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# **STRATEGIC DECISION-MAKING IN THE BLOCKCHAIN ERA: THE BLOCKCHAIN BUSINESS INTELLIGENCE FRAMEWORK**

## **Blockchain for Information Systems Engineering (BC4ISE) 2026**

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# WHY DO WE NEED A BLOCKCHAIN BUSINESS INTELLIGENCE FRAMEWORK?

## What are the current challenges? [2, 3]

- Integration of blockchain in an organizational context
- Measuring the business impact of blockchain/decentralized applications (DApp) from a holistic perspective
- Steering of organizations employing blockchain using BC performance data
- Process and tools for usage and analysis of blockchain data in organizations undefined
- Missing link between blockchain chain data and off-chain data for analysis

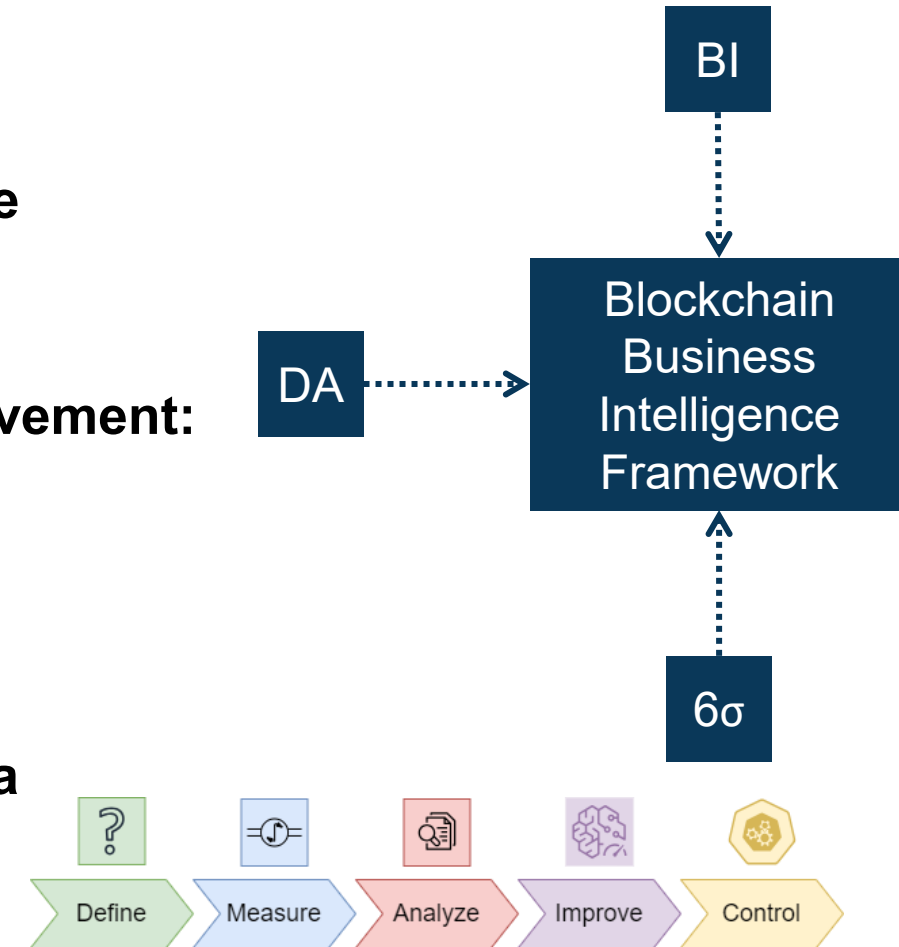
## Solution

- Leveraging data analytics functionalities for blockchain
- Integration of off-chain and on-chain data for combined intelligence gathering
- Mapping of blockchain intelligence on Six-Sigma Quality Management methodology

