

Tech Saksham

Case Study Report

Data Analytics with Power BI

“Analysis of Crypto currency Growth in last 5 year”

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ABSTRACT

Over the past five years, the cryptocurrency market has experienced remarkable growth and evolution, characterized by significant fluctuations in prices, adoption rates, and regulatory landscapes. This paper provides a comprehensive analysis of the key trends, drivers, and implications of cryptocurrency growth from 2019 to 2024. Utilizing a combination of quantitative data analysis and qualitative research, we examine the factors contributing to the surge in cryptocurrency popularity, including technological advancements, financial innovation, and shifting investor attitudes. We also explore the role of macroeconomic trends, regulatory developments, and geopolitical events in shaping the trajectory of the cryptocurrency market. Furthermore, we assess the impact of major cryptocurrency milestones, such as the rise of decentralized finance (DeFi), the emergence of non-fungible tokens (NFTs), and the integration of blockchain technology into mainstream industries. Through this analysis, we aim to provide valuable insights into the dynamics driving cryptocurrency growth and its implications for financial markets, technology adoption, and societal change.

INDEX

Sr. No.	Table of Contents	Page No.
1	Chapter 1: Introduction	4
2	Chapter 2: Services and Tools Required	6
3	Chapter 3: Project Architecture	7
4	Chapter 4: Modeling and Result	9
5	Conclusion	18
6	Future Scope	19
7	References	20
8	Links	21

CHAPTER 1

INTRODUCTION

1. Problem Statement

Technological Innovations and Development: Explore the technological innovations and developments within the cryptocurrency space over the past five years, including advancements in blockchain technology, smart contracts, interoperability solutions, and privacy protocols. Assess the impact of technological innovation on scalability, security, and usability of cryptocurrencies.

Market Sentiment and Sentiment Analysis: Conduct sentiment analysis to gauge market sentiment towards cryptocurrencies over the past five years, utilizing social media data, news sentiment indicators, and investor surveys. Identify correlations between market sentiment, price movements, and trading volumes.

2. Proposed Solution

1. Data Collection and Preparation: Gather comprehensive data on cryptocurrency prices, market capitalization, trading volumes, adoption rates, regulatory developments, technological advancements, and investor sentiment over the past five years. Clean and preprocess the data to ensure consistency and accuracy.

2. Time-Series Analysis of Price Trends: Utilize time-series analysis techniques to examine the trends in cryptocurrency prices over the past five years. Plot price charts, moving averages, and volatility indicators to identify patterns, trends, and significant price movements. Analyze the factors influencing price dynamics, such as market speculation, demand-supply dynamics, and external events.

3. Feature

- **Investment Behavior Analysis:** Investigate investment behavior in the cryptocurrency market over the past five years, including trends in investor demographics, investment strategies, portfolio allocations, and institutional participation.
- **Performance Benchmarking:** Benchmark cryptocurrency performance against traditional assets, indices, and other investment classes over the past five years to evaluate risk-adjusted returns, volatility, and correlation coefficients.

4. Advantages

- **Insight into Market Trends:** Analysis of cryptocurrency growth provides insights into market trends, including price movements, adoption rates, trading volumes, and market capitalization. Understanding these trends helps investors and stakeholders make informed decisions regarding investment strategies and risk management.
- **Risk Management:** Analysis of cryptocurrency growth allows investors to assess and manage risks associated with cryptocurrency investments. By understanding past market fluctuations, regulatory changes, and technological developments, investors can better anticipate and mitigate risks..

5. Scope

The scope of analysis of cryptocurrency growth over the past five years encompasses a comprehensive examination of various dimensions within the cryptocurrency ecosystem. This includes analyzing historical price trends, market capitalization dynamics, adoption and usage patterns, regulatory developments, technological innovations, investment behavior, market sentiment, risk assessment, performance benchmarking, and future outlook. By delving into these aspects, analysts seek to gain insights into the evolution and trajectory of cryptocurrencies, understand the factors driving growth and volatility, identify investment opportunities and risks, assess regulatory impacts, and anticipate future trends and developments. Such analysis aims to provide valuable insights for investors, businesses, policymakers, researchers, and enthusiasts to navigate the complex and rapidly evolving landscape of cryptocurrencies effectively.

