

# **MEXICO TOY STORES CASE STUDY**



# OVERVIEW

Here we have the sales & inventory data along with store and product information for a fictitious toy store chain in Mexico.

The data shows more than 800,000 transaction from January 1st, 2017 to September 30<sup>th</sup>, 2018

The objective is to prepare the data, analyze and visualize it, and subsequently outline findings which allow the toy store chain to enhance its decision-making capabilities

## OBJECTIVES

The major questions that we will attempt to answer are:

- Revenue and Profit Analysis
- Category performance of Profit /Revenue across the stores
- Product Performance
- Best Performing Stores
- Monthly Sales Trend
- Inventory analysis

# DATA DICTIONARY

## SALES

Field	Description
Sale ID	Sale ID
Store ID	Store ID
Product ID	Product ID
Units	No of Quantity sold
Selling_Dt	Date of the transaction

## PRODUCT

Field	Description
Product ID	Product ID
Product Name	Product name
Product Category	Product Category
Product Cost	Product cost (\$USD)
Product_Price	Product retail price (\$USD)

## STORES

Field	Description
Store ID	Store ID
Store Name	Store name
Store City	City in Mexico where the store is located
Store Location	Location in the city where the store is located
Store Open Date	Date when the store was opened

## INVENTORY

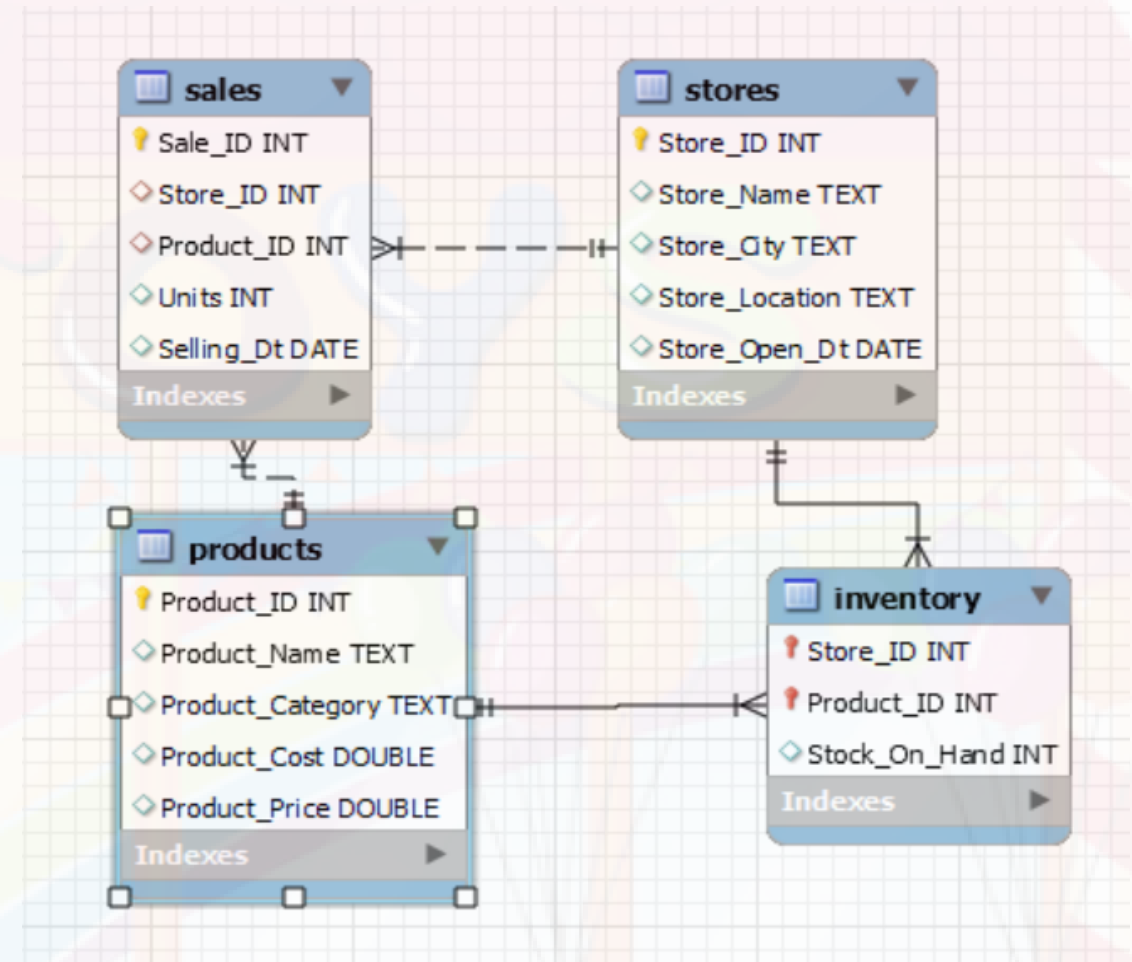
Field	Description
Store ID	Store ID
Product ID	Product ID
Stock On Hand	Stock quantity of the product in the store (inventory)