# WHAT IS BLOCKCHAIN BUSINESS INTELLIGENCE AND WHY DO WE NEED IT?

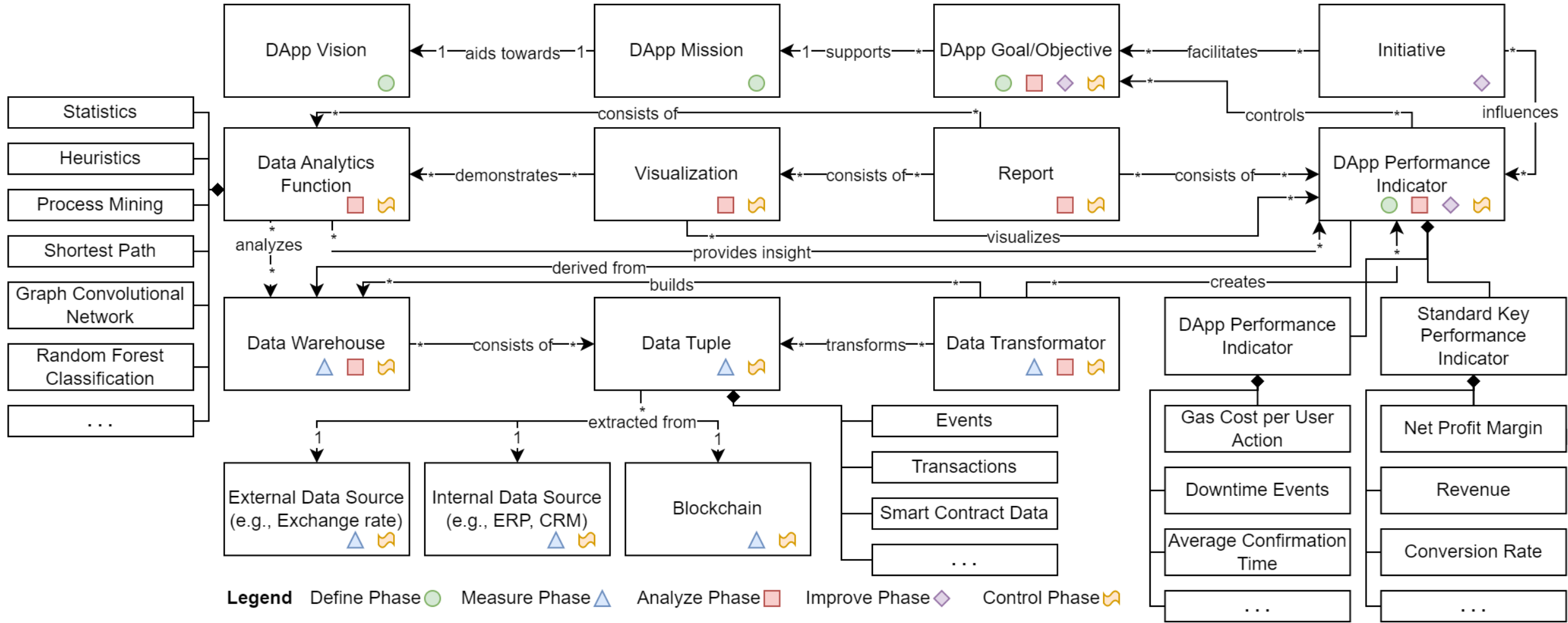
- **Convergence of Business Intelligence and Blockchain**
- **Use of established:**
  - **Business Intelligence methodologies**
  - **Six Sigma continuous improvement process as basis**
  - **Data Analytics techniques**
- **Combination of**
  - **Mult-Perspective strategic considerations (Balanced Scorecard)**
  - **Blockchain data (transactions, addresses, events)**
  - **Off-chain data (CRM, ERP, 3rd party data)**
- **Goal: Embedding of blockchain data in business intelligence practices of an organization**

- **Business Intelligence** [9, 10]
  - Holistic, balanced perspective on vision, goals and KPIs
  - Transforms business data into actionable information
  - Uses reports, KPIs, and visual dashboards
  - Improves strategic planning and operational performance
- **Six Sigma** [6]
  - Methodology focused on reducing defects and variation
  - Uses the DMAIC framework for continuous quality improvement: Define, Measure, Analyze, Improve, Control
  - Enhances quality, efficiency, and customer satisfaction
  - Methodology related to business intelligence practices
- **Data Analytics** [7]
  - Collects, aggregates, transforms, loads off-/on-chain data
  - Uses statistics and predictive models



- **Business Intelligence**
  - **Balanced Scorecard (Vision, Mission, Goal, Initiative, KPI, Report)**
  - **Business Intelligence architecture (Data Sources, Data Warehouse, Data Transformator, Data Analytics Function, KPI)**
- **Six Sigma**
  - **Quality Management (Data Source, Data Tuple, Data Analytics Function, KPI, Goal, Initiative)**
  - **Derivation of application process**
- **Data Analytics**
  - **Extract-Transform-Load process (Data Source, Data Transformator, Data Tuple, Data Warehouse)**
  - **Statistics, ML etc. (Data Analytics Function, Visualization)**

# THE BLOCKCHAIN BUSINESS INTELLIGENCE FRAMEWORK



# THE BLOCKCHAIN INTELLIGENCE FRAMEWORK – DEFINE PHASE



## Purpose

- **Align DApp Efforts: Serves as the core mechanism to ensure all decentralized application initiatives stay unified and aligned**
- **Defines strategic and operational goals for DApps**



## Elements

- **DApp Vision, DApp Mission, DApp Goal/Objective, DApp Performance Indicator**

## Actions

- **Definition/statement DApp vision & mission**
- **Definition of goals supporting achievement of mission & vision**
- **Assigning measuring Performance Indicators for each goal**
  - **DApp Performance Indicator (e.g. average gas cost per booking)**
  - **«Standard» Performance Indicator (e.g. conversion rate)**

