❖ Experiment Design

1. **Define Scope**
    a. **Define Objectives:** To test metrics between a centralized and decentralized database within Tryton ERP

    b. **Define Metrics:**
        i. Ratio of Data to Errors
        Ratio R = Total Data Acquired: Number of Errors
        Percentage = [100 – R]
        ii. Transaction Entry Time = (Time When Transaction is Entered – Time When Transaction Appears on the Database)
        iii. Transactions Per Minute TPM = Number of Transactions Counted in 60 seconds
        iv. Throughput = Transactions on Database / 60 seconds
        v. Total Database Size = Total Amount of Disk Space for Database
        vi. Used Memory = Amount of Disk Space the Database Uses
        vii. Free Memory = Amount of Disk Space the Database isn't Using

2. **Define Methodology**
    a. **Two Systems:** Centralized (Control) vs. Decentralized (Test)
    b. **Use Case Selection:** The same scenario will be applied to both systems and metrics will be captured & compared
    c. **Data Acquisition:** Collect metrics from both ERPs
    d. **Data Analysis:** Qualitative & Quantitative
        i. **Quantitative:** Real data sets
        ii. **Qualitative:** Useability, adaptability and reliability

3. **Centralized Supply Chain**
    a. **Software Selