

# Satisfaction-with-Mobile-Payment-Integration-across-Vari- ous-Online-Transactions

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```
library(readr)
library(dplyr)

##
## Attaching package: 'dplyr'
## The following objects are masked from 'package:stats':
##
##   filter, lag
## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union

library(tidyr)
library(ggplot2)

data <- read_csv("Suero_Huervana_Ahumada/CSV FILES/Survey.csv")

## Rows: 108 Columns: 34
## -- Column specification -----
## Delimiter: ","
## chr (33): Timestamp, Email Address, Name, Age, Gender, Occupation, Address, ...
## lgl (1): Score
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.

str(data)

## spc_tbl_ [108 x 34] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
## $ Timestamp                                : chr [1:108] "3
## $ Email Address                           : chr [1:108] "
## $ Score                                    : logi [1:108] 1
## $ Name                                    : chr [1:108] "
## $ Age                                     : chr [1:108] "
## $ Gender                                  : chr [1:108] "F
## $ Occupation                             : chr [1:108] "S
## $ Address                                 : chr [1:108] "1
## $ Contact Number(Optional)               : chr [1:108] "0
## $ Which online payment method or platform do you primarily use for making purchases?: chr [1:108] "C
## $ How often do you use online payment for making purchases? : chr [1:108] "A
## $ PE1                                     : chr [1:108] "A
```

```

## $ PE2 : chr [1:108] "
## $ PE3 : chr [1:108] "
## $ EE1 : chr [1:108] "
## $ EE2 : chr [1:108] "
## $ EE3 : chr [1:108] "
## $ AUT1 : chr [1:108] "
## $ AUT2 : chr [1:108] "
## $ AUT3 : chr [1:108] "
## $ AUT4 : chr [1:108] "
## $ SI1 : chr [1:108] "
## $ SI2 : chr [1:108] "
## $ FC1 : chr [1:108] "
## $ FC2 : chr [1:108] "
## $ FC3 : chr [1:108] "
## $ FC4 : chr [1:108] "
## $ SE1 : chr [1:108] "
## $ SE2 : chr [1:108] "
## $ SE3 : chr [1:108] "
## $ A1 : chr [1:108] "
## $ A2 : chr [1:108] "
## $ A3 : chr [1:108] "
## $ A4 : chr [1:108] "
## - attr(*, "spec")=
## .. cols(
## ..   Timestamp = col_character(),
## ..   `Email Address` = col_character(),
## ..   Score = col_logical(),
## ..   Name = col_character(),
## ..   Age = col_character(),
## ..   Gender = col_character(),
## ..   Occupation = col_character(),
## ..   Address = col_character(),
## ..   `Contact Number(Optional)` = col_character(),
## ..   `Which online payment method or platform do you primarily use for making purchases?` = col_cha
## ..   `How often do you use online payment for making purchases?` = col_character(),
## ..   PE1 = col_character(),
## ..   PE2 = col_character(),
## ..   PE3 = col_character(),
## ..   EE1 = col_character(),
## ..   EE2 = col_character(),
## ..   EE3 = col_character(),
## ..   AUT1 = col_character(),
## ..   AUT2 = col_character(),
## ..   AUT3 = col_character(),
## ..   AUT4 = col_character(),
## ..   SI1 = col_character(),
## ..   SI2 = col_character(),
## ..   FC1 = col_character(),
## ..   FC2 = col_character(),
## ..   FC3 = col_character(),
## ..   FC4 = col_character(),
## ..   SE1 = col_character(),
## ..   SE2 = col_character(),
## ..   SE3 = col_character(),

```

```
## .. A1 = col_character(),
## .. A2 = col_character(),
## .. A3 = col_character(),
## .. A4 = col_character()
## .. )
## - attr(*, "problems")=<externalptr>
```

