SQL - Finance and Supply Chain Analytics of AtliQ Hardware

About AtliQ hardware

AtliQ hardware is a leading hardware company which specializes in Computer devices such as desktops, laptops, printer, monitors, keyboards and mouse having a global reach of customer.

Problem statement

The focus on use of Excel files has led to unresponsiveness and performance inefficiency. To overcome the problem, AtliQ Hardware hired data analysts. They will utilize MySQL as their database management system to extract meaningful insights from the data. These insights will empower the company to enhance decision-making and optimize operations, ultimately boosting overall performance with the help of data.

Project Overview

- This project is designed to analyze and extract valuable insights from

the provided AtliQ database to make informed business decisions.

- The database contains information about sales, products, customers, and regions for Atliq Hardware.

- I've to analyze sales, market, customer behavior, and supply chain data and do the necessary Tasks.
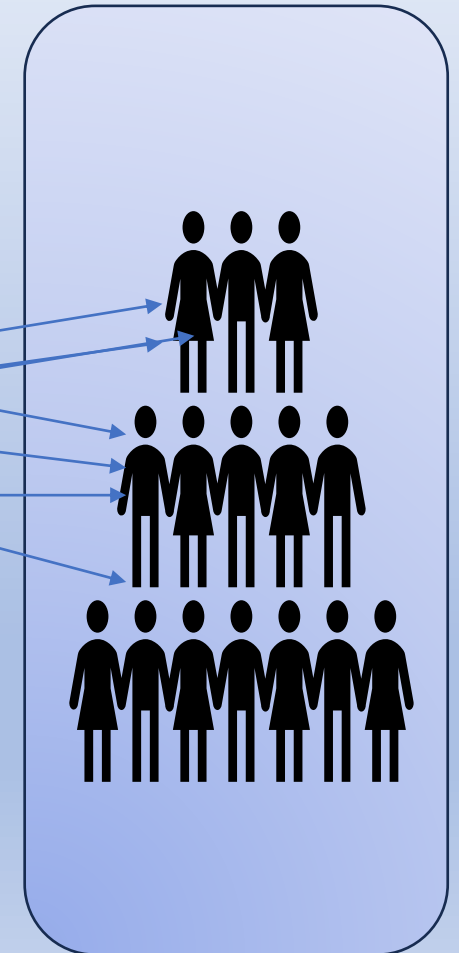
AtliQ hardware business model

AtliQ hardware
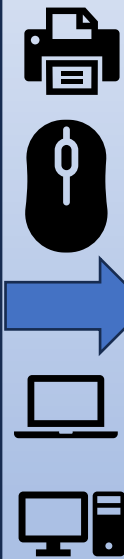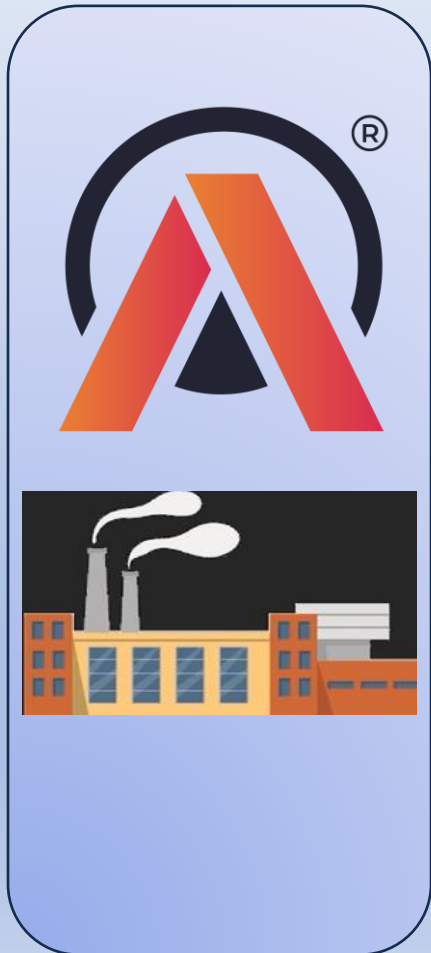
Customer

