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.

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

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Permission and Permissionless Networks

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Types of Digital Assets

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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.

4. DIGITAL ASSET INVESTMENT FORMS

Direct Digital Asset Investment Forms

Direct Ownership (On-Chain): Requires a cryptocurrency wallet for secure storage (public and private keys).

Exchanges:

a. **Centralized Exchanges (CEXs):** Most common, offer ease of use but are prone to hacks and regulations.
b. **Decentralized Exchanges (DEXs):** More secure but less user-friendly and may face regulatory challenges.

Risks of Direct Ownership:

- Increased fraud risk (fake ICOs, scams).
- Loss of access to funds if you lose your wallet keys.
- Price manipulation by large holders.

Indirect Digital Asset Investment Forms

Indirect Ownership (Off-Chain):

- Offers exposure to digital assets without needing a wallet or dealing with the blockchain directly.

Types of Indirect Ownership:

- **Cryptocurrency Coin Trusts:** Invest in a pool of cryptocurrency held by a trust, similar to a mutual fund. (No wallet needed, but may have high fees.)
- **Cryptocurrency Futures Contracts:** Agreements to buy/sell crypto at a future price (cash settled, involves leverage and volatility).
- **Cryptocurrency ETFs:** Track the performance of digital assets using derivatives, offering diversification but not directly owning the asset.
- **Cryptocurrency Stocks:** Invest in companies involved in the digital asset space (exchanges, miners, blockchain tech).
- **Hedge Funds:** Offer various strategies for indirect digital asset exposure, including mining Bitcoin.

Digital Forms of Investment for Non-Digital Assets

Asset-backed Tokens: Digital tokens representing ownership of real-world assets (gold, real estate, stocks).

- **Benefits:** Increased liquidity (fractional ownership), transparent records, lower costs.
- Regulated as securities due to underlying asset ownership.

Decentralized Finance (DeFi): A movement creating open-source financial applications on blockchain.

- **Decentralized Applications (dApps):** Blockchain-based apps for various financial functions (lending, trading, etc.).
- **Smart contracts:** Automate financial activities in a decentralized and secure way.

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.