```
summary(data)
```

```
##   Timestamp      Email Address      Score      Name
## Length:108      Length:108      Mode:logical Length:108
## Class :character Class :character NA's:108      Class :character
## Mode :character Mode :character      Mode :character
##   Age      Gender      Occupation      Address
## Length:108 Length:108      Length:108      Length:108
## Class :character Class :character Class :character Class :character
## Mode :character Mode :character Mode :character Mode :character
## Contact Number(Optional)
## Length:108
## Class :character
## Mode :character
## Which online payment method or platform do you primarily use for making purchases?
## Length:108
## Class :character
## Mode :character
## How often do you use online payment for making purchases?      PE1
## Length:108      Length:108
## Class :character      Class :character
## Mode :character      Mode :character
##   PE2      PE3      EE1      EE2
## Length:108 Length:108      Length:108      Length:108
## Class :character Class :character Class :character Class :character
## Mode :character Mode :character Mode :character Mode :character
##   EE3      AUT1      AUT2      AUT3
## Length:108 Length:108      Length:108      Length:108
## Class :character Class :character Class :character Class :character
## Mode :character Mode :character Mode :character Mode :character
##   AUT4      SI1      SI2      FC1
## Length:108 Length:108      Length:108      Length:108
## Class :character Class :character Class :character Class :character
## Mode :character Mode :character Mode :character Mode :character
##   FC2      FC3      FC4      SE1
## Length:108 Length:108      Length:108      Length:108
## Class :character Class :character Class :character Class :character
## Mode :character Mode :character Mode :character Mode :character
##   SE2      SE3      A1      A2
## Length:108 Length:108      Length:108      Length:108
## Class :character Class :character Class :character Class :character
## Mode :character Mode :character Mode :character Mode :character
##   A3      A4
## Length:108 Length:108
## Class :character Class :character
## Mode :character Mode :character
```

```
head(data)
```

```
## # A tibble: 6 x 34
##   Timestamp      `Email Address` Score Name Age Gender Occupation Address
##   <chr>          <chr>          <lg1> <chr> <chr> <chr> <chr> <chr>
## 1 3/11/2024 11:31:20 jiruel.suero@s~ NA jiru~ 20 Male Student Dingle~
## 2 3/11/2024 11:32:57 samanthaarceob~ NA Sama~ 20 Female Student Legane~
## 3 3/11/2024 12:08:32 irene.magante@~ NA Iren~ 52 Female Employed San Jo~
## 4 3/11/2024 12:48:04 noreendlr@yaho~ NA Nore~ 50 Female Employed san jo~
## 5 3/11/2024 13:05:08 jorjitlee.sumi~ NA Jorj~ 20 Female Student Santa ~
## 6 3/11/2024 16:22:15 sharrenlaolao@~ NA SHAR~ 21 Female Student Buenav~
## # i 26 more variables: `Contact Number(Optional)` <chr>,
## # `Which online payment method or platform do you primarily use for making purchases?` <chr>,
## # `How often do you use online payment for making purchases?` <chr>,
## # PE1 <chr>, PE2 <chr>, PE3 <chr>, EE1 <chr>, EE2 <chr>, EE3 <chr>,
## # AUT1 <chr>, AUT2 <chr>, AUT3 <chr>, AUT4 <chr>, SI1 <chr>, SI2 <chr>,
## # FC1 <chr>, FC2 <chr>, FC3 <chr>, FC4 <chr>, SE1 <chr>, SE2 <chr>,
## # SE3 <chr>, A1 <chr>, A2 <chr>, A3 <chr>, A4 <chr>
```

