STUDY THE GROWTH OF CRYPTO-CURRENCY AND PREDICT ITS FUTURE

Data Visualization

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Executive Summary

The aim of this report is to analyze and study various cryptocurrencies and predict their future in the global market. The dataset consists of the top 10 cryptocurrency coins ranked by their total market value capture worldwide. The data was obtained from the CoinGecko API documentation [1] and visualized using Microsoft Power BI.

The visualizations are designed to provide insights into the behavior of these coins on different parameters, such as historical prices, market value capture, total volume, all-time high and low prices, open and close prices per day, and more. Additionally, the analysis delves into the reasons behind price fluctuations in cryptocurrencies and highlights the importance of blockchain technology in improving data management across different industries.

Background

What Is a Blockchain

A blockchain is a distributed database or ledger that is shared among the nodes of a computer network. As a database, a blockchain stores information electronically in digital format. Blockchains are best known for their crucial role in cryptocurrency systems, such as bitcoin, for maintaining a secure and decentralized record of transactions. The innovation with a blockchain is that it guarantees the fidelity and security of a record of data and generates trust without the need for a trusted third party.

One key difference between a typical database and a blockchain is how the data is structured. A blockchain collects information together in groups, known as blocks, that hold sets of information. All new information that follows that freshly added block is compiled into a newly formed block that will then also be added to the chain once filled.

Cryptocurrency

Cryptocurrency serves as a medium of exchange, a store of value, and a unit of measure. While cryptocurrencies have little inherent value, they are used to price the value of other assets.

Digital assets, also known as crypto assets, are digital representations of value made possible by cryptography and blockchain. Their original intent was to serve as a vehicle for transferring value without the use of a bank or other trusted third-party entity.

Origin and Growth

“The idea for cryptocurrency first emerged in 1983, when an American cryptographer David Chaum published a conference paper outlining an early form of anonymous cryptographic electronic money. The concept was for a currency that could be sent untraceably and in a manner that did not require centralized entities (i.e., banks) [2].

Bit Gold, often deemed a direct precursor to Bitcoin, was designed in 1998 by Nick Szabo. It required a participant to dedicate computer power to solving cryptographic puzzles, and those who solved the puzzle received a reward. Combined with Chaum’s work, it results in something that comes very close to resembling Bitcoin.

“The rise of Bitcoin gave a chance to the birth of numerous other cryptocurrencies, including Ethereum, Ripple, Litecoin, and countless others.” [2]. The cryptocurrency market has experienced periods of significant growth, with the total market capitalization reaching over $2 trillion in 2021.

Although the popularity of cryptocurrencies has been on the rise, their market remains highly volatile and is susceptible to regulatory and technological hurdles. Nonetheless, the progress made in blockchain technology and the growing acceptance of cryptocurrencies in mainstream finance and commerce suggest that they will maintain a significant presence in the future.

This report aims to provide a comprehensive analysis of the current state of the cryptocurrency market, including the factors influencing its growth and the challenges it faces. It will also offer predictions for the future performance of cryptocurrencies based on market trends and expert analysis.

Analysis

This report provides an analysis of the top 10 cryptocurrency coins ranked by their market share worldwide. The coins included in the analysis are Bitcoin, Ethereum, Tether, Binance Coin, USD Coin, Ripple, Cardano, Lido-Staked-Ether, Polygon, and Dogecoin.

Visualizations created using Microsoft Power BI were used to analyze the data and gain insights into the behavior of these coins on various parameters. The report provides a detailed analysis of the performance of each coin and identifies trends and patterns in their market behavior.

Data Cleaning and Preparation

The dataset is a combination of various API calls to the CoinGecko API endpoints. Power BI dashboard will fetch the data from public APIs provided by CoinGecko documentation [1]. As there are more than 20,000 cryptocurrencies actively being transacted in the market, we are keeping our study limited to the top 10 coins as per CoinGecko. Coins in study: Bitcoin, Ethereum, Tether, USD-coin, Polygon, XRP, Cardano, Dogecoin, Lido-staked ether, Binance coin.

Step 1: Explored the APIs on CoinGecko website. Used the data source topic selection choosing the dataset to fetch and generated URLs.

