

# **ST3188: Statistical Methods for Market Research**

## **Individual Assignment: Coursework**

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## Executive Summary

The objective of this report is to achieve four research aims. Firstly, to understand the increasing concern among customers, regarding how 'safe' it is to travel on cruise in the future. Secondly, to develop possible marketing strategies that can be used to address customers' concerns of traveling on cruise in future. Thirdly, to explore how perceptions of cruise traveling has changed since Covid-19 started, and whether this perception is different among customers of different demographic groups. Lastly, to identify ways to encourage non-cruisers to consider cruising as their future holiday itineraries. In order to address these aims, the following research questions and objectives have been formulated.

Research Objectives
RO 1.1: To identify the extent of how concerned customers are in terms of cruising.
RO 1.2: To explore the relationship between safety factors and customer's decision on a cruise trip.
RO 2: To identify if there is a preferred marketing strategy by customers.
RO 3: To find out if there is a difference in change of perception among customers of different demographic groups.
RO 4: To examine whether predictor variables can be used to attract non-cruisers to cruising in the future.

Based on the research objectives, the research will come up with hypotheses, and propose several statistical tests to test the hypothesis of each of these objectives. Following which, the research will discuss project details as well as the estimated costs for this research.

## Sample and Methodology

The main method used for data collection will be through survey questionnaires. Respondents will include customers and non-customers of the cruise industry. The questionnaires will be disseminated through emails of existing customers based on Carnival Corporation's documents and past records of customer databases. Probability sampling techniques such as simple random sampling and stratified sampling will be used to ensure diversity among qualified respondents. Due to the large population size, this report intends to select a representative sample size based on 95% confidence level.

The following techniques will be utilised to analyse survey responses.

Research Objective	Statistical Test
RO 1.1	One-sample T-test
RO 1.2	$\chi^2$ Statistical test and Cramer's V Test
RO 2	One-way Anova Test
RO 3	Multiple Linear Regression Test
RO 4	Two-Group Discriminant Analysis

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## **1.0 Introduction**

### **1.1 Background Information**

Founded in 1972, Carnival Corporation is the world's largest leisure travel company which holds many prominent brands such as Carnival Cruise Line, Princess Cruises and Cunard. Due to the impact of Covid-19, the economy of the cruise industry has been suffering with cruise ships being unable to operate. Taking into account the all-time low revenue, maintenance costs and large size of employment, Carnival Corporation is currently facing a crisis.

Cruises have been labeled as platforms that condone the fast spread of Covid-19, resulting in decreasing confidence of customers toward cruise travels, especially regular customers from the older age group who are more prone to contracting the virus. Thus, Carnival Corporation is currently facing the challenge to rebuild the confidence of customers toward cruise travels through new safety measures.

### **1.2 Current Issues**

The occurrence of Covid-19 has resulted in increasing concern among customers regarding the safety of cruise travel. With cruises being labeled with a bad reputation for spreading Covid-19, it resulted in changes of customers' perception toward cruise travels. Thus, there is a need for Carnival Corporation to market and portray a positive image. In order to revive its economy, Carnival Corporation has to tap into their previous regular market, and find ways to attract other potential customers such as non-cruisers in order to expand its customer market in the future.

### 1.3 Research Aims

The following research aims have been identified to address the issues faced by Carnival Corporation.

RA 1: To understand the increasing concern among customers, regarding how 'safe' it is to travel on cruise in the future.

RA 2: To develop possible marketing strategies that can be used to address customers' concerns of traveling on cruise in future.

RA 3: To explore how perceptions of cruise traveling has changed since Covid-19 started, and whether this perception is different among customers of different demographic groups.

RA 4: To identify ways to encourage non-cruisers to consider cruising as their future holiday itineraries.

### 1.4 Research Questions

Based on the research aims, the following research questions have been formulated.

#### RA1

RQ 1.1: How concerned are the customers regarding the safety of cruising due to Covid-19?

RQ 1.2: Do safety concerns influence customers' decision on a cruise trip?

These questions aim to explore the concerns that customers have towards cruise travel due to Covid-19, and how those concerns will affect their decision to travel on cruise.

