IBM NALAIYA THIRAN PROJECT

Global Sales Data Analytics

A PROJECT REPORT

Submitted by

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TEAM ID: **PNT2022TMID02361**

1.INTRODUCTION

1.1 PROJECT OVERVIEW

Shopping online is currently the need of the hour. Because of the unfortunate pandemic, its not easy to walk into a store randomly and buy anything you want which drastically brought down sales. Using software which help to collect data and analyse the sales performance, we can spot the trends which will boost the store's business and provide better sales forecasts and goals for the organization.

1.2 PURPOSE

- Know fundamental concepts and can work on IBM Cognos Analytics.
- Gain a broad understanding of plotting different visualizations to provide a suitable solution.
- Able to create meaningful Visualizations and Dashboard(s).

2.LITERATURE SURVEY

2.1 EXISTING PROBLEM

- Unclear return and guarantee policies
- Lack of security on websites that don't implement stringent cyber security measures
- Additional charges apart from product charges
- Digital payment failures

2.2 REFERENCES

- *Manpreet Singh* and *Bhawick Ghutla* in their paper titled **"WALMART'S SALES DATA ANALYSIS - A BIG DATA ANALYTICS PERSPECTIVE", 2017**analysed the data sets of world's largest retailers, Walmart Store to determine the business drivers and predict which departments are affected by the different scenarios (such as temperature, fuel price and holidays) and their impact on sales at stores' of different locations.
- *Nikita Malik* in her paper titled **"SALES PREDICTION MODEL FOR BIG MART", 2018** analysed the case of Big Mart, a one-stop-shopping center, has been discussed to predict the sales of different types of items and for understanding the effects of different factors on the items' sales.
- *Amesanggeng, Riki* and*Ariadi Saputra* **"SALES ANALYSIS USING THE FORECASTING METHOD", 2019**came up with amethod used in the presentation of this scientific work by using a forecasting method which helps determine the approximate stock of goods to come.
- *Samuel Kuosa in his paper titled* "**ANALYSING AND IMPROVING THE SALES STRATEGY AND PROCESS", 2017**intended to identify and analyze the sales strategy and sales process of Robert Bosch Oy, which is a subsidiary of the multinational Robert Bosch GmbH. This thesis focuses on the mobility solutions business sector.

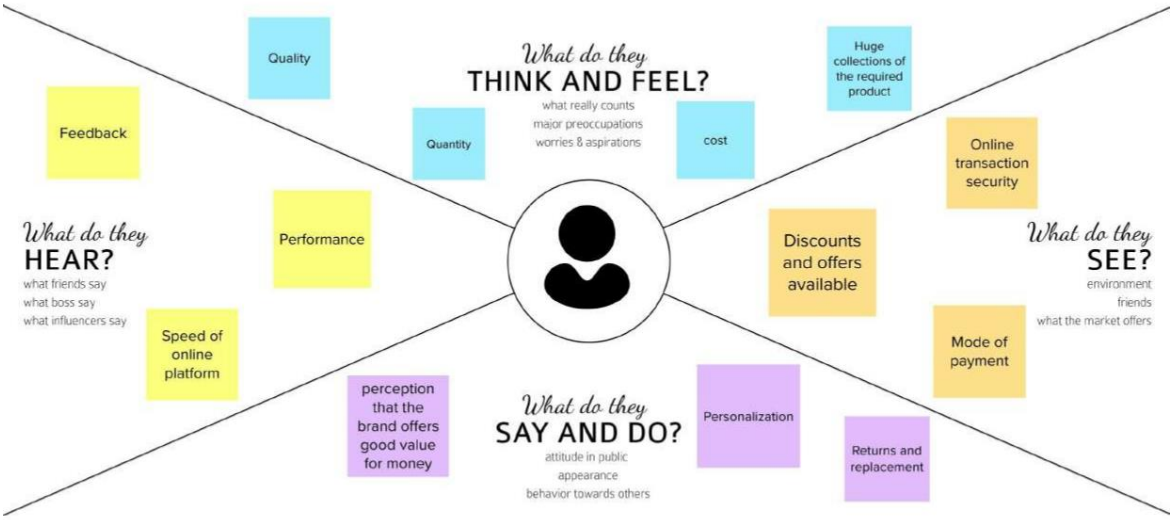
2.3 PROBLEM STATEMENT DEFINITION

Data that includes a large array of metrics is known as sales data, but broadly speaking, if you can measure something that relate to the salesprocess. Software such as IBM cognos, which help to collect the data and helps to analyse the performance. It is important to know to learn to read that data to understand that what means for business and where to improve. With right sales analysis tools and wealth of information, we can spot the current trends that will empower the organization to provide better sales forecasts and goals for the rest of the organization.

