

Mandat dunin

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Préface

Bienvenue dans le projet “Mandat dunin”. Ce document présente l’ensemble du travail réalisé pour analyser les données, créer une architecture de données robuste, et développer une application finale.

Présentation du projet

Ce projet vise à mettre en place une solution d’analyse automatisée des données de vente afin d’identifier les tendances clés et les opportunités d’amélioration de la performance commerciale..

Structure du document

Ce document est organisé en plusieurs parties:

1. **Contexte et projet:** Présentation du contexte, des objectifs et de la méthodologie.
2. **Collecte et Analyse exploratoire (EDA)** des données :Statistiques descriptives, visualisations et analyse des relations entre les variables.
3. **Analyse avancées:** Techniques d’analyse avancées appliquées aux données.
4. **Mise en oeuvre des tableaux de bords :** Présentation de l’application développée à partir des analyses.

Part I

Contexte et projet

1 Introduction

Ce document introduit le projet **Mandat Dunin**. Il s'agit d'un mandat d'analyse de données visant à extraire de la valeur à partir des données commerciales et opérationnelles d'une entreprise, en vue d'optimiser ses performances de ventes et marketing.

1.1 Objectifs du projet

Mettre en place une solution d'analyse automatisée des données de vente afin d'identifier les tendances clés et les opportunités d'amélioration de la performance commerciale.

1.2 Méthodologie

la méthodologie de gestion de projet choisie pour ce projet est le : scrum .

1.3 Équipe et parties prenantes

Datcha simon-pierre Beugré : Consultant

Marc André : Encadreur , product owner

1.4 Durée (6 semaines)

du 15 mars au 29 avril 2025

Part II

Analyse exploratoire (EDA)

2 Analyse exploratoire des données (EDA)

2.1 Introduction

Ce chapitre présente l'analyse exploratoire des données réalisée dans le cadre du projet. Il comprend des statistiques descriptives, des visualisations et une analyse des relations entre les variables.

2.2 Structure du chapitre

Ce chapitre est organisé en plusieurs sections:

1. **Collecte et Préparation des données**
2. **Analyse descriptive** : Analyse détaillée des commandes, contrats et kits , clients.
3. **Visualisations**: Représentations graphiques des données pour identifier les tendances et les patterns.

3 Collecte et Préparation des données

3.1 Sources et méthodes de collecte des données

Table 3.1: Vue d'ensemble des sources de données

Source	Type	Description	Methode_de_collecte	Volume	Fréquence
avivia database	Base de données SQL	Base de donnée transactionnel des activités de ventes	Via la plateforme Eve	8 Go	Temps réel

3.2 Nettoyage et prétraitement des données

connexion et vue d'ensemble de la base de données

```
library(DBI)
library(odbc)

conn <- dbConnect(odbc(), .connection_string = "Driver={ODBC Driver 18 for SQL Server};",
                    Server = "server-sql-dunin-eve.database.windows.net", Database = "AviviaEve_Copy",
                    UID = "accesAviviaData", PWD = "Citric&Private&Designed&Maturity1&Cloning")

# selectionner les noms des tables
print(DBI::dbListTables(conn,schema="dbo"))
```

```
[1] "CommEW"           "CommEWArch"      "CommHistoEW"     "CommLogEW"
[5] "ComposRepriseEW" "ContratEW"       "ContratHistoEW"  "ContratLogEW"
[9] "DeductionEW"     "eCommerceEW"    "EventEW"         "exportProjet"
[13] "ProjetEW"        "ProjetLogEW"     "SequenceEW"      "SessionEW"
[17] "SessionExtEW"    "Sessions"        "sysdiagrams"     "UsagerEW"
[21] "UsagerInfoEW"    "UsagerLogEW"     "UsagerParamRole"
```

les informations de la base de données sont principalement contenues dans trois tables principales : ProjetEW, CommEW et ContratEW.

```
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
```

```
#acces aux tables sans chargement en memoire
GetLazyDBAccess <- function(conn,tables){
  lazyDb <- lapply(tables, function(tbl_name) {
    tbl(conn, tbl_name) # Acceses each table from the connection
  })
  lazyDb
}

mainTables <- c("CommEW","ContratEW","ProjetEW")
AviviaDBData <- GetLazyDBAccess(conn,mainTables)
names(AviviaDBData) <- mainTables

print(AviviaDBData |> names())
```

```
[1] "CommEW"      "ContratEW"  "ProjetEW"
```

3.2.1 table commandes

```
AviviaDBData$CommEW |> glimpse()
```

Rows: ??

Columns: 37

Database: Microsoft SQL Server 12.00.0429[accesAviviaData@server-sql-dunin-eve/AviviaEve_Copy]