Consumer
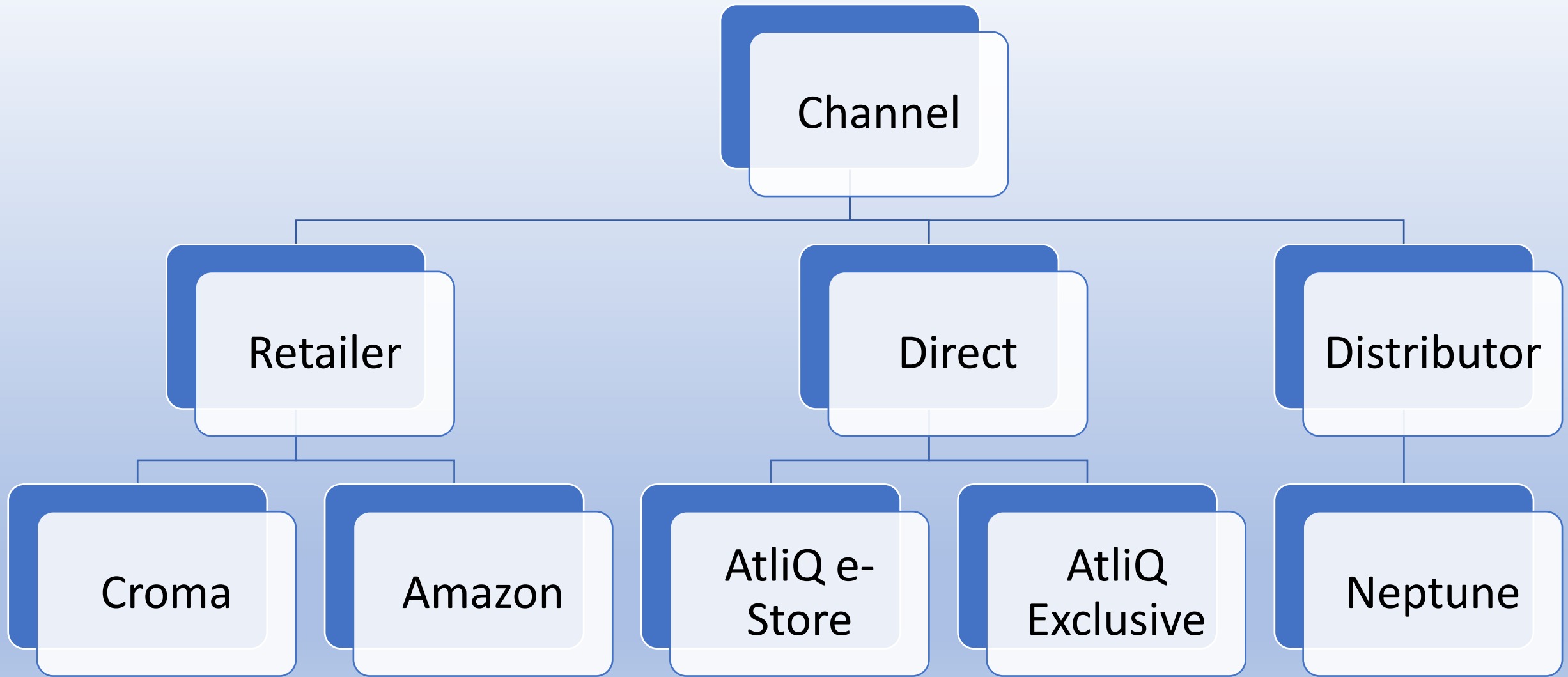
Fundamental finance concepts used

Pre-invoice deduction : yearly discounts agreements made at the beginning of the each financial year

Post-invoice deduction : promotional offers + placement fees + performance rebate