CHAPTER 2

SERVICES AND TOOLS REQUIRED

2.1 Services Used

- **Data Analytics Platforms:** Utilizing data analytics platforms to gather, clean, preprocess, and analyze vast amounts of historical data on cryptocurrency prices, market capitalization, trading volumes, and other relevant metrics. These platforms may include specialized tools for data visualization, statistical analysis, and machine learning
- **Financial Modeling Software:** Leveraging financial modeling software to develop predictive models and forecast future cryptocurrency prices, market trends, and investment opportunities. These models may incorporate factors such as historical price data, market capitalization, trading volumes, and external variables

2.2 Tools and Software used

Tools:

- **PowerBI:** The main tool for this project is PowerBI, which will be used to create interactive dashboards for real-time data visualization.
- **Power Query:** This is a data connection technology that enables you to discover, connect, combine, and refine data across a wide variety of sources.

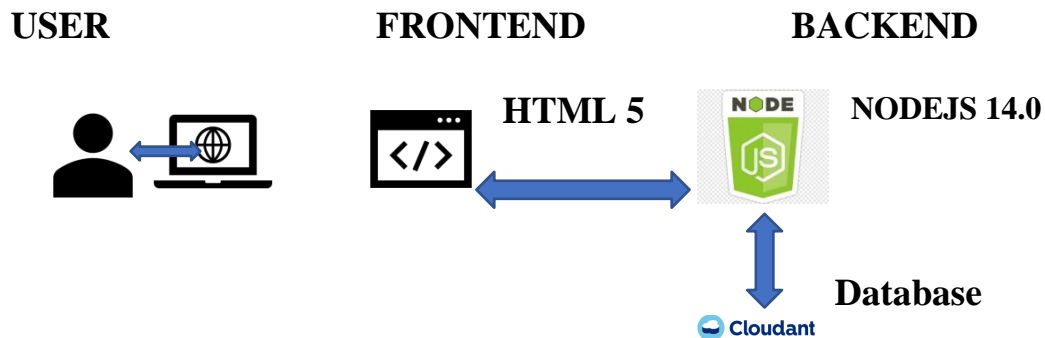
Software Requirements:

- **PowerBI Desktop:** This is a Windows application that you can use to create reports and publish them to PowerBI.
- **PowerBI Service:** This is an online SaaS (Software as a Service) service that you use to publish reports, create new dashboards, and share insights.
- **PowerBI Mobile:** This is a mobile application that you can use to access your reports and dashboards on the go.

CHAPTER 5

PROJECT ARCHITECTURE

3.1 Architecture



Here's a high-level architecture for the project:

- 1. Data Collection** : Gather historical data on cryptocurrency prices, market capitalization, trading volumes, and other relevant metrics from various sources such as cryptocurrency exchanges, financial APIs, and blockchain explorers.
- 2. Data Preprocessing** : Clean the collected data by handling missing values, outliers, and inconsistencies. Convert data types, adjust timestamps, and ensure data consistency across different sources. This step may involve data normalization, scaling, and transformation.
- 3. Exploratory Data Analysis (EDA)** : Perform exploratory data analysis to gain insights into the dataset's characteristics, distribution, and correlations. Visualize key metrics over time using charts, graphs, and heatmaps to identify trends, patterns, and anomalies.
- 4. Feature Engineering** : Engineer additional features from the raw data to capture, moving averages, percentage changes, and other derived metrics.
- 5. Model Development**: Develop predictive models to forecast cryptocurrency prices, market trends, and growth trajectories. Utilize machine learning algorithms such as linear regression, decision trees, random forests, or deep learning models like recurrent neural networks (RNNs) and long short-term memory networks (LSTMs).