3.IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS

https://github.com/IBM-EPBL/IBM-Project-20526-1659724543/blob/e71347b2f045c3e7061e4a9f235a73a782fd739e/Project%20Design%20and%20Planning/Ideation%20Phase/empathy%20map.pdf



3.2 IDEATION & BRAINSTORMING

https://github.com/IBM-EPBL/IBM-Project-20526-1659724543/blob/main/Project%20Design%20and%20Planning/Ideation%20Phase/IDEATION%20(1).pdf

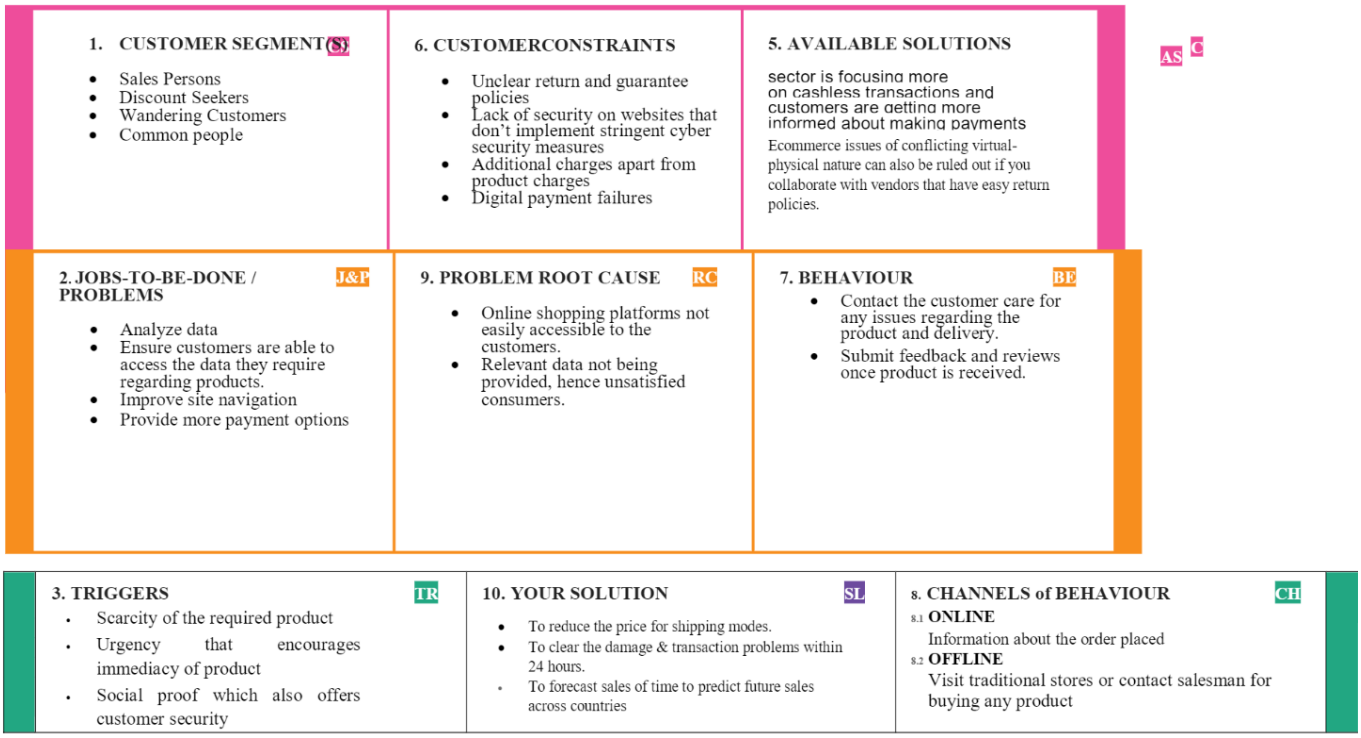
3.3 PROPOSED SOLUTION

- Using IBM Cognos , we can analyze the previous year sales data.By comparing the customer and product analysis, we can predict future sales forecasts.
- Focusing on the data will provide most valuable and important information that will be useful to predict the future sales pattern. Once you've incorporated sales data analysis into your pipeline, you can begin moving on to metrics that suit the more bespoke challenges you face.

3.4 PROBLEM SOLUTION FIT

- Sector is focusing more on cashless transactions and customers are getting more informed about making payments.
- Collaborating with vendors that have easy return policies.
- To reduce the price for shipping modes.
- To clear the damage & transaction problems within 24 hours.
- To forecast sales of time to predict future sales across countries.

