

PGDM, 2018-20
Research Methodology
DM-303

Trimester – III, End-Term Examination: March 2019

Time allowed: 2 hrs 30 min

Max Marks: 50

Roll No: _____

Instruction: Students are required to write Roll No on every page of the question paper, writing anything except the Roll No will be treated as **Unfair Means**. In case of rough work please use answer sheet.

Section - A

Attempt any 3 out of 5 questions from this section. Each question carries 5 marks .

Question1: How should the decision to conduct research be made? What is the role of the researcher in the problem definition process?

Question 2: A B-School is interested in finding out if students with prior work experience do better than students without previous experience. Explain the process of formulating of hypothesis, data collection and drawing conclusions relating to the research question.

Question3: What are the common types of errors encountered in defining research problem? What can be done to reduce the Incidence of such errors?

Question4: What are the primary differences between qualitative and quantitative research techniques?

Question5: Name the major modes for obtaining information via a survey.

Section – B

Attempt any 2 out of 3 questions from this section. Each question carries 10 marks.

Question 1

Malhotra Spices Company came into operation in 1960 and has its operations in all parts of the country. It was in the business of manufacturing and selling spices suitable for the Indian kitchen. The spices were packed into tetrapacks containing spices in different quantities like 100, 150, 200, 250 and 500 gm. Chairman of Malhotra Spices, Mr Malhotra, was wondering whether they should change the packaging from tetrapack to plastic or glass bottle packaging. Before taking a final decision, as an experiment, the company introduced plastic and glass bottle packaging in addition to the existing tetra packs packaging in the national capital region (NCR) of Delhi. Mr Malhotra was thinking that switching over to a new

packaging would involve a huge investment and if the results were not different for the other two types of packaging they would drop the idea of change in packaging.

Type of packaging		Type of store	
1	plastic	1	Large store
2	glass	2	Medium store
3	tetrapack	3	Small store

Use a two-way analysis of variance to examine whether the type of packaging, with the size of the store treated as a block, has any effect on the sales volume. Write a summary of your findings.

Tests of Between-Subjects Effects

Dependent Variable: Sales (in Rs. Lakhs)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3921.122 ^a	4	980.281	8.093	.000	.564
Intercept	413478.828	1	413478.828	3.414E3	.000	.993
packaging	3808.867	2	1904.433	15.722	.000	.557
store	112.256	2	56.128	.463	.634	.036
Error	3028.244	25	121.130			
Total	426323.000	30				
Corrected Total	6949.367	29				

a. R Squared = .564 (Adjusted R Squared = .495)

Parameter Estimates

Dependent Variable: Sales (in Rs. Lakhs)

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	118.958	4.840	25.834	.000	109.308	128.513	.963
[packaging=1]	13.700	4.922	2.783	.010	3.563	23.837	.237
[packaging=2]	-13.888	4.822	-2.884	.006	-24.037	-3.763	.242
[packaging=3]	0 ^a						
[store=1]	-2.888	4.853	-.595	.557	-12.884	7.106	.014
[store=2]	1.887	5.188	.321	.751	-9.019	12.352	.004

[store=3]

0^a

a. This parameter is set to zero because it is redundant.

Post Hoc Tests

Type of Packaging

Multiple Comparisons

Sales (in Rs. Lakhs)

Tukey HSD

(I) Type of Packaging	(J) Type of Packaging	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Plastic	Glass	27.60*	4.922	.000	15.34	39.86
	Tetra packs	13.70*	4.922	.026	1.44	25.96
Glass	Plastic	-27.60*	4.922	.000	-39.86	-15.34
	Tetra packs	-13.90*	4.922	.024	-26.16	-1.64
Tetra packs	Plastic	-13.70*	4.922	.026	-25.96	-1.44
	Glass	13.90*	4.922	.024	1.64	26.16

Based on observed means.

The error term is Mean Square(Error) = 121.130.

*. The mean difference is significant at the .05 level.

Type of Store

Multiple Comparisons

Sales (in Rs. Lakhs)

Tukey HSD

(I) Type of Store	(J) Type of Store	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Large Store	Medium Store	-4.55	4.853	.621	-16.64	7.53
	Small Store	-2.89	4.853	.824	-14.98	9.20
Medium Store	Large Store	4.55	4.853	.021	-7.53	16.04
	Small Store	1.67	5.188	.945	-11.26	14.59
Small Store	Large Store	2.89	4.853	.824	-9.20	14.06
	Medium Store	-1.67	5.188	.945	-14.59	11.26

Multiple Comparisons

Sales (in Rs. Lakhs)

Tukey HSD

(I) Type of Store	(J) Type of Store	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Large Store	Medium Store	-4.56	4.853	.621	-16.64	7.53
	Small Store	-2.89	4.853	.824	-14.98	9.20
Medium Store	Large Store	4.56	4.853	.621	-7.53	16.64
	Small Store	1.67	5.188	.945	-11.26	14.59
Small Store	Large Store	2.89	4.853	.824	-9.20	14.98
	Medium Store	-1.67	5.188	.945	-14.59	11.26

Based on observed means.

