

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 30th, 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**
 - **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

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

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)

INVENTORY

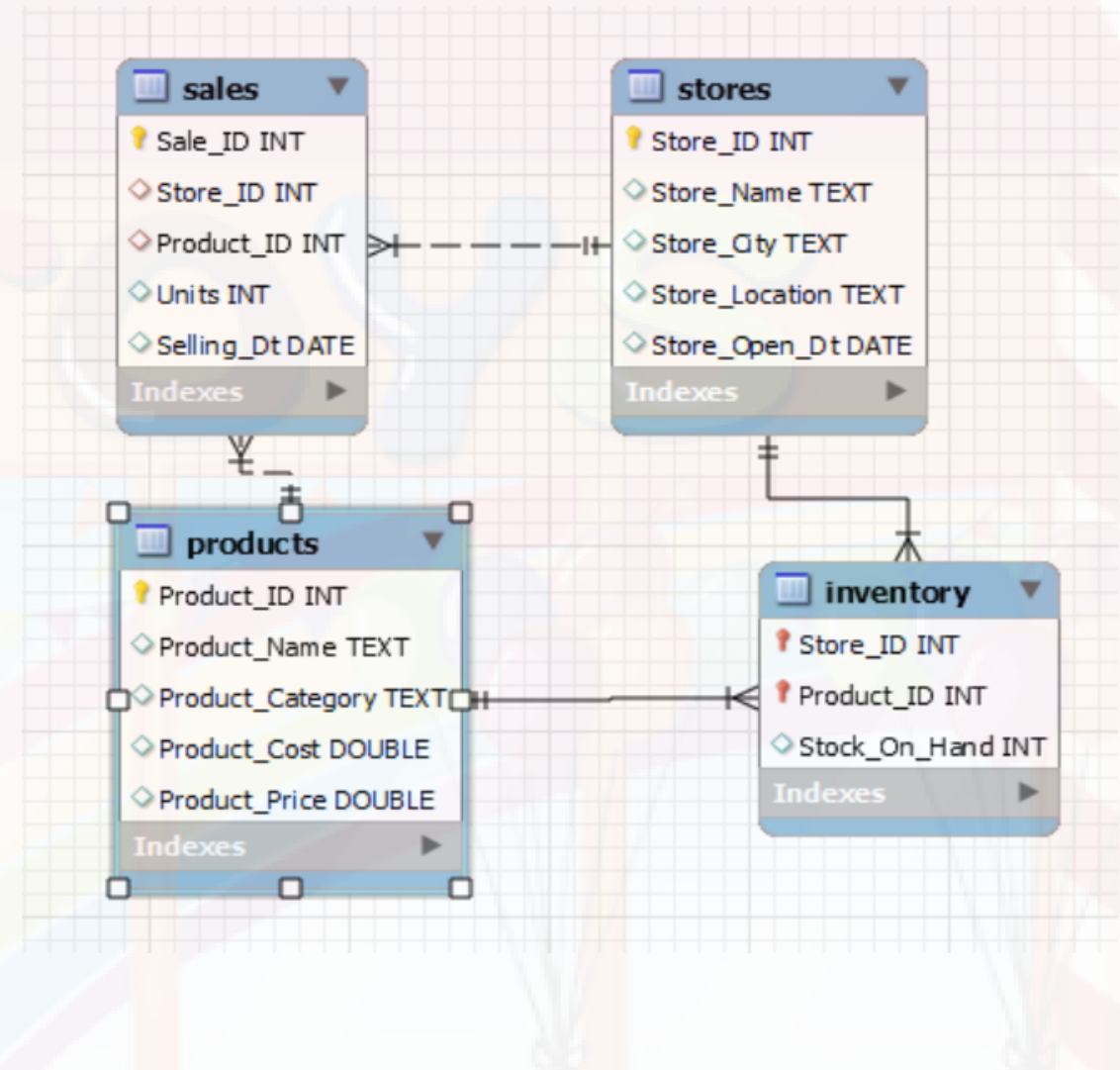
Field	Description
Store ID	Store ID
Product ID	Product ID
Stock On Hand	Stock quantity of the product in the store (inventory)

DATA MODEL

The Database has 4 tables as shown in the previous slide.