## Purpose

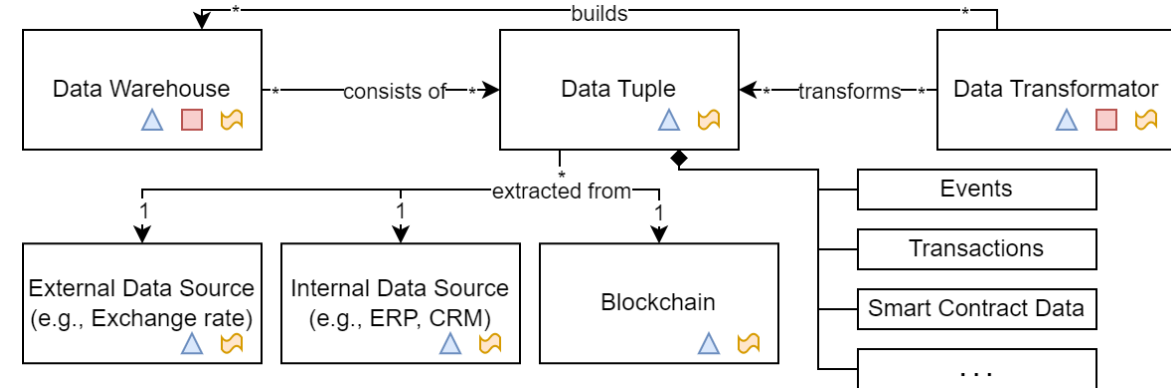
- Extract necessary data from multiple systems and prepare for latter analysis
- “Measure” performance data

## Elements

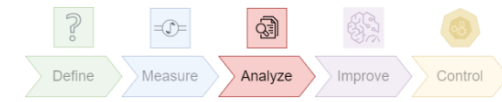
- Internal/External Data source, Blockchain, Data Tuple, Data Transformator, Data Warehouse

## Actions

- Definition of necessary data sources
- Extraction, Transformation and Loading of data



# THE BLOCKCHAIN INTELLIGENCE FRAMEWORK – ANALYZE PHASE



## Purpose

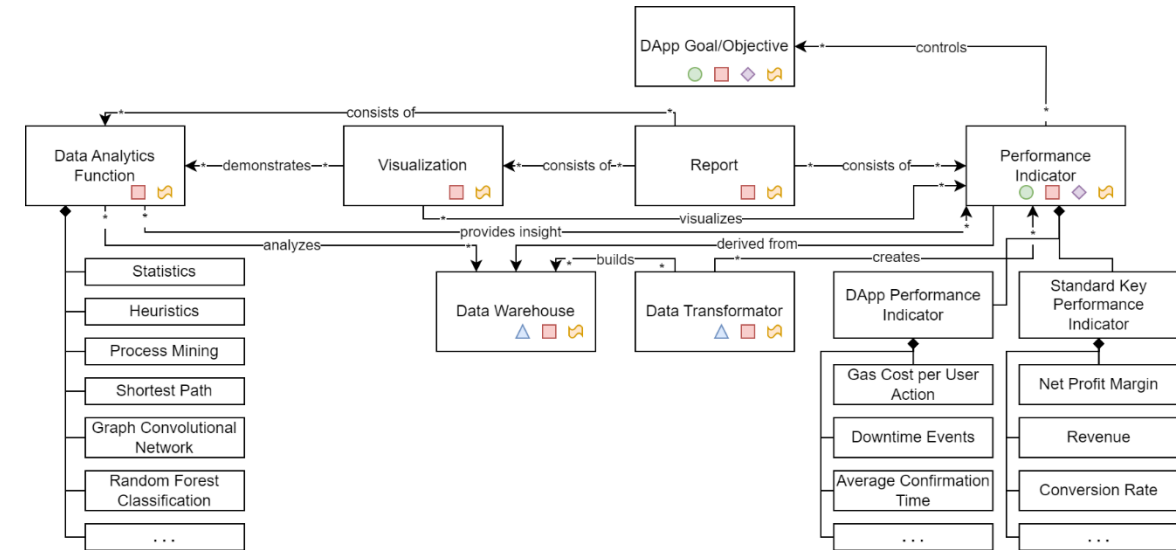
- Extract insights of prepared (measured) data
- Provide user with information (statistics, visual, reports)
- Track progress towards goals/objectives

## Elements

- Data Warehouse, Data Transformator, Data Analytics Function, Visualization, Report, Performance Indicator, DApp Goal/Objective