#### RA2

RQ 2: What are the marketing strategies that can address customers' concern of cruise traveling?

This question aims to discover ways to rebuild customers' confidence toward safety of cruise traveling.

### RA3

RQ 3: Do the different demographic groups affect the change in perception of cruising before and after Covid-19?

This question aims to discover whether there is a difference in the change in perception of cruising among different age groups.

### RA4

RQ 4: What strategies can be implemented to attract non-cruisers in the future?

This question aims to discover possible strategies to attract non-cruisers, so as to expand the market for cruise travel in the future.

## 1.5 Research Objectives

In order to address the above questions, the following research objectives have been identified.

RO 1.1: To identify the extent of how concerned customers are in terms of cruising.

RO 1.2: To explore the relationship between safety factors and customer's decision on a cruise trip.

RO2: To identify if there is a preferred marketing strategy by customers.

RO 3: To find out if there is a difference in change of perception among customers of different demographic groups.

RO 4: To examine whether predictor variables can be used to attract non-cruisers to cruising in the future.

## **2.0 Methodology**

### 2.1 Purpose of Research

The objective of this market research is to address the research aims with exploratory and descriptive nature. The research aims to define the customers' concerns and establish its relationship with the decision to embark on a cruise trip. It aims to develop understanding towards the change in customers' perceptions among different demographic groups. The research also wants to explore potential marketing strategies and variables that can be used to attract non-cruisers, so as to expand the target market. The research will be exploratory in nature for RO 1.1, and 2, while being descriptive for RO 1.2, 3 and 4.

### 2.2 Research Design

The approach to this market research will be mainly deductive, through the testing of existing hypotheses that were created for each research objective. The research will use quantitative data to test hypotheses for each research objective. These data will be collected through survey questionnaires that will be disseminated to customers that have their profiles in Carnival Corporation's past documents and database. However, to address RO 4, there is a need to include non-cruisers in the sample size as well.

### 2.3 Data Analysis

The following statistical techniques will be utilised to test the hypotheses for each objective.

RO 1.1: One-sample T-test

RO 1.2:  $\chi^2$  Statistical test and Cramer's V Test

RO 2: One-way Anova Test

RO 3: Multiple Linear Regression Test

RO 4: Two-Group Discriminant Analysis



### 3.0 Data Collection

#### 3.1 Data Required

Demographics data required	Data type
Gender	Nominal
Age	Ratio
Country	Nominal
Education	Ordinal
Household Income	Ratio
Household Size	Ordinal
Cruise Travel History	Nominal

Research objectives data required	Data type
How concerned are customers from a scale of 0 to 10	Ratio
Safety concerns' influence on customers decision to travel (Will/ will not travel)	Nominal
Most preferred marketing strategy	Ordinal
Previous perception of cruising (Positive/ Negative/ No perception)	Nominal
Current perception of cruising (Positive/ Negative/ No perception)	Nominal
Variables that will attract non-cruisers	Nominal

### 3.2 Questionnaire and Sampling Design

The research will select respondents that include both past customers of the cruise industry and non-cruisers. The questionnaire will be done in the form of an online survey due to the large customer market from many different countries. It will mainly consist of multiple-choice questions. A brief summary and instructions will be included at the start of the questionnaire.

Questionnaires will be disseminated to emails of customers that have their profiles recorded in Carnival Corporation's customer database. Only customers that have traveled within two years prior to Covid-19 (2018 - 2019) will be prompted to participate in the questionnaire. This helps the research to focus on responses of current customers. The responses will be selected through stratified random sampling, by classifying the responses based on their age group, so that each age group will have a similar number of responses.

The questionnaire will also be available on other online platforms such as social media, to reach respondents that are non-cruisers. Responses from these platforms that have shown an existing cruise travel history will be filtered out, so as to target non-cruisers. The remaining responses will then be selected from a random sampling method.