# DATA MODEL

The Database has 4 tables as shown in the previous slide. Products and Stores are the data tables with Primary Keys named Product ID and Store ID respectively.

Inventory is also a data table with composite primary keys Store ID and Product ID . Store ID and Product ID of Inventory table are connected to the primary keys, named - Store ID of Stores Table and Product ID of Products table  
Sales table has primary key named Sale ID. The foreign keys being Store ID and Product ID -connected to the primary keys, named - Store ID of Stores Table and Product ID of Products table

The ERD has been shown in the given diagram



# EDA - REVENUE – COGS- PROFIT MARGIN – TOTAL QUANTITY ORDERED

The Store Chain earned a revenue of \$14 million.

The Profit is more than \$4 million

The Cost incurred for the Store Chain is around \$10.4 million

The company has an overall profit margin of around 28% which also matches the ideal profit margin of a Retail Toy Store

Mexico Toy Store has sold more than 1 million units of products from January 2017 till September 2018

```
/*TOTAL REVENUE*/
select round(sum(p.Product_Price* sl.Units),0) as Total_Sales
from sales sl
join products p on sl.Product_ID = p.Product_ID;
/*TOTAL PROFIT*/
select round(sum((p.Product_Price-p.Product_Cost)* sl.Units),0) as Total_Profit
from sales sl
join products p on sl.Product_ID = p.Product_ID;
/*TOTAL COST INCURRED*/
select round(sum(sl.Units*p.Product_Cost),0) from sales sl
join products p on sl.Product_ID= p.Product_ID;
/*QUANTITY SOLD*/
select sum(Units) as Total_Quantity from sales;
/*PROFIT MARGIN*/
select
round(sum((p.Product_Price-p.Product_Cost)*sl.Units)/sum(p.Product_Price*sl.Units)*100,2) as Profit_Margin
from sales sl join products p on sl.Product_ID =p.Product_ID;
```

Total_Sales	Total_Profit	COGS	Total_Quantity	Profit_Margin
▶ 14444572	▶ 4014029	▶ 10430543	▶ 1090565	▶ 27.79%

# WHAT IS THE SALES AND % CHANGE IN SALES

The Toy Store has experienced a growth since January 2017 to September 2018 on overall basis. As per analysis there is a positive trend found in the sales. The way sales gone up in the month of March - April in 2017, same pattern could be found around March in 2018 as well. Also, we could see a rise in sales in the month of November and December in 2017 probably because of the Christmas Eve. However, the MoM change seems to be volatile. Need to check the Economic factors or market condition during the summer months to manage budgeting, inventory etc.

/\*MONTHWISE SALES TREND\*/

```
select Year, MonthName, Total_Sales,
concat(coalesce(round(100*(Total_Sales-lag(Total_Sales) over ()) / lag(Total_Sales) over (,2),0),"%")
as Percentage_Change
from
(Select YEAR(STR_TO_DATE(s1.Selling_Dt, '%Y-%m-%d')) AS Year,
MONTH(STR_TO_DATE(s1.Selling_Dt, '%Y-%m-%d')) AS Month, monthname(s1.Selling_Dt) as MonthName,
round(sum(s1.Units*p.Product_Price)) as Total_Sales
from sales s1
join Products p on s1.Product_ID = p.Product_ID
GROUP BY
YEAR(STR_TO_DATE(s1.Selling_Dt, '%Y-%m-%d')),
MONTH(STR_TO_DATE(s1.Selling_Dt, '%Y-%m-%d')),
monthname(s1.Selling_Dt)
ORDER BY
Year, Month) as TT;
```