The error term is Mean Square(Error) = 121.130.

Question 2

A Factor analysis was carried out to find out what determines the preference for automobile purchase. With reference to the exhibits that follow, write down your analysis. Prepare the labels for the factors given in the rotated component matrix and explain your rationale. Also interpret these factors. Compute the amount of variation explained by each factor. Interpret your findings. Determine the variance summarized by these factors combined. Explain the meaning of the total variance summarized.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.822
Bartlett's Test of Sphericity	Approx. Chi-Square	362.120
	df	153
	Sig.	.000

Communalities

	Initial	Extraction
Price on Road	.889	.289
Brand Name	.544	.891
Engine Capacity	.318	.348

Looks & Design	.425	.227
Fuel Efficiency	.531	.592
Discount Schme	.309	.408
Resale Value	.415	.399
After Sale Services	.400	.288
Running and Maintaining Cost	.550	.606
Convenience Features	.379	.345
Purpose of Purchase	.271	.110
Performance Information		
Available	.464	.281
Driving Pleasure	.489	.558
Car Image & Positioning	.415	.395
Economical	.553	.407
Colours Available	.415	.416
Advertising & Marketing	.368	.251
Safety	.575	.448

Extraction Method: Principal Axis Factoring.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.926	21.813	21.813	3.360	18.669	18.669	2.431	13.504	13.504
2	2.188	12.169	33.979	1.831	9.062	27.731	1.963	10.905	24.408
3	1.788	9.912	43.892	1.298	7.213	34.944	1.453	8.073	32.482
4	1.538	8.545	52.437	.940	5.224	40.167	1.383	7.685	40.167
5	1.246	6.922	59.359						
6	1.093	6.072	65.431						
7	.899	5.000	70.431						
8	.778	4.345	74.776						
9	.677	3.785	78.561						
10	.599	3.319	81.880						
11	.538	2.962	84.842						
12	.491	2.717	87.559						
13	.456	2.532	90.091						
14	.431	2.401	92.492						
15	.415	2.312	94.804						
16	.407	2.241	97.045						
17	.399	2.188	99.233						
18	.368	2.073	100.000						

Extraction Method: Principal Axis Factoring.

Rotated Factor Matrix^a

	Factor			
	1	2	3	4
Driving Pleasure	.724			
Colours Available	.621			
Safety	.579	.305		
Convenience Features	.574			
Car Image & Positioning	.464		.419	
Performance Information Available	.422	.286		
After Sale Services	.397			
Fuel Efficiency		.764		
Running and Maintaining Cost	.255	.681	.256	
Economical		.521	.270	
Engine Capacity		.513		.285
Purpose of Purchase				
Discount Scheme			.618	
Resale Value			.581	
Price on Road			.301	
Advertising & Marketing	.325		.337	
Brand Name				.927
Looks & Design				.412

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Question 3

MRP Biscuit Company started its operations in Ambala city, Haryana, in 2001. For the last three years, the growth has taken a sharp dip. This has been a concern to the management. The company decided to get a study done from a research agency to identify the various factors that influence the preference for biscuits. A sample of 40 individuals was chosen randomly from Ambala. The data was collected on variables like preservation, quality, taste, nutrition value and preference on a 7-point scale with the higher number indicating a more positive rating.

A multiple regression was conducted to help in explaining the preference for the brand of biscuits in terms of the nutrition value, taste and preservation quality.

With reference to the following outputs from the regression run in SPSS

- Interpret the partial regression coefficients.
- Comment on the overall significance of the regression using the ANOVA table.
- As a marketing manager of the biscuit company, on what attributes will you concentrate more so as to improve the marketability of the brand?