Project Title: GLOBAL SALES DATA ANALYTICSProject Design Phase-I - Solution FitTeam ID:PNT2022TMI02361



4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

https://github.com/IBM-EPBL/IBM-Project-20526-1659724543/blob/main/Project%20Design%20and%20Planning/Project%20Design%20Phase%20II/Functional%20Requirement%20(1).pdf

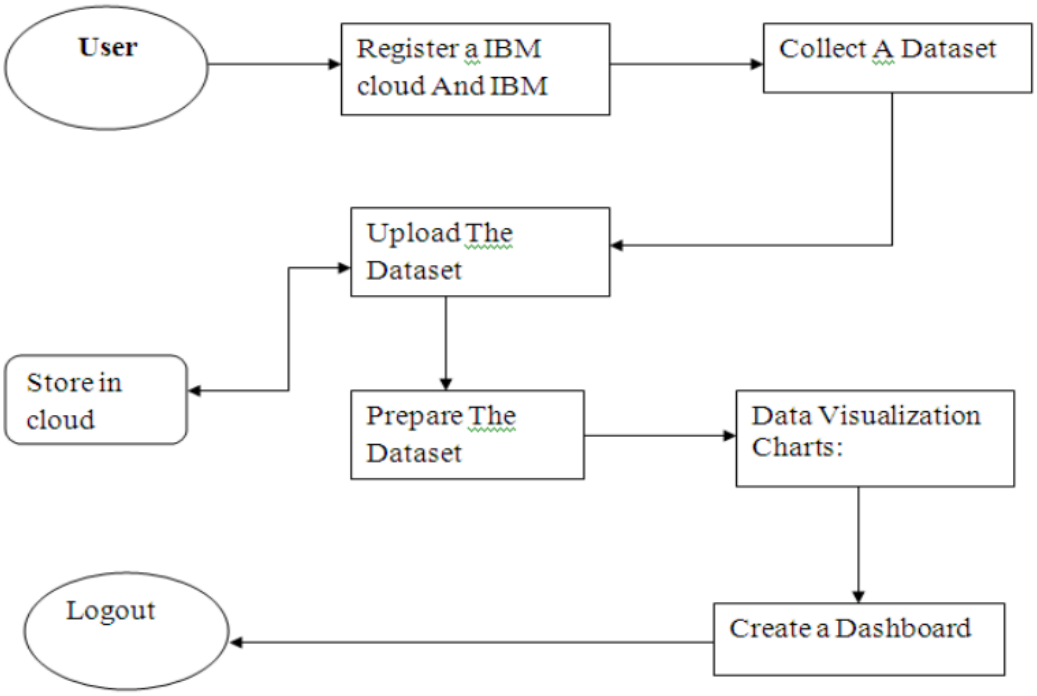
FRNo.	FunctionalRequirement(Epic)	Sub Requirement(Story/Sub-Task)
FR-1	**UserRegistration**	Registration through Gmail.Registration throughLinkedIN.
FR-2	**UserConfirmation**	Confirmation viaEmailConfirmationviaOTP
FR-3	**Dataset**	Dataset upload toCognosAnalyticsTool.
FR-4	**Visualize/Analyses.**	Toanalysesthedataset,dragand drop columns.
FR-5	**CreateDashboards**	CreateCharts,Graphs,Tables,etc.
FR-6	**LogOut**	When the Dashboardshavebeendownloaded,logout.

4.2 NON-FUNCTIONAL REQUIREMENTS

FRNo.	Non-FunctionalRequirement	Description
NFR-1	**Usability**	The dashboard can beaccessedby the user until theproper store sales dataset ispresent.
NFR-2	**Security**	TheDashboards/Templatesareaccessible to anyone withthe proper Log Incredentials.
NFR-3	**Reliability**	Templates aredependablebecause weupload and access themviathecloud
NFR-4	**Performance**	The user can easily drag toanymetricstheywantto view,andit worksasexpected.
NFR-5	**Availability**	Everyone who wants tolearnmore about sales datacan accessitforfree.
NFR-6	**Scalability**	The user can change themetrics at any time withdashboards/templatesbecausethey are veryscalable.