- GET/coins/{id}/ohlc: This endpoint is used to get open, high, low close of a specific coin.
- GET/coins/{id}/market_chart/range: This is used to get historic data of a specific coin.
- GET/coins/markets: This endpoint is used to get overview of these 10 coins.
- GET/coins/markets (sparkline = true) Is used to get sparklines of these 10 coins

Step 2: Opened Power BI and Get Data by clicking web source and then pasted the URLs from the CoinGecko and transform the data.

Step 3: Transformed the data columns to understandable date format from Unicode, changed the currency and percentage format and then added the column of coins' label in each dataset to mark the coin name.

Step 4: Built up all tables in a 1:M relationship with the market overview table for further analysis.

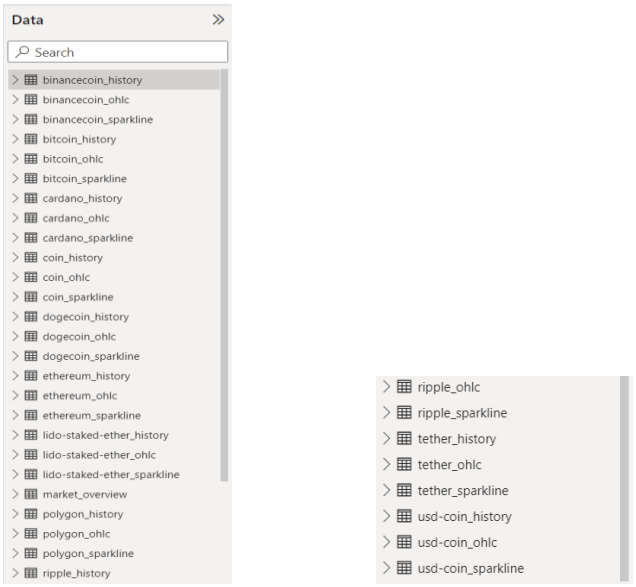

Figure 1. Data set

Visualization

This cryptocurrency analysis of top 10 crypto coins is based on their market capture value in the world. The data is being fetched in real time and displayed on the visuals. The date we finalized for visualization analysis is April 1, 2023.

By utilizing the data from the CoinGecko API, a one-stop-shop for analyzing different crypto coins can be created. This means that all the relevant data and information about a particular cryptocurrency can be accessed and analyzed in one place. This can include price history, market capitalization, trading volume, and other important metrics that investors and traders use to make informed decisions about buying or selling cryptocurrencies.

1. Main Page Dashboard

The dashboard we created consists of six modules, each of which provides analysis and visualization primarily from a single perspective.