Cost of goods sold : manufacturing cost + freight cost + other cost

Gross Price: 30 $

- Pre-invoice Deduction: 2

= Net Invoice Sales: 28

- Post-invoice Deductions: 3

= Net Sales: 25

- Cost Of Goods Sold (COGS): 20

= Gross Margin: 5

Gross Margin % of Net Sales (GM/NS): 20 %

- **Supply chain concepts used**

Forecast value : The predicted value of demand of products

Net error : The difference between forecast value and actual value

Absolute Net error : positive value of net error even if net error is negative

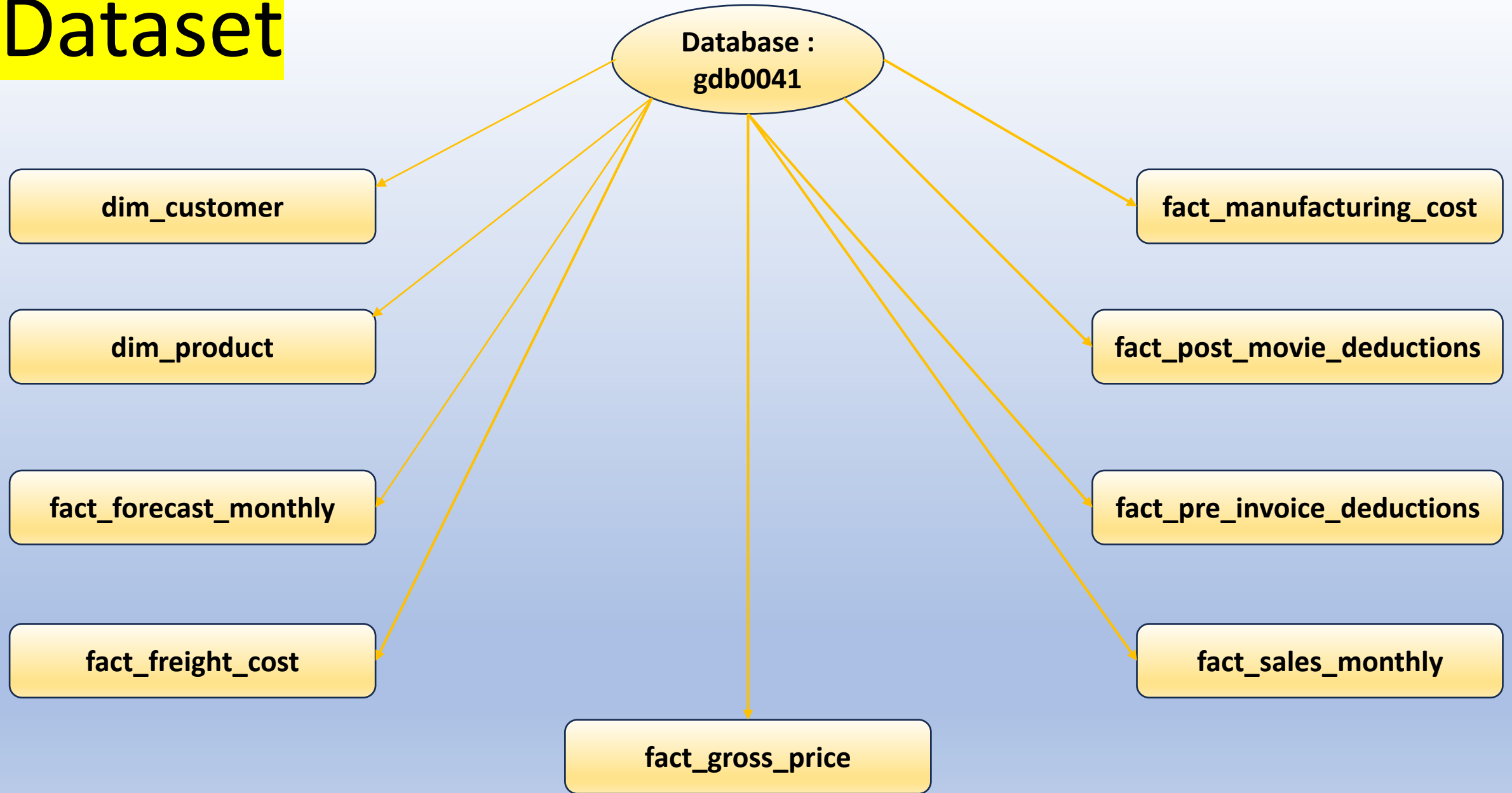Absolute Net error percent : Total absolute net error divided by total forecast valu

Forecast accuracy percent : 100 – absolute net error percent

Forecast accuracy is a driving factor of supply chain success

Croma India product wise sales report for the Fiscal year - 2021

```sql
SELECT s.date,
       s.product_code, p.product, p.variant, s.sold_quantity, g.gross_price,
       ROUND(g.gross_price*s.sold_quantity,2) as total_gross_price
    FROM fact_sales_monthly s
    JOIN
       dim_product p ON s.product_code=p.product_code
    JOIN
       fact_gross_price g ON g.product_code=s.product_code AND g.fiscal_year=get_fiscal_year(s.date)
    WHERE
       customer_code=90002002 AND get_fiscal_year(date)=2021
    ORDER BY DATE ASC
    LIMIT 100000;
```

