OPIM5272: Project Queries and Reports (Phase III)

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1: Product Inventory

Query/Report:

Part I:

Sales team wants to know which products are not available.

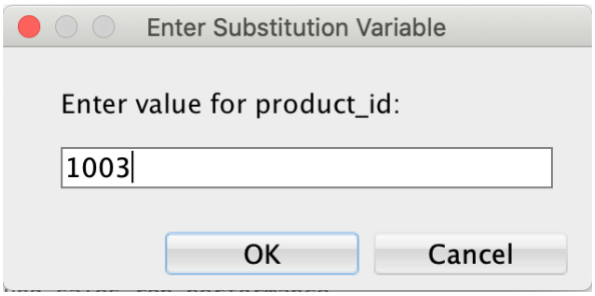
```
select * from product
where product_id not in (select product_id
                         from warehouse_product_data
                         where warehouse_inventory_by_product > 0)
;
```

	PRODUCT_ID	PRODUCT_NAME	PRODUCT_LAUNCHDATE	PRODUCT_PRICE	PRODUCT_LINE	BRAND_ID
1	1008	Daisy Doll – Annie the Astronaut	05-MAY-19	29.99	Daisy Doll – Ca...	17
2	1000	Block Bananza – Fall Fun – Fall 2019	01-JAN-19	10.99	Block Bananza –...	10

Part II:

Sales team wants to know how much inventory of a particular product is available.

```
select product_id
, sum(warehouse_inventory_by_product) "Total Inventory"
, LISTAGG(warehouse_id, ', ') WITHIN GROUP (ORDER BY warehouse_id)
"List of WarehouseIDs"
from warehouse_product_data
where product_id = &product_id
group by product_id
;
```



	PRODUCT_ID	Total Inventory	List of WarehouseIDs
1	1003	6700	102, 106

Business Value:

In the dynamic toy business, the sales team must be able to track the inventory of the products in the warehouses. If a particular product is not in the warehouse, then the sales team should be aware in order to know that to focus on those products that are not available. By knowing which products are not available, the sales team can also check in with the supply chain team in order to ensure that there are pipeline orders in place in order to replenish the product. In Report Part B, in order to properly negotiate and generate a sales order for a customer, the sales team needs to know whether a specific product is available and the exact inventory amount. In order to save time from sorting through a list, the Query Part B allows for the input of a specific product_id. This way, the sales team can search for the exact product that they need to know about in order to hold a discussion with the client.

2: Sales Representative Performance

Query/Report:

Leadership team wants to know the performance of sales representatives.

```
select s.sales_rep_id, s.sales_rep_name
, s.sales_rep_salary
, nvl(sum(t.transactions_revenue), 0) "TOTAL_SALES"
, lpad(concat(round(nvl(sum(t.transactions_revenue)
                      /(select sum(transactions_revenue)
                           from transactions)*100, 0)
                           , 2), '%'), 9, ' ')
"PERCENTAGE_OF_TOTAL_SALES"
, round(nvl(avg(t.transactions_revenue),0),2) "AvgSalesPerCustomer"
from transactions t join customer c
on (t.customer_id = c.customer_id)
```

```
right outer join sales_representative s
on (c.sales_rep_id = s.sales_rep_id)
group by s.sales_rep_id, s.sales_rep_name, s.sales_rep_salary
order by 4 DESC
;
```

	SALES_REP_ID	SALES_REP_NAME	SALES_REP_SALARY	TOTAL_SALES	PERCENTAGE_OF_TOTAL_SALES	AvgSalesPerCustomer
1	1000003	Will West	70000	54619.5	34.08%	18206.5
2	1000001	Jessie Jones	95000	44477	27.75%	22238.5
3	1000006	Cora Connors	70000	31484	19.65%	15742
4	1000000	Sally Smith	80000	21980	13.72%	10990
5	1000004	Ben Brown	80000	7693	4.8%	7693
6	1000005	Danielle Downs	95000	0	0%	0
7	1000007	Gary Garcia	95000	0	0%	0
8	1000009	Joe Johnson	65000	0	0%	0
9	1000002	Tom Twain	65000	0	0%	0
10	1000008	Harry Hwang	95000	0	0%	0

Business Value:

In order to determine annual bonus compensation for each of the sales representatives, it is critical to know the individual sales performances. The contribution of each sales representative to the total sales will contribute to the final decision on how the bonus payout will be structured. Also, knowing the sales performances for the sales representatives will be helpful in determining whether additional training is needed across all sales representatives, particularly if only one or two sales representatives contribute to the majority of sales. This report is also a helpful analysis tool for assessing base compensation versus bonus for each sales representative. The average sales per customer metric can help determine how well the sales representative is performance in terms of cross selling and upselling. For example, in the report generated here, Will West is not only generating the highest absolute sales, but he is also generating the highest average sales per customer, which suggests that he is able to successfully cross sell and/or upsell when engaging with customers.