A research will be conducted on 2000 respondents globally that have embarked on a cruise trip before with a 95% confidence level. The sample size for non-cruisers will be determined through estimation, proportion of non-cruisers, incidence and completion rate. As we do not have data on the percentage of non-cruisers, the best estimate will be a proportion of 0.5. The survey will be conducted without replacements, which means that each respondent will only be surveyed once. As the research is conducted globally, the chance of surveying each respondent more than once is unlikely. Hence the estimated rate of respondents taking the survey once only is 0.9 and we can calculate that the incidence rate is 0.45. An average online survey has a completion rate of 0.29. (Lindemann, 2020) However, the completion rate can be estimated to 0.4 by providing respondents with incentives. Therefore, the final sample size for non-cruisers will be increased by a factor of 5.56. With an estimate of  $\pm 0.05$ , the final sample size for non-cruisers will be approximately 2136 respondents.

## 4.0 Data Analysis

### 4.1 Research Objective 1.1

To identify the extent of how concerned customers are in terms of cruising.

H0	Customers are not very concerned with cruising. $H_0 = 5$
H1	Customers are very concerned with cruising. $H_1 > 5$
Variable	Customers' average score from 0 to 10 (0 being not concerned, 10 being most concerned)

From a scale of 0 - 10, respondents will rate how concerned they are with cruising. A score of 0 will indicate that they are not concerned at all, whereas a score of 10 indicates they are most concerned. The score of 5 will be decided as the point of neutrality. Therefore, the null hypotheses will be a score rating of 5. The average score will be used to test the hypotheses of this research objective, using the one-sample t-test.

Based on the value generated by SPSS, the test will reject H0 if the P-value is less than 0.05 at a 95% confidence level. This means that there is insufficient evidence to conclude that customers are not very concerned with cruising.

## 4.2 Research Objective 1.2

To explore the relationship between safety factors and customer's decision on a cruise trip.

H0	There is no association between safety concerns and the decision to travel on a cruise trip.
H1	There is an association between safety concerns and the decision to travel on a cruise trip.
Variables	X: Concerns Y: Decision to travel

Respondents will be questioned whether they will travel despite the existing safety concerns. They will indicate their decision to travel in the form of "yes/no". The research will conduct cross tabulation between the two variables, followed by Pearson  $\chi^2$  Statistical test and Cramer's V Test.

Based on the value generated by SPSS, the test will reject H0 if the P-value is less than 0.05 at a 95% confidence level. This means that there is insufficient evidence to conclude there is no association between safety concerns and the decision to travel on a cruise trip. Cramer's V statistical test will then be used to measure the association. Based on the value generated by SPSS, a Cramer's V coefficient will indicate the strength of association, perfect(1), strong(0.30 - 0.99), moderate (0.10 - 0.29), weak(0.01 - 0.09) and none(0). However, if the P-value is more than or equal to 0.05, H0 will not be rejected, which means that there is insufficient evidence to conclude that there is an association between the two variables. From this result, the research will find out whether there is a relationship between the two variables, the type, as well as the strength of the relationship.

### 4.3 Research Objective 2

To identify if there is a preferred marketing strategy by customers.

H0	There is no preferred marketing strategy. (All means are equal)
H1	There is a preferred marketing strategy. (Not all means are equal)
Independent variable	Marketing strategies implemented
Dependent variable	Customers score on each 'preferred marketing strategy'

Respondents will rank their most preferred marketing strategy that is given in the questionnaire with '1' being the most preferred. The average of these scores will be used to test the hypothesis using the One-Way Anova statistical test.

Based on the value generated by SPSS, the test will reject H0 if the P-value is less than 0.05 at a 95% confidence level. This means that there is insufficient evidence to conclude that there is no preferred marketing strategy. Hence, marketing strategies with a lower average score will be indicated as the more preferred strategies. However, if the P-value is more than 0.05, H0 will not be rejected, which means that there is insufficient evidence to conclude that there is a preferred marketing strategy.

#### 4.4 Research Objective 3

To find out if there is a difference in change of perception among customers of different demographic groups.

H0	There is no change in perception among customers of different demographic groups.
H1	There is a change in perception among customers of different demographic groups.
Independent variables	Gender, age, country, education, household income, household size, cruise travel history
Dependent variable	Change in perception (Positive, negative, neutral)

Respondents will be required to state their current perception of cruising (positive, negative or neutral). This response will be compared to the previous question in the questionnaire which asks them to state their past perception of cruising. The change in perception will then be recorded along with their demographic profile and used to test the hypothesis. Multiple linear regression will be used as the statistical test.