Output

Query

date	product_code	product	variant	sold_quantity	gross_price	total_gross_price
2020-09-01	A0118150101	AQ Dracula HDD – 3.5 Inch SATA 6 Gb/s 5400 R...	Standard	202	19.0573	3849.57
2020-09-01	A0118150102	AQ Dracula HDD – 3.5 Inch SATA 6 Gb/s 5400 R...	Plus	162	21.4565	3475.95
2020-09-01	A0118150103	AQ Dracula HDD – 3.5 Inch SATA 6 Gb/s 5400 R...	Premium	193	21.7795	4203.44
2020-09-01	A0118150104	AQ Dracula HDD – 3.5 Inch SATA 6 Gb/s 5400 R...	Premium Plus	146	22.9729	3354.04
2020-09-01	A0219150201	AQ WereWolf NAS Internal Hard Drive HDD – 8....	Standard	149	23.6987	3531.11
2020-09-01	A0219150202	AQ WereWolf NAS Internal Hard Drive HDD – 8....	Plus	107	24.7312	2646.24
2020-09-01	A0220150203	AQ WereWolf NAS Internal Hard Drive HDD – 8....	Premium	123	23.6154	2904.69
2020-09-01	A0320150301	AQ Zion Saga	Standard	146	23.7223	3463.46
2020-09-01	A0321150302	AQ Zion Saga	Plus	236	27.1027	6396.24
2020-09-01	A0321150303	AQ Zion Saga	Premium	137	28.0059	3836.81
2020-09-01	A0418150103	AQ Mforce Gen X	Standard 3	23	19.5235	449.04
2020-09-01	A0418150104	AQ Mforce Gen X	Plus 1	82	19.9239	1633.76
2020-09-01	A0418150105	AQ Mforce Gen X	Plus 2	86	20.0766	1726.59
2020-09-01	A0418150106	AQ Mforce Gen X	Plus 3	48	19.9365	956.95
2020-09-01	A0519150201	AQ Mforce Gen Y	Standard 1	138	22.3984	3090.98
2020-09-01	A0519150202	AQ Mforce Gen Y	Standard 2	72	24.9298	1794.95
2020-09-01	A0519150203	AQ Mforce Gen Y	Standard 3	38	26.5871	1010.31
2020-09-01	A0519150204	AQ Mforce Gen Y	Plus 1	149	26.1081	3890.11
2020-09-01	A0519150205	AQ Mforce Gen Y	Plus 2	29	29.7008	861.32

Croma India gross monthly total sales report

Query

```sql
SELECT s.date,
        ROUND(SUM(s.sold_quantity*g.gross_price),2) as total_gross_price
FROM fact_sales_monthly s
JOIN fact_gross_price g
ON s.product_code=g.product_code
AND g.fiscal_year=get_fiscal_year(s.date)
WHERE customer_code=90002002
GROUP BY s.date
ORDER BY s.date ASC;
```

Output

date	total_gross_price
2017-09-01	122407.57
2017-10-01	162687.56
2017-12-01	245673.84
2018-01-01	127574.73
2018-02-01	144799.54
2018-04-01	130643.92
2018-05-01	139165.06
2018-06-01	125735.36
2018-08-01	125409.90
2018-09-01	343337.14
2018-10-01	440562.10
2018-12-01	653944.72
2019-01-01	359025.06
2019-02-01	356607.19
2019-04-01	379549.74
2019-05-01	340152.29
2019-06-01	343792.08
2019-08-01	338108.87
2019-09-01	808250.42

Yearly gross sales report for croma

Query

```sql
SELECT g.fiscal_year,
        ROUND(SUM(s.sold_quantity*g.gross_price)/1000000,2) as total_gross_price
FROM fact_sales_monthly s
JOIN fact_gross_price g
ON s.product_code=g.product_code
AND g.fiscal_year=get_fiscal_year(s.date)
WHERE customer_code=90002002
GROUP BY fiscal_year
ORDER BY fiscal_year ASC;
```