\$ Code	<chr> "C-000089", "C-000093", "C-000115", "C-000119", "C~
\$ Projet	<chr> "P-000175", "P-000181", "P-000219", "P-000223", "P~
\$ Archive	<int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ~
\$ Abandon	<int> 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, ~
\$ Emplacement	<chr> "Manufacturier", "Manufacturier", "Client", "Clien~
\$ Statut	<chr> "Installation", "Installation", "Installation", "I~
\$ Createur	<chr> "dunintech", "glebel", "clientweb", "clientweb", "~
\$ Editeur	<chr> "", "", "", "", "", "", "", "", "", "", "", "", "", ""~
\$ DocumXML	<chr> "<xmlDunin version='1.00'><obj clas='Comm'><prop n~
\$ EveXML	<chr> "<xmlDunin version='1.00'><obj clas='Ingenierie'><~
\$ ERPXML	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ FlagERP	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ DocumRef	<chr> "", "", "", "", "", "", "", "", "", "", "", "", "", ""~
\$ Avis	<int> 0, 0, 1, 1, 1, 0, NA, 0, 1, 1, 1, NA, 0, 0, 1, 0, ~
\$ RequisMatXML	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ EstimeNestingXML	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ RequisNestingXML	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ CtrlNesting	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ FicCNCSauve	<int> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ EtapeTransfertERP	<int> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ Proprietaire	<chr> "dunintech", "glebel", "clientweb", "clientweb", "~
\$ BomXML	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ DateCreation	<dtm> 2023-08-30 14:48:34, 2023-08-31 13:11:14, 2023-09~
\$ LienERP	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ EtiquettesHTML	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ AdresseCourrielComm	<chr> "{\\"infos\\":[{\\"etape\\":\\"Saisie\\",\\"email_From\\":~
\$ TypeProcess	<chr> "interne", "interne", "externe", "externe", "exter~
\$ bomJSON	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ export1	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ export2	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ export3	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ export4	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ export5	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ refExterne	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ timeStamp	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ ref1	<chr> "", "", "", "", "", "", "", "", "cuisine 2", "", "test~
\$ ref2	<chr> "", "", "", "", "", "", "", "", "", "", "", "", "", ""~

3.2.2 table contrat

```
AviviaDBData$ContratEW |> glimpse()
```

Rows: ??

Columns: 38

Database: Microsoft SQL Server 12.00.0429[accesAviviaData@server-sql-dunin-eve/AviviaEve_Cop]

```
$ Code      <chr> "P-001666-S1", "P-001471-S8", "P-000907-S1", "P-00~
$ Projet    <chr> "P-001666", "P-001471", "P-000907", "P-001681", "P~
$ Archive   <int> 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 0, ~
$ Abandon   <int> 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, ~
$ Emplacement <chr> "Manufacturier", "Manufacturier", "Manufacturier", ~
$ Statut    <chr> "Saisie", "Saisie", "Saisie", "Saisie", "Saisie", ~
$ Createur  <chr> "alaplant", "abreault", "abreault", "rbouchard@av~
$ Editeur   <chr> "", "", "", "", "", "", "", "", "", "", "", "", "", ""~
$ DocumXML  <chr> "<xmlDunin version='1.00'><obj clas='Contrat'><pro~
$ EveXML    <chr> "<xmlDunin version='1.00'><obj clas='Ingenierie'><~
$ ERPXML    <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ DocumRef  <chr> "", "", "", "", "", "", "", "", "", "", "", "", "", ""~
$ DernierJourValide <date> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ Avis      <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, ~
$ RequisMatXML <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ EstimeNestingXML <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ RequisNestingXML <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ CtrlNesting <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ FicCNCSauve <int> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ EtapeTransfertERP <int> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ Proprietaire <chr> "alaplant", "abreault", "abreault", "rbouchard@av~
$ BomXML    <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ DateCreation <dtm> 2025-01-09 21:23:06, 2025-01-13 15:13:06, 2025-02~
$ LienERP   <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ EtiquettesHTML <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ FlagERP   <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ AdresseCourrielComm <chr> "{\"infos\":{\"etape\":\"Saisie\",\"email_From\":~
$ TypeProcess <chr> "interne", "interne", "interne", "interne", "inter~
$ bomJSON   <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ export1   <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ export2   <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ export3   <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ export4   <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ export5   <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
```

```

$ refExterne      <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ timeStamp      <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ ref1           <chr> "Cuisine V1", "Plan cuisine (version 2)", "Cuisine~
$ ref2           <chr> "", "", "", "", "", "", "", "", "", "", "", "", "", ""~

```

3.2.3 table projet

```
AviviaDBData$ProjetEW |> glimpse()
```

```

Rows: ??
Columns: 7
Database: Microsoft SQL Server 12.00.0429[accesAviviaData@server-sql-dunin-eve/AviviaEve_Copy]
$ Code      <chr> "P-000001", "P-000002", "P-000004", "P-000006", "P-000011~
$ Client    <chr> "Avivia", "", "", "", "", "Avivia", "", "CRobitaille", "A~
$ Createur  <chr> "1", "1", "glebel", "glebel", "glebel", "1", "glebel", "c~
$ ProjetXML <chr> "<xmlDunin version='1.00'><obj clas='Projet'><prop nom='$~
$ Archive   <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, ~
$ DateCreation <dtm> 2022-07-21 12:33:39, 2022-10-12 18:18:16, 2022-10-12 20:~
$ Libre     <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, ~

```

Après une analyse des champs des différentes tables, nous avons choisi de nous concentrer sur ceux contenant des fichiers XML notamment : *DocumXML*, *EveXML* et *ProjetXML*. Ces derniers non seulement synthétisent les informations de chaque table, mais renferment également davantage de données pertinentes et intéressantes.

aperçu d'un fichier DocumXML

```
library(xml2)
```

```
AviviaDBData$CommEW |> head(1) |> pull(DocumXML) |> as_xml_document() |> print()
```

```

{xml_document}
<xmlDunin version="1.00">
[1] <obj clas="Comm">\n  <prop nom="$aNote" type="boolean"><![CDATA[false]]>< ...