5. PROJECT DESIGN

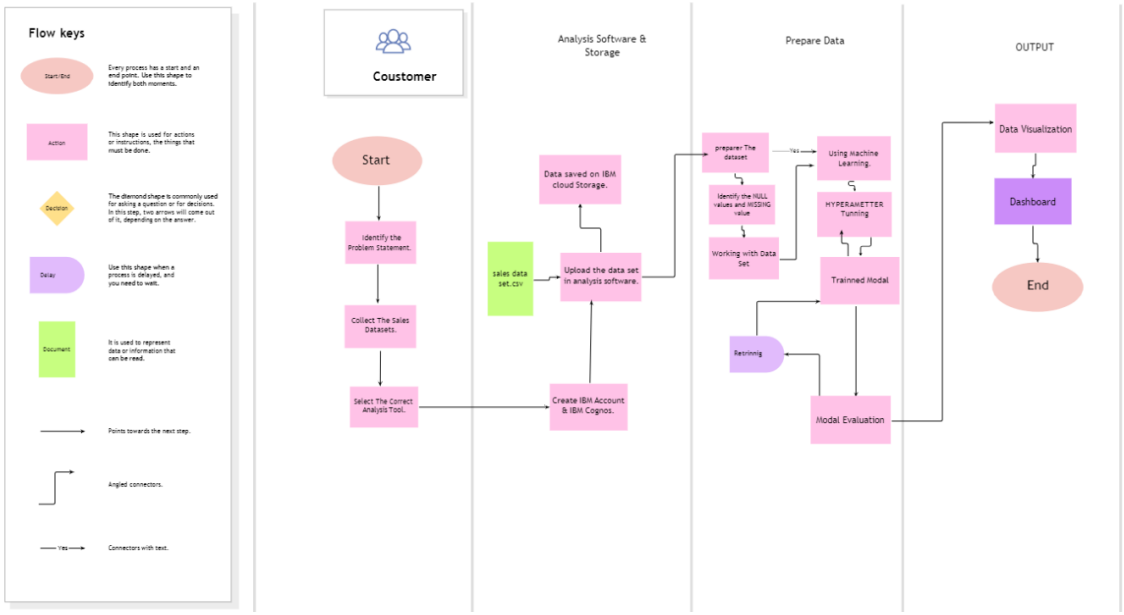
5.1 DATA FLOW DIAGRAMS



5.2 SOLUTION & TECHNICAL ARCHITECTURE

Global Sales Data Analytics

TEAM ID: PNT2022TMID02361



6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Lakshana Lavanya M S Mohita Sara Oommen P S Hariharan Harish G
		USN-2	I will receive confirmation email oncel registered for the application	1	Low	
		USN-3	I will log in to the desired application using my login credentials.	1	Medium	
Sprint-2	Pre processing	USN-4	As a user, I can do the data cleaning process.	2	High	Lakshana Lavanya M S Mohita Sara Oommen P S Hariharan Harish G
		USN-5	I can perform Extract, TransformLoad (ETL) process.	2	High	

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
	Dashboard	USN-7	As a user, I can analyse the data by performing calculations and executing several visualisation charts.	2	High	Lakshana Lavanya M S Mohita Sara Oommen P S Hariharan Harish G
		USN-8	I can gain insights of the data for business analysis.	2	High	
		USN-9	I can get the information for business analysis.	1	Medium	
Sprint-4	Report, Story andcustomer care	USN-10	As a user, I can generate report for the customer or sales analyst for knowing the insights about the sales.	2	Medium	Lakshana Lavanya M S Mohita Sara Oommen P S Hariharan Harish G
		USN-11	I can clear queries of customers fromthe analysis of the sales.	1	Medium	
		USN-12	I can modify report according to the information gathered after analysis.	1	Low	

6.2 Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date(Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date(Actual)
Sprint-1	4	6 Days	24 Oct 2022	29 Oct 2022	4	29 Oct 2022
Sprint-2	4	6 Days	31 Oct 2022	05 Nov 2022	2	05 Oct 2022
Sprint-3	6	6 Days	07 Nov 2022	12 Nov 2022	6	12 Oct 2022

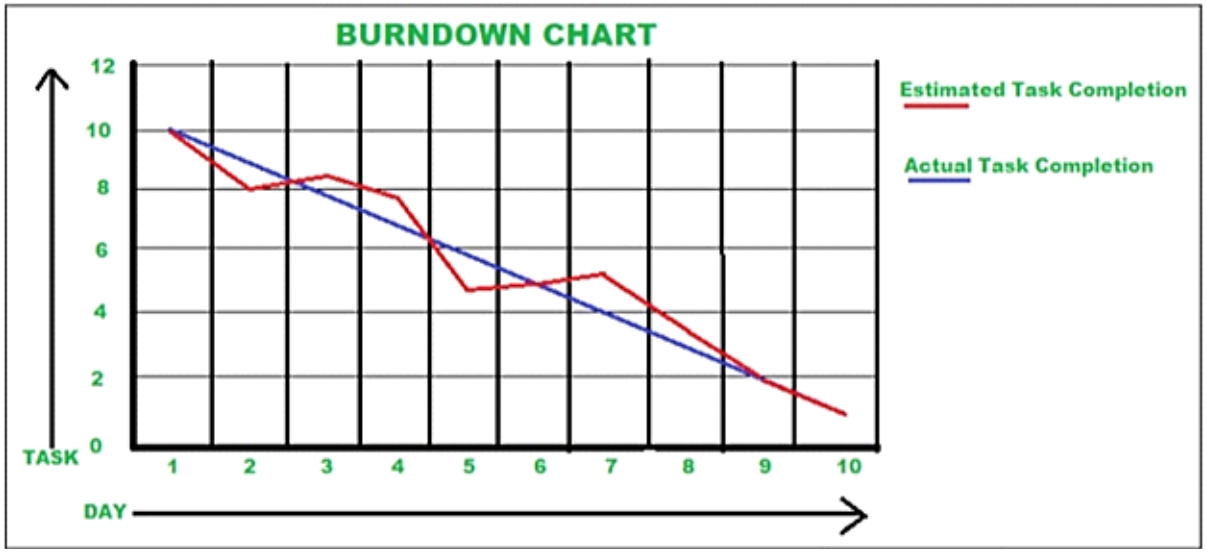
Velocity:

We have a 24-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

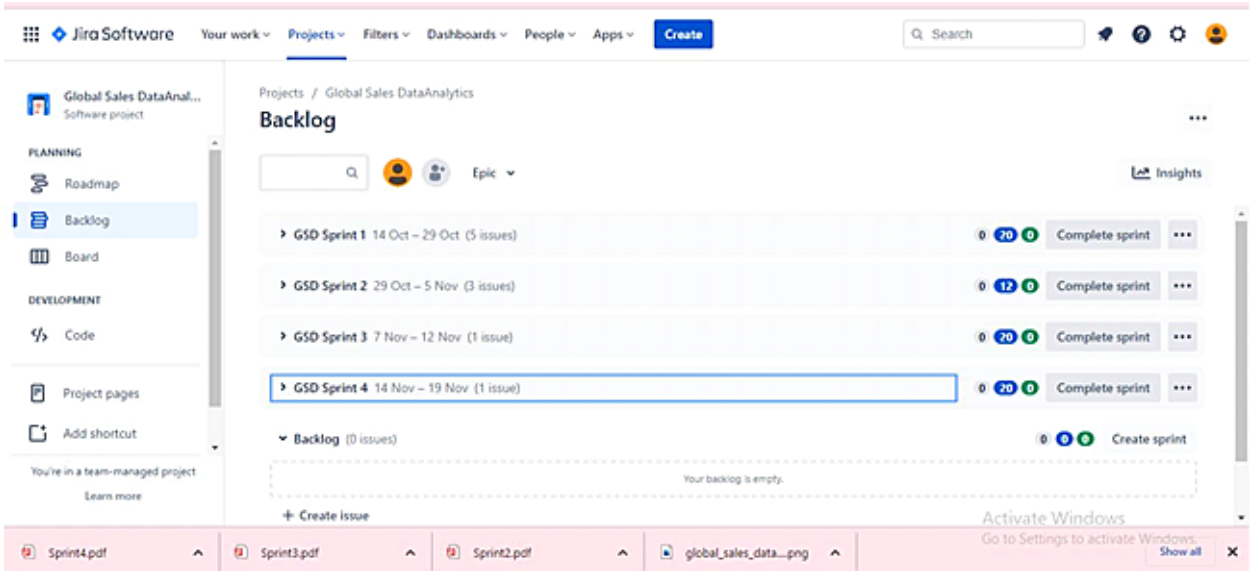
AV = Sprint Duration / Velocity = 20 / 10 = 2

BurndownChart :

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.



6.3 Reports from JIRA



Burndown Chart

7. CODING & SOLUTIONING

7.1 Feature 1

Sales – Analysis:

This is an analysis of the sales data with particular focus given to how promotions and advertising translate into sales, in terms of both units sold and sales dollars.

Different types of Sales Analysis

- Furniture company sales analysis HTML file
- Cereal Company Sales Analysis HTML file
- Financial Statement Analysis PDFfile

Analysis using R Shiny Dashboard

- Furniture company sales Dashboard R Shinyapp

Steps for Cereal Company Sales Analysis

1. Download the RawData
2. Analysis code Rfile
3. Final Analysis Rfile

Steps for Furniture company sales analysis

1. Download the RawData
2. Analysis code Rfile
3. Dashboard Code HTMLfile
4. Final Dashboard PDFfile
5. Final Analysis HTMLfile