CHAPTER 6

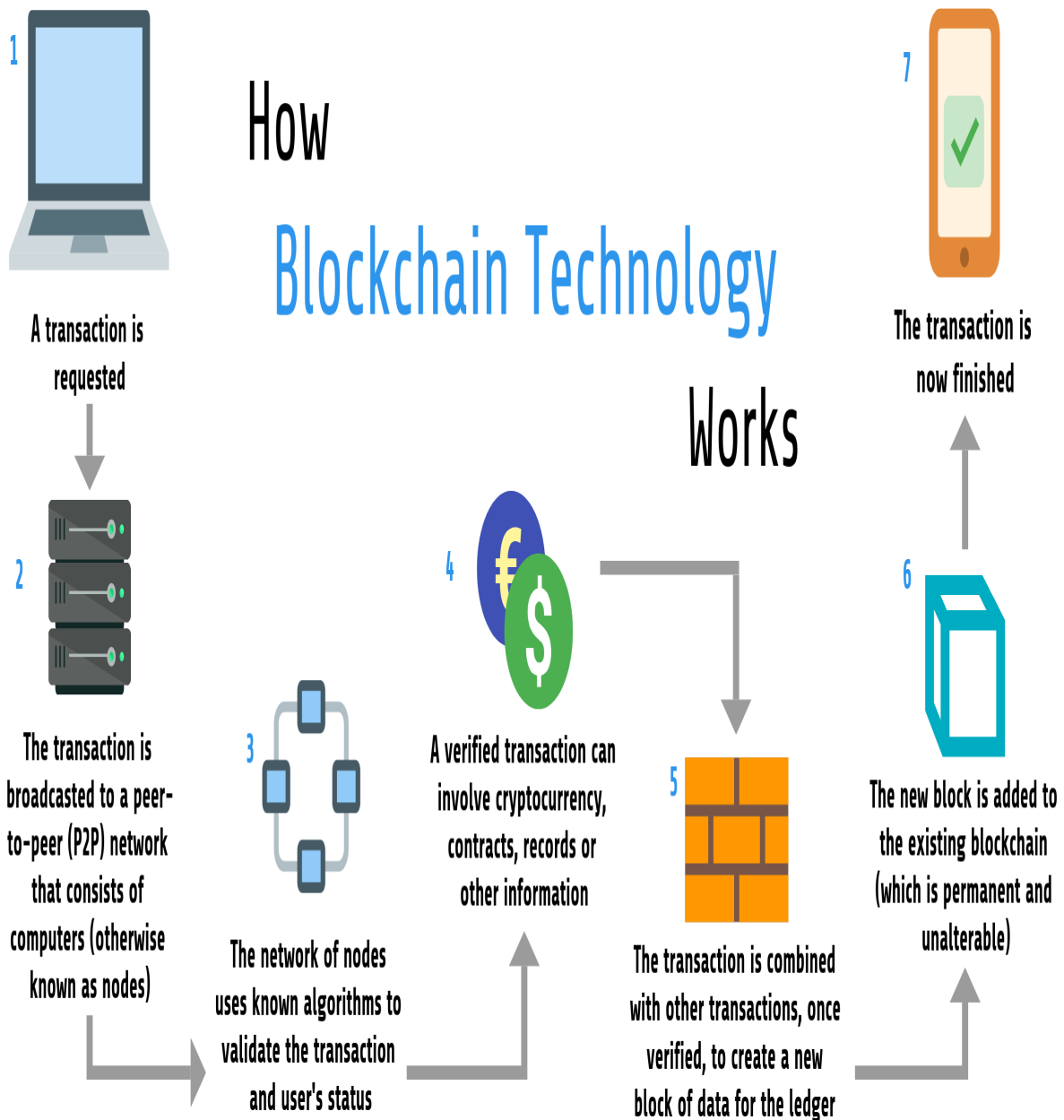
MODELING AND RESULT

Manage relationship



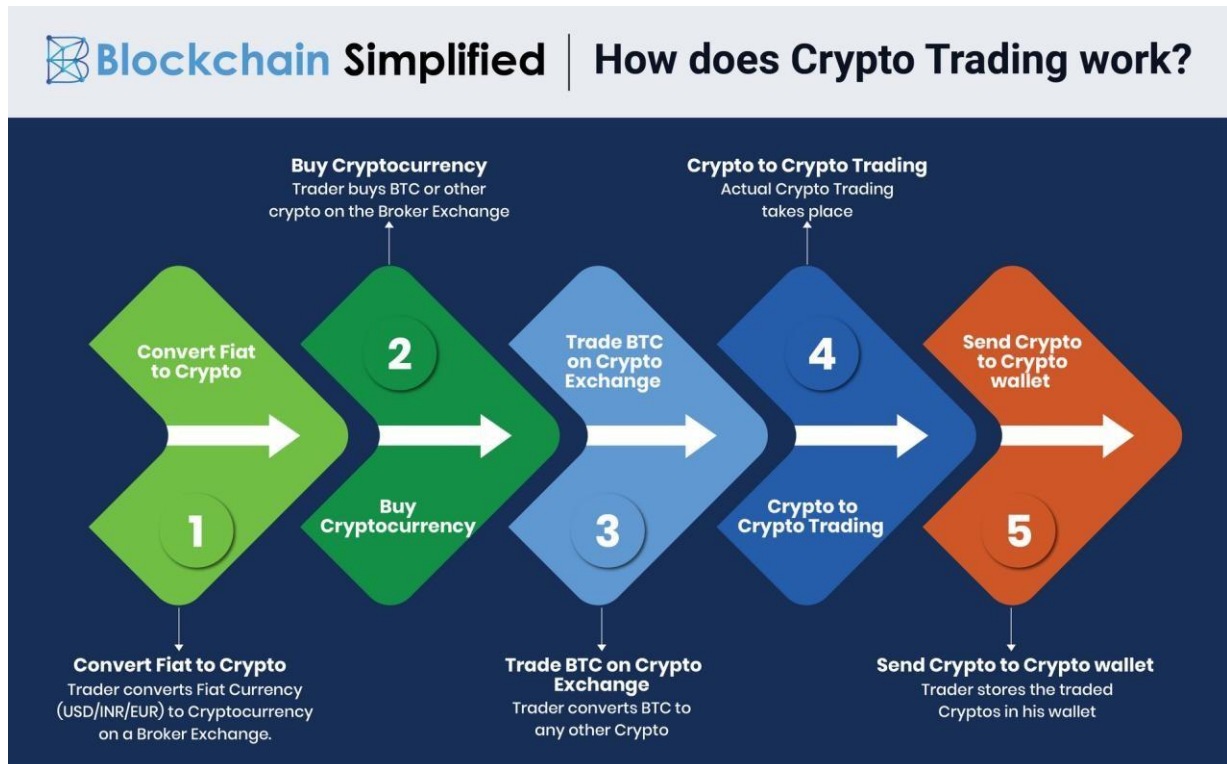
Table 1. Capitalization of top 10 crypto-currencies

	Name		Rate (USD)	Mkt cap (USD bn)	% Total CC mkt cap	Cumulated mkt cap
1	Bitcoin	BTC	55.253,4	1030	60.1%	60.1%
2	Ethereum	ETH	1.785,39	205.6	12.0%	72.1%
3	Cardano	ADA	1,236953	39.6	2.3%	74.4%
4	Binance Coin	BNB	253,84	39.3	2.3%	76.7%
5	Tether	USDT	1,0003	38.7	2.3%	78.9%
6	Polkadot	DOT	34,90790	32.2	1.9%	80.8%
7	Ripple	XRP	0,46955	21.4	1.2%	82.1%
8	Uniswap	UNI	29,7310	15.5	0.9%	83.0%
9	Litecoin	LTC	197,969	13.3	0.8%	83.8%
10	Chainlink	LINK	30,28	12.6	0.7%	84.5%



Modelling for Gender and Age data

Notice that the Gender and age of the client are missing from the data. These can be formulated from the birth number YYMMDD where at months (the 3rd and 4th digits) greater than 50 means that client is a Female. We can create a column for Gender.



For birthday, we need to reduce the birth month of the female by 50 and then change the date format to DD/MM/YYYY adding 1900 to the year.