```

3.3 Transformation et enrichissement des données

3.3.1 structure de fichier xml

exemple de la structure des fichiers xmls (ils ont ensemble fondamentalement la meme structure)

```
AviviaDBData$CommEW |> head(1) |> pull(DocumXML) |> as_xml_document() |> xml_structure()
```

```
<xmlDunin [version]>
  <obj [clas]>
    <prop [nom, type]>
      {cdata}
    <prop [nom, type]>
      {cdata}
    <prop [nom, type]>
      {cdata}
    <prop [nom, type]>
      {cdata}
    <prop [nom, type]>
      {cdata}
    <prop [nom, type]>
      {cdata}
    <prop [nom, type]>
      {cdata}
    <carac [nom, type]>
      {cdata}
    <prop [nom, type]>
      {cdata}
    <carac [nom, type]>
      {cdata}
    <prop [nom, type]>
      {cdata}
    <prop [nom, type]>
      {cdata}
    <prop [nom, type]>
      {cdata}
    <prop [nom, type]>
      {cdata}
    <prop [nom, type]>
      {cdata}
    <prop [nom, type]>
      {cdata}
  </obj>
</xmlDunin>
```

```
{cdata}>
<prop [nom, type]>
    {cdata}
<prop [nom, type]>
    {cdata}
<prop [nom, type]>
    {cdata}
<prop [nom, type]>
    {cdata}
<prop [nom, type]>
    {cdata}
<prop [nom, type]>
    {cdata}
<prop [nom, type]>
    {cdata}
<prop [nom, type]>
    {cdata}
<prop [nom, type]>
    {cdata}
<prop [nom, type]>
    {cdata}
<prop [nom, type]>
    {cdata}
<prop [nom, type]>
    {cdata}
<prop [nom, type]>
    {cdata}
<prop [nom, type]>
    <entr [no, type]>
        <obj [clas]>
            <prop [nom, type]>
                {cdata}
            <prop [nom, type]>
                {cdata}
            <prop [nom, type]>
                {cdata}
            <prop [nom, type]>
                {cdata}
            <prop [nom, type]>
                {cdata}
        <prop [nom, type]>
            {cdata}
    <prop [nom, type]>
        {cdata}
    <prop [nom, type]>
        {cdata}
    <prop [nom, type]>
        {cdata}
```

```

<prop [nom, type]>
  {cdata}
<prop [nom, type]>
<prop [nom, type]>
  {cdata}
<prop [nom, type]>
  {cdata}
<prop [nom, type]>
  {cdata}
<prop [nom, type]>
  <entr [no, type]>
    <obj [clas]>
      <prop [nom, type]>
        {cdata}
      <prop [nom, type]>
        {cdata}
      <prop [nom, type]>
        {cdata}
      <prop [nom, type]>
        {cdata}
      <prop [nom, type]>
        {cdata}
      <prop [nom, type]>
        {cdata}
    <entr [no, type]>
      <obj [clas]>
        <prop [nom, type]>
          {cdata}
        <prop [nom, type]>
          {cdata}
        <prop [nom, type]>
          {cdata}
        <prop [nom, type]>
          {cdata}
      <entr [no, type]>
        <obj [clas]>
          <prop [nom, type]>
            {cdata}
          <prop [nom, type]>
            {cdata}
          <prop [nom, type]>
            {cdata}
          <prop [nom, type]>

```



```
{cdata}
<entr [no, type]>
    <obj [clas]>
        <prop [nom, type]>
            {cdata}
        <prop [nom, type]>
            {cdata}
        <prop [nom, type]>
            {cdata}
        <prop [nom, type]>
            {cdata}
</prop [nom, type]>
{cdata}
<prop [nom, type]>
{cdata}
<prop [nom, type]>
{cdata}
<prop [nom, type]>
{cdata}
<prop [nom, type]>
{cdata}
<prop [nom, type]>
{cdata}
<prop [nom, type]>
{cdata}
<prop [nom, type]>
{cdata}
<prop [nom, type]>
{cdata}
<prop [nom, type]>
{cdata}
<prop [nom, type]>
{cdata}
<prop [nom, type]>
{cdata}
<carac [nom, type]>
{cdata}
<prop [nom, type]>
{cdata}
<prop [nom, type]>
{cdata}
<notif [clas, ident, type]>
{cdata}
<prop [nom, type]>
{cdata}
```

[illegible]

[illegible]

```

<prop [nom, type]>
  {cdata}
<prop [nom, type]>
  {cdata}
<prop [nom, type]>
  {cdata}
<prop [nom, type]>
  {cdata}
<prop [nom, type]>
  {cdata}
<prop [nom, type]>
  {cdata}
<prop [nom, type]>
  {cdata}
<prop [nom, type]>
  {cdata}
<prop [nom, type]>
  {cdata}
<prop [nom, type]>
  {cdata}
<prop [nom, type]>
  {cdata}

```

3.3.2 extractions des information et tables potentielles des différents fichiers xmls

3.3.2.1 fichiers DocumXML et EveXML de la table CommEW (commandes)

```

load("C:/Users/datch/Desktop/aviviaMandatDoc/data/commandes.RData")
#
commandes |> names()