## Actions

- Analyze data prepared in data warehouse
- Extract and present information



# THE BLOCKCHAIN INTELLIGENCE FRAMEWORK – IMPROVE PHASE

## Purpose

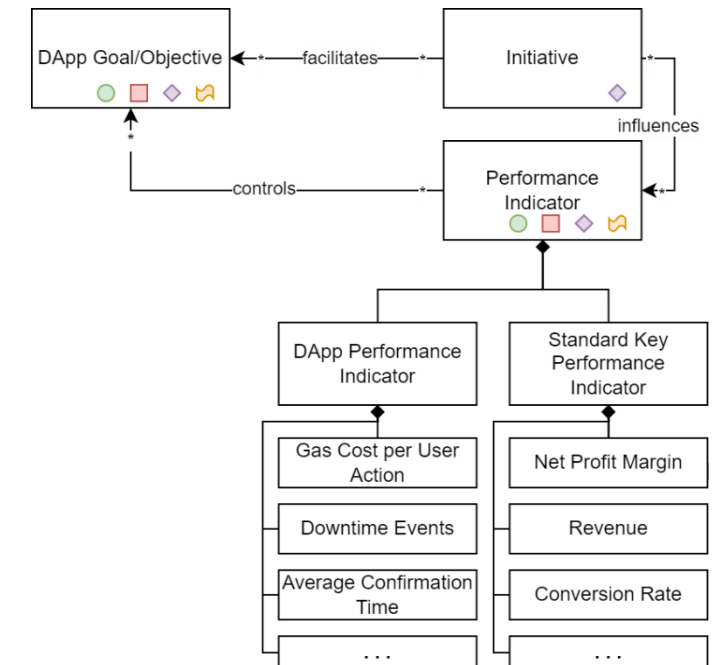
- Decide on improvements based upon analysis results
- Derive concrete initiatives to influence KPIs towards objectives

## Elements

- Data Warehouse, Data Transformator, Data Analytics Function, Visualization, Report, Performance Indicator, DApp Goal/Objective

## Actions

- Interpret data
- Derive improvements
- Implement improvements



# THE BLOCKCHAIN INTELLIGENCE FRAMEWORK – CONTROL PHASE



## Purpose

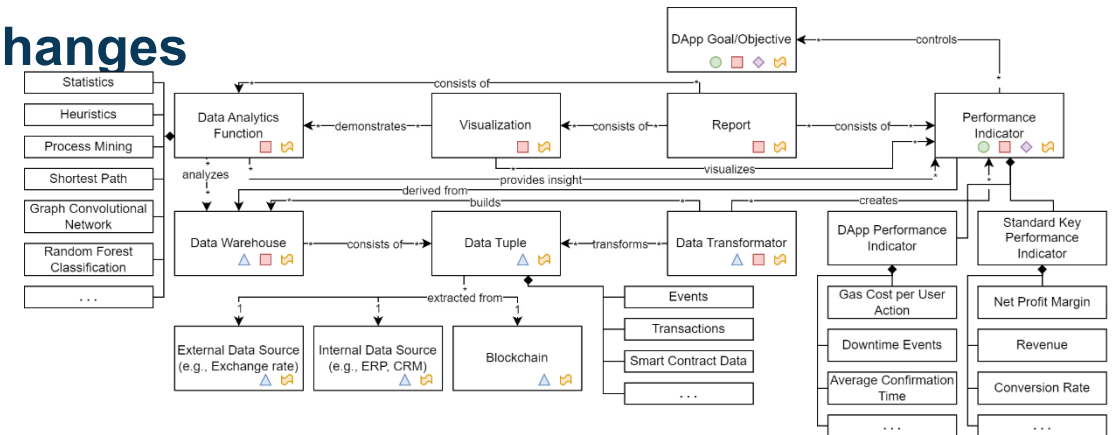
- Verify the effect of the implemented initiatives
- Continuous steering of business efforts toward goal achievement