	Date	ABC Report Currency	ABC Transaction Currency	\$ Exchange Rate
Valid 100%	Valid 100%	Valid 100%	Valid 100%	
Error 0%	Error 0%	Error 0%	Error 0%	
Empty 0%	Empty 0%	Empty 0%	Empty 0%	
2 distinct, 0 unique	3 distinct, 0 unique	3 distinct, 0 unique	8 distinct, 8 unique	
1	1/1/2020	GBP	EUR	0.91
2	1/1/2020	USD	EUR	1.11
3	1/2/2020	GBP	EUR	0.95
4	1/2/2020	USD	EUR	1.18
5	1/1/2020	EUR	GBP	1.10
6	1/1/2020	EUR	USD	0.90
7	1/2/2020	EUR	GBP	1.05
8	1/2/2020	EUR	USD	0.85

For Age, we shall assume it is year 1999 as explain previously and use it to minus from the birth year.

Replacing values

Set some fields to English for easy understanding, we replace values to English with the Power Query Editor.

\$ Sales	ABC Currency	Date
100	EUR	1/1/2017
10	GBP	1/1/2017
50	USD	1/1/2017
25	EUR	2/1/2017
50	GBP	2/1/2017
75	USD	3/1/2017

Duplicate the “district /region” then split column using space as delimiter.

Then merge column by Region and direction. Refer to applied steps for details.

[SumOfUnitPr... ▼]		fx =SUM (Product[Unit Price])		
Produc...	Product Code	Unit Price	SumOfUnitPrice	
1722	0702016	€ 56.00	€ 898,141.44	
1723	0702017	€ 56.00	€ 898,141.44	
1724	0702018	€ 56.00	€ 898,141.44	
1725	0702019	€ 56.00	€ 898,141.44	
1726	0702020	€ 56.00	€ 898,141.44	
1727	0702021	€ 56.00	€ 898,141.44	
1733	0702027	€ 22.79	€ 898,141.44	
1734	0702028	€ 28.00	€ 898,141.44	
1735	0702029	€ 28.00	€ 898,141.44	
1736	0702030	€ 28.00	€ 898,141.44	

Grouping of age by ranges

As the customers’ age ranges from 12 to 88, we shall group them into different generation age range for easier profiling, we will group the ages into 5 groups.