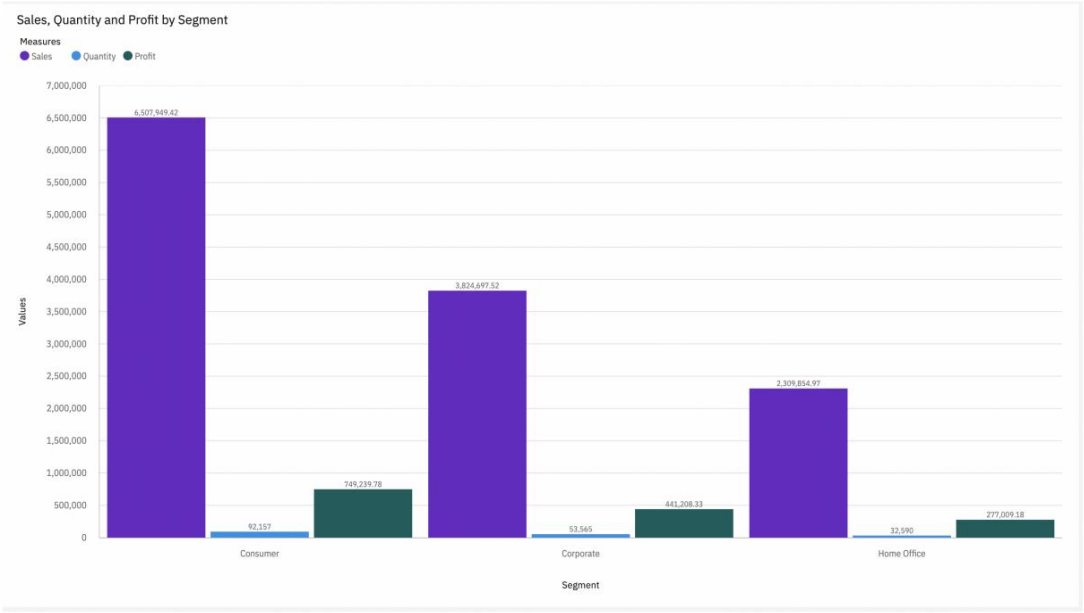
fearture-1:

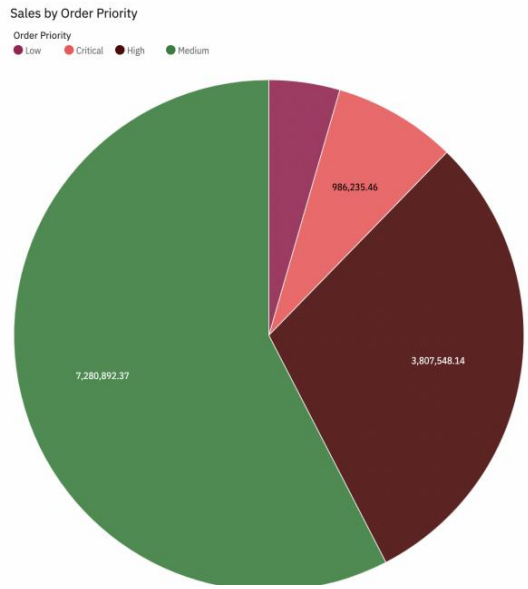
Step 1: Understand the Business

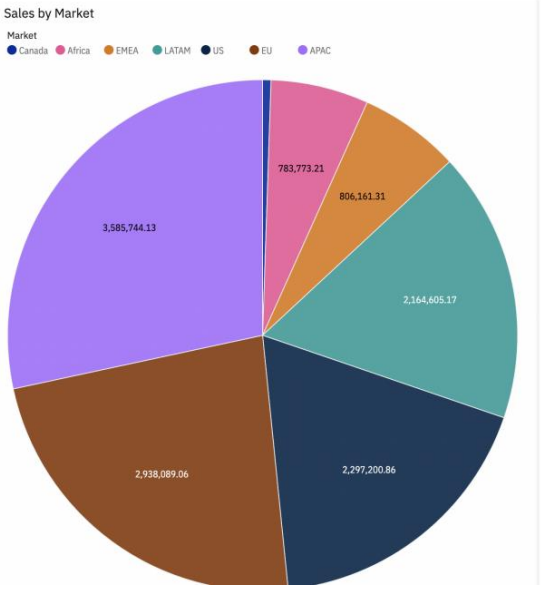
Step 2: Get Your Data

Step 3: Explore and Clean Your Data

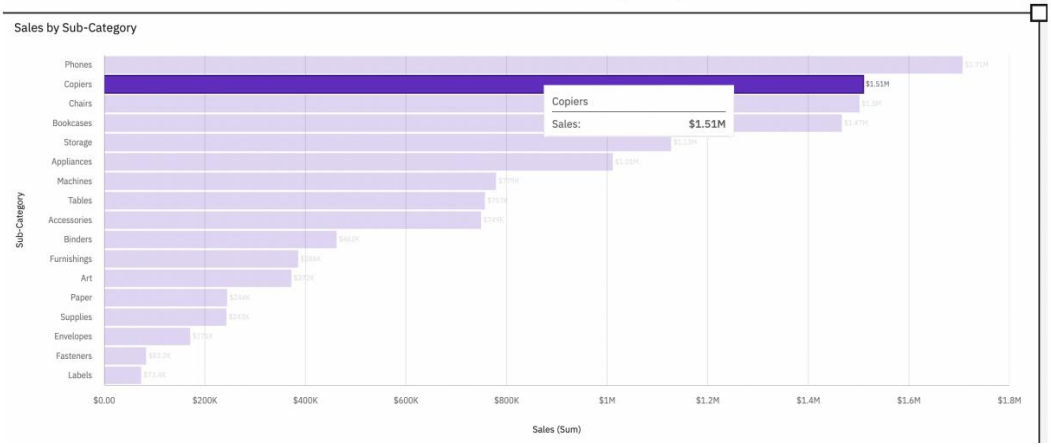
Step 4: Enrich Your Datasets







Sales	Profit	Quantity	Discount
$1.51M	$259K	7.45K	12%
Sales	Profit	Quantity	Discount