```
tail(data)
```

```
## # A tibble: 6 x 34
##   Timestamp      `Email Address` Score Name Age Gender Occupation Address
##   <chr>          <chr>          <lg1> <chr> <chr> <chr> <chr> <chr>
## 1 4/18/2024 11:19:29 nhecyjoyice@gma~ NA Nhec~ 20 Female Student San Mi~
## 2 4/18/2024 12:38:53 dmbenedicto11@~ NA Dave 20 Male Student Oton, ~
## 3 4/18/2024 12:52:06 gloriaariellem~ NA Arie~ 23 Female Employed 88 DB ~
## 4 4/18/2024 13:07:35 b.divinagracia~ NA Bene~ 21 Male Employed Jaro I~
## 5 4/18/2024 13:24:01 zenhuervana@gm~ NA Zenn~ 24 Female Employed Lapuz,~
## 6 4/18/2024 20:25:16 sheyangxxx@gma~ NA Shea~ 18 Female Student San Ag~
## # i 26 more variables: `Contact Number(Optional)` <chr>,
## # `Which online payment method or platform do you primarily use for making purchases?` <chr>,
## # `How often do you use online payment for making purchases?` <chr>,
## # PE1 <chr>, PE2 <chr>, PE3 <chr>, EE1 <chr>, EE2 <chr>, EE3 <chr>,
## # AUT1 <chr>, AUT2 <chr>, AUT3 <chr>, AUT4 <chr>, SI1 <chr>, SI2 <chr>,
## # FC1 <chr>, FC2 <chr>, FC3 <chr>, FC4 <chr>, SE1 <chr>, SE2 <chr>,
## # SE3 <chr>, A1 <chr>, A2 <chr>, A3 <chr>, A4 <chr>
```

## DEMOGRAPHICS

### AGE

```
# Convert Age column to numeric
data <- data %>%
  mutate(Age = as.numeric(Age))
```

```
## Warning: There was 1 warning in `mutate()`.
## i In argument: `Age = as.numeric(Age)`.
## Caused by warning:
## ! NAs introduced by coercion
```

```
# Remove NA values in Age column
cleaned_data <- data %>%
  filter(!is.na(Age))
```

```
# Count and arrange the frequencies of ages
age_counts <- cleaned_data %>%
```

```
count(Age) %>%
  arrange(Age)

age_plot <- ggplot(age_counts, aes(x = Age, y = n)) +
  geom_bar(stat = "identity", fill = "skyblue", color = "black") +
  labs(title = "Age frequency",
        x = "Age",
        y = "Frequency")+
  theme_minimal()

#ggsave("age_distribution_plot.png", plot = age_plot, width = 8, height = 6, dpi = 300)
```

## GENDER

```
library(dplyr)

# Replace "Gay" with "Others" in the Gender column
data <- data %>%
  mutate(Gender = ifelse(Gender == "Gay", "Others", Gender))

gender_freq <- data %>%
  count(Gender) %>%
  arrange(Gender)
gender_freq
```

Gender	n
1 Female	41
2 Male	63
3 Others	1
4 Prefer not to say	3

```
gender_plot <- ggplot(gender_freq, aes(x = Gender, y = n)) +
  geom_bar(stat = "identity", fill = "skyblue") +
  labs(title = "Gender Frequency",
        x = "Gender",
        y = "Frequency") +
  geom_text(aes(label = n), vjust = -0.5, size = 3) +
  theme_minimal()

#ggsave("gender_frequency_plot.png", plot = gender_plot, width = 8, height = 6)
```

## OCCUPATION

```
library(dplyr)

# Define valid occupations
valid_occupations <- c("Student", "Employed", "Unemployed", "Self Employed")

# Replace invalid occupations with "Others" in the Occupation column
data <- data %>%
```

```
mutate(Occupation = ifelse(!(Occupation %in% valid_occupations), "Others", Occupation))

occupation_freq <- data %>%
  count(Occupation) %>%
  arrange(Occupation)

occupation_plot <- ggplot(occupation_freq, aes(x = Occupation, y = n)) +
  geom_bar(stat = "identity", fill = "skyblue") +
  labs(title = "Occupation Frequency",
       x = "Occupation",
       y = "Frequency") +
  geom_text(aes(label = n), vjust = -0.5, size = 3) +
  theme_minimal()

#ggsave("occupation_frequency_plot.png", plot = occupation_plot, width = 8, height = 6)
```

#### ONLINE PAYMENT METHOD OR PLATFORM THEY USE

```
payment_method_count <- data %>%
  count(`Which online payment method or platform do you primarily use for making purchases?`)

for (i in 1:nrow(payment_method_count)) {
  print(paste("The total number of individuals who primarily use", payment_method_count[i, "Which online
"]

