Google Data Analytics Course

Blockchain Investment Case Study

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Scenario

- Junior Analyst at an established business intelligence consultancy
- Tasked with leading a new project for a family office client looking to allocate capital into the digital asset market
- Two digital assets have been requested for analysis: Ethereum (ETH) and Cardano (ADA)

Deliverables

• Create a comprehensive report outlining both digital assets and the corresponding analysis with insights dictating which asset should receive the allocation from the client

Presentation Overview

Background Information

- The Digital Asset Market
- Ethereum & Cardano timelines
- Smart contract functionality

Data Analytics Process

- Ask: Business Objective
- Prepare: Data Source
- Process: Data Cleaning
- Analysis & Visuals

Final Recommendations

- Future Outlook
- Allocation Recommendations



The Digital Asset Market

- Digital assets and cryptocurrencies were designed to facilitate peer-to-peer payments without an intermediary
 - Decentralized
 - Trustless
 - \circ Borderless
 - Store of Value
- Ethereum (ETH) and Cardano (ADA) were created as smart contract platforms
 - Provides infrastructure, security, and scalability for decentralized application (dApps) development

Top Cryptocurrencies

Asset Name	Ticke	r	Market Cap.	Price
Bitcoin	BTC	₿	\$965 B	\$51 K
Ethereum	ETH		\$482 B	\$4 K
Solana	SOL	9	\$59 B	\$193
Cardano	ADA		\$47 B	\$1.41

Ethereum's Timeline

Ethereum's smart contract is deployed on the mainnet. Ethereum becomes fully operational and ready for users.

July 30, 2015

Ethereum surpasses Bitcoin in daily active users & address for the first time.

May 31, 2018



Vitalik Buterin, Founder of Ethereum & Head of The Ethereum Foundation

Ethereum splits into two different blockchains due to hacking of \$50 million in funds. New chain named Ethereum Classic.

July 20, 2016

May 22, 2019

The Ethereum Foundation outlines plans to fund the transition from Ethereum to Ethereum 2.0. This transition converts Ethereum into a "proof-of-stake" blockchain.

Cardano's Timeline

Cardano goes live on its mainnet with an initial coin offering to the public raising \$600 million.

December 31, 2016

Cardano unlocks native asset ledger capacity, allowing NFTs and other tokens to be created and stored on the network.

March 1, 2021



Charles Hoskinson, CEO of IOHK & Founder of Cardano

Shelley hard fork combinator event which brings "staking" method to Cardano for its token holders as an incentive to secure the network.

July 29, 2020

September 12, 2021

Full smart contract capabilities comes to mainnet. Decentralized applications begin writing scripts to be deployed for Cardano's users.

Smart Contract Functionality: ETH vs. ADA





- Solidity programing language
- Uses an account-based ledger model
- Transactions per second: 13 (Layer-1)
- Uses "proof-of-work" consensus mechanism
- Moving to "proof-of-stake" in early 2022 to achieve ESG compliance measures
- Haskell programming language
- Uses the eUTXO (extended unspent transaction throughput) ledger model
- Transactions per second: 15-20 (Layer-1)
- Uses the industry leading Ouroboros "proof-of-stake" consensus mechanism

The Data Analytics Process

1. Ask	2. Prepare	3. Process	4. Analysis	5. Share	6. Act
Define	Data Sources	Document	Derive Insights	Create High	Final
Business Goal		Cleaning	Based on	Quality Visuals	Recommendations
	Data Integrity	Process	Business Goal		
Identify				Use Visuals to	Report to
Stakeholders	Select Tools for Cleaning &	Sort & Filter	Use Tools Such as Excel, R, &	Enhance Analysis	Stakeholders
Ask Clarifying Questions	Analysis		SQL	Know Your Audience	

Stage 1 - Ask: Business Objective





Stage 2 - Prepare: Data Source

01	Where is the data located?	• CoinMetrics.io - Open-sourced, on-chain analytics company that pulls data from the corresponding network directly from the network's base ledger
02	How is the data organized?	 1500+ observations for each data set Provides all necessary variables that display network participation; active addresses, price, transactions, fees, circulating supply, etc
03	Any issues with the data?	 ETH data begins in 2015 & ADA begins in late 2017 Null values for several variables right after the network went live (network wasn't recording those values right away)



Stage 3 - Process: Data Cleaning Process

Primary Tool: Microsoft Excel

- Data sets have ~1500 observations, easily manipulated, filtered and sorted using spreadsheet application
- Analysis requires regression models, analyst-configured formulas, and Excel provides easy access to these tools



Stage 4 - Analysis: Price-to-Revenue Ratio

P/R Ratio similar to P/E Ratio from traditional equity markets

- Higher the ratio, the more expensive the asset is relative to its revenue
- Lower the ratio, the cheaper the asset is relative to its revenue

Inputs

- Free Float Market Cap: excludes locked assets that haven't vested for investors, are being staked or are in inactive wallets
- Price: USD value of one unit of the asset
- EOY Revenue 2021: total revenue generated to date denominated in USD
- Revenue per unit: how much network revenue is attributed to one unit

Intended Output

• How expensive/cheap one unit of ADA or ETH is compared to the total revenue generated in fees to validators/miners by their networks

Stage 4 - Analysis: Price-to-Revenue Ratio

Results

- ETH yields a 21.20 P/R Ratio
- ADA yields a 10,443 P/R Ratio
 - Cardano's network has a current free float supply of ~31 bil.
 - Significantly less revenue generated over Cardano's lifetime due to smart contracts' recent release