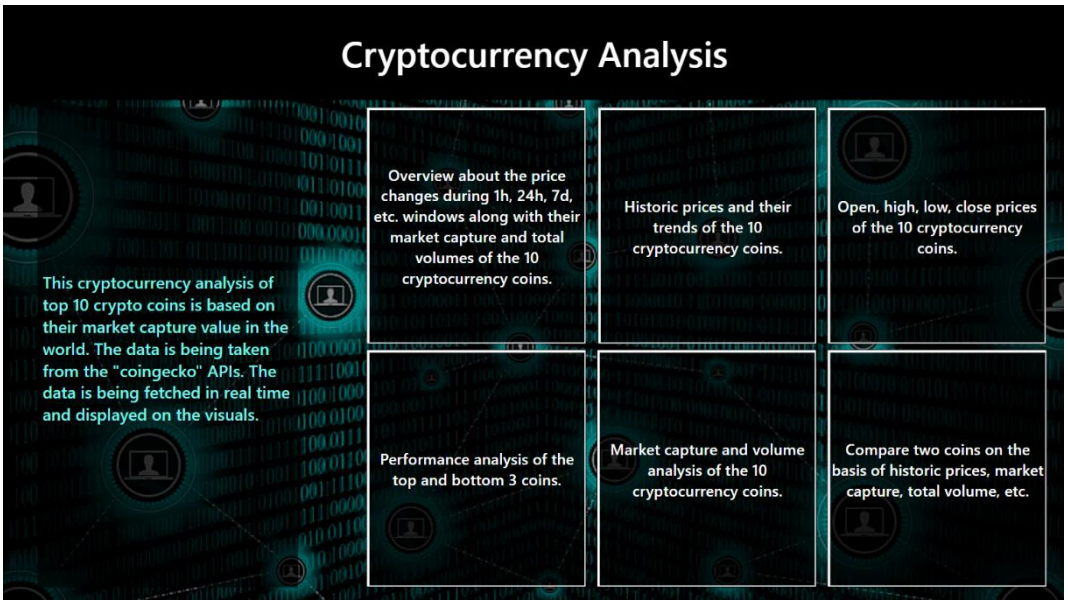

Figure 2. Main Page Dashboard

2. Cryptocurrency Overview

a. We have designed a dashboard that provides an overview of price changes in the cryptocurrency market over various timeframes, including 1 hour, 24 hours, 7 days, 14 days, 30 days, 200 days, and 1 year. Additionally, the dashboard displays the market share and total volumes of the top 10 cryptocurrency coins.

b. Furthermore, the dashboard features sparklines that clearly illustrate the price trend over the last 7 days, enabling decision makers to identify the degree of price volatility quickly and easily in the market.

c. The dashboard shows that Bitcoin, Cardano, and Dogecoin have followed a similar pattern of continuous price growth over the last 200 days. However, the prices of these cryptocurrencies have dropped by almost 40% compared to the prices seen last year.

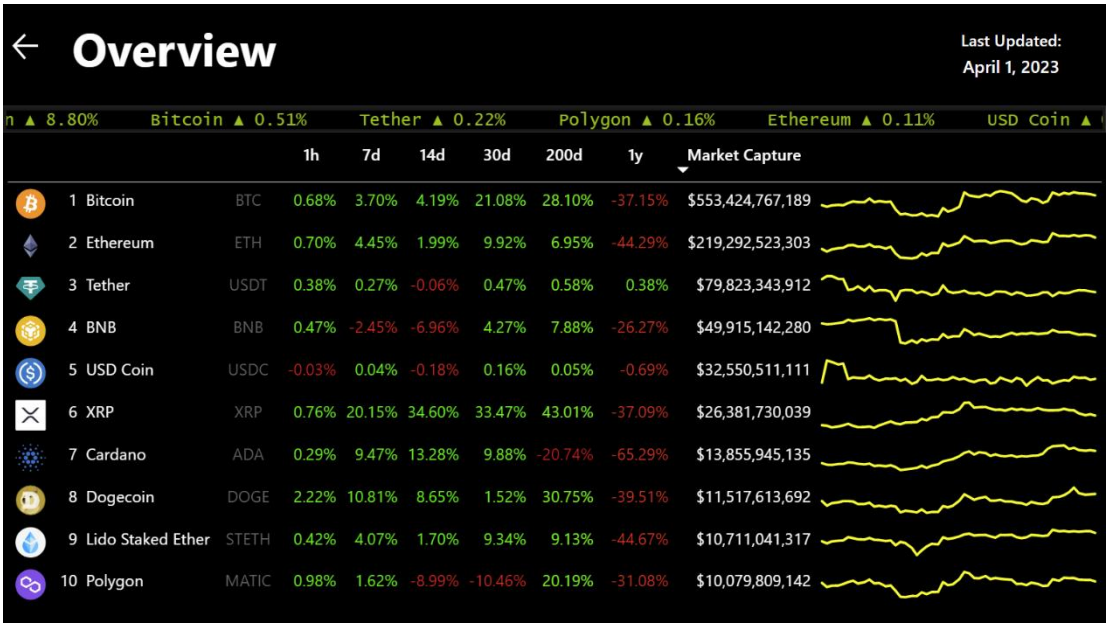

Figure 3. Cryptocurrency Analysis

3. History Prices and Trends

a. The historic prices of coin dashboard showcase the prices, all time high and low prices, and the total volume of the coin in the market.
b. The dashboard also signifies the last updated date of the data to keep the users up to date with the current data.
c. We have created a filter pane on the dashboard to enable users to navigate through the different coins and time periods. By applying and hiding the filter pane, users can view the relevant price history trends and the corresponding market share and volumes. This feature allows for a more customized and efficient viewing experience of the dashboard.