1. Product ID is the primary key of Products Tables
2. Store ID is the primary key of Stores table
3. 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 of Stores and Product ID of Products table
4. 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

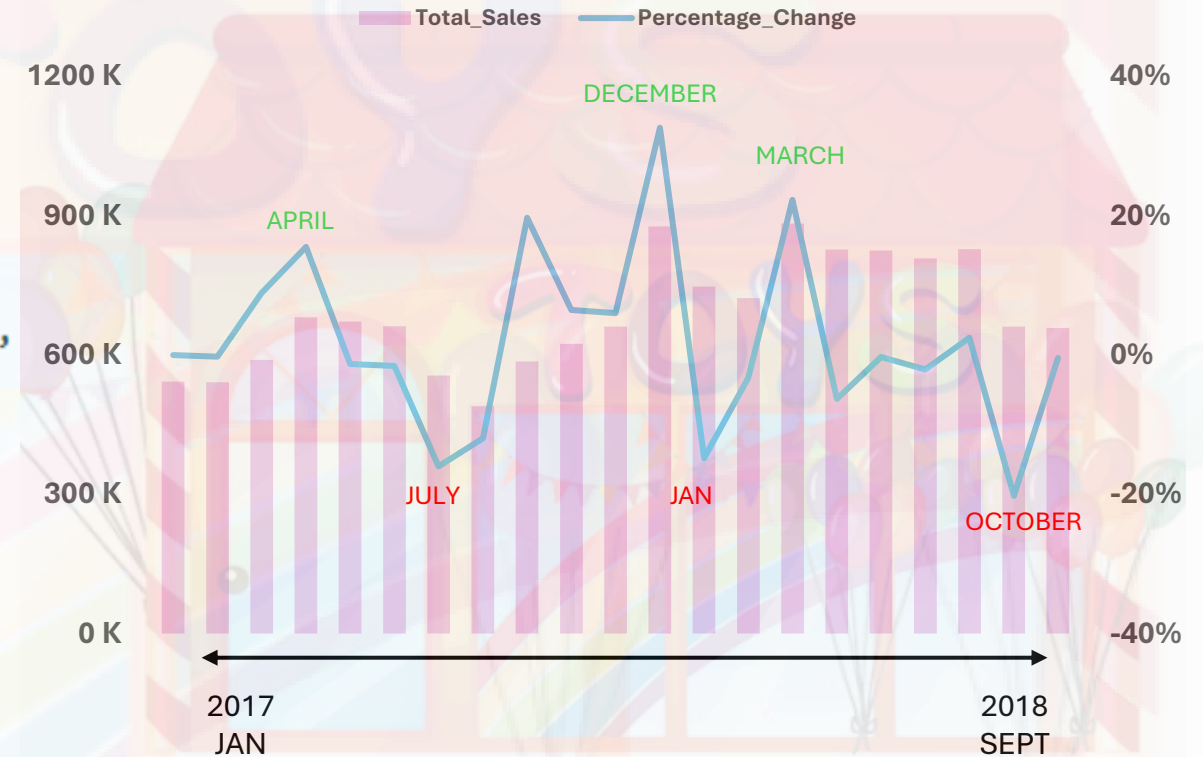
```
/*TOTAL REVENUE*/
select round(sum(p.Product_Price* sl.Units),0) as Total_Sales
from sales sl
join products p on sl.Product_ID = p.Product_ID;
/*TOTAL PROFIT*/
select round(sum((p.Product_Price-p.Product_Cost)* sl.Units),0) as Total_Profit
from sales sl
join products p on sl.Product_ID = p.Product_ID;
/*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 MOM 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 steady rise in sales from the month of September till December 2017. A jump of sales of 32% in December in 2017 happened 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.

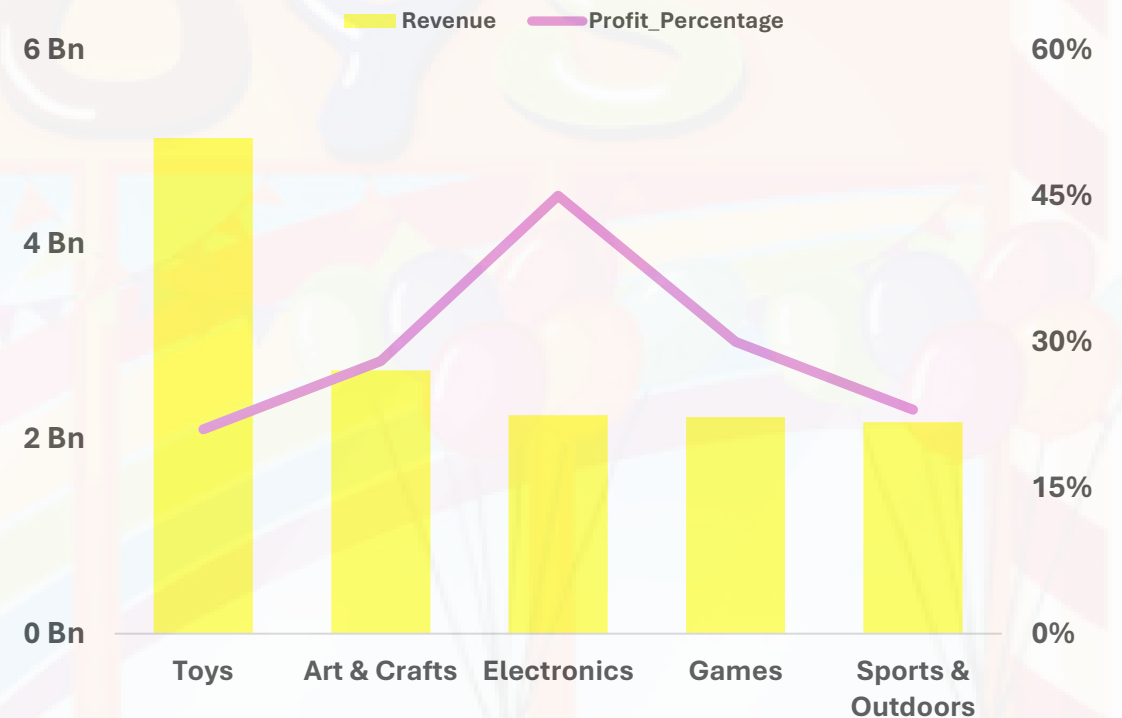
```
select Year, MonthName, Total_Sales,  
concat(coalesce(round(100*(Total_Sales-lag(Total_Sales)  
over ()) / lag(Total_Sales) over (,2),0),"%")  
as Percentage_Change  
from  
(Select YEAR(sl.Selling_Dt) AS Year,  
MONTH(sl.Selling_Dt) AS Month, monthname(sl.Selling_Dt) as MonthName,  
round(sum(sl.Units*p.Product_Price))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