```

[1] "CabBase"	"CabBFiller"	"CabBFillerAuto"
[4] "CabTable"	"CabTall"	"CabTFillerAuto"
[7] "CabVanity"	"CabWall"	"CabWFiller"
[10] "CabWFillerAuto"	"CadreConfig"	"Comm"
[13] "Commentaire"	"Comptoir"	"Cooking"
[16] "DessousBT"	"DessousHotte"	"DessousWall"
[19] "Dessus"	"Disclaimer"	"Dishwashers"
[22] "DoorAPart"	"DoorConfig"	"DoorConfigAluVitre"
[25] "DoorConfigVitre"	"DoorLayout"	"Dos"

[28]	"Etape"	"FillerTrav"	"FourConfig"
[31]	"Ingenierie"	"Kit"	"LayoutComptoir"
[34]	"Lumiere"	"Molding"	"MoldingAssemble"
[37]	"MoulLum"	"MoulLumGroupeAchat"	"MoulPied"
[40]	"MoulPiedGroupeAchat"	"MoulTete"	"MoulTeteGroupeAchat"
[43]	"NicheVinConfig"	"NotifUser"	"PanBoxPlein"
[46]	"PanBoxRect"	"PanDeco"	"PanelAPart"
[49]	"PanelAuto"	"PanelCompos"	"PanelCote"
[52]	"PanelDos"	"PanelFillerAuto"	"PanelWall"
[55]	"PanelWallSous"	"PullOutConfig"	"Rangement2"
[58]	"Refrigeration"	"RollOutConfig"	"SommaireKit"
[61]	"TabletteConfig"	"TiroirConfig"	"TiroirConfigPIPN"
[64]	"Various"	"Ventilation"	"WoodTop"
[67]	"ZoneFaceApp"	"ZoneFaceAvant"	"ZoneFaceCote"
[70]	"ZoneFaceDessous"	"ZoneFaceDessus"	"ZoneFaceDos"
[73]	"ZoneFaceInt"	"ZoneSection"	

3.3.2.2 fichiers DocumXML et EveXML de la table ContratEW (contrats)

```
load("C:/Users/datch/Desktop/aviviaMandatDoc/data/contrats.RData")
#
contrats |> names()
```

[1]	"CabBase"	"CabBFiller"	"CabBFillerAuto"
[4]	"CabTable"	"CabTall"	"CabTFiller"
[7]	"CabTFillerAuto"	"CabVanity"	"CabWall"
[10]	"CabWFiller"	"CabWFillerAuto"	"CadreConfig"
[13]	"Commentaire"	"ComposCustom"	"Comptoir"
[16]	"Contrat"	"Cooking"	"DessousBT"
[19]	"DessousHotte"	"DessousWall"	"Dessus"
[22]	"Disclaimer"	"Dishwashers"	"DivisionConfig"
[25]	"DoorAPart"	"DoorConfig"	"DoorConfigAluVitre"
[28]	"DoorConfigVitre"	"DoorLayout"	"Dos"
[31]	"Etape"	"FillerTrav"	"FillerTravSimple"
[34]	"FourConfig"	"Ingenierie"	"Kit"
[37]	"LayoutComptoir"	"Lumiere"	"MoldingAssemble"
[40]	"MoulLumGroupeAchat"	"MoulPied"	"MoulPiedGroupeAchat"
[43]	"MoulTete"	"MoulTeteGroupeAchat"	"NicheVinConfig"
[46]	"NotifUser"	"PanBoxPlein"	"PanBoxRect"
[49]	"PanBoxTrav"	"PanDeco"	"PanelAPart"

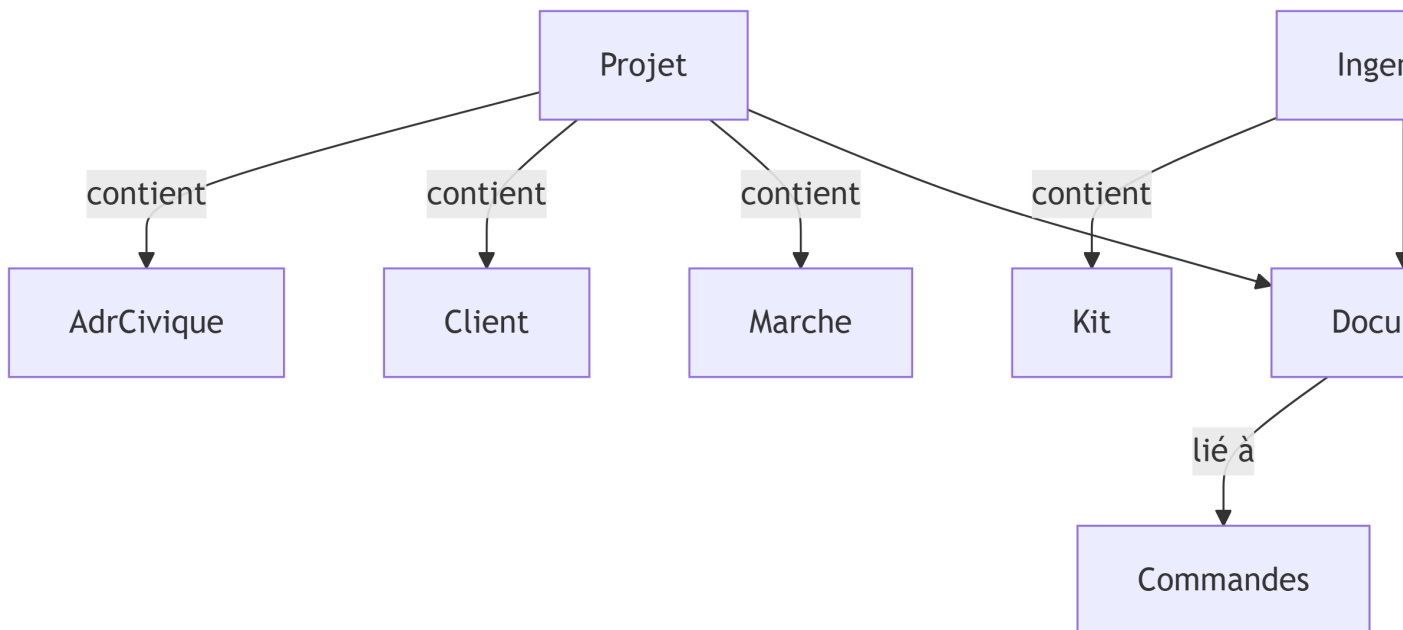
[52]	"PanelAuto"	"PanelCompos"	"PanelCote"
[55]	"PanelDos"	"PanelFillerAuto"	"PanelWall"
[58]	"PanelWallSous"	"PullOutConfig"	"Rangement2"
[61]	"Refrigeration"	"RollOutConfig"	"SommaireKit"
[64]	"TabletteConfig"	"TiroirConfig"	"TiroirConfigPIPN"
[67]	"Various"	"WasherDryers"	"WoodTop"
[70]	"ZoneFaceApp"	"ZoneFaceAvant"	"ZoneFaceCote"
[73]	"ZoneFaceDessous"	"ZoneFaceDessus"	"ZoneFaceDos"
[76]	"ZoneFaceInt"	"ZoneSection"	