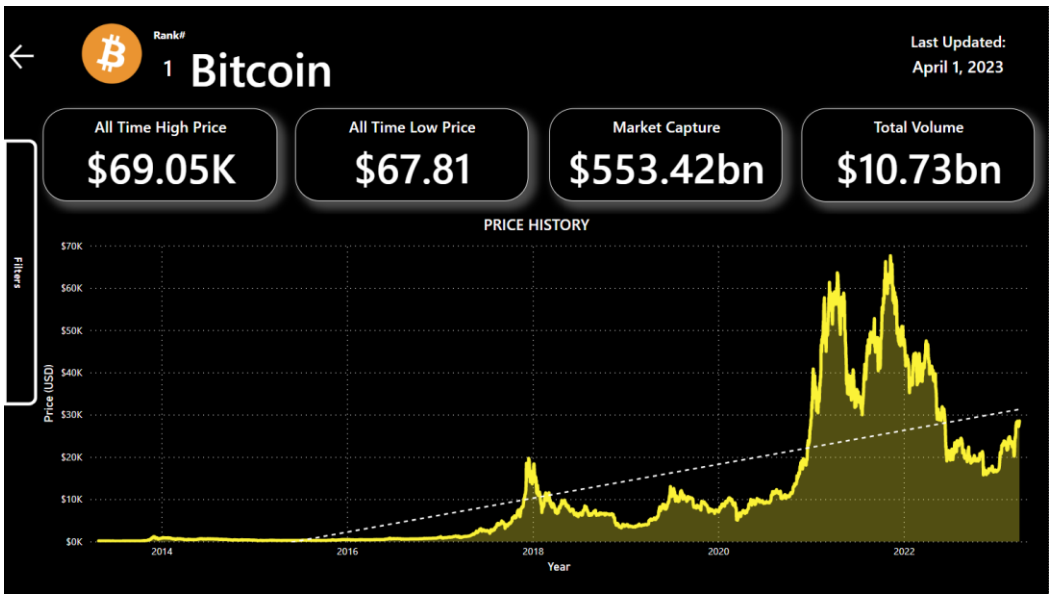

Figure 4. History Prices and Trends

4. OHLC of the 10 Coins

a. This dashboard is mainly using the candlestick charts to show the open, high, low and close price over different periods in order to gauge market sentiment and make predictions about the where the market might be headed next.
b. The green candles show prices going up and red candles show price declining and the wick represent the highest and lowest prices the asset hit during the trading frame.
c. The presence of a long wick at the bottom of a candle on the dashboard is an indication that investors are looking to buy. For instance, upon applying the filter to the 1-year period and selecting Bitcoin, the dashboard displays a red candle with a long wick at the bottom in November 2022. As a result of more investors purchasing, the price of Bitcoin increased starting from December.

Figure 5. OHLC Dashboard

5. Performance Analysis

a. The performance dashboard provides a snapshot of the top and bottom 3 performers n the cryptocurrency market over the past 30 days and 1-year period.
b. The bar chart on the dashboard presents a clear visualization of the top performers in the past 30 days, with XRP, Bitcoin, and Ethereum taking the lead. Among these, XRP had the best performance with a price increase of 33.47%. The top performers in the last 1 year were Tether, USD Coin, and Polygon.
c. The bottom bar charts on the dashboard display the bottom 3 performers over the previous 30 days and 1 year. They indicate that all 10 coins experienced a poor performance, with their prices dropping compared to their previous levels.

d. In addition to the top and bottom performance charts, the dashboard also includes a display of the percentage changes in the price of each coin over the last 1 hour, 7 days, 14 days, and 200 days. This feature enables users to check the price changes over other time periods and gain a broader understanding of the price trends.