Year	MonthName	Total_Sales	Percentage_Change
2017	January	542555	0%
2017	February	541352	-0.22%
2017	March	589485	8.89%
2017	April	681073	15.54%
2017	May	672370	-1.28%
2017	June	661980	-1.55%
2017	July	556034	-16%
2017	August	489423	-11.98%
2017	September	585844	19.7%
2017	October	623874	6.49%
2017	November	661304	6%
2017	December	877204	32.65%
2018	January	747196	-14.82%
2018	February	722632	-3.29%
2018	March	883516	22.26%
2018	April	827691	-6.32%
2018	May	825319	-0.29%



# WHAT IS THE OVERALL CATEGORY PERFORMANCE

Toys and Art & Crafts categories drive more than 50% of total revenue. At the same time, it could be seen that Electronics and Games are having a relatively high Profit Margin. Importantly the same categories are also the popular one across the stores & location in terms of profit and revenue.

```
78  /*Category Performance*/
79  • select p.Product_Category, round(sum(p.Product_Price*sl.Units),0) as Revenue, concat(
80    round(sum((p.Product_Price-p.product_Cost)*sl.Units)/sum(p.Product_Price*sl.Units)*100,0),"%")
81    as Profit_Percentage
82  from sales sl
83  join
84  products p on sl.Product_ID=p.Product_ID
85  group by p.Product_Category
86  order by Revenue desc ;
87
```

	Product_Category	Revenue	Profit_Percentage
▶	Toys	5093241	21%
	Art & Crafts	2705364	28%
	Electronics	2246771	45%
	Games	2226836	30%
	Sports & Outdoors	2172360	23%

## WHAT ARE THE TOP PRODUCTS ACROSS THE STORES

**As per overall analysis, Leg Bricks, Colorbuds, Action Figure, Magic Sand are among top 5 products both in terms of Sales and Profit**

**For Toys Category - Lego Bricks and Action Figures are responsible for lion's share of Profit. For Electronics Category Colorbuds constitutes a huge share of profit of more than \$834 K for the company**

```
/*TOP 5 SELLING PRODUCTS*/
```

```
select p.Product_Name, round(sum(p.Product_Price*sl.Units),0) as Total_Sales
from sales sl
join
products p on sl.Product_ID=p.Product_ID
group by p.Product_Name
order by Total_Sales desc
limit 5 ;
```

```
/*TOP 2 PRODUCTS ACROSS CATEGORIES*/
```

```
select Category, Prod_Name, Total_Sales, Total_Profit from
(select p.Product_Category as Category, p.Product_Name as Prod_Name,
round(sum(sl.Units*p.Product_Price),0) as Total_Sales,
round(sum(sl.Units*(p.Product_Price-Product_Cost)),0) as Total_Profit,
row_number() over (partition by p.Product_Category order by round(sum(sl.Units*p.Product_Price),0) desc)
as Row_No from sales sl join products p on sl.Product_ID = p.Product_ID
Group by p.Product_Category, p.Product_Name)as TopProducts
where Row_No <=2;
```

Product_Name	Total_Sales
Lego Bricks	2388883
Colorbuds	1564476
Magic Sand	968962
Action Figure	926748
Rubik's Cube	912983

Category	Prod_Name	Total_Sales	Total_Profit
Art & Crafts	Magic Sand	968962	121196
Art & Crafts	Kids Makeup Kit	488416	146598
Electronics	Colorbuds	1564476	834944
Electronics	Gamer Headphones	376938	107748
Games	Rubik's Cube	912983	91344
Games	Deck Of Cards	587398	252102
Sports & Outdoors	Splash Balls	541630	60248
Sports & Outdoors	Nerf Gun	530595	132715
Toys	Lego Bricks	2388883	298685
Toys	Action Figure	926748	347748



## WHAT IS THE PERFORMANCE ACROSS THE LOCATION

The Store has 50 outlets across 29 different cities in Mexico. Downtown is the most popular store location having high density of population.