Descriptive Statistics

	Mean	Std. Deviation	N
Nutrition Value	4.0250	1.73187	40
Preference	4.7250	1.79726	40
Taste	4.0000	2.08782	40
Preservation Quality	3.8750	1.71251	40

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	Preservation Quality, Taste, Preference ^a		Enter

a. All requested variables entered.

b. Dependent Variable: Nutrition Value

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.834 ^a	.678	.651	1.62240	.978	25.296	3	36	.000

a. Predictors: (Constant), Preservation Quality, Taste, Preference

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	79.338	3	26.446	25.296	.000 ^a
	Residual	37.637	36	1.045		
	Total	116.975	39			

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	79.338	3	26.446	25.296	.000 ^a
	Residual	37.637	36	1.045		
	Total	116.975	39			

a. Predictors: (Constant), Preservation Quality, Taste, Preference

b. Dependent Variable: Nutrition Value

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	.474	.468		1.013	.318			
	Preference	.630	.220	.654	2.865	.007	.810	.431	
	Taste	.241	.151	.291	1.599	.119	.759	.257	.151
	Preservation Quality	-.101	.217	-.100	-.460	.644	.719	-.077	-.044

a. Dependent Variable: Nutrition Value

Section - C

Compulsory Case Study (15 Marks)

A study conducted to explore the prevalence and impact of sleep problems on various aspects of people's lives. Staff from a university in Melbourne, Australia were invited to complete a questionnaire containing questions about their sleep behaviour (e.g. hours slept per night), sleep problems (e.g. difficulty getting to sleep) and the impact that these problems have on aspects of their lives (work, driving, relationships). The sample consisted of 271 respondents (55% female, 45% male) ranging in age from 18 to 84 years (mean=44yrs).

The research variable (dependent) that was used for this analysis was the hours of sleep each week night (hours/night). The variables used, each with a measurement scale of 1=not at all 10=extremely, were as follows:

- sex, marital As in table below
- stressm8 Rating of stress over last month
- impact2 Rating of energy level
- impact5 Rating of life satisfaction
- impact8 Rating of overall well-being

- impact7 Rating of relationships

Tests of Between-Subjects Effects

Dependent Variable: hours sleep/ week nights

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	16.002 ^a	9	1.778	1.559	.137	.112
Intercept	283.125	1	283.125	248.186	.000	.691

		Value Label	N
sex	0	female	69
	1	male	52
marital status	1	single	26
	2	married/de facto	86
	3	divorced	8
	4	widowed	2

sex	.156	1	.156	.137	.712	.001
marital	6.670	3	2.223	1.949	.126	.050
stressmo	2.437	1	2.437	2.136	.147	.019
impact2	.005	1	.005	.004	.949	.000
impact5	4.307	1	4.307	3.775	.055	.033
impact6	.745	1	.745	.653	.421	.006
impact7	1.614	1	1.614	1.415	.237	.013
Error	126.627	111	1.141			
Total	5558.250	121				
Corrected Total	142.628	120				

a. R Squared = .112 (Adjusted R Squared = .040)

a. This parameter is set to zero because it is redundant.

Parameter Estimates

Dependent Variable: hours sleep/ week nights

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	8.782	.879	7.693	.000	6.020	8.504	.348
[sex=0]	-.076	.908	-.370	.712	-.484	.332	.001
[sex=1]	0 ^a	.	.	.	.	.	.
[marital=1]	.888	.800	.999	.320	-.792	2.401	.009
[marital=2]	.560	.782	.707	.481	-1.010	2.129	.004
[marital=3]	-.288	.878	-.234	.815	-1.046	1.535	.000
[marital=4]	0 ^a	.	.	.	.	.	.
stressmo	-.081	.055	-1.462	.147	-.191	.029	.019
impact2	.004	.058	.065	.949	-.108	.115	.000
impact5	-.163	.881	-.194	.055	-.330	.003	.033
impact6	.878	.094	8.808	.421	-.111	.264	.006
impact7	.075	.083	1.160	.237	-.090	.199	.013

Parameter Estimates

Dependent Variable: hours sleep/ week nights

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	6.762	.879	7.693	.000	5.020	8.504	.348
[sex=0]	-.076	.206	-.370	.712	-.484	.332	.001
[sex=1]	0 ^a						
[marital=1]	.805	.806	.999	.320	-.792	2.401	.009
[marital=2]	.560	.792	.707	.481	-1.010	2.129	.004
[marital=3]	-.205	.878	-.234	.815	-1.946	1.535	.000
[marital=4]	0 ^a						
stressmo	-.081	.056	-1.462	.147	-.191	.029	.019
impact2	.064	.056	.065	.049	-.108	.115	.000
impact5	-.165	.064	-1.043	.000	-.300	.009	.000
impact8	.076	.094	.808	.421	-.111	.264	.006

a. This parameter is set to zero because it is redundant.

Write down your analysis of the model developed. Is there a significant difference between males and females in respect of hours of sleep? What, if any, is the effect of marital status? Which of the 4 impact factors has the strongest influence on sleep, and in which way does it influence sleep?

Write down the equation for hours of sleep for

- (i) married males
- (ii) married females

Which category (sex & marital status) enjoys maximum sleep hours on the average, and which category is most deprived of sleep?