

Introduction to Digital Assets

1. INTRODUCTION

This learning module provides overview of **digital asset** investments, covering key concepts and risks.

Digital Assets:

- Include cryptocurrencies, tokens, and digital collectibles, secured by advanced encryption techniques like blockchain.
- Growing globally since 2009, offering diversification and higher returns.
- Volatile nature and regulatory uncertainties pose higher risks.

2. DISTRIBUTED LEDGER TECHNOLOGY

Distributed Ledger Technology (DLT)

DLT improves financial record-keeping, enabling efficient exchange and tracking of financial asset ownership on a peer-to-peer basis.

Proof of Work vs. Proof of Stake

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Permission and Permissionless Networks

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Types of Digital Assets

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Advantages:

- Accuracy
- Transparency
- Secure record-keeping
- Speedy ownership transfer
- Peer-to-peer interactions

Limitations:

- High energy consumption
- Security risks related to data

Key Elements of a DLT Network:

1. **Digital Ledger:** A shared database of transactions accessible to all participants.
2. **Consensus Mechanism:** Ensures agreement on the validity of transactions and updates to the ledger.
 - Involves transaction validation and ledger update agreement.
 - Provides real-time transparency and data access.
3. **Participant Network:** A peer-to-peer network of nodes (participants) verifying transactions.

Security:

- Cryptography verifies participant identities and secures information exchange.
- Prevents unauthorized access by third parties.

Smart Contracts:

- Self-executing programs based on pre-defined conditions.
- Examples: Automatic collateral transfer on default, claim execution.

Blockchain vs. DLT:

- Blockchain is a type of DLT that uses a chain of linked blocks to record information.
- Each block contains transactions and a cryptographic hash for security and order.
- Consensus mechanisms ensure transaction validity and placement within the blockchain history.

Proof of Work vs. Proof of Stake

Both PoW and PoS are consensus mechanisms used in blockchains to validate transactions and secure the network without a central authority.

Proof of Work (PoW):

- **Mechanism:** Miners compete to solve complex puzzles, with the winner adding the next block and earning rewards.
- **Security:** High computational cost discourages tampering. Attackers need immense processing power to gain control.
- **Energy Consumption:** Requires significant computing power, leading to high energy usage.
- **Example:** Bitcoin and early Ethereum.

Proof of Stake (PoS):

- **Mechanism:** Validators stake their own cryptocurrency to validate transactions and add blocks.
- **Security:** Losing staked coins incentivizes honest behavior. Malicious actors risk losing their stake.
- **Energy Efficiency:** Less computational power needed compared to PoW, resulting in lower energy consumption.
- **Evolving Protocol:** Gaining popularity but newer than PoW.

Permission and Permissionless Networks

DLT networks can be either permissionless or permissioned.

a) Permissionless Networks:

- Open to new users.
- Participants have access to all transactions and network functions.

Characteristics:

- No central authority needed for transaction verification.
- All transactions recorded on a single database, with each node storing a copy.
- Immutable records: Data entered into the blockchain cannot be changed.
- Trust not required between transacting parties.

Example: Bitcoin.

b) Permissioned Networks:

- Closed networks with well-defined participant activities.
- Only pre-approved participants can make changes.
- Varying levels of access to ledger.

Characteristics:

- Limited number of members.
- Faster speed.
- Cost-effective.
- Partially decentralized.
- Limited membership access.
- Governance determined by a centralized organization.

Types of Digital Assets

1. Cryptocurrencies

- Enable near-real-time transactions without intermediaries.
- Issued by individuals, companies, or organizations.
- Not backed by physical forms or central monetary authorities.
- Utilize DLT for secure transactions.
 - Various forms: stablecoins, altcoins.
 - Cap on issuance to maintain value.
 - Significant price volatility.
 - Central banks exploring Central Bank Digital Currencies (CBDCs).

2. Tokens

Tokenization: Represents ownership rights to physical assets on blockchain or distributed ledger.

Non-Fungible Tokens (NFTs): Unique digital assets (e.g., artwork) with certificates of authenticity stored on blockchain.

Security Tokens:

- Digitize ownership rights for publicly traded securities.
- Improve efficiency in post-trade processing, settlement, record-keeping, and custody.

Initial Coin Offerings (ICOs):

- Form of security tokens where companies sell crypto-tokens to investors.
- Alternative to traditional, regulated capital-raising methods like IPOs.

Utility Tokens:

- Enable network services like payment and fees.
- Compensate for network activities.

Governance Tokens:

- Grant voting rights to holders.
- Allow participation in decision-making and influence on permissionless blockchain networks.

3. DIGITAL ASSET INVESTMENT FEATURES

Digital Assets Growth: Cryptocurrencies have surged in number, from 70 in 2013 to nearly 10,000 by early 2022, attracting institutional investors and expanding financial service offerings.

