

Module 8: Critical Thinking - Oral and PowerPoint Presentation

Brian Goff – 344580

Colorado State University - Global

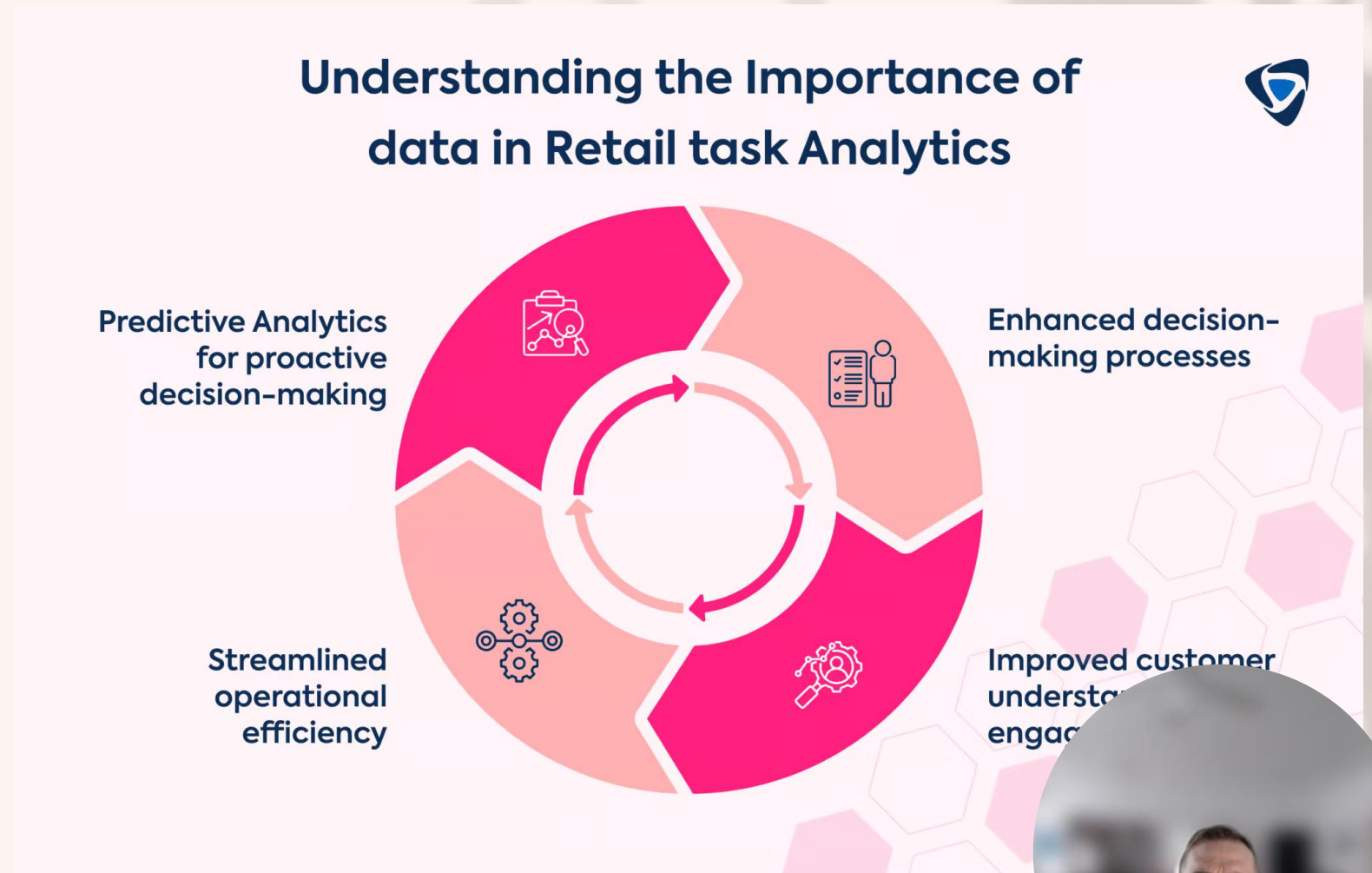
24WB-MIS581 - Capstone - Business Intelligence and Data Analytics

Dr. Justin Bateh

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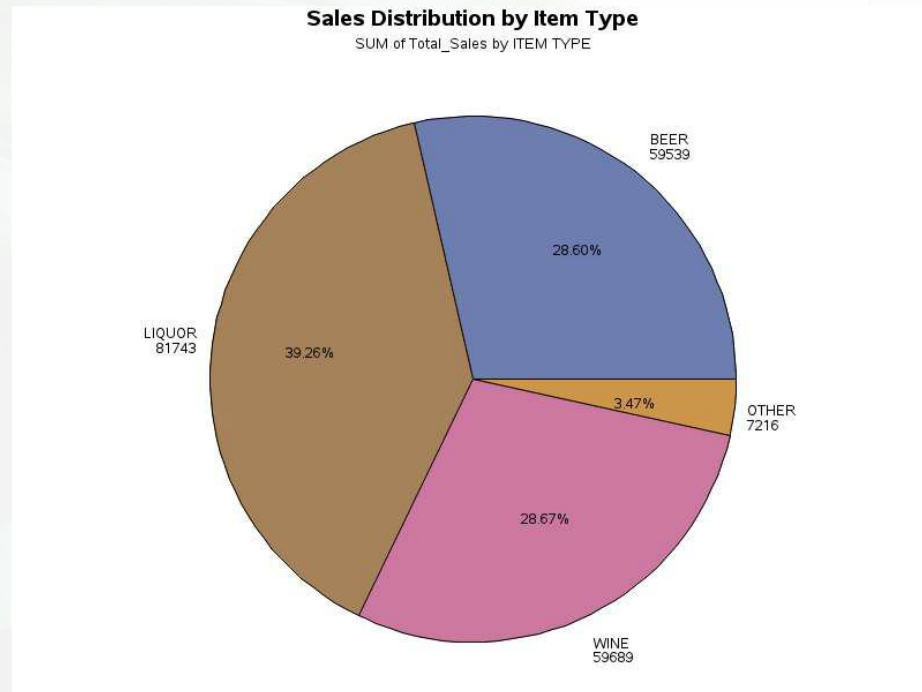


How do we predict sales?