## Elements

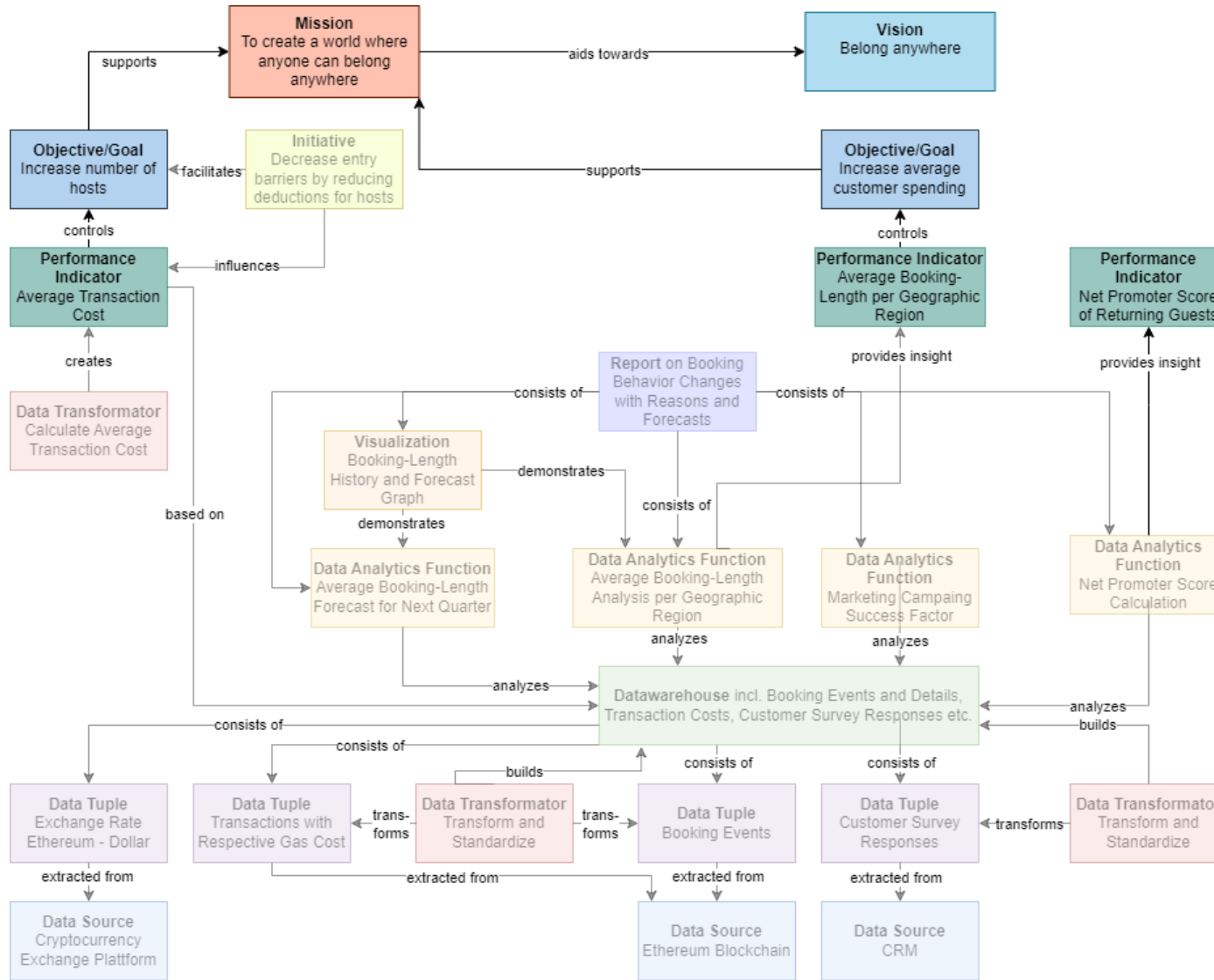
- DApp Goal/Objective, Data Analytics Function, Visualization, Report, Performance Indicator, Data Warehouse, Data Tuple, Data Transformator, External/Internal Data Source, Blockchain

## Actions

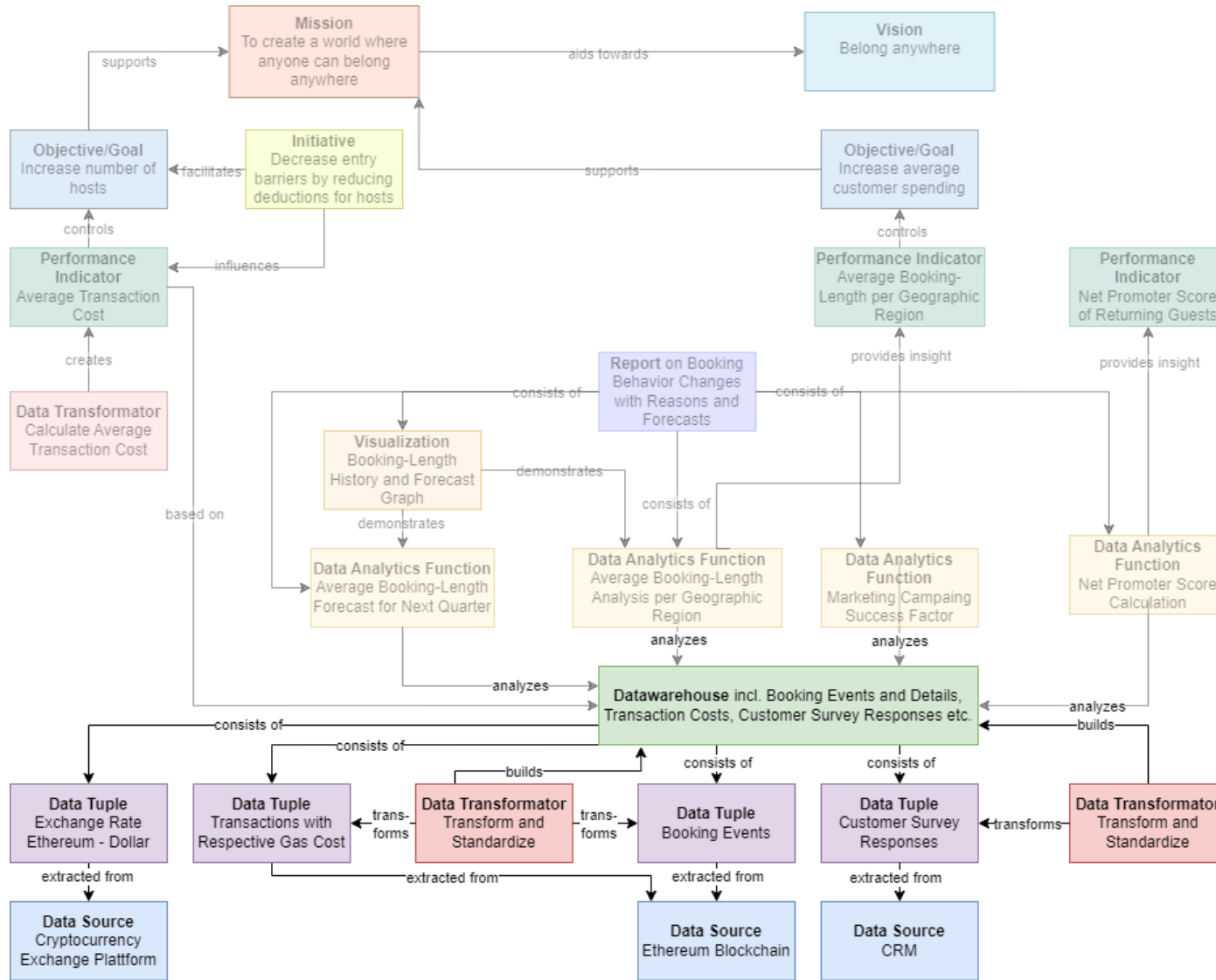
- Ensure executed initiatives bring expected KPI changes