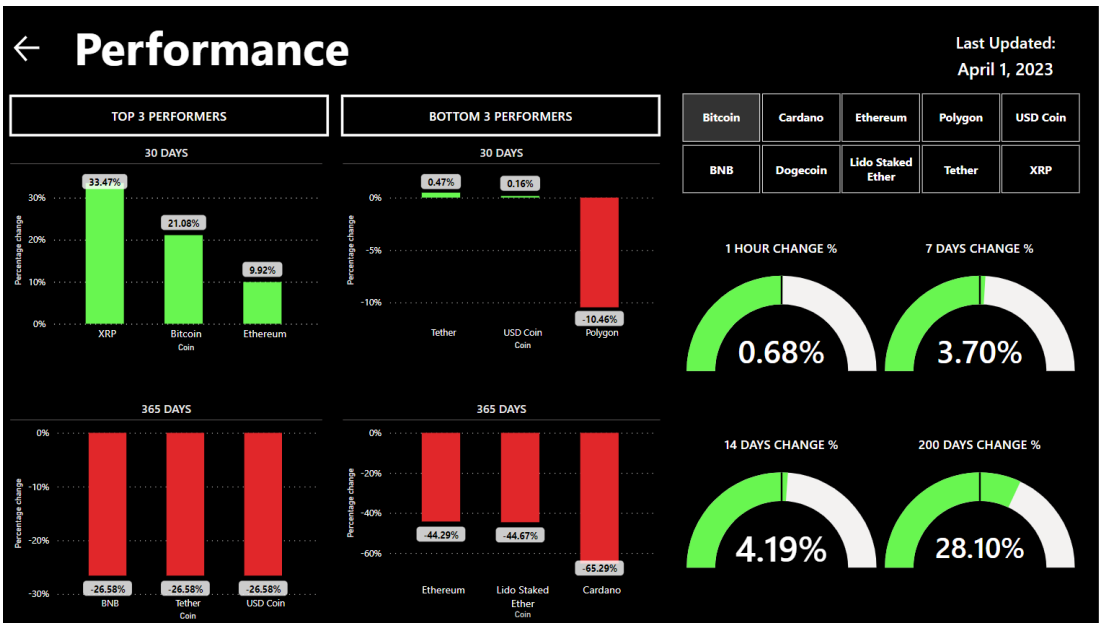

Figure 6. Performance Dashboard

6. Market Capture and Volume

a. The market analysis dashboard provides a breakdown of the total market share captured by each specific coin over a given duration. This allows users to easily compare the market share of different coins and assess their relative performance.

b. In addition to market share, the dashboard also displays the total market volume held by each coin over the same duration. This provides insight into the overall trading activity and liquidity of each coin and can be useful for making investment decisions.

c. Market capture tends to increase when a cryptocurrency gains popularity and adoption among investors. For example, the dashboard shows that Tether had a high market volume ratio (over 15% in 2021) compared to other coins but a low market capture during the same period. This is partly because of Tether is a stablecoin that is designed for investors to hold for protection from the volatility of the market, but investors may prefer to invest cryptocurrencies that have the potential for high return. As a result, Bitcoin has a higher market capture in the same duration due to its popularity and potential for higher returns compared to stablecoins like Tether.