Output

fiscal_year	total_gross_price
2018	1.32
2019	3.56
2020	6.50
2021	23.22
2022	44.64

Top 5 markets by net sales in fiscal year 2021

Query

```sql
SELECT market, ROUND(SUM(net_sales)/1000000,2) as net_sales_mil
FROM net_sales
WHERE fiscal_year=2021
GROUP BY market
ORDER BY net_sales_mil DESC
LIMIT 5
```

Output

market	net_sales_mil
India	210.67
USA	132.05
South Korea	64.01
Canada	45.89
United Kingdom	44.73

Top 5 products by net sales in fiscal year 2021

Query

```sql
SELECT product, ROUND(SUM(net_sales)/1000000,2) as net_sales_mil
FROM net_sales
WHERE fiscal_year=2021
GROUP BY product
ORDER BY net_sales_mil DESC
LIMIT 5
```

Output

product	net_sales_mil
AQ BZ Allin1	33.75
AQ Qwerty	27.84
AQ Trigger	26.95
AQ Gen Y	23.58
AQ Maxima	22.32

Top 5 customers by net sales in fiscal year 2021

Query

```sql
SELECT c.customer, ROUND(SUM(net_sales)/1000000,2) as net_sales_mil
FROM net_sales ns
JOIN dim_customer c
ON c.customer_code=ns.customer_code
WHERE fiscal_year=2021
GROUP BY c.customer
ORDER BY net_sales_mil DESC
LIMIT 5
```

Output

customer	net_sales_mil
Amazon	109.03
Atliq Exclusive	79.92
Atliq e Store	70.31
Sage	27.07
Flipkart	25.25

Top 10 customers by net sales percent

```sql
WITH cte1 AS(

SELECT customer,

       ROUND(SUM(net_sales)/1000000,2) as net_sales_mil

   FROM net_sales ns JOIN dim_customer c

   ON ns.customer_code=c.customer_code

   WHERE ns.fiscal_year=2021

   GROUP BY customer)

SELECT *,net_sales_mil*100/SUM(net_sales_mil) OVER() AS percent_netsales FROM cte1 ORDER BY net_sales_mil DESC LIMIT 10;
```

Query

Output

customer	net_sales_mil	percent_netsales
Amazon	109.03	13.233402
Atliq Exclusive	79.92	9.700206
Atliq e Store	70.31	8.533803
Sage	27.07	3.285593
Flipkart	25.25	3.064692
Leader	24.52	2.976089
Neptune	21.01	2.550067
Ebay	19.88	2.412914
Electricalsocity	16.25	1.972327
Synthetic	16.10	1.954121

Net sales percent by region

Query

Output

```sql
WITH cte1 AS(
SELECT c.customer,
       c.region,
       ROUND(SUM(net_sales)/1000000,2) as net_sales_mil
   FROM net_sales ns JOIN dim_customer c
   ON ns.customer_code=c.customer_code
   WHERE ns.fiscal_year=2021
   GROUP BY c.customer,c.region)
   SELECT *, net_sales_mil*100/SUM(net_sales_mil) OVER(PARTITION BY region ) AS percent_netsales_region
   FROM cte1
   ORDER BY region,net_sales_mil DESC;
```

customer	region	net_sales_mil	percent_netsales_region
Amazon	APAC	57.41	12.988688
Atliq Exclusive	APAC	51.58	11.669683
Atliq e Store	APAC	36.97	8.364253
Leader	APAC	24.52	5.547511
Sage	APAC	22.85	5.169683
Neptune	APAC	21.01	4.753394
Electricalsocity	APAC	16.25	3.676471
Synthetic	APAC	14.14	3.199095
Propel	APAC	14.14	3.199095
Flipkart	APAC	12.96	2.932127
Novus	APAC	12.91	2.920814
Expression	APAC	12.90	2.918552
Girias	APAC	11.30	2.556561
Vijay Sales	APAC	11.27	2.549774
Ebay	APAC	11.14	2.520362
Reliance Digital	APAC	11.10	2.511312
Electricalslytical	APAC	11.08	2.506787
Lotus	APAC	10.53	2.382353