More than 50% profit is being generated from Downtown area itself

However, a closer look states that among 3 stores in Airport area 2 are generating topmost revenue for the Toy store chain. Hence further study should be done by Marketing Team to realize whether to expand the business over there to optimize sales

```
/* Sales and Share of Profit across location*/
```

```
with cte as(
```

```
SELECT s.Store_Location, round(sum(sl.Units*p.Product_Price),0) as Total_Sales,
```

```
round(sum(sl.Units*(p.Product_Price- p.Product_Cost)),0) as Profit
```

```
from stores s join sales sl on s.Store_ID = sl.Store_ID
```

```
join products p on sl.Product_ID = p.Product_ID
```

```
group by s.Store_Location
```

```
)
```

```
select Store_Location, Total_Sales, concat(round(100*PROFIT/SUM(PROFIT) over (),0),"%") as Profit_Share
```

```
from cte
```

```
order by Total_Sales desc;
```

Store_Location	Total_Sales	Profit_Share
Downtown	8219596	56%
Commercial	3279140	23%
Residential	1656114	11%
Airport	1289723	9%

## WHAT ARE THE TOP 5 STORES IN TERMS OF SALES

As per Analysis Ciudad de Mexico 2 of Airport is earning the highest revenue of \$554 K with a handsome profit margin of 31%.

Apart from this, as expected Downtown area has snatched the 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> position in terms of revenue with an average profit margin of around 27%

In short, all top 5 stores are either located in Airport or downtown. Hence, the store chain should focus on the problem area of the stores from residential and commercial location.

```
/*BEST STORES*/  
Select s.Store_Location, s.Store_Name, round(sum(sl.Units * p.Product_Price),0) as Sales_Value,  
concat(round(sum(sl.Units * (p.Product_Price-p.Product_Cost))*100/sum(sl.Units * p.Product_Price),0),"%")  
as Profit_Margin  
from sales sl join stores s on sl.Store_ID = s.Store_ID  
join products p on sl.Product_ID = p.Product_ID  
Group by s.Store_Location,s.Store_Name  
order by Sales_Value desc  
limit 5;
```

Store_Location	Store_Name	Sales_Value	Profit_Margin
Airport	Ciudad de Mexico 2	554553	31%
Airport	Guadalajara 3	449355	27%
Downtown	Ciudad de Mexico 1	433556	26%
Downtown	Toluca 1	411157	25%
Downtown	Monterrey 2	372999	29%

## WHAT IS THE OVERALL INVENTORY AND COST TIED UP WITH THAT FOR THE TOY STORE

As on September 30, 2018, the store has 29742 products in stock which results in having \$300 K tied up in the inventory

```
/*TOTAL INVENTORY*/  
/*--Units--*/  
select sum(Stock_On_Hand) as Total_Stock_Unit from inventory;
```

Total_Stock_Unit
▶ 29742

```
/*--Cost--*/  
select round(sum(p.Product_Cost * i.Stock_On_Hand),0) as Inventory_Cost  
from inventory i join products p on i.Product_ID = p.Product_ID;
```

Inventory_Cost
▶ 300210

## WHICH PRODUCTS ARE OUT OF STOCK

There are a Total of 20 Products for which the inventory is 0 across 37 different Stores. Here if we drill down further then Action Figure is a Product which falls under topmost 5 revenue generating product. More than two stores are there where Action Figure stock is 0 and a potential revenue loss is being incurred

```
/*OUT OF STOCK PRODUCTS*/  
With OutOfStockProducts as  
(  
  select s.Store_Name, p.Product_Name,  
  i.Stock_On_Hand as Total_Stock  
  from inventory i join products p on i.Product_ID=P.Product_ID  
  join stores s on i.Store_ID=s.Store_ID  
  Group by s.Store_Name, p.Product_Name, i.Stock_On_Hand  
)  
select distinct(Product_Name)  
from OutOfStockProducts  
where Total_Stock = 0;
```