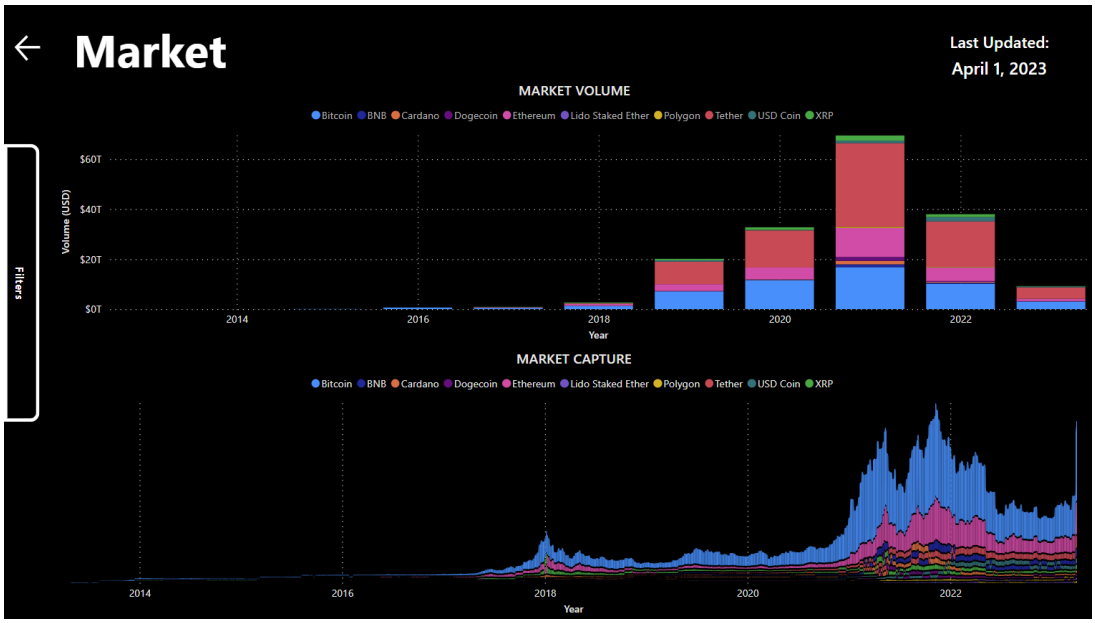

Figure 7. Market Analysis

7. Comparison Between Coins

a. The comparison chart provides a comprehensive comparison between two specific coins based on various parameters, including their current price, all-time high and low prices, market capture, and total volume.

b. The dashboard with two panes provides a clear display of the differences and similarities between the two coins from every perspective, allowing investors to easily understand both coins. For instance, despite both Bitcoin and Ethereum having a high percentage of market volume, they share a similar price history over a duration, but Bitcoin has a significantly higher price and market capture compared to Ethereum.

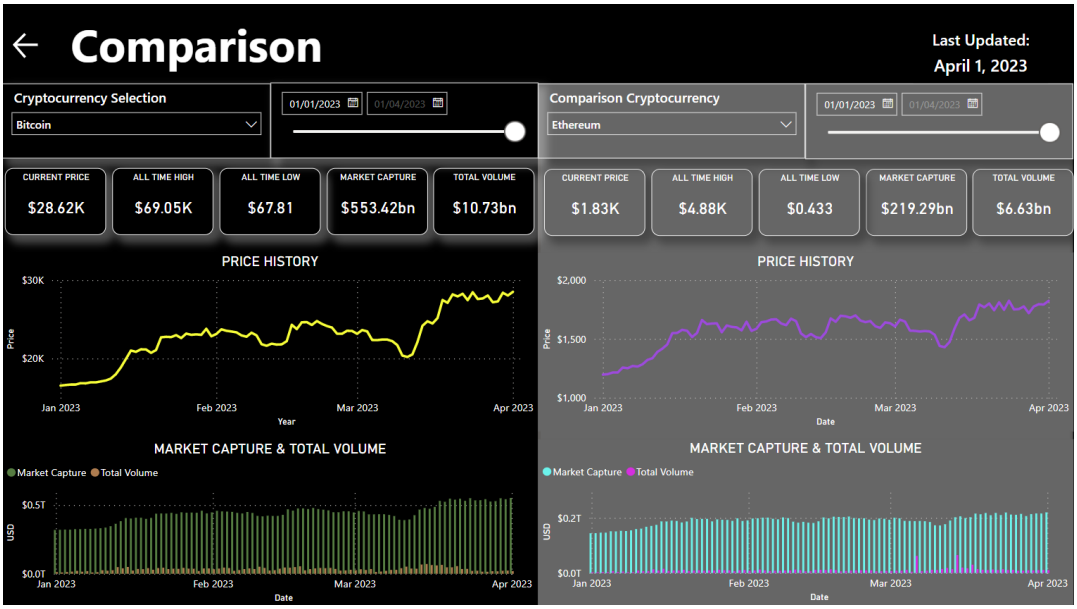

Figure 8. Comparison Chart

8. **Geographic Map of Ownership**
   a. The geographic map shows the ownership volume and ownership percentage of percentage over the countries in the world.
   b. India, the US, Vietnam, China, and Brazil are the top five countries with the highest cryptocurrency ownership, while the United Arab Emirates, Vietnam, the US, the Philippines, and India have the highest ownership percentage of their populations.
   c. India has seen a rapid growth in crypto adoption, despite the regulatory uncertainty and confusion surrounding policies affecting the industry. Currently, an estimated 157 million people in India, which represents 11.5% of the country's total population, own cryptocurrency. In addition, the United Arab Emirates has the highest percentage of its population owning cryptocurrency, with 2 million people estimated to be invested in the industry.

