Midterm Exam

Supply Chain Management – MGMT 323-L1

Prof. Muhammad Wamiq

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Ma05283

Question 1

Describe and draw a supply chain for Imtiaz Super Market.

Note: Your answer should note exceed 300 word

Answer 1

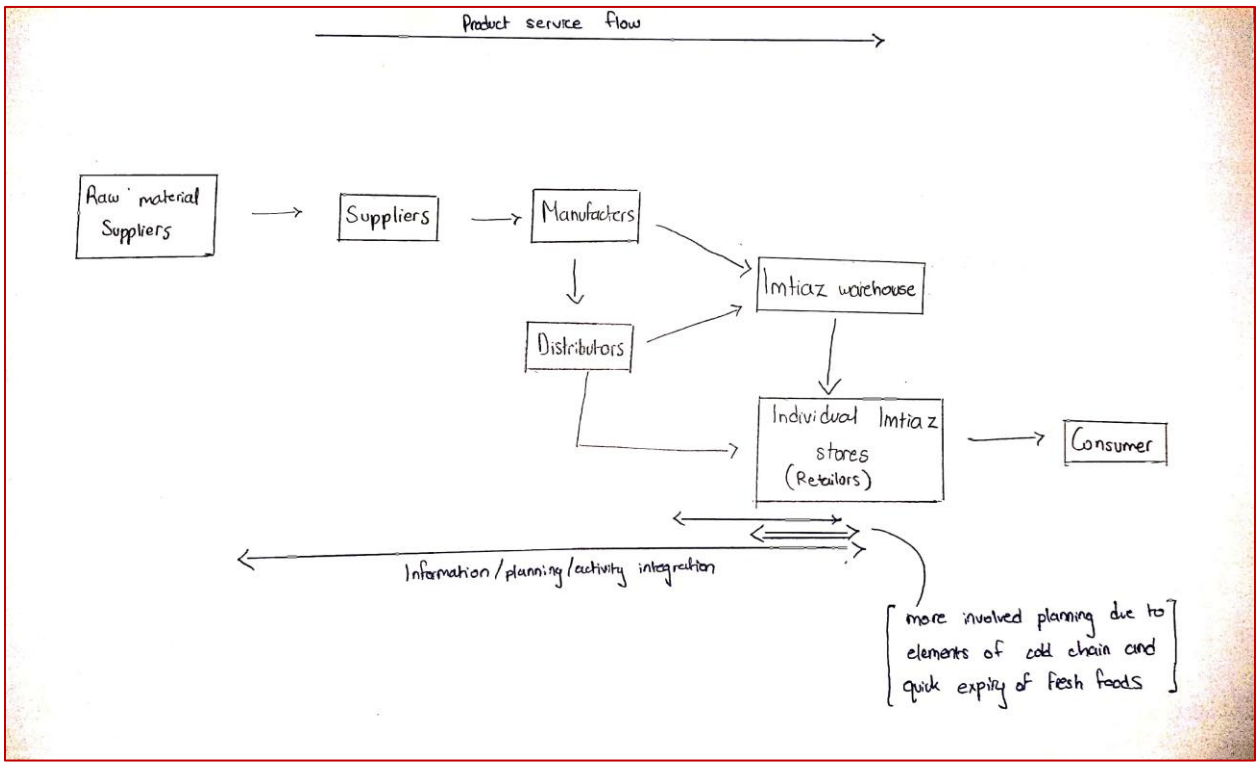

Figure 1: Drawn structure of Imtiaz super store supply chain

A supply chain consists of 4 essential characteristics: Purchasing, Operations, Distribution, and Integration. For Imtiaz Super Market, all of these play a heavily critical role due to the type of industry they are in, requiring fresh foods – available all the time – with multiple providers to deal with.

Beginning at the manufacturers, Imtiaz Super Store would make agreements on how much product they would be procuring and at what rates.

As Imtiaz is a super store with multiple products, its supply chain differs from other stores, as it would be dealing with both distributors and manufacturers directly depending on the product they procure (as it would be more feasible to procure 300 boxes of pens from a distributor, but it would make much more financial sense to procure tons of basmati rice from a manufacturer).