## [1] "The total number of individuals who primarily use Coins.ph is: 1"
## [1] "The total number of individuals who primarily use G Cash is: 92"
## [1] "The total number of individuals who primarily use Hello Money is: 1"
## [1] "The total number of individuals who primarily use Online banking is: 12"
## [1] "The total number of individuals who primarily use PayMaya is: 1"
## [1] "The total number of individuals who primarily use secret is: 1"

# Replace "secret" with "others"
data <- data %>%
  mutate(`Which online payment method or platform do you primarily use for making purchases?` = ifelse(

payment_method_count <- data %>%
  count(`Which online payment method or platform do you primarily use for making purchases?`) %>%
  arrange(desc(n))

payment_method_plot <- ggplot(payment_method_count, aes(x = `Which online payment method or platform do
  geom_bar(stat = "identity", fill = "skyblue") +
  labs(title = "Payment Method Frequency",
       x = "Payment Method",
       y = "Frequency") +
  geom_text(aes(label = n), vjust = -0.5, size = 3) +
  theme_minimal()

#ggsave("payment_method_frequency_plot.png", plot = payment_method_plot, width = 8, height = 6)
```

## HOW OFTEN AN INDIVIDUAL USE ONLINE PAYMENT

```
payment_frequency_count <- data %>%
  count(`How often do you use online payment for making purchases?`)

for (i in 1:nrow(payment_frequency_count)) {
  print(paste("The total number of individuals who use online payment", payment_frequency_count[i, "How
}

## [1] "The total number of individuals who use online payment 2-3 times a week is: 18"
## [1] "The total number of individuals who use online payment 4-6 times a week is: 9"
## [1] "The total number of individuals who use online payment Daily is: 6"
## [1] "The total number of individuals who use online payment Multiple times a day is: 6"
## [1] "The total number of individuals who use online payment Once a week is: 18"
## [1] "The total number of individuals who use online payment Rarely (Less than once a month) is: 51"

# Replace invalid frequency categories with "Others"
data <- data %>%
  mutate(`How often do you use online payment for making purchases?` =
    case_when(
      `How often do you use online payment for making purchases?` %in% c("2-3 times a week", "4-6
      TRUE ~ "Others"
    )
  )

payment_frequency_count <- data %>%
  count(`How often do you use online payment for making purchases?`) %>%
  arrange(desc(n))

payment_frequency_plot <- ggplot(payment_frequency_count, aes(x = `How often do you use online payment
  geom_bar(stat = "identity", fill = "skyblue") +
  labs(title = "Payment Frequency Frequency",
       x = "Payment Frequency",
       y = "Frequency") +
  geom_text(aes(label = n), vjust = -0.5, size = 3) +
  theme_minimal()

#ggsave("payment_frequency_plot.png", plot = payment_frequency_plot, width = 8, height = 6)
```

## DETERMINANTS

CHANGING “Strong Disagree to”Strongly Disagree” (Error in making the survey)

```
changed_data <- data

# Iterate through each row and replace "Strong Disagree" with "Strongly Disagree"
for (i in 1:nrow(changed_data)) {
  changed_data[i, ] <- lapply(changed_data[i, ], function(x) ifelse(x == "Strong Disagree", "Strongly D
})