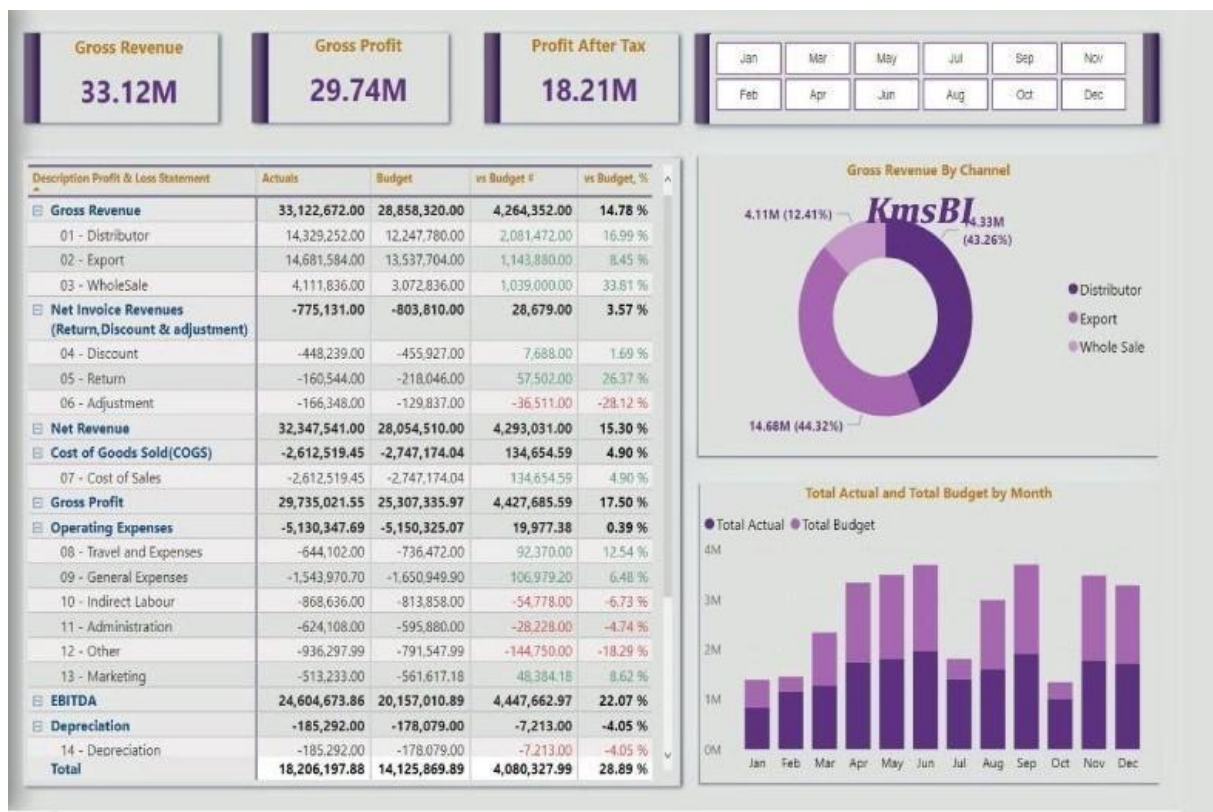
The Gen Y are youths,

Gen X are young working adults, some starting their families

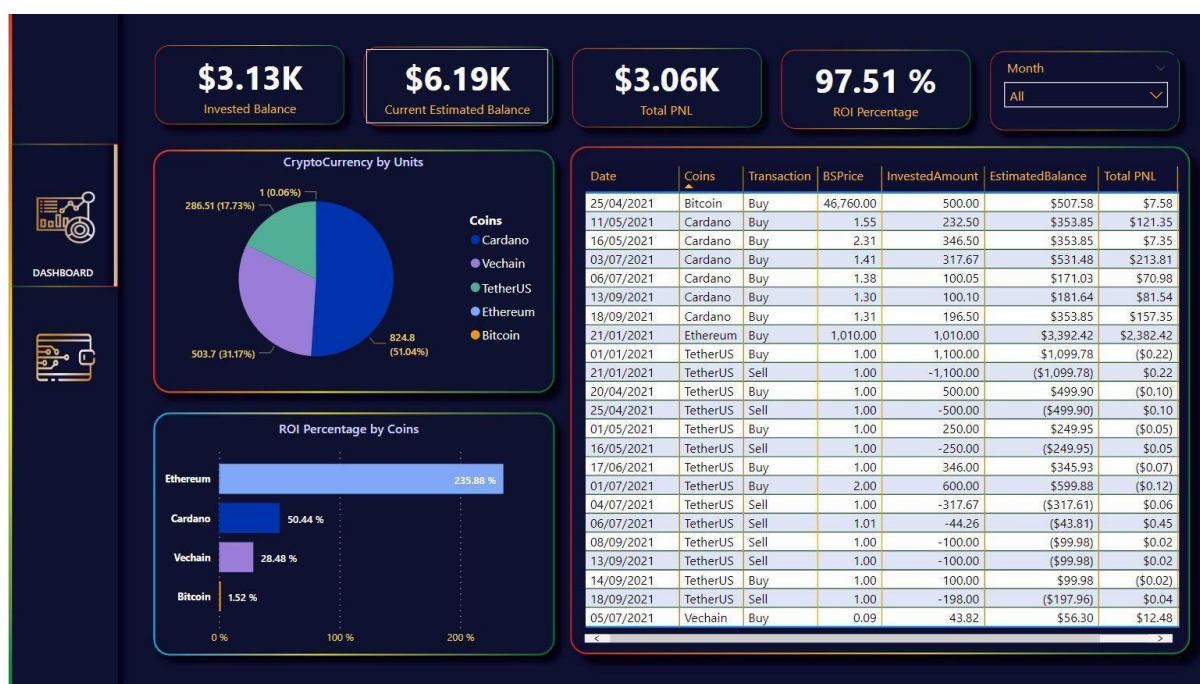
Baby Boomer are working adults with families.