Figure 9. Geo Map of Ownership

Increase and Decrease in Price:

After the data has been visualized, we have observed that, Cryptocurrencies gained popularity in the recent year's due to various applications in the real world. Cryptocurrencies were initially a niche concept that only a few people understood. It took time for the public to become aware of their existence and potential uses. There was a lack of infrastructure to support the use of cryptocurrencies, such as exchanges and wallets, which made it difficult for people to buy and store them and thus, the prices are low.

Reasons for increase in price:

- **Increased interest from investors**
  Cryptocurrencies have increased in price when there is a heightened interest from investors. This can occur due to various factors such as positive news coverage, announcements of partnerships.

- **Limited supply**
  Cryptocurrencies such as Bitcoin have a limited supply, meaning that there is a fixed number of coins that will ever be created. This creates scarcity and makes it an attractive investment option. As supply becomes more limited, the price tends to increase [3].
- **Increased institutional adoption.**
  As more financial institutions such as banks adopt cryptocurrencies, this created confidence in the market. This has led to increased demand for cryptocurrencies and can help drive up their price.
- **Mainstream acceptance**
  As more businesses and retailers begin to accept cryptocurrencies as a form of payment this might lead to increased adoption for cryptocurrencies. This increased adoption can create a snowball effect, leading more businesses and individuals accepting cryptocurrencies [3].

Reasons for decline in price:

- **Market speculation**
  The value of cryptocurrencies is highly volatile, largely due to market speculation. If investors believe that the value of a particular cryptocurrency has been artificially inflated, they may decide to sell off their holdings, causing sudden drops in the price. This can result in a reduction in the overall value of the cryptocurrency.
- **Lack of adoption**
  Despite of increasing popularity, they are not widely accepted as a form of payment. This lack of adoption can limit the potential to gain mainstream acceptance.
- **Security issues**
  Cryptocurrencies can be attacked by hackers. This has happened before where hackers have stolen millions of dollars worth digital currency from exchanges. When this happens, investors lose their trust and might not be willing to buy them anymore.
- **Environmental concern**
  The process of mining cryptocurrencies and adding transactions to the blockchain requires a significant amount of energy, leading to high carbon emissions. This poses a long-term sustainability concern. Additionally, the value of cryptocurrencies can be highly volatile and is influenced by various factors, including changes in regulations, investor sentiment, and technological advancements. It's important to consider these factors when evaluating the potential risks and rewards of investing in cryptocurrencies.
- **Volatility**
  Cryptocurrencies are notoriously volatile, and this made them unattractive to many investors who were looking for stable investments [5].

- **Regulatory concerns**
  Governments around the world are becoming more involved in regulating the cryptocurrency market. Increased regulatory oversight could lead to a decrease in demand for cryptocurrencies and a subsequent drop in their prices [3].
- **Economic recession**
  Economic downturns often lead to a decrease in investor confidence and a shift away from high-risk investments, such as cryptocurrencies.

Conclusion & Recommendations

Cryptocurrency is often seen as a way to make quick profits or as a financial trend, but it is still far from replacing traditional currencies. However, blockchain technology is rapidly evolving and is poised to revolutionize the way data is managed across various industries.

As a recommendation, blockchain technology could be used to improve the risky stock market industry by replacing the centralized architecture. This would result in a more transparent, faster, secure, and risk-free operation. By leveraging the benefits of blockchain, the stock market could potentially become more efficient and trustworthy [4].

Predicting the future of cryptocurrencies is a challenging task due to the highly volatile and unpredictable nature of the market. However, by using a combination of market analysis, news and events, technical and sentiment analysis, expert opinions, and diversification, investors can make more informed decisions and potentially achieve better outcomes.

Overall, cryptocurrencies have the potential to revolutionize the financial system, but they need to address some key challenges to achieve widespread adoption and growth. By focusing on education, security, interoperability, scalability, regulatory clarity, and integration with traditional financial systems, cryptocurrencies can continue to grow and evolve in the coming years.

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