Distinguishing Characteristics of Digital Assets

Similarities:

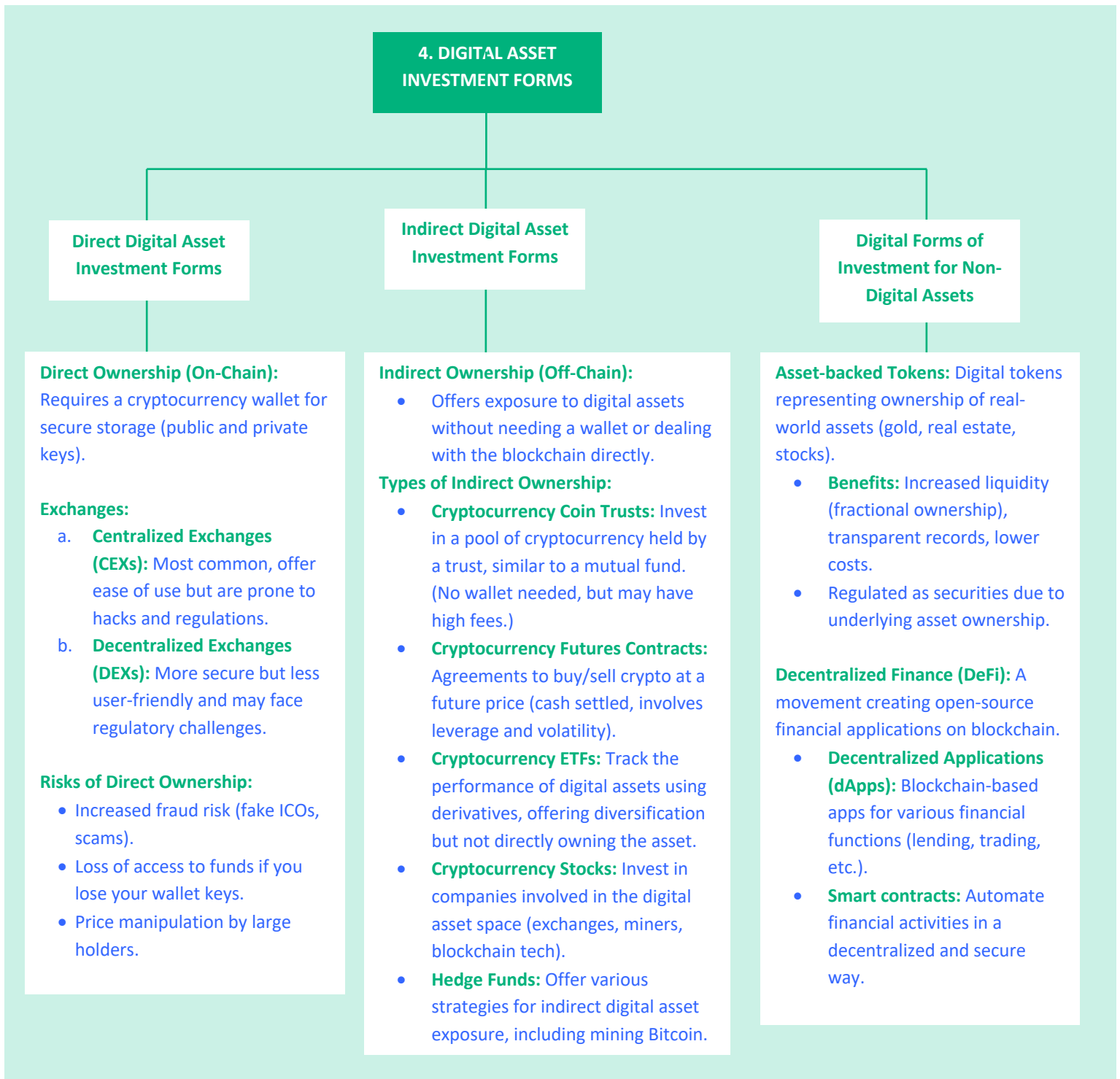
- Both digital and traditional assets use indirect investment mechanisms like ETFs and hedge funds.

Differences:

- **Inherent Value:** Traditional assets have inherent value linked to assets or cash flow, while digital assets rely on appreciation, scarcity, and future transfer of value.
- **Transaction Validation:** Traditional assets use private, centralized ledgers. Digital assets leverage decentralized ledgers with encryption and permissioned/permissionless networks.
- **Medium of Exchange:** Traditional assets trade in accepted currencies. Digital assets like Bitcoin can be used for online transactions in specific ecosystems (Web3) but face challenges for mainstream adoption.
- **Legal and Regulatory Protection:** Traditional assets are well-regulated. Digital assets lack established standards and are vulnerable to fraud and manipulation.

Investible Digital Assets

- **Bitcoin (BTC/XBT):** The most popular cryptocurrency, used for payments and storing value.
- **Altcoins:** Alternative cryptocurrencies offering functionalities beyond Bitcoin (e.g., Ethereum's programmability for apps).
- **Stablecoins:** Cryptocurrencies pegged to real-world assets (fiat, gold) for price stability and easier transactions.
 - **Smart stablecoins:** Use algorithms to manage supply.
 - **Asset-backed tokens:** Digital versions of real-world assets for crypto wallets (NOTE: Not exchangeable for fiat and lack legal backing).
- **Meme Coins:** Cryptocurrencies inspired by internet jokes, known for high volatility and potential for quick gains/losses.



5 DIGITAL ASSET INVESTMENT RISK, RETURN, AND

- **Digital Asset Growth:** Bitcoin and Ethereum have surged in popularity, attracting traditional investors.
- **Investment Nature:** Cryptocurrencies are considered alternative investments due to their volatile, market-dependent nature.

Digital Asset Investment Risks and Returns

- **Limited Underlying Value:** Rely on price appreciation, not cash flow.
- **Price Dependence on Demand:** Scarcity drives prices.
- **High Volatility:** Remains significantly higher than traditional assets.
- **Regulatory Uncertainty:** Regulations are evolving, with differing approaches globally.
- Potential for **fraud** and criminal activity.

Diversification Benefits of Digital Asset Investments

- Low correlation with traditional assets.
- Influenced by factors like adoption, technology, and regulation.
- Increasing correlation with traditional assets may reduce diversification benefits over time.