3.3.2.3 fichiers ProjetXML de la table ProjetEw (projets)

```
load("C:/Users/datch/Desktop/aviviaMandatDoc/data/projets.RData")
#
projets |> names()
```

[1]	"AdrCivique"	"AdrCourriel"	"Client"	"Commentaire"
[5]	"CoordonneesJS"	"Marche"	"Projet"	"Telephone"

3.3.3 diagrammes de sélection des entités pour l'analyse



4 Analyse descriptive

4.1 Introduction

Cette section présente les statistiques descriptives des différentes entités analysées dans le projet: projet , ingenerie , documents.

4.2 Méthodologie

Statitstique descriptive univariée , bivariée et multivariée .

4.3 Structure de cette section

Cette section est divisée en plusieurs sous-sections, chacune se concentrant sur une entité spécifique:

1. **documents (commandes , contrats)** : Analyse des commandes et contrats, volumes, tendances temporelles, etc.
2. **Projet(Clients, AdresseCivique, Marche)** : Analyse des clients, segmentation, comportements, etc.
3. **Ingenerie(Kit)** : Analyse des kits, compositions, popularité, etc.
4. **Synthèse**: Vue d'ensemble et synthèse des statistiques descriptives.

5 Analyse des documents (commandes)

Ce chapitre présente une analyse descriptive des commandes.

5.1 Vue d'ensemble des commandes et préparations des données

5.1.1 Résumé de la table

```
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(purrr)
load("C:/Users/datch/Desktop/aviviaMandatDoc/data/commandes.RData")
```

```
TableCommande <- commandes$Comm
```

```
TableCommande <- TableCommande |> select_if(~!all(is.na(.))) |> # supprimer les colonnes tota
  rename_with(~ gsub("[^A-Za-z0-9]", "", .)) |> #supprime les caractères spéciaux
  rename_with(~tolower(.)) #convertir les colonnes en format minuscules
```

```
TableCommande |> glimpse () # afficher le résumé de la table
```


Rows: 714

Columns: 191

\$ anote	<chr> "false", "", "false", "false", "false", "~
\$ documsource	<chr> "false", "", "false", "false", "false", "~
\$ estcq	<chr> "false", "", "false", "false", "false", "~
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\$ estimport	<chr> "false", "", "false", "false", "false", "~
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\$ disclaimers	<chr> "", "", "", "", NA, "", "", "falsePriseMe~
\$ emplacementcre	<chr> "Interne", "Interne", "Externe", "Externe~
\$ enerreur	<chr> "false", "", "false", "false", "false", "~
\$ enpsd	<chr> "false", "", "false", "false", "false", "~
\$ etapes	<chr> "dunintech2023/08/30ManufacturierSaisie20~
\$ identcour	<chr> "0", "0", "0", "0", "0", "0", "0", "0", "~
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\$ promotions	<chr> "", "", "", "", "", "", "", NA, "", "", "~
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\$ typeprocess	<chr> "interne", "interne", "externe", "externe~

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\$ installation	<chr> "false", "", "false", "false", "false", "~
\$ prisemesure	<chr> "falsepriseDeMesure", "nullpriseDeMesure"~
\$ typeclient	<chr> "particulier", "particulier", "particulie~
\$ assemblage	<chr> "assemble", "assemble", "nonAssemble", NA~
\$ edgecolle	<chr> "pur", "pur", "pur", "pur", "pur", "pur",~
\$ gamme	<chr> "gamme_3", "gamme_2", "gamme_1", "gamme_3~
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\$ courrielcharge	<chr> "malavoie@dunin.com", NA, NA, NA, NA, NA,~
\$ createurcourriel	<chr> "malavoie@dunin.com", "glebel@avivia.ca",~
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\$ statutjobsite	<chr> "false", "", "false", "false", "false", "~
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\$ codetaxe2	<chr> "TVQ", "N/A", "TVQ", "TVQ", "TVQ", "TVQ",~
\$ fuelextra	<chr> "0", "", "0", "0", "0", "0", "0", "0", "0~
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\$ fraispsd	<chr> NA, "PSD_LIV", NA, NA, NA, NA, "PSD_LIV", ~
\$ montantecartprix	<chr> NA, "", NA, NA, NA, "0", "0", "0", NA, "0~
\$ soustotal2clientfinal	<chr> NA, "PSD", NA, NA, NA, NA, NA, NA, NA, NA~
\$ soustotalcomptoirdealer	<chr> NA, "PSD", NA, NA, NA, NA, NA, NA, NA, NA~
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\$ soustotalmoulureeff	<chr> NA, "11.86", NA, NA, NA, "17.29", "0", "0~
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\$ escsup	<chr> NA, NA, NA, NA, NA, "0", "0", "0", NA, "0~