8. TESTING
8.1 Test Cases

st case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute
Page_TC_001	Functional	Home Page	Verify user is able to see the Login/ Signup popup when user clicked on My account button	Nil	1.Enter URL and click go 2.Click on My Account dropdow 3.Verify login/Singup popup dis or not
Page_TC_002	UI	Home Page	Verify the UI elements in Login/Signup popup	Nil	1.Enter URL and click go 2.Click on My Account dropdow 3.Verify login/Singup popup wit UI elements: a.email text box b.password text box c.Login button d.New customer? Create accou e.Last password? Recovery pas link
Page_TC_003	Functional	Home page	Verify user is able to log into application with Valid credentials	Nil	1.Enter URL(https://shopenzer.c and click go 2.Click on My Account dropdow 3.Enter Valid username/email i text box 4.Enter valid password in passv box 5.Click on login button
Page_TC_004	Functional	Login page	Verify user is able to log into application with InValid credentials	Nil	1.Enter URL(https://shopenzer.c and click go 2.Click on My Account dropdow 3.Enter InValid username/email text box 4.Enter valid password in passv box 5.Click on login button
Page_TC_004	Functional	Login page	Verify user is able to log into application with InValid credentials	Nil	1.Enter URL(https://shopenzer.c and click go 2.Click on My Account dropdow 3.Enter Valid username/email i text box 4.Enter Invalid password in pas text box 5.Click on login button
Page_TC_005	Functional	Login page	Verify user is able to log into application with InValid credentials	Nil	1.Enter URL(https://shopenzer.c and click go 2.Click on My Account dropdow 3.Enter InValid username/email text box 4.Enter Invalid password in pas text box 5.Click on login button

8.2 User Acceptance Testing

Copying and pasting screenshots of test results into Word or Excel is
very time-consuming and prone to human error. Optimize your UATtesting with automated documentation, workflow and defect management. The right tool will help you with exploratory testing and be able to document tests using a recorder for playback as needed, accelerating the processand
reducing the back-and-forth between the software development and testing teams.

9. RESULTS

9.1 Performance Metrics

The analysis covered the period from 2012 to 2015, with conversion to the Brazilian currency Real BRL (R$). Some results:

- The US was the country with the highestprofit.
- The country that presented the biggest loss in sales was Turkey.
- There was greater demand for Superstore products to be shipped via thestandard mode.
- The Technology Category presented better results in Profit andSales.
- The Retail segment performed better for all the yearsevaluated.

10. ADVANTAGES & DISADVANTAGES

4. ADVANTAGES

1. Cost efficiency
2. Receive full-scaleservices
3. Maximizepresentation
4. Savetime

DISADVANTAGES

1. Risk of choosing the wrongprovider
2. Lack of on-sitesupport
3. Lesscontrol
4. Datasecurity

11. CONCLUSION

By implementing this analytics solution, the company brought their competitive and sales data reporting in-house, cut costs and increased the accuracy of their reporting and analysis. As the company moves forward with this new solution, their sales reporting costs will most likely be reduced by 50 to 70%. They are now able to analyze raw data themselves, respond more quickly to changes in market trends and perform root cause analysis to determine those shifts in the market. By securing quicker access to their data with the new solution, the company was also able to reduce the risk associated with delayed responses to changes in their markets.With the new solution, the company can now process sales reports faster than the outsourced solution, reducing turnaround time between 50% to 60%. The reporting needs of the company have been streamlined, consolidating over 10reports into the centralized dashboard solution. The company's competitive analysis group is also able to more quickly respond to internal data requests given they have the ability to pull the information themselves. With this quicker response, the company is better able to react to changes in the market and predict opportunities for its sales force.The business also experienced an increase in the overall understanding of their sales data throughout the organization. Thecompany now has great flexibility in the presentation of their sales and competitive data, while also being able to integrate sales data with other key data points for the organization.

12. FUTURE SCOPE

Sales analytics refers to the use of technology to collect and use sales data to derive actionable insights. It is used to identify, optimize, and forecast sales. It uses different metrics and KPIs to plan an efficient sales model that generates higher revenue for the business.