Two Datasets + Advanced Analytics





Hypothesis 1: Impact of Product Categories on Sales



Liquor dominates at 39.26%



Beer & Wine contribute nearly 57% combined

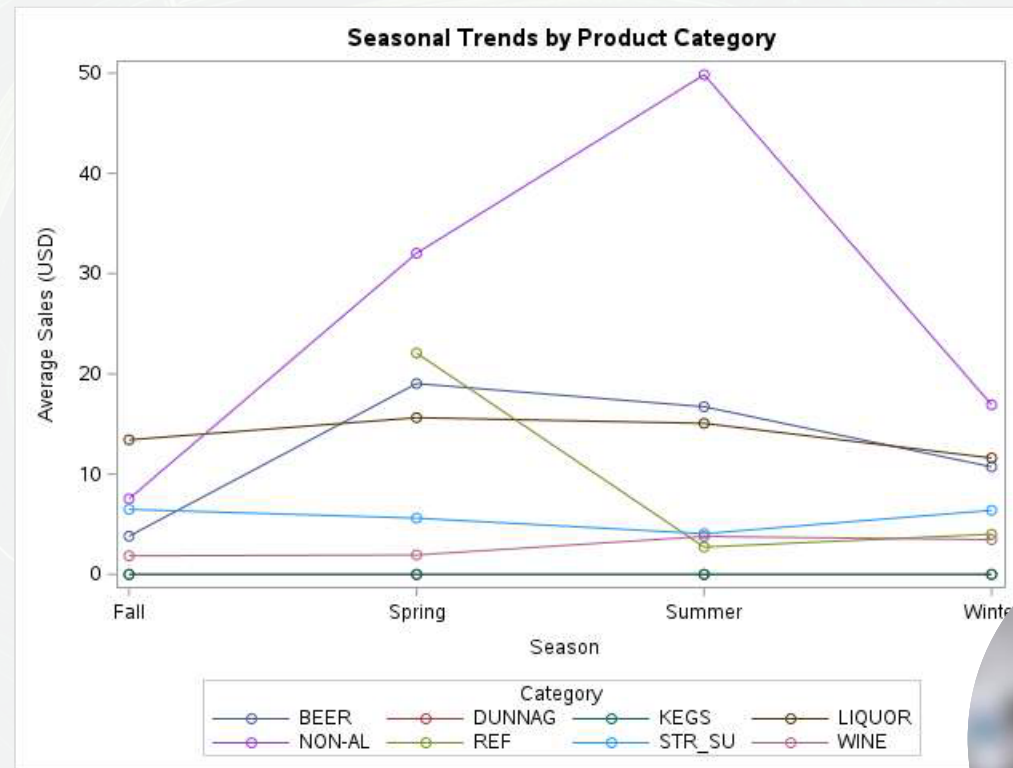


"Other" categories contribute only 3.47%



Hypothesis 2 – Seasonal Trends & Sales

- Liquor peaks in summer—major sales spike.
- Beer & Wine follow seasonal trends—higher in warm months.
- Kegs & other categories show minimal seasonality.



Hypothesis 3 – Marketing Campaign Effectiveness

- ANOVA confirms product categories significantly impact sales.
- F-value: 619.71, p-value: <0.0001 → Highly significant.
- R-square: 0.6716 → 67% of sales variability explained by categories.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	741024	741024	619,71	<,0001
Error	303	362314	1195,75689		
Corrected Total	304	1103338			

Root MSE	34,57972	R-Square	0,6716
Dependent Mean	237,93393	Adj R-Sq	0,6705
Coeff Var	14,53333		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	323,58856	3,96982	81,51	<,0001
SKU_Code	1	-0,55983	0,02249	-24,89	<,0001



Chi-Square Test for Sales Volume and Retention Status

The FREQ Procedure

Frequency Percent Row Pct Col Pct	Table of Sales_Category by Retention_Status			
	Sales_Category	Retention_Status		
		Non-Reta	Retained	Total
Hig		0	117	117
		0,00	0,52	0,52
		0,00	100,00	
		0,00	0,72	
Low		6255	12657	18912
		27,65	55,94	83,59
		33,07	66,93	
		99,27	77,54	
Med		46	3550	3596
		0,20	15,69	15,89
		1,28	98,72	
		0,73	21,75	
Total		6301	16324	22625
		27,85	72,15	100,00

Statistics for Table of Sales_Category by Retention_Status

Statistic	DF	Value	Prob
Chi-Square	2	1565,5240	<,0001
Likelihood Ratio Chi-Square	2	2267,2179	<,0001
Mantel-Haenszel Chi-Square	1	1333,7181	<,0001
Phi Coefficient		0,2630	
Contingency Coefficient		0,2544	
Cramer's V		0,2630	

Sample Size = 22625

Hypothesis 4 – Evaluating the Relationship Between Sales Volume and Customer Retention

- Chi-Square Test confirms a strong link between sales volume & retention.
- High sales customers are retained at a 100% rate.
- Low & Medium sales customers show mixed retention, opportunity for engagement.



Ethical Considerations & Data Validity



Conclusion & Next Steps