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\$ totalcomptoirgraniteeff	<chr> NA, NA, NA, NA, NA, "0", "0", "0", NA, "0~
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\$ totalescautreeff	<chr> NA, NA, NA, NA, NA, "0", NA, NA, NA, "0",~
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\$ lumieres	<chr> NA, NA, NA, NA, NA, NA, NA, "PUCK79mm_WH3~
\$ ref1	<chr> NA, NA, NA, NA, NA, NA, NA, "cuisine 2tru~
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\$ cumulinstall	<chr> NA, NA, NA, NA, NA, NA, NA, "1199.77", NA~
\$ fraispedm	<chr> NA, NA, NA, NA, NA, NA, NA, "120", NA, NA~
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\$ totalesceff	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, "~
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\$ totaltx2cf	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
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\$ totalesccomptoirgraniteeff	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
\$ totalesccomptoirquartzeff	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
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\$ condition02	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
\$ condition03	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
\$ condition04	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~

```

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$ fraissav         <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ dateprisemesure  <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ emailplanifenvoi <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ dateprevexped    <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ totalcem         <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ specsportes      <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
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$ prenomclient     <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
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$ dateacompte2recep <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ totalescompte    <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ totalesccomptoirbois <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ totalesccomptoirgranite <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ totalesccomptoirquartz <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ totalesccomptoirstratifie <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ datelivraisoninstall <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~

```

5.1.2 selections des variables (colonnes pertinentes)

```

variables_utiles <- c(
  "nomclient", "codeclient2", "typeclient", "ciclient",
  "datecreation", "datevalidite", "datedebvalidite", "datereqexped", "dateprevexped", "datelivraison",
  "acompte1", "acompte2", "solde", "total", "totalht",
  "soustotal", "soustotalcab", "soustotalcomptoir", "soustotalservice", "totallivraison",
  "qteitems", "qteitemscab", "gamme", "gammedesc",
  "statutcred", "statutcjobsite", "validcred",
  "aveclivraison", "cleenmain", "prisemesure", "installation",
  "codepost", "emplacementcre", "division",
  "commentaires", "courrielclient", "nomcharge", "telephoneclient"
)

TableCommande <- TableCommande[,variables_utiles]

TableCommande |> glimpse()

```

Rows: 714

Columns: 39

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\$ codeclient2	<chr> "Avivia", NA, "Avivia", "Avivia", "Avivia", "Aviv~
\$ typeclient	<chr> "particulier", "particulier", "particulier", "par~
\$ ciclient	<chr> "0", NA, "0", "0", "0", "0", NA, NA, NA, "0", NA,~
\$ datecreation	<chr> "2023/08/30", "2023/08/31", "2023/09/14", "2023/0~
\$ datevalidite	<chr> "2023/11/28", NA, NA, NA, NA, "2024/03/04", NA, N~
\$ datedebvalidite	<chr> "2023-08-31true", NA, NA, NA, NA, "2023-12-06true~
\$ datereqexped	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, "~
\$ dateprevexped	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
\$ datelivraisoninstall	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
\$ acompte1	<chr> "305.7440%", "PSD40%", NA, NA, NA, "3322.8240%", ~
\$ acompte2	<chr> "420.3955%", "PSD55%", NA, NA, NA, "4568.8855%", ~
\$ solde	<chr> "764.35", "PSD", NA, NA, NA, "8307.06", "348.28",~
\$ total	<chr> "764.35", "PSD", NA, NA, NA, "8307.06", "348.28",~
\$ totalht	<chr> "664.8", "PSD", NA, NA, NA, "7225.1", "348.28", "~
\$ soustotal	<chr> "346.43", "330.66", "0", "0", "0", "1935.55", "34~
\$ soustotalcab	<chr> "341.02", "297.37", "0", "0", "0", "1519.91", "34~
\$ soustotalcomptoir	<chr> "0", "PSD", "0", "0", "0", NA, "0", "2701.76", "0~
\$ soustotalservice	<chr> NA, "PSD", NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
\$ totallivraison	<chr> "318.37", "PSD", NA, NA, NA, "289.55", "PSD", "28~
\$ totalinstall	<chr> NA, NA, NA, NA, NA, NA, NA, NA, "1499.77", NA, NA, NA~
\$ qteitems	<chr> "2", "4", "0", "0", "0", "10", "2", "26", "0", "8~
\$ qteitemscab	<chr> "1", "1", "0", "0", "0", "4", "1", "12", "0", "3~
\$ gamme	<chr> "gamme_3", "gamme_2", "gamme_1", "gamme_3", NA, "~
\$ gammedesc	<chr> NA, NA, NA, NA, NA, "gamme_desc_2true", "gamme_de~
\$ statutcred	<chr> "false", "", "false", "false", "false", "false", ~
\$ statutcjobsite	<chr> "false", "", "false", "false", "false", "false", ~
\$ validcred	<chr> "true", "true", "true", "true", "true", "true", "~
\$ aveclivraison	<chr> "true", "1", "1", "1", "1", "1", "1", "1", "true"~
\$ cleenmain	<chr> "false", "", "false", "false", "false", "false", ~
\$ prisemesure	<chr> "falsepriseDeMesure", "nullpriseDeMesure", "false~
\$ installation	<chr> "false", "", "false", "false", "false", "false", ~
\$ codepost	<chr> "GOA1LO", NA, "GOA1LO", "GOA1LO", "GOA1LO", "GOA1~
\$ emplacementcre	<chr> "Interne", "Interne", "Externe", "Externe", "Exte~
\$ division	<chr> "Division_1", "Division_1", "Division_1", "Divisi~
\$ commentaires	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
\$ courrielclient	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
\$ nomcharge	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
\$ telephoneclient	<chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~