# Print the updated dataframe
print(changed_data)
```

```
## # A tibble: 108 x 34
##   Timestamp      `Email Address` Score Name   Age Gender Occupation Address
##   <chr>          <chr>          <dbl> <chr> <dbl> <chr> <chr>    <chr>
## 1 3/11/2024 11:31:~ jiruel.suero@s~ NA   jiru~   20 Male   Student Dingle~
## 2 3/11/2024 11:32:~ samanthaarceob~ NA   Sama~   20 Female Student Legane~
## 3 3/11/2024 12:08:~ irene.magante@~ NA   Iren~   52 Female Employed San Jo~
## 4 3/11/2024 12:48:~ noreendlr@yaho~ NA   Nore~   50 Female Employed san jo~
## 5 3/11/2024 13:05:~ jorjitlee.sumi~ NA   Jorj~   20 Female Student Santa ~
## 6 3/11/2024 16:22:~ sharrenlaolao@~ NA   SHAR~   21 Female Student Buenav~
## 7 3/11/2024 16:39:~ khiakiks2305@g~ NA   JIEC~   18 Female Student TIGUIB~
## 8 3/11/2024 16:43:~ kaykiekyutie@g~ NA   SKY ~   18 Female Student Buenav~
## 9 3/11/2024 16:56:~ mharieleeereci~ NA   MHAR~   19 Female Student Legane~
## 10 3/11/2024 17:05:~ arkadatakill2~ NA   Wolf~   21 Male   Student Brgy c~
## # i 98 more rows
## # i 26 more variables: `Contact Number(Optional)` <chr>,
## #   `Which online payment method or platform do you primarily use for making purchases?` <chr>,
## #   `How often do you use online payment for making purchases?` <chr>,
## #   PE1 <chr>, PE2 <chr>, PE3 <chr>, EE1 <chr>, EE2 <chr>, EE3 <chr>,
## #   AUT1 <chr>, AUT2 <chr>, AUT3 <chr>, AUT4 <chr>, SI1 <chr>, SI2 <chr>,
## #   FC1 <chr>, FC2 <chr>, FC3 <chr>, FC4 <chr>, SE1 <chr>, SE2 <chr>, ...

# Write changed_data to a CSV file
write_csv(changed_data, "changed_data.csv")
```

```
question_columns <- c("PE1", "PE2", "PE3", "EE1", "EE2", "EE3", "AUT1", "AUT2", "AUT3", "AUT4", "SI1", "SI2", "FC1", "FC2", "FC3", "FC4", "SE1", "SE2")
```

## CHANGING QUESTIONS TO FACTOR

```
for (column_name in question_columns) {
  changed_data[[column_name]] <- factor(changed_data[[column_name]],
    levels = c("Strongly Disagree", "Disagree", "Neutral", "Agree", "Strongly Agree"),
    ordered = TRUE)
}
```

## SEPARATING THE DEMOGRAPHICS AND DETERMINANTS

```
demographic_cols <- c("Timestamp", "Email Address", "Score", "Name", "Age", "Gender", "Occupation", "Address")
demographics <- changed_data %>%
  select(all_of(demographic_cols))

demographic_cols
```

```
## [1] "Timestamp"
## [2] "Email Address"
## [3] "Score"
## [4] "Name"
## [5] "Age"
## [6] "Gender"
## [7] "Occupation"
## [8] "Address"
## [9] "Contact Number(Optional)"
## [10] "Which online payment method or platform do you primarily use for making purchases?"
## [11] "How often do you use online payment for making purchases?"
```

```
determinant_cols <- setdiff(names(changed_data), demographic_cols)
determinants <- changed_data %>%
  select(all_of(determinant_cols))
```



```
determinant_cols
```

```
## [1] "PE1" "PE2" "PE3" "EE1" "EE2" "EE3" "AUT1" "AUT2" "AUT3" "AUT4"  
## [11] "SI1" "SI2" "FC1" "FC2" "FC3" "FC4" "SE1" "SE2" "SE3" "A1"  
## [21] "A2" "A3" "A4"
```

MAPPING EACH QUESTION TO ITS CORRESPONDING CATEGORY

```
category_map <- list(  
  "Performance Expectancy" = c("PE1", "PE2", "PE3"),  
  "Effort Expectancy" = c("EE1", "EE2", "EE3"),  
  "Attitude toward using technology" = c("AUT1", "AUT2", "AUT3", "AUT4"),  
  "Social influence" = c("SI1", "SI2"),  
  "Facilitating Conditions" = c("FC1", "FC2", "FC3", "FC4"),  
  "Self-Efficacy" = c("SE1", "SE2", "SE3"),  
  "Anxiety" = c("A1", "A2", "A3", "A4")  
)  
  
category_df <- stack(category_map)  
colnames(category_df) <- c("question", "category")
```

CONVERT TO NUMERIC AND CALCULATE MEANS CONVERT TO NUMERIC AND CALCULATE STANDARD DEVIATIONS COMBINE MEANS, STANDARD DEVIATIONS, AND CATEGORIES