Comparison

- Mastercard P/S Ratio: 20.20
- Visa P/S Ratio: 20.25
- Ethereum's P/R Ratio: 21.20
 - Electronic card payment processing companies used a proxy for comparison of Ethereum's settlement network

Price to Revenue Ratio					
		ETH		ADA	
EOY FF Market Cap 2021	\$	515,546,753,337	\$	63,045,690,186	
EOY Price 2021	\$	4,610	\$	2.03	
Current FF Supply		111843996		30996958182	
EOY Revenue (Fees)	\$	24,313,225,559	\$	6,037,324	
Rev. per unit	\$	217	\$	0.0002	
P/R Ratio	\$	21.20		10443	



Stage 4 - Analysis: Forecasted Revenue

Results

- Project the total revenue generated from the network until 2025
- Under the analyst's assumptions, a weighted average will be used to calculate the growth rate for each year after 2021
 - Adoption is projected to increase significantly over the years as regulation becomes clear, infrastructure is improved, and the market matures
 - Weighting 2021: 10%, 2022: 20%, 2023: 30%, 2024: 40%
 - Both ADA and ETH are smart contract platforms, thus both networks have been given the same assumptions

Weighted Average Forecast (ETH)					
Date	EOY Revenue	Growth Rate	Weighting		
2017	\$ 1,945,051,652				
2018	\$ 5,695,740,135	193%	5%		
2019	\$ 6,627,351,019	16%	35%		
2020	\$ 8,735,552,237	32%	45%		
2021	\$ 24,313,225,559	178%	10%		
2022	\$ 27,201,247,130	12%	20%		
2023	\$ 29,938,213,000	10%	30%		
2024	\$ 32,748,028,852	9%	40%		
2025	\$ 34,956,957,596	7%	-		

Weighted Average Forecast (ADA)						
Date	EOY Revenue		Growth Rate	Weighting		
2017	\$	9,333	-	a 17		
2018	\$	43,189	363%	5%		
2019	\$	52,531	22%	35%		
2020	\$	94,137	79%	45%		
2021	\$	6,037,324	6313%	10%		
2022	\$	16,492,236	173%	20%		
2023	\$	45,732,162	177%	30%		
2024	\$	132,028,639	189%	40%		
2025	\$	394,315,835	199%	-		

Stage 4 - Analysis: Regression Analysis

Inputs

- Inputs used are "TxCnt" (transactions per day) and "PriceUSD" (USD value of one unit)
- Trying to determine:
 - Multiple R Value: Correlation Coefficient
 - R-Squared Value: "goodness-of-fit"

Results

- ETH (follows an exponential trendline)
 - Multiple R: 0.684
 - R-Squared: 0.553
- ADA (follows a power trendline)
 - Multiple R: 0.901
 - R-Squared: 0.843

R-Squared Value: "Goodness-of-Fit"			
	ETH	ADA	
Linear	0.4685	0.8128	
Exponential	0.5533	0.0109	
Logarithmic	0.2271	0.7798	
Power	0.5233	0.8430	



Stage 5 - Share: Forecasted Revenue



- Ethereum's forecasted revenue into the next 4 years follows a linear trend
 - Ethereum has seen impressive growth due to global adoption and new deployments of dApps
 - However, it can be assumed that Ethereum will grow at a steady linear rate after 2021's 178% growth in revenue



Stage 5 - Share: Forecasted Revenue



- Cardano's forecasted revenue follows an exponential growth rate
 - Smart contracts have been released on mainnet
 - dApps are beginning to deploy for users to use
 - Cardano's scaling solution *Hydra* will allow for a large increase in transactions per second once released

Stage 5 - Share: Regression Analysis



- Ethereum's price and the transaction per day have a positive relationship
 - The scatterplot shows an exponential relationship between the variables
 - The R-Squared value is moderately weak compared to Cardano's

Stage 5 - Share: Regression Analysis



- Cardano's price and transactions per day have a positive relationship
 - The scatterplot shows a power relationship between the two variables
 - The R-Squared value is significantly stronger than Ethereum's



Future Outlook

Ethereum

- Moving to "proof-of-stake" in early 2022 to provide ESG compliance for institutional investment demand and to alleviate "gas fees" for retail users
- "Sharding" will be implemented which would improve the amount of transactions that can be processed per block

• Layer-2 applications such as Polygon becoming popular scaling solutions

Cardano

 Multiple decentralized exchanges coming to mainnet in early 2022, increasing use case for the ADA token as a medium of exchange

 Djed algorithmic stable-coin will be released to mainnet in 2022, further increasing the use case for the ADA token as collateral for minting Djed

 Hydra scaling solution will be starting its testnet to find bugs/errors which will provide more transactions per block

Stage 6 - Act: Final Recommendation

These recommendations are based on different time horizons in which the family office would hold their capital allocation into the two projects. Based on the analysis conducted and the future outlooks for the projects:

- 1. Short time horizon (>1 year): Allocate to **Ethereum**. The move to "proof-of-stake" will increase demand for the asset, driving up price in the short term.
- 2. *Medium time horizon (1 3 years):* Allocate evenly to both **Cardano** and **Ethereum.** If assuming project milestones are fulfilled and favorable regulatory environment, hedge your allocation by investing in both projects.
- 3. Long time horizon (3+ years): Allocate to **Cardano.** The platform's strategic and academic approach to development will prove to be extremely beneficial as it adapts to suit many different use cases globally.



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