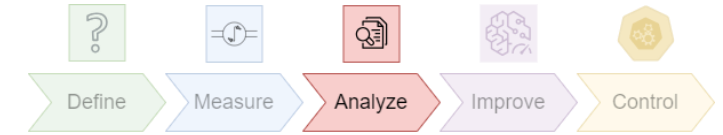
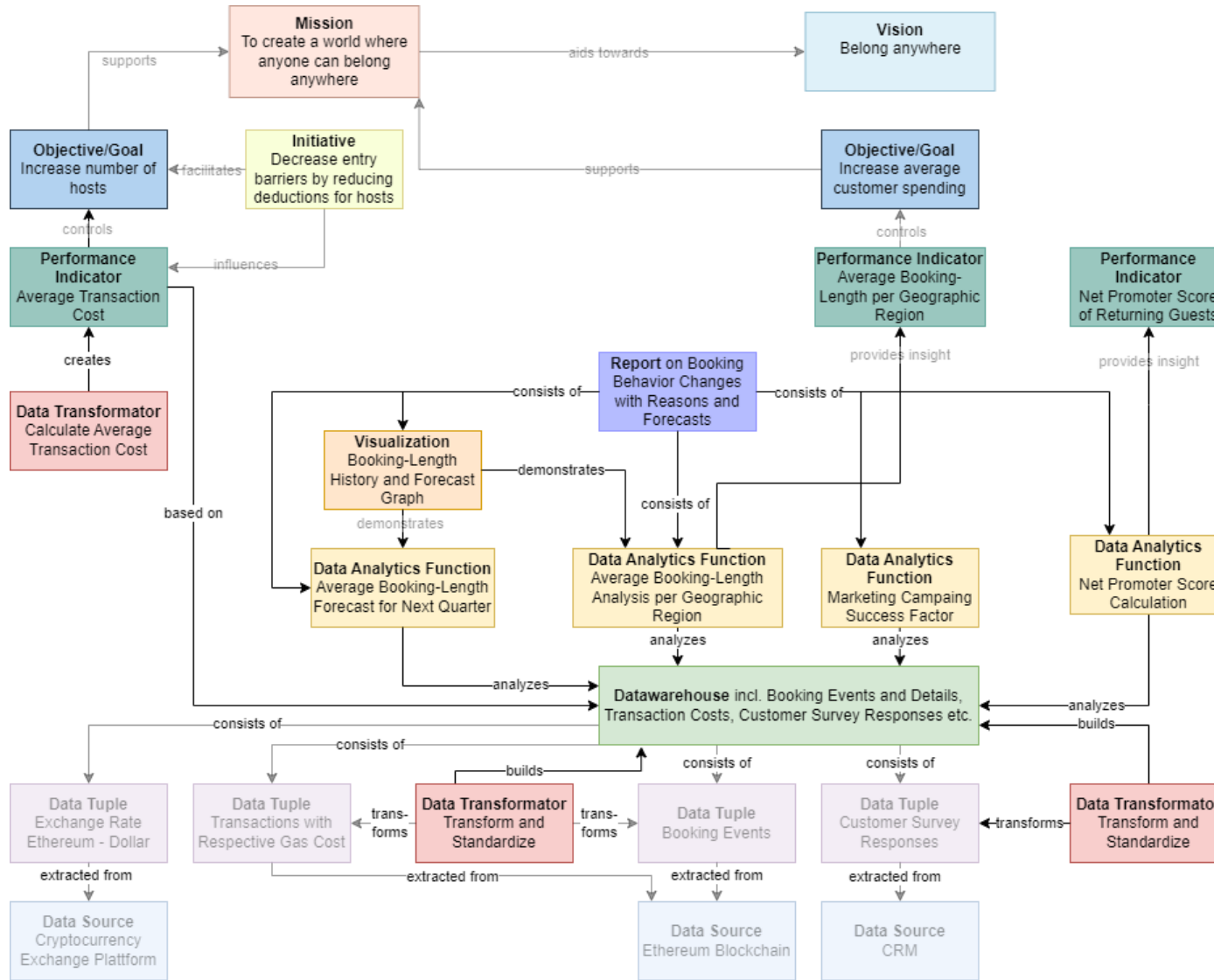
# DEMONSTRATION OF APPLICATION OF THE BBIF – DECENTRALIZED LODGING