3: Customer Data View Restricted by Sales Representative

Query/Report:

Management team wants to create specific views by sales_rep id for assigned customers

```
create or replace view customerData_view
as select c.customer_id, c.customer_name, c.customer_address,
c.customer_email
      from CUSTOMER c
      where c.sales_rep_id = 1000001
      order by c.customer_id
      WITH READ ONLY
```

```
;
select * from customerData_view;
```

	CUSTOMER_ID	CUSTOMER_NAME	CUSTOMER_ADDRESS	CUSTOMER_EMAIL
1	100001	WalMart	702 S.W. 8th St. Bentonville, AK 72716	wally@walmart.com

Business Value:

As different sales representatives have responsibility for different client accounts, it is important to maintain some levels of privacy with regard to customer details. Thus, we have created a simple view including key customer details such as customer id, name, address, and email. Since this is a simple view with "READ ONLY" access, the sales representative with access to each view will have the ability to view but not update the data of assigned customers.

4: Customers by Sales Representative

Query/Report:

Management wants to know which customer accounts are assigned to each sales representative.

```
select s.sales_rep_id, s.sales_rep_name, count(c.sales_rep_id) "Number
of Customers"
, LISTAGG(c.customer_id, ', ') WITHIN GROUP (ORDER BY c.customer_id)
"List of CustomerIDs"
from CUSTOMER c, sales_representative s
where c.sales_rep_id (+)= s.sales_rep_id
group by s.sales_rep_id, s.sales_rep_name
order by 3 desc
;
```

	SALES_REP_ID	SALES_REP_NAME	Number of Customers	List of CustomerIDs
1	1000000	Sally Smith	2	100000, 100005
2	1000003	Will West	2	100002, 100003
3	1000006	Cora Connors	2	100006, 100007
4	1000009	Joe Johnson	1	100009
5	1000001	Jessie Jones	1	100001
6	1000004	Ben Brown	1	100004
7	1000008	Harry Hwang	1	100008
8	1000007	Gary Garcia	0	(null)
9	1000002	Tom Twain	0	(null)
10	1000005	Danielle Downs	0	(null)

Business Value:

This report is helpful for the manager of the sales team in terms of resource management. By assessing how many customer accounts each sales representative is responsible for, the manager can determine whether additional support is needed for existing customer accounts and also which sales representative to assign for new client accounts.

5: Supplier Quality Scores by Brand and Product

Query/Report:

The management and sales team want to know the supplier quality scores by brand and product.

```
select distinct b.brand_id
, b.brand_name
, b.brand_category
, sum(c.product_raw_material_quantity * s.supplier_quality_evaluation)
     over(partition by p.brand_id order by p.brand_id) as "Supplier
Quality Score"
from product p, brand b, product_cost c, raw_material r, supplier s
where p.product_id = c.product_id
and p.brand_id = b.brand_id
and c.raw_material_id = r.raw_material_id
and r.supplier_id = s.supplier_id
order by 4
;
```

	BRAND_ID	BRAND_NAME	BRAND_CATEGORY	Supplier Quality Score
1	15	Chemistry Creations	STEM	0.4
2	12	Color and Learn	Art	1
3	13	Marvel	Licensed	1
4	17	Math Mayhem	STEM	2
5	18	Plant and Play	Environment	2.2
6	11	Playful Pets	Environment	4.5
7	10	Block Bananza	STEM	5.3

```
select distinct p.product_id
, p.product_name
, p.product_line
, sum(c.product_raw_material_quantity * s.supplier_quality_evaluation)
    over(partition by p.product_id order by p.product_id) as "Supplier
Quality Score"
from product p, product_cost c, raw_material r, supplier s
where p.product_id = c.product_id
```

```
and c.raw_material_id = r.raw_material_id
and r.supplier_id = s.supplier_id
order by 4;
```

	PRODUCT_ID	PRODUCT_NAME	PRODUCT_LINE	Supplier Quality Score
1	1006	Chemistry Creations – Dinosaur Wonders	Chemisty Creations – Animals	0.4
2	1003	Color and Learn – Space Travel	Color and Learn – World	1
3	1004	Marvel – Superhero Classic 3 Pack with Comic Book	Marvel – Multipack	1
4	1008	Daisy Doll – Annie the Astronaut	Daisy Doll – Careers	2
5	1009	Math Mayhem – Fun with Fractions	Math Mayhem – Basics	2.2
6	1000	Block Bananza – Fall Fun – Fall 2019	Block Bananza – Seasons	2.3
7	1001	Block Bananza – Spring Sun – Spring 2020	Block Bananza – Seasons	3
8	1002	Playful Pets – Benny the Beagle	Playful Pets – Dogs	4.5