From the estimated model coefficient, the relationship between change in perception and each of the demographic variables will be shown. A positive coefficient will indicate a direct relationship whereas a negative coefficient indicates an inverse relationship. In order to measure the 'fit of model', the adjusted  $R^2$  will indicate how the model fits observations of this statistical test.  $R^2$  will indicate a weak(0 to 0.25), moderate(0.25 to 0.8) or strong(0.8 to 1) fit of model.

The global F-test will be conducted to test if the independent variables are useful for estimating the dependent variable. If the generated P-value is less than 0.05, we will reject H0, which means that there is at least one independent variable capable of estimating the dependent variable.

Lastly, the research will conduct the partial t-test to test each of the independent variables' ability to estimate the dependent variable. A generated P-value of less than

0.05 will allow us to reject H0, which means that the tested variable contributes significantly to estimating the dependent variable.

#### 4.5 Research Objective 4

To examine whether predictor variables can be used to attract non-cruisers to cruising in the future.

H0	Predictor variables are not effective in attracting non-cruisers.
H1	Predictor variables are effective in attracting non-cruisers.
Independent variables	Price, Variety of activities, Duration, Facilities, Food
Dependent variable	Attracted/not attracted to cruising

Respondents for this objective will only be non-cruisers. The hypothesis of this objective will be tested by the two-group discriminant analysis.

From the test of equality of group means, predictor variables with a P-value of less than 0.05 at 95% confidence level, indicates that they contribute significantly, whereas a lower Wilks' lambda indicates more potential for the particular predictor variable to discriminate. We will be able to derive the correlation between predictor and dependent variables from the structure matrix. A high correlation indicates a stronger predictor variable. The Wilks' Lambda table will be used to assess the 'fit of model'. A P-value of less than 0.05 concludes that the set of predictor variables is effective in discriminating the dependent variables.

## **5.0 Future Research and Project Details**

Through this research, Carnival Corporation will be able to derive a better understanding of factors such as customers' concerns, perception, the potential marketing strategies as well as variables that attract non-cruisers. With this information, Carnival Corporation will be able to narrow their scope and focus resources on these factors in future.

### **5.1 Future Research & Concerns**

By understanding how the concerns affect decisions of cruise travel, Carnival Corporation will be able to better undertake measures to address these concerns.

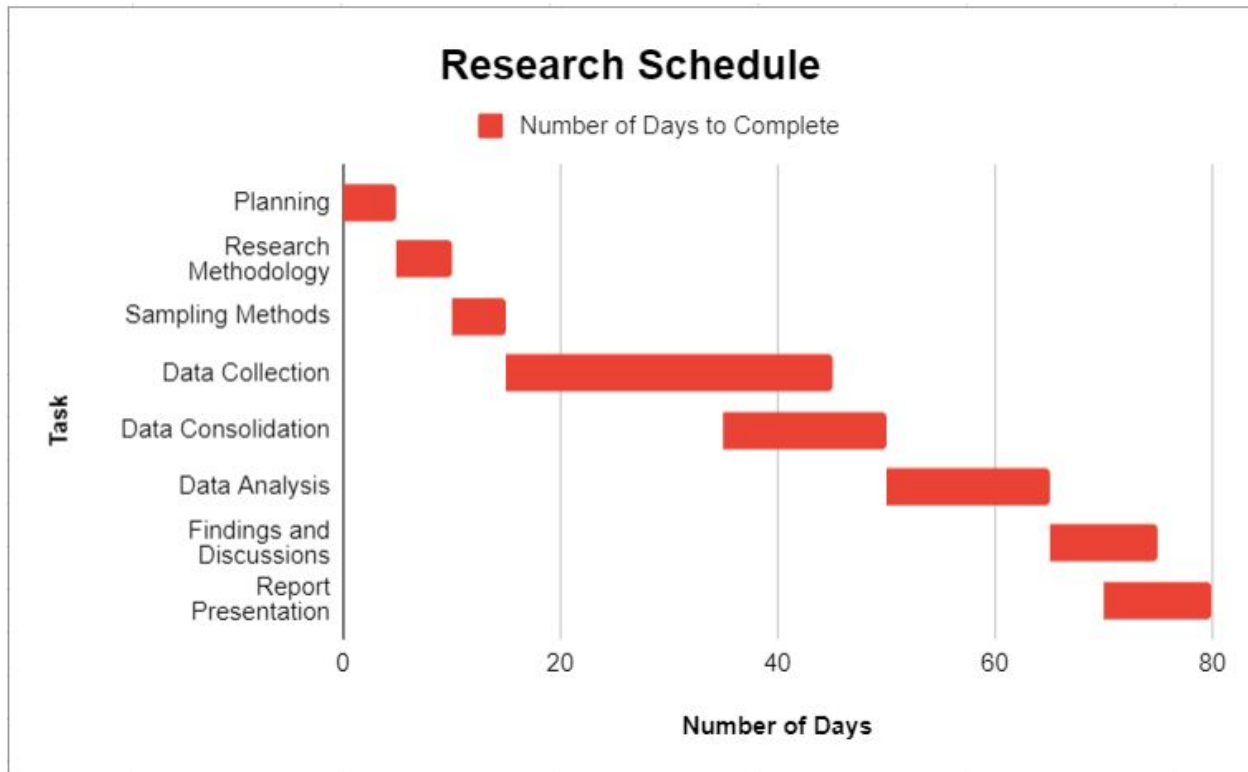
The potential marketing strategies can be further explored and turned into viable solutions to attract customers. Based on predictor variables mentioned in research objective 4, future marketing strategies can be formulated to attract non-cruisers. This research aims to gather extensive and in-depth information from respondents through the form of focus groups in the future, with regards to the responses of the questionnaire.