```
determinants_means <- determinants %>%  
  mutate(across(everything(), as.numeric)) %>%  
  summarise_all(.funs = mean) %>%  
  pivot_longer(cols = everything(), names_to = "question", values_to = "mean")  
  
determinants_sds <- determinants %>%  
  mutate(across(everything(), as.numeric)) %>%  
  summarise_all(.funs = sd) %>%  
  pivot_longer(cols = everything(), names_to = "question", values_to = "sd")  
  
determinant_summary <- determinants_means %>%  
  inner_join(determinants_sds, by = "question") %>%  
  inner_join(category_df, by = "question")  
  
determinant_summary
```

```
## # A tibble: 23 x 4  
##   question mean sd category  
##   <chr> <dbl> <dbl> <fct>  
## 1 PE1 4 0.865 Performance Expectancy  
## 2 PE2 4.10 0.885 Performance Expectancy  
## 3 PE3 4.04 0.916 Performance Expectancy  
## 4 EE1 3.74 0.900 Effort Expectancy  
## 5 EE2 3.81 0.912 Effort Expectancy  
## 6 EE3 4.09 0.768 Effort Expectancy  
## 7 AUT1 3.93 0.817 Attitude toward using technology  
## 8 AUT2 3.83 0.881 Attitude toward using technology  
## 9 AUT3 3.69 0.893 Attitude toward using technology  
## 10 AUT4 3.92 0.822 Attitude toward using technology  
## # i 13 more rows
```

## COMBINE MEANS AND STANDARD DEVIATIONS BY CATEGORY

```
determinant_mean_by_category <- aggregate(mean ~ category, determinant_summary, mean)
determinant_sd_by_category <- aggregate(sd ~ category, determinant_summary, sd)
```

```
determinant_summary_by_category <- determinant_mean_by_category %>%
  inner_join(determinant_sd_by_category, by= "category")
```

```
determinant_summary_by_category
```

```
##              category      mean      sd
## 1      Performance Expectancy 4.046296 0.02601724
## 2              Effort Expectancy 3.879630 0.07998948
## 3 Attitude toward using technology 3.840278 0.03931236
## 4              Social influence 3.791667 0.02051421
## 5      Facilitating Conditions 3.775463 0.05203399
## 6              Self-Efficacy 3.728395 0.09371743
## 7              Anxiety 3.643519 0.03124287
```

```
write.csv(determinant_summary_by_category, "determinantMeanSd.csv")
```

## PLOTTING DETERMINANTS

```
determinant_mean_sd <- read_csv("Suero_Huervana_Ahumada/CSV FILES/determinantMeanSd.csv")
```

```
## New names:
## Rows: 7 Columns: 4
## -- Column specification
## ----- Delimiter: "," chr
## (1): category dbl (3): ...1, mean, sd
## i Use `spec()` to retrieve the full column specification for this data. i
## Specify the column types or set `show_col_types = FALSE` to quiet this message.
## * `` -> `...1`
```

```
# Define custom colors
```

```
my_colors <- c("Performance Expectancy" = "#FF6F61",
              "Effort Expectancy" = "#6B5B95",
              "Attitude toward using technology" = "#88B04B",
              "Social influence" = "#F7CAC9",
              "Facilitating Conditions" = "#92A8D1",
              "Self-Efficacy" = "#955251",
              "Anxiety" = "#FFA600")
```

```
# Plotting
```

```
determinant_plot <- ggplot(determinant_mean_sd, aes(x = category, y = mean, fill = category)) +
  geom_bar(stat = 'identity', color = "black") +
  geom_errorbar(aes(ymin = mean - sd, ymax = mean + sd), width = 0.4, position = position_dodge(0.9)) +
  labs(title = "Mean with Standard Deviation",
       x = "Category",
       y = "Mean") +
  theme(plot.title = element_text(hjust = 0.5),
        axis.text.x = element_text(angle = 45, hjust = 1),
        legend.position = "none") + # Remove legend
  scale_fill_manual(values = my_colors) # Apply custom colors
```

```
#ggsave("determinant_mean_sd.png", plot = determinant_plot, width = 10, height = 6, dpi = 300)
```

determinant\_plot