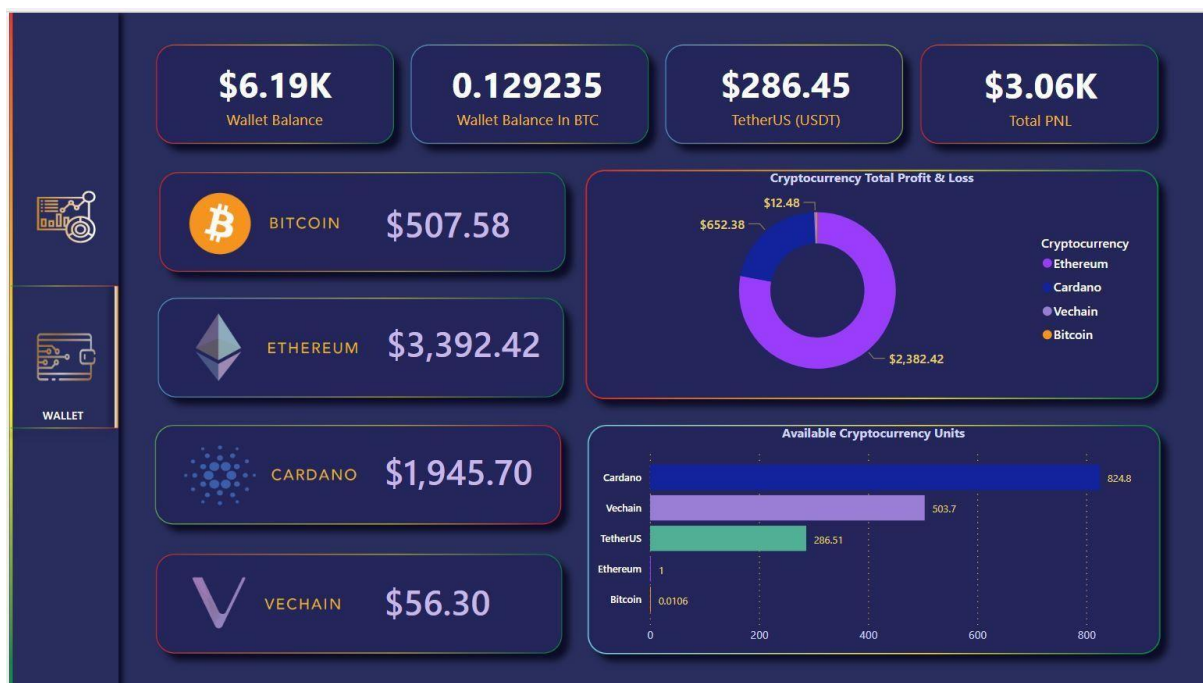
The silent Generations some are working and retired, living on pensions.

The greatest Generation, retired elderly living on pensions.



Dashboard





CONCLUSION

The project “Real-Time Analysis of Bank Customers” using PowerBI has successfully demonstrated the potential of data analytics in the banking sector. The real-time analysis of customer data has provided valuable insights into customer behavior, preferences, and trends, thereby facilitating informed decision-making. The interactive dashboards and reports have offered a comprehensive view of customer data, enabling the identification of patterns and correlations. This has not only improved the efficiency of data analysis but also enhanced the bank’s ability to provide personalized services to its customers. The project has also highlighted the importance of data visualization in making complex data more understandable and accessible. The use of PowerBI has made it possible to present data in a visually appealing and easy-to-understand format, thereby aiding in better decision-making.

FUTURE SCOPE

The future scope of this project is vast. With the advent of advanced analytics and machine learning, PowerBI can be leveraged to predict future trends based on historical data. Integrating these predictive analytics into the project could enable the bank to anticipate customer needs and proactively offer solutions. Furthermore, PowerBI's capability to integrate with various data sources opens up the possibility of incorporating more diverse datasets for a more holistic view of customers. As data privacy and security become increasingly important, future iterations of this project should focus on implementing robust data governance strategies. This would ensure the secure handling of sensitive customer data while complying with data protection regulations. Additionally, the project could explore the integration of real-time data streams to provide even more timely and relevant insights. This could potentially transform the way banks interact with their customers, leading to improved customer satisfaction and loyalty.

REFERENCES

<https://www.eloquens.com/tool/GvgJcjJV/engineering/cryptocurrency-excel-templates/cryptocurrency-dashboard-in-power-bi>

LINK

<https://github.com/Gowthamk005/NM-Crypto-Currency.git>