Once product has been procured, a major part of the supply chain which is not directly depicted in figure 1, is the cold chain and hygienic transportation of several food items, at this part of the supply chain, it is critical to maintain the quality of the products by securing the right transportation.

As Imtiaz has multiple branches, they may opt to have a central warehouse, which would allow to store products in the optimal condition until required at the retail outlets. This, again, depends on product to product, as fresh produce is not going to be stored in warehouses while processed foods can be maintained in a warehouse for long periods of time.

Finally, the end of the supply chain is the retail stores where the customers come to purchase the items, this part of the chain is most important to Imtiaz super stores as this part reflects on the entire reputation and trust of the company to its customers.

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Question 2 **10 pts**

As a routine annual evaluation of supplier, manager at Bonbon Inc. has compiled the following data

PERFORMANCE CRITERIA	SCORE	WEIGHT
Technology	85	0.10
Quality	95	0.25
Responsive	90	0.15
Delivery	80	0.15
Cost	90	0.20
Environment	75	0.05
Business	95	0.10
Total score		1.00

Where,

1. Scale of 0 means "Worst" and 100 means "Best" for each of performance category.
2. Weights are assigned to each of the performance criteria based on its relative importance.

You need to evaluate the performance of Bonbon Inc. supplier. Also share your final verdict about the performance of this supplier.

Answer

PERFORMANCE CRITERIA	SCORE	WEIGHT	WEIGHTED SCORE
Technology	85	0.10	8.5
Quality	95	0.25	23.75
Responsive	90	0.15	13.5
Delivery	80	0.15	12
Cost	90	0.20	18
Environment	75	0.05	3.75
Business	95	0.10	9.5
Total score		1.00	89.00

Table 1: Evaluated weighted score

To analyze the performance of a supplier, in this question we are using the Weighted Criteria Evaluation System. This system requires us to assign weights and rate suppliers on important factors which determine their performance, this data has been provided to us already. By running this data on excel and multiplying both weight and score we see the result coming to 89.

This is a significant outcome of our whole procedure, as based on this final score, we will classify the supplier. A score greater than 90 is preferred, where a supplier is considered for new involvement in the product development and opportunities. Unfortunately, **for this supplier, it comes under the certified scale (score between 70 and 90), where a supplier just meets the intended purpose.**

My final verdict would be to send a notice to the supplier regarding their performance, to remind them to increase their performance levels above 90 to be at the best position (as this is a routine evaluation of an existing supplier) and keep conducting business with them. They also have great individual criteria scores, which proves their credentials.

*All calculations are done through excel formulas

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Question 3	15 pts

The Green Giant store placed different offers for a pack of mixed vegetables. Given below is a table compiled to display historical observations (let "Y" be the number of packs sold and "X" be the price). Use the data shown in the table to determine regression equation, correlation coefficient and coefficient of determination.

Observations	Price ($) (X)	Quantity Sold (Y)
1	2.70	760
2	3.50	510
3	2.0	980
4	4.20	250
5	3.10	320
6	4.05	480

*All calculations are done through excel formulas

Answer

Price ($)	Quantity Observations (X)	Sold (Y)	xy	x^2	y^2		
1	2.70	760	2052	7.29	577600		
2	3.50	510	1785	12.25	260100		
3	2.0	980	1960	4	960400		
4	4.20	250	1050	17.64	62500		
5	3.10	320	992	9.61	102400		
6	4.05	480	1944	16.4025	230400		
sum X	19.55	sum Y	3300.00	sum XY	9783.00	sum X^2	67.19
Average X	3.26	Average Y	550.00	n	6	sum Y^2	2193400.00
Linear Regression							
b	-277.627968						
a	1454.604462						
Linear Regression Equation							
y = -277.63x + 1454.60							
Correlation Coefficient							
R	**-0.843392918**						
Coefficient of Determination							
R^2	**0.711311615**						
(Checks out with Excel calculated value)							

