyota/en/newsroom/corporate/36003677.html>
5. <https://www.investopedia.com/articles/markets/021416/how-toyotamakes-money-tm.asp>
6. <https://www.studocu.com/row/document/east-west-university/strategicmanagement/case-study-analysis-on-toyota-corporation/26858084>
7. <https://economictimes.indiatimes.com/industry/auto/auto-news/toyotaposts-first-loss-in-5-years-on-slow-sales/articleshow/87169008.cms>
8. <https://ijcrt.org/papers/IJCRT22A6682.pdf>
9. [https://global.toyota/pages/global\\_toyota/ir/library/annual/2021\\_001\\_integrated\\_en.pdf](https://global.toyota/pages/global_toyota/ir/library/annual/2021_001_integrated_en.pdf)