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 ;
```



WHAT ARE THE TOP PRODUCTS ACROSS THE STORES

As per overall analysis, Lego 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 2 PRODUCTS ACROSS CATEGORIES*/
```

```
select Category, Prod_Name, Total_Sales, Total_Profit from
```

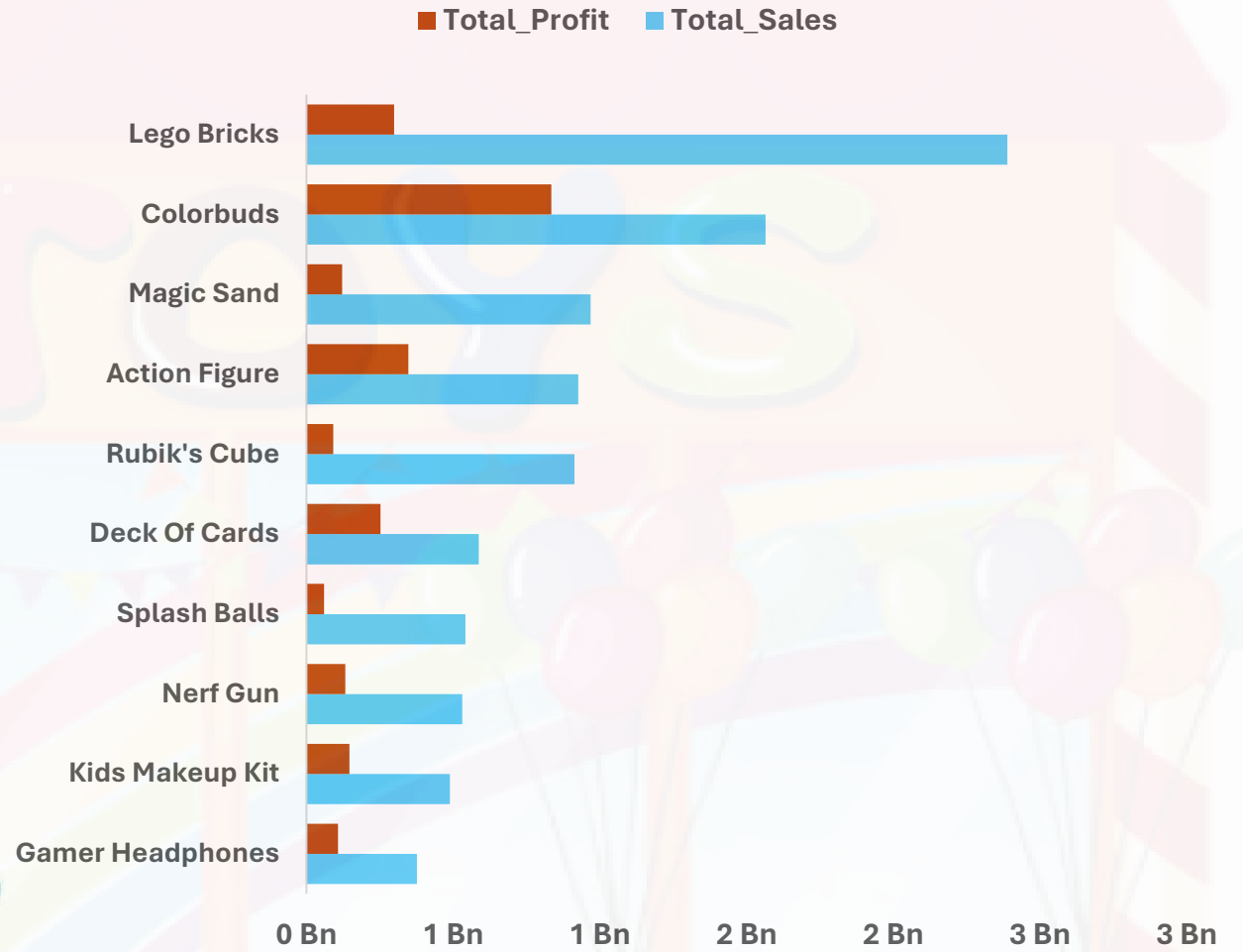
```
(select p.Product_Category as Category, p.Product_Name as Prod_Name,  
round(sum(sl.Units*p.Product_Price),0) as Total_Sales,  
round(sum(sl.Units*(p.Product_Price-Product_Cost)),0) as Total_Profit,
```

```
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;
```