5.1.3 Conversion des colonnes dans des types de variables appropriés

```
library(dplyr)
library(stringr)
library(lubridate)
```

Attaching package: 'lubridate'

The following objects are masked from 'package:base':

date, intersect, setdiff, union

```
TableCommande_cleaned <- TableCommande |>
  mutate(
    # Conversion des dates
    datecreation = ymd(datecreation),
    datevalidite = ymd(datevalidite),
    datedebvalidite = ymd(str_remove(datedebvalidite, "true")),
    datereqexped = ymd(datereqexped),
    dateprevexped = ymd(dateprevexped),
    datelivraisoninstall = ymd(datelivraisoninstall),

    # Garder les acomptes en double mais nettoyer leur format
    acompte1 = str_replace(acompte1, "%", ""), # Enlever le % s'il existe
    acompte1 = as.numeric(str_extract(acompte1, "[0-9.]+")), # Extraire la valeur numérique
    acompte2 = str_replace(acompte2, "%", ""), # Enlever le % s'il existe
    acompte2 = as.numeric(str_extract(acompte2, "[0-9.]+")), # Extraire la valeur numérique

    # Nettoyer la colonne prisemesure et convertir en booléen
    prisemesure = case_when(
      str_detect(prisemesure, "false") ~ FALSE,
      str_detect(prisemesure, "true") ~ TRUE,
      str_detect(prisemesure, "null") ~ NA,
      TRUE ~ NA
    ),

    # Conversion des autres colonnes numériques
    across(c(solde, total, totalht, soustotal, soustotalcab,
              soustotalcomptoir, totallivraison, totalinstall),
```

```

    ~ as.numeric(str_replace_all(., "[^0-9.-]", ""))),

# Conversion des booléens
across(c(statutcred, statutcjobsite, validcred, aveclivraison, cleenmain, installation),
  ~ case_when(
    . %in% c("true", "1") ~ TRUE,
    . %in% c("false", "", "0") ~ FALSE,
    TRUE ~ NA
  )),

# Conversion des autres types
across(c(qteitems, qteitemscab), as.integer),
across(c(nomclient, codeclient2, typeclient, gamme, gammedesc, emplacementcre, division)
)

```

Warning: There were 3 warnings in `mutate()`.

The first warning was:

i In argument: `datevalidite = ymd(datevalidite)`.

Caused by warning:

! 1 failed to parse.

i Run `dplyr::last_dplyr_warnings()` to see the 2 remaining warnings.

```
#
```

```
TableCommande_cleaned |> glimpse()
```

Rows: 714

Columns: 39

```

$ nomclient      <fct> Avivia, NA, Avivia, Avivia, Avivia, Avivia, NA, A~
$ codeclient2    <fct> Avivia, NA, Avivia, Avivia, Avivia, Avivia, NA, A~
$ typeclient     <fct> particulier, particulier, particulier, particulie~
$ ciclient       <chr> "0", NA, "0", "0", "0", "0", NA, NA, NA, "0", NA,~
$ datecreation   <date> 2023-08-30, 2023-08-31, 2023-09-14, 2023-09-14, ~
$ datevalidite   <date> 2023-11-28, NA, NA, NA, NA, 2024-03-04, NA, NA, ~
$ datedebvalidite <date> 2023-08-31, NA, NA, NA, NA, 2023-12-06, NA, NA, ~
$ datereqexped   <date> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, ~
$ dateprevexped   <date> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, ~
$ datelivraisoninstall <date> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, ~
$ acompte1       <dbl> 305.744, 40.000, NA, NA, NA, 3322.824, 139.314, 5~
$ acompte2       <dbl> 420.3955, 55.0000, NA, NA, NA, 4568.8855, 191.555~
$ solde          <dbl> 764.35, NA, NA, NA, NA, 8307.06, 348.28, 13918.37~