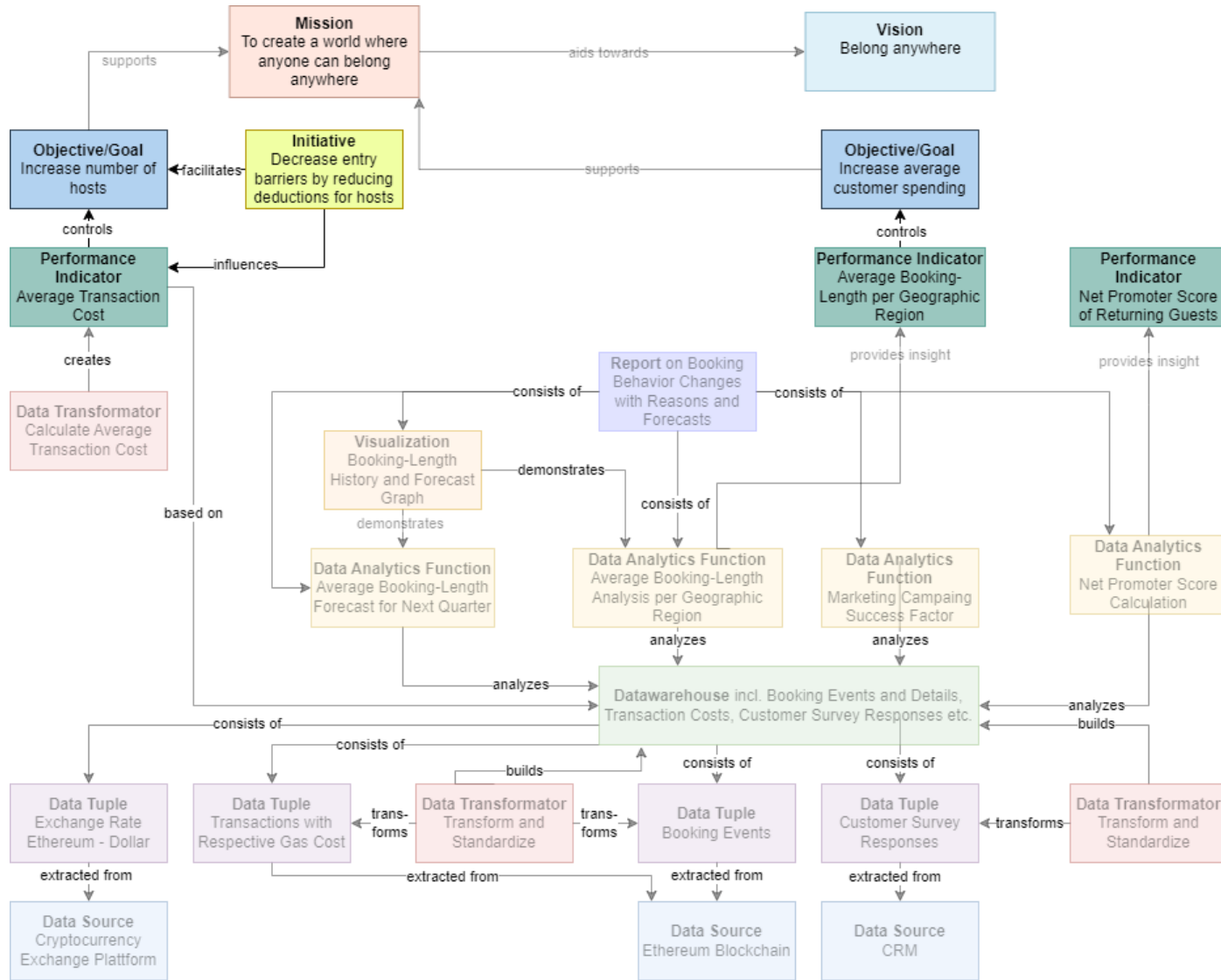
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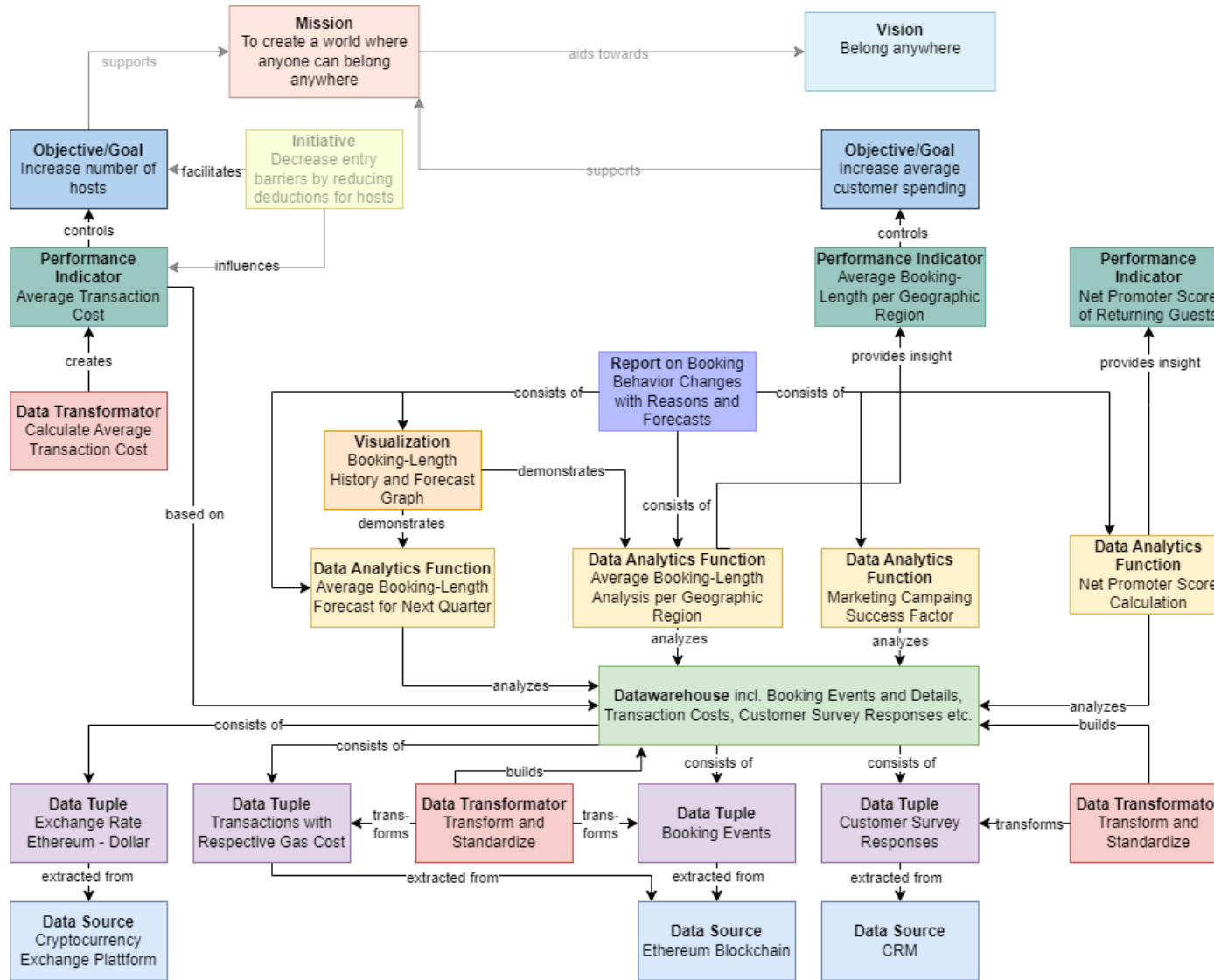
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# CONCLUSION & FUTURE WORK

- **Framework integrating blockchain in business intelligence environment**
- **Integration of blockchain business intelligence in the continuous improvement cycle**

## Limitations

- **Application and usefulness to be verified**
- **Viability of framework and methodology in organizations**
- **Adaptations needed for automated analysis**

## Future Work

- **Further development of the framework into a conceptual modeling method**
- **Development of a low-code modeling tool for automated analysis and steering**

# QUESTIONS? / DISCUSSION



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