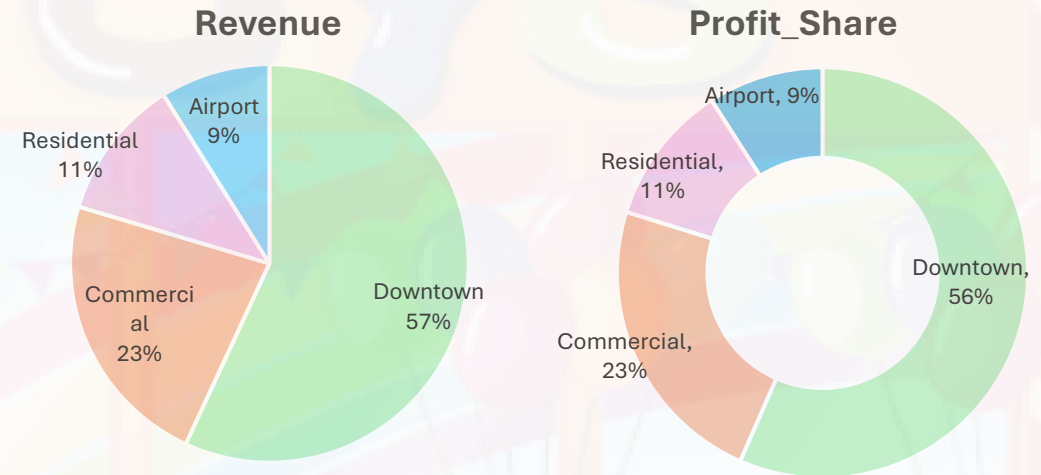
WHAT IS THE PERFORMANCE ACROSS THE LOCATION

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;
```



WHAT ARE THE TOP 5 STORES IN TERMS OF SALES

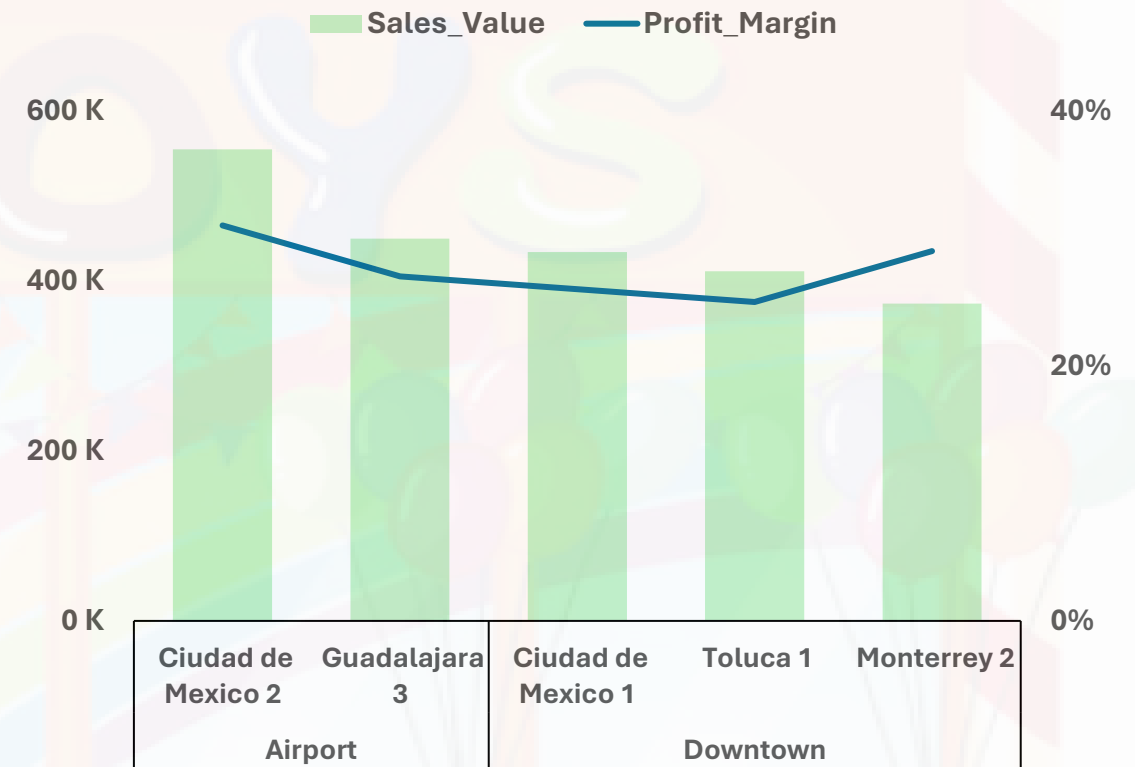
As per Analysis Ciudad de Mexico 2 of Airport is earning the highest revenue of \$554 K with a handsome profit margin of 31%.

Apart from this, as expected Downtown area has snatched the 3rd, 4th and 5th 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
```



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 IN EACH STORE

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.

Upon doing a Store Level analysis it could be found that more than two stores are there where Action Figure stock is 0 (even after having a good amount of sell and probably a potential revenue loss is being incurred

In this regards there are 77 instances where inventory is 0 only. Hence Store level evaluation could be done to maximize sales and profit

```
/*STOREWISE AND PRODUCTWISE 0 INVENTORY CHECK*/
```

```
select bp.Store_Name, bp.Product_Name, bp.UnitsSold, (i.Stock_On_Hand) as Total_Stock
```

```
from inventory i join StoreWiseBottomProducts bp on i.Store_ID = bp.Store_ID
```

```
and i.Product_ID = bp.Product_ID
```

```
Group by Store_Name, Product_Name,UnitsSold, i.Stock_On_Hand
```

```
having Total_Stock = 0