Table 1

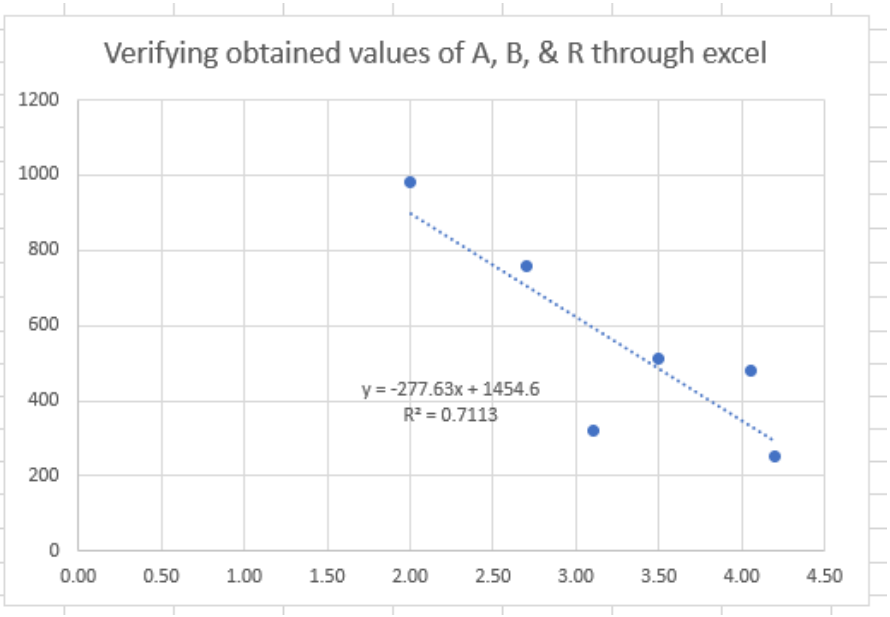

Table 2

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Question 4 **15 pts**

The monthly demand for XYZ Auto Manufacturer is as follows,

Month	Demand (Units)	Month	Demand (Units)
January	100	May	105
February	80	June	110
March	110	July	125
April	115	August	120

1. Use the exponential smoothing method to forecast the number of units for February to September. The initial forecast for January was 105 units; **α** (alpha) = 0.2.
2. Calculate the absolute percentage error for each month from February through August and the MAD and MAPE of forecast error as of the end of August.
3. Calculate the tracking signal as of the end of August. What can you say about the performance of your forecasting method?

Answer

exponential smoothing method					
Month	Demand (Units)	Forecast		Alpha	0.2
January	100	105.0			
February	80	104.0			
March	110	99.2			
April	115	101.4			
May	105	104.1			
June	110	104.3			
July	125	105.4			
August	120	109.3			
September		111.5			

MSFE, MAD, MAPE calculations						
Month	Demand (Units)	Forecast	Error (e)	Absolute error	e^2	Absolute % error
January	100	105.0	-5.0	5	25.00	5.0
February	80	104.0	-24.0	24.0	576.00	30.0
March	110	99.2	10.8	10.8	116.64	9.8
April	115	101.4	13.6	13.6	186.05	11.9
May	105	104.1	0.9	0.9	0.83	0.9
June	110	104.3	5.7	5.7	32.83	5.2
July	125	105.4	19.6	19.6	383.52	15.7
August	120	109.3	10.7	10.7	113.78	8.9
	Total		32.3	90.33	1434.65	87.31
	Average			11.29	179.33	10.91

RSFE	**32.3**
MAD	**11.29**
MSE	**179.33**
MAPE	**10.91**
Tracking signal	**2.863**

What can you say about the performance of your forecasting method?
Our forecasting results demonstrate that our forecast is 11.29 (MAD) or 10.91 (MAPE) off from the actual demand. So these can be addressed.
Furthermore, our value for the tracking signal is low enough to be considered a good forecast.
Moreover, our MSE, shows that there is a positive bias in our results, with the forecast demonstrating more positive results compared to actual demand