Business Value:

Continuous evaluation of supplier relationships is critical to the success of the business. Creating reports that allow for assessment of supplier quality at a brand level will be helpful in determining whether there are certain brands that work with better suppliers than other brands. The suppliers are evaluated on an integer scale based on an evaluation of their commitment to important values such as raw material quality, sustainable sourcing and ethical business practices. Based on this evaluation, we can strengthen our customer-facing claims around the quality of our toy products. Further, we can also evaluate the supplier quality at a more granular product level to determine whether certain products within a brand contribute more or less to the brand's overall supplier quality score. In terms of the impact scores, higher scores mean a better-quality supplier.

6: Contribution Margin By Product

Query/Report:

The management team wants to know which products have the highest versus lowest contribution margin

```
select p.product_id
, p.product_name
, p.product_line
, p.product_price "Price per unit"
, sum(c.product_cost_by_raw_material) "RawMaterialCostPerUnit"
, sum(c.product_cost_by_labor) "LaborCostPerUnit"
, round((p.product_price - sum(c.product_cost_by_raw_material) -
sum(c.product_cost_by_labor)) * 100
          /(p.product_price), 2) "% ContributionMargin"
from product_cost c, product p
where p.product_id = c.product_id
```

```
group by p.product_id, p.product_name, p.product_line, p.product_price
order by 6 DESC
;
```

	PRODUCT_ID	PRODUCT_NAME	PRODUCT_LINE	Price per unit	RawMaterialCost...	LaborCostPerUnit	% Contribution...
1	1009	Math Mayhem – Fun with...	Math Mayhem – Basics	16.99	7.15	9	4.94
2	1008	Daisy Doll – Annie the...	Daisy Doll – Careers	29.99	14	2.5	44.98
3	1002	Playful Pets – Benny t...	Playful Pets – Dogs	24.99	12.85	2.4	38.98
4	1004	Marvel – Superhero Cla...	Marvel – Multipack	14.99	8.1	2.3	30.62
5	1003	Color and Learn – Spac...	Color and Learn –...	10.99	3.9	2.2	44.49
6	1006	Chemistry Creations – ...	Chemisty Creation...	12.99	2.84	1.2	68.9
7	1001	Block Bananza – Spring...	Block Bananza – S...	19.99	11.7	1.2	35.47
8	1000	Block Bananza – Fall F...	Block Bananza – S...	10.99	8.6	1	12.65

Business Value:

In addition to inventory management, it is important to assess the contribution margin of each product. To determine it, a report can be generated to provide price/unit and variable costs per unit in terms of raw material and labor costs. Using the price/unit versus variable costs, the contribution margin by product can be calculated. Products with higher contribution margins are considered more valuable than products with lower contribution margins. Using this report, the product portfolio can be evaluated to determine how to focus efforts on the higher contribution margin products.

7: Recommendation Engine

Query/Report:

The sales team wants to know which products to recommend to cross sell, given a customer's interest in a particular product

```
CREATE OR REPLACE VIEW SALES_TRANS_CUST AS
  SELECT DISTINCT CUSTOMER_ID, PRODUCT_NAME, PRODUCT_LINE
      FROM (SELECT A.CUSTOMER_ID, B.PRODUCT_NAME, B.PRODUCT_LINE
      FROM transactions A, product B
      WHERE A.PRODUCT_ID = B.PRODUCT_ID
      );

-- Drop table AR_SH_SAMPLE_SETTINGS

BEGIN
      EXECUTE IMMEDIATE 'DROP Table AR_SH_SAMPLE_SETTINGS';
  EXCEPTION
      WHEN OTHERS THEN NULL;
END;

-- Create table AR_SH_SAMPLE_SETTINGS
```

```
CREATE TABLE AR_SH_SAMPLE_SETTINGS (
  SETTING_NAME  VARCHAR2(30),
  SETTING_VALUE VARCHAR2(4000));

-- Insert data into AR_SH_SAMPLE_SETTINGS

BEGIN
     INSERT INTO AR_SH_SAMPLE_SETTINGS VALUES
(DBMS_DATA_MINING.ASSO_MIN_SUPPORT,0.04);
     INSERT INTO AR_SH_SAMPLE_SETTINGS VALUES
(DBMS_DATA_MINING.ASSO_MIN_CONFIDENCE,0.1);
     INSERT INTO AR_SH_SAMPLE_SETTINGS VALUES
(DBMS_DATA_MINING.ASSO_MAX_RULE_LENGTH,3);
     INSERT INTO AR_SH_SAMPLE_SETTINGS VALUES
(DBMS_DATA_MINING.ODMS_ITEM_ID_COLUMN_NAME, 'PRODUCT_NAME');
     COMMIT;
END;

-- Create model for Market Basket Analysis using Sales history
transactional data

BEGIN
     DBMS_DATA_MINING.CREATE_MODEL(
     MODEL_NAME       => 'AR_SH_SAMPLE',
     MINING_FUNCTION  => DBMS_DATA_MINING.ASSOCIATION,
     DATA_TABLE_NAME  => 'SALES_TRANS_CUST',
     CASE_ID_COLUMN_NAME => 'CUSTOMER_ID',
     SETTINGS_TABLE_NAME => 'AR_SH_SAMPLE_SETTINGS'
     );
END;


-- What items should we recommend when customer is interested in "Math
Mayhem - Fun with Fractions"?
-- Assume the antecedent item is "Math Mayhem - Fun with Fractions".
-- Since the number of items in antecedent is 1, the number_of_items is
2.
-- choose top 5, ordered by rule lift to see top recommendations by lift
-- Change sort to RULE_SUPPORT to see top recommendations by support

SELECT ROWNUM RANK,
     CONSEQUENT_NAME RECOMMENDATION,
     NUMBER_OF_ITEMS NUM,
     ROUND(RULE_SUPPORT, 3) SUPPORT,
```

```
      ROUND(RULE_CONFIDENCE, 3) CONFIDENCE,
      ROUND(RULE_LIFT, 3) LIFT,
      ROUND(RULE_REVCONFIDENCE, 3) REVERSE_CONFIDENCE
FROM (SELECT * FROM DM$VRAR_SH_SAMPLE
      WHERE NUMBER_OF_ITEMS = 2
      AND EXTRACT(antecedent, '//item[item_name="Math Mayhem - Fun with
Fractions"]') IS NOT NULL
      ORDER BY RULE_LIFT DESC, NUMBER_OF_ITEMS)
WHERE ROWNUM <= 5;
```

Output:

```
RANK   RECOMMENDATION                              NUM   SUPPORT   CONFIDENCE   LIFT
REVERSE_CONFIDENCE
    1 Chemistry Creations - Dinosaur Wonders       2     0.125            1      8
1
```

```
-- What items should we recommend when we have "Block Bananza - Spring
Sun - Spring 2020" in basket?
-- Assume the antecedent item is "Block Bananza - Spring Sun - Spring
2020".
-- Since the number of items in antecedent is 1, the number_of_items is
2.
-- choose top 5, ordered by RULE_LIFT to see top recommendations by lift
-- Change sort to RULE_SUPPORT to see top recommendations by support

SELECT ROWNUM RANK,
      CONSEQUENT_NAME RECOMMENDATION,
      NUMBER_OF_ITEMS NUM,
      ROUND(RULE_SUPPORT, 3) SUPPORT,
      ROUND(RULE_CONFIDENCE, 3) CONFIDENCE,
      ROUND(RULE_LIFT, 3) LIFT,
      ROUND(RULE_REVCONFIDENCE, 3) REVERSE_CONFIDENCE
FROM (SELECT * FROM DM$VRAR_SH_SAMPLE
      WHERE NUMBER_OF_ITEMS = 2
      AND EXTRACT(antecedent, '//item[item_name="Block Bananza - Spring
Sun - Spring 2020"]') IS NOT NULL
      ORDER BY RULE_LIFT DESC, NUMBER_OF_ITEMS)
WHERE ROWNUM <= 5;
```

Output:

```
RANK   RECOMMENDATION             NUM   SUPPORT   CONFIDENCE   LIFT   REVERSE_CONFIDENCE
    1 Dont Get Bored Board Game    2     0.125           1      8                   1
```

The SALES_TRANS_CUST table data:

```
select * from SALES_TRANS_CUST;
```

CUSTOMER_ID	PRODUCT_NAME	PRODUCT_LINE
100003	Playful Pets - Benny the Beagle	Playful Pets - Dogs
100004	Block Bananza - Fall Fun - Fall 2019	Block Bananza - Seasons
100005	Block Bananza - Fall Fun - Fall 2019	Block Bananza - Seasons
100007	Playful Pets - Benny the Beagle	Playful Pets - Dogs
100002	Math Mayhem - Fun with Fractions	Math Mayhem - Basics
100002	Chemistry Creations - Dinosaur Wonders	Chemisty Creations - Animals
100006	Chemistry Creations - Cooking Class	Chemistry Creations - Cooking
100001	Block Bananza - Spring Sun - Spring 2020	Block Bananza - Seasons
100001	Dont Get Bored Board Game	Board Game - Family
100000	Block Bananza - Fall Fun - Fall 2019	Block Bananza - Seasons

Business Value:

Extremely useful in cross selling. The sales team can use the report to extract recommendations and suggest products to customers backed by data.