```

```
order by UnitsSold desc;
```

Store_Name	Product_Name	UnitsSold	Total_Stock
Puebla 3	Action Figure	1535	0
Mexicali 2	Action Figure	1511	0
Guanajuato 2	Barrel O' Slime	1475	0
Xalapa 2	Action Figure	1272	0
La Paz 1	Mini Ping Pong Set	1132	0
Ciudad de Mexico 4	Dino Egg	1025	0
Villahermosa 1	Dino Egg	977	0
Mexicali 1	Action Figure	908	0
Aguascalientes 1	Mini Ping Pong Set	888	0
Pachuca 1	Dino Egg	844	0
Puebla 2	Animal Figures	833	0
Monterrey 1	Dino Egg	827	0
Mexicali 2	Dino Egg	792	0
Guanajuato 1	Mini Ping Pong Set	749	0

Note:- Here StorewiseBottomProducts is a view that has been created for the sake of simplicity which would help in other queries as well

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 \$30,000 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
Monopoly	207	2896
Mini Basketball Hoop	234	2104
Classic Dominoes	241	1926
Uno Card Game	241	962
Chutes & Ladders	255	2547
Playfoam	357	1424
Foam Disk Launcher	379	3407
Teddy Bear	483	5308
Supersoaker Water Gun	513	6151
Mr. Potatohead	709	3538

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;
```

Prod_Name	Avg Quantity_Sold (Per Day)	Restock (in days)
Colorbuds	167	7
PlayDoh Can	165	13
Barrel O' Slime	146	9
Deck Of Cards	134	20
Magic Sand	97	20
Lego Bricks	96	12
Splash Balls	96	9
Action Figure	93	7
Rubik's Cube	73	21
Animal Figures	63	13



THANK YOU