Product_Name
Action Figure
Dino Egg
Etch A Sketch
Hot Wheels 5-Pack
Plush Pony
Foam Disk Launcher
Mini Ping Pong Set
Playfoam
Gamer Headphones
Glass Marbles
Teddy Bear
Barrel O' Slime
Splash Balls
Chutes & Ladders
Mr. Potatohead
Supersoaker Wate...
Jenga

## HOW MUCH MONEY IS TIED UP WITH INVENTORY FOR THE BOTTOM SELLING PRODUCTS

As we dig dip into the sales analysis, it could be seen that there are a good number of Products having low potential to generate sales. Uno Cards, Play foam, Monopoly are some of the Products which could not even touch the mark of \$100 K revenue. after doing inventory analysis it is clear that more than \$47,000 is tied up in inventory for these products. Hence before restocking for the upcoming months, we can let go off some of these products to maximize sales and profit

```
/*INVENTORY COST TIED UP FOR BOTTOM SELLING PRODUCTS*/
```

```
WITH BottomProducts AS (  
    SELECT p.Product_Name, ROUND(SUM(p.Product_Cost * sl.Units), 0) AS Total_Sales  
    FROM sales sl JOIN products p ON sl.Product_ID = p.Product_ID  
    GROUP BY p.Product_Name  
    ORDER BY Total_Sales ASC  
    LIMIT 10)  
SELECT p.Product_Name,  
SUM(i.Stock_On_Hand) AS Total_Stock_On_Hand,  
round(SUM((i.Stock_On_Hand)*p.Product_Price),0) as Tied_Up_Money  
FROM inventory i JOIN products p ON i.Product_ID = p.Product_ID  
JOIN BottomProducts bp ON p.Product_Name = bp.Product_Name  
GROUP BY p.Product_Name  
ORDER BY Total_Stock_On_Hand ASC;
```

Product_Name	Total_Stock_On_Hand	Tied_Up_Money
Jenga	181	1808
Monopoly	207	4138
Mini Basketball Hoop	234	5848
Classic Dominoes	241	2408
Uno Card Game	241	1926
Chutes & Ladders	255	3312
Playfoam	357	3923
Foam Disk Launcher	379	4544
Plush Pony	497	9935
Mr. Potatohead	709	7083



## WHICH PRODUCTS NEED TO BE RESTOCKED URGENTLY

We have identified topmost 10 products which have comparatively high daily demands. As per that they need restocking within 10-15 days to meet the demand

Colorbuds, Lego Bricks, Action Figures are some of the important Product Names due to their Revenue and Profit generating capacity – which need restocking even within 10-12 days.

Overall the Store Chain has a cumulative monthly demand of around 52,000 units of products, whereas currently it has around 29,500 units of products on hand. Even though the stock varies across the Stores and as per their demand, the analysis clearly states that stock needs to be replenished in order to meet the demand of coming Christmas Eve of 2018

```
/*RESTOCK ALERT*/  
with Restock as(  
  select p.Product_ID, P.Product_Name, round(sum(sl.Units)/(21*30),0) as Quantity_Sold_Per_Day  
  from sales sl join products p on sl.Product_ID = p.Product_ID  
  group by p.Product_ID, p.Product_Name  
)  
select rs.Product_ID, rs.Product_Name, rs.Quantity_Sold_Per_Day,  
round((sum(i.Stock_On_Hand)/ Quantity_Sold_Per_Day),0) as RestockIn_days  
from Restock rs join inventory i on rs.Product_ID=i.Product_ID  
group by Product_ID, rs.Product_Name  
order by Quantity_Sold_Per_Day desc  
limit 10;
```

Product_ID	Product_Name	Quantity_Sold_Per_Day	RestockIn_days
6	Colorbuds	167	7
25	PlayDoh Can	165	13
3	Barrel O' Slime	146	9
8	Deck Of Cards	134	20
19	Magic Sand	97	20
18	Lego Bricks	96	12
31	Splash Balls	96	9
1	Action Figure	93	7
30	Rubik's Cube	73	21
2	Animal Figures	63	13



**THANK YOU**