Top 2 markets in each region in fiscal year 2021

```sql
WITH cte1 AS(
    SELECT c.market, c.region, ROUND(SUM(gross_price_total)/1000000,2) as gross_sales_mil
    FROM net_sales ns
    JOIN dim_customer c
    ON ns.customer_code=c.customer_code
    WHERE fiscal_year=2021
    GROUP BY c.market,c.region
    ORDER BY gross_sales_mil DESC),
    cte2 as ( select *, dense_rank() over(PARTITION BY region ORDER BY gross_sales_mil DESC) AS rnk FROM cte1)
SELECT * FROM cte2 WHERE rnk<=2;
```

Query

Output

market	region	gross_sales_mil	rnk
India	APAC	455.05	1
South Korea	APAC	131.86	2
United Kingdom	EU	78.11	1
France	EU	67.62	2
Mexico	LATAM	2.30	1
Brazil	LATAM	2.14	2
USA	NA	264.46	1
Canada	NA	89.78	2

forecast accuracy for all customers in the fiscal year 2021

```sql
WITH forecast_error_table as (
SELECT
    s.customer_code as customer_code,
    c.customer as customer_name,
    c.market as market,
    SUM((s.forecast_quantity-s.sold_quantity)) as net_error,
    ROUND(SUM((s.forecast_quantity-s.sold_quantity))*100/SUM(s.forecast_quantity),1) as net_error_percent,
    SUM(ABS(s.forecast_quantity-s.sold_quantity)) as abs_net_error,
    ROUND(SUM(ABS(s.forecast_quantity-s.sold_quantity))*100/SUM(s.forecast_quantity),2) as abs_net_error_percent
FROM fact_act_est s
JOIN dim_customer c
ON s.customer_code = c.customer_code WHERE s.fiscal_year=2021 GROUP BY customer_code
)
SELECT *, IF (abs_net_error_percent > 100, 0, 100.0 - abs_net_error_percent) AS forecast_accuracy
FROM forecast_error_table
ORDER BY forecast_accuracy DESC;
```

Query

Output

customer_code	customer_name	market	net_error	net_error_percent	abs_net_error	abs_net_error_percent	forecast_accuracy
90013120	Coolblue	Italy	23985	18.0	70467	52.77	47.23
70010048	Atliq e Store	Bangladesh	22571	15.9	75711	53.31	46.69
90023027	Costco	Canada	43773	15.6	149303	53.33	46.67
90023026	Relief	Canada	44504	16.3	146948	53.73	46.27
90017051	Forward Stores	Portugal	31244	26.5	63568	53.84	46.16
90017058	Mbit	Portugal	23335	21.2	59473	53.97	46.03
90023028	walmart	Canada	44242	15.6	153058	54.02	45.98
90023024	Sage	Canada	40836	14.2	155610	54.18	45.82
90015146	Mbit	Norway	63355	30.1	114189	54.24	45.76
90013124	Amazon	Italy	25218	18.5	73826	54.24	45.76
90017054	Flawless Stores	Portugal	30327	26.4	62483	54.48	45.52
70027208	Atliq e Store	Brazil	13608	28.8	25784	54.49	45.51
90015147	Chiptec	Norway	68970	30.8	122100	54.54	45.46
80001019	Neptune	China	161269	12.6	695779	54.56	45.44
90015144	Sound	Norway	65563	29.1	123257	54.63	45.37
90009130	Logic Stores	Newzealand	6885	6.2	60225	54.66	45.34
90015149	UniEuro	Norway	70414	33.1	116172	54.67	45.33
90021088	Electricalslytical	United Kin...	99339	30.7	176975	54.67	45.33
90017050	Electricalsara S...	Portugal	29416	25.6	62760	54.72	45.28
70013125	Atliq Exclusive	Italy	21770	17.6	67546	54.73	45.27

INSIGHTS FOUND

- Croma sales has upward trendline.

- Indian market generated maximum net sales 210.67m for the fiscal year 2021 having USA in the second position with 132.05m net sales.

- Amazon is the top customer among all customers by net sales generating 109.03m that is 13.23% of the total net sales followed by AtliQ Exclusive and then by AtliQ e-store in the fiscal year 2021.

- In APAC region, Amazon was the top customer with net sales of 57.41m that is 12.98% of the total net sales of APAC region.

- In APAC region, India is the top market followed by South Korea.

- Coolblue has the highest 47.23 % of supply chain forecast accuracy.

THANK YOU !