13. APPENDIX

Source Code

```
from flask import Flask, render_template, request, redirect, url_for,session import ibm_db
import re


app = Flask(_name_)


hostname = '2f3279a5-73d1-4859-88f0-a6c3e6b4b907.c3n41cmd0nqnrk39u98g.databases.appdomain.cloud'
uid = 'hmf80902'
pwd = 'oHzpnV88erkd09'
driver = "{IBM DB2 ODBC DRIVER}"
db_name = 'bludb' port = '30756' protocol = 'TCPIP'
cert = "C:/Users/Prithiarun/Desktop/IBM/TEST/certi.crt" dsn = (
"DATABASE ={0};"
"HOSTNAME ={1};"
"PORT ={2};"
"UID ={3};" "SECURITY=SSL;" "PROTOCOL={4};"
"PWD ={6};"
).format(db_name, hostname, port, uid, protocol, cert, pwd)
```

```
connection = ibm_db.connect(dsn, "", "") print(dsn)
# query = "SELECT username FROM USER1 WHERE username=?" # stmt = ibm_db.prepare(connection, query)
# ibm_db.bind_param(stmt, 1, username) # ibm_db.execute(stmt)
# username = ibm_db.fetch_assoc(stmt) # print(username)
try:
conn = ibm_db.connect(dsn,"", "") print("connected to database")
except:
print("unable to connect") server =ibm_db.server_info(conn)
print("DBSNAME: ", server.DBMS_NAME) print("DBMS_VER: ", server.DBMS_VER)
print("DBNAME: ", server.DB_NAME)

app.secret_key = 'a'



@app.route('/', methods=['GET', 'POST']) @app.route('/register', methods=['GET', 'POST']) def register():
```

```
msg = " "
ifrequest.method == 'POST':
username = request.form['username'] email_id = request.form['email_id'] phone_no = request.form['phone_no'] password = request.form['password']
query = "SELECT * FROM USER1 WHERE username=?;" stmt = ibm_db.prepare(connection, query) ibm_db.bind_param(stmt, 1, username) ibm_db.execute(stmt)
account = ibm_db.fetch_assoc(stmt) if (account):

msg = "Account already exists!"
returnrender_template('register.html', msg=msg)
# elif not re.match(r'[^@]+@[^@]+\.[^@]+',email_id): # msg = "Invalid emailaddres"
# elif not re.match(r'[A-Za-z0-9+', username):
#         msg = "Name must contain only characters andnumbers" else:
query = "INSERT INTO USER1 values(?,?,?,?)"
stmt = ibm_db.prepare(connection, query) ibm_db.bind_param(stmt, 1, username)
```

ibm_db.bind_param(stmt, 2, email_id)
ibm_db.bind_param(stmt, 3, phone_no)
ibm_db.bind_param(stmt, 4, password) ibm_db.execute(stmt)
msg = 'You have successfully Logged In!!' return render_template('login.html', msg=msg)
else:

msg = 'PLEASE FILL OUT OF THE FORM'
returnrender_template('register.html', msg=msg)

@app.route('/login', methods=['GET', 'POST']) def login():
globaluseridmsg = ' '
ifrequest.method == "POST": username = request.form['username'] password = request.form['password']
query = "select * from user1 where username=? and password=?" stmt = ibm_db.prepare(connection, query) ibm_db.bind_param(stmt, 1, username)
ibm_db.bind_param(stmt, 2, password) ibm_db.execute(stmt)
account = ibm_db.fetch_assoc(stmt)

```
print(account) if account:
session['Loggedin'] = True session['id'] =account['USERNAME']
session['username'] = account['USERNAME'] msg = 'Logged in Successfully'
returnrender_template('welcome.html', msg=msg, username=str.upper(username))
else:
msg = 'Incorrect Username or Password' return render_template('login.html',msg=msg)
else:
msg = 'PLEASE FILL OUT OF THE FORM'
returnrender_template('login.html', msg=msg)



@app.route('/welcome', methods=['GET', 'POST']) def welcome():
ifrequest.method == 'POST':
username = request.form['username'] print(username)
returnrender_template('welcome.html', username=username) else:
returnrender_template('welcome.html', username=username)
```

```
if "main" == _name_: app.run()
```

HTML CODE

```
<html>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b><u>GLOBA
L SALES
ANALYSIS</u
></b></center>
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src="https://us3
.ca.analytics.ib
m.com/bi/?pers
pective=dashbo
ard&amp;amp;path
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rs%2FGlobal_S
uperstore2%2B
Dashboard&am
p;amp;closeWindow
OnLastView=tr
ue&amp;amp;ui_ap
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href="Ibm.html
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>GLOBAL
DATA  SALES
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ANALYTICS

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GitHub & Project Demo Link

https://github.com/IBM-EPBL/IBM-Project-20526-1659724543