```



```

$ total <dbl> 764.35, NA, NA, NA, NA, 8307.06, 348.28, 13918.37~
$ totalht <dbl> 664.80, NA, NA, NA, NA, 7225.10, 348.28, 12105.56~
$ soustotal <dbl> 346.43, 330.66, 0.00, 0.00, 0.00, 1935.55, 348.28~
$ soustotalcab <dbl> 341.02, 297.37, 0.00, 0.00, 0.00, 1519.91, 342.25~
$ soustotalcomptoir <dbl> 0.00, NA, 0.00, 0.00, 0.00, NA, 0.00, 2701.76, 0.~
$ soustotalservice <chr> NA, "PSD", NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
$ totallivraison <dbl> 318.37, NA, NA, NA, NA, 289.55, NA, 289.55, NA, 3~
$ totalinstall <dbl> NA, NA, NA, NA, NA, NA, NA, 1499.77, NA, NA, NA, ~
$ qteitems <int> 2, 4, 0, 0, 0, 10, 2, 26, 0, 8, 0, 0, 6, 2, 0, 2, ~
$ qteitemscab <int> 1, 1, 0, 0, 0, 4, 1, 12, 0, 3, 0, 0, 2, 1, 0, 1, ~
$ gamme <fct> gamme_3, gamme_2, gamme_1, gamme_3, NA, gamme_2, ~
$ gammedesc <fct> NA, NA, NA, NA, NA, gamme_desc_2true, gamme_desc_~
$ statutcred <lgl> FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, ~
$ statutcjobsite <lgl> FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, ~
$ validcred <lgl> TRUE, TRUE, TRUE, TRUE, TRUE, TRUE, TRUE, TRUE, T~
$ aveclivraison <lgl> TRUE, TRUE, TRUE, TRUE, TRUE, TRUE, TRUE, TRUE, T~
$ cleenmain <lgl> FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, ~
$ prisemesure <lgl> FALSE, NA, FALSE, FALSE, FALSE, FALSE, FALSE, TRU~
$ installation <lgl> FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, ~
$ codepost <chr> "GOA1LO", NA, "GOA1LO", "GOA1LO", "GOA1LO", "GOA1~
$ emplacementcre <fct> Interne, Interne, Externe, Externe, Externe, Inte~
$ division <fct> Division_1, Division_1, Division_1, Division_1, D~
$ commentaires <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ courrielclient <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ nomcharge <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~
$ telephoneclient <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N~

```

5.1.4 Gestion des valeurs manquantes

```

library(questionr)

look_for(TableCommande_cleaned)

```

pos	variable	label	col_type	missing	values
1	nomclient	-	fct	190	Abeldesign ABrealt ACloutier ALaplante Avivia Base

					BCA Cuisine
					belinterieur
					ClientWeb
					CRobitaille
					DuninTest
					GroupeNova
					JBoucher
					LCAConstruktion
					LescuisinesJL
					MaximeLandryDrolet
					Menuiserie-els
					MLamontagne
					RBouchard
					relookingspray
					TSanderson
					Visiondici
2	codeclient2	-	fct	194	Abeldesign
					ABrealt
					ACloutier
					ALaplante
					Avivia
					Base
					BCACuisine
					belinterieur
					ClientWeb
					CRobitaille
					DuninTest
					GroupeNova
					JBoucher
					LCAConstruktion
					LescuisinesJL
					MaximeLandryDrolet
					Menuiserie-els
					MLamontagne
					RBouchard
					relookingspray
					TSanderson
					Visiondici
3	typeclient	-	fct	0	particulier
					particuliertrue
					promoteurtrue
					revendeurtrue
4	ciclient	-	chr	565	

5	datecreation	-	date	0	
6	datevalidite	-	date	540	
7	datedebvalidite	-	date	540	
8	datereqexped	-	date	574	
9	datepreveexped	-	date	705	
10	datelivraisoninstall	-	date	713	
11	acompte1	-	dbl	280	
12	acompte2	-	dbl	280	
13	solde	-	dbl	311	
14	total	-	dbl	187	
15	totalht	-	dbl	185	
16	soustotal	-	dbl	35	
17	soustotalcab	-	dbl	56	
18	soustotalcomptoir	-	dbl	288	
19	soustotalservice	-	chr	502	
20	totallivraison	-	dbl	489	
21	totalinstall	-	dbl	628	
22	qteitems	-	int	1	
23	qteitemscab	-	int	1	
24	gamme	-	fct	75	gamme_1 gamme_2 gamme_3
25	gammedesc	-	fct	195	gamme_desc_1true gamme_desc_2true
26	statutcred	-	lgl	194	
27	statutcjobsite	-	lgl	194	
28	validcred	-	lgl	0	
29	aveclivraison	-	lgl	76	
30	cleenmain	-	lgl	126	
31	prisemesure	-	lgl	127	
32	installation	-	lgl	64	
33	codepost	-	chr	369	
34	emplacementcre	-	fct	0	Externe Interne
35	division	-	fct	11	Division_1
36	commentaires	-	chr	688	
37	courrielclient	-	chr	711	
38	nomcharge	-	chr	693	
39	telephoneclient	-	chr	713	

5.2 Distribution des commandes par montant

[Analyse de la distribution des commandes par montant]

5.3 Évolution temporelle des commandes

[Analyse de l'évolution temporelle des commandes]

5.4 Commandes par canal

[Analyse de la répartition des commandes par canal]

5.5 Commandes par région

[Analyse de la répartition des commandes par région]

5.6 Taux de conversion

[Analyse des taux de conversion]

5.7 Synthèse de l'analyse des commandes

[Synthèse des principales observations et conclusions concernant les commandes]

Part III

Analyse avancée

6 Titre à remplir

7 À compléter

Contenu à rédiger ici.

Part IV

Application finale

8 Titre à remplir

9 À compléter

Contenu à rédiger ici.