Focus groups will be an effective way to generate suggestions and ideas from the consumers' point of view. It will create a better understanding of consumers' behaviour, especially for non-cruisers. Carnival Corporation can therefore make use of this information to introduce potential marketing strategies.



## 5.2 Gantt Chart

Estimated Time taken for Research: 3 Months



## 5.3 Estimated Costs

The total estimated costs for this research will be USD 300 000. The estimated costs have been broken down for the following project tasks.

Project Task	Cost (USD)
Planning & Research	25 000
Data Collection & Analysis	200 000
Final Report	25 000
Admin/Miscellaneous	50 000

## 5.4 Questionnaire



### Concerns of the Cruise Industry

This is a questionnaire developed by researchers affiliated with Carnival Corporation. We seek to understand the various concerns of the cruise industry due to the Covid-19 pandemic. This questionnaire will take 5 - 10 minutes of your time. The data collected will only be used for research purposes and details of respondents will not be disclosed. We greatly appreciate your participation in this questionnaire.

1. What is your gender?

- Male
- Female

2. What is your age?

\_\_\_\_\_

3. Which country are you from?

\_\_\_\_\_

4. What is your highest education level?

- Primary
- Secondary
- Tertiary
- Graduate
- Other

5. What is your estimated household income?

\_\_\_\_\_

6. What is your household size?

\_\_\_\_\_

7. Have you been on a cruise trip before?

- Yes
- No



The cruise industry is one of the most negatively affected among all sectors, due to the presence of Covid-19 pandemic. Normal cruise operations have been disabled, rendering Carnival Corporation with next to no revenue, along with a large amount of maintenance costs. We hope to receive your precious feedback to help us better manage this overwhelming challenge.

Please answer the following questions based on your personal opinion.

8. How concerned are you towards a cruise trip? (From a scale of 0 to 10, 0 being least concerned, 10 being most concerned)

\_\_\_\_\_

9. Will safety concerns stop you from travelling?

- Yes
- No

10. What is your most preferred marketing strategy?

- Marketing strategy A
- Marketing strategy B
- Marketing strategy C

11. What is your previous perception towards a cruise trip? (Before Covid-19)

- Positive
- Neutral
- Negative

12. What is your current perception towards a cruise trip?

- Positive
- Neutral
- Negative

13. Please tick the following factors that attract you:

- Price
- Variety of activities
- Duration
- Facilities
- Food

**Thank you**

## 6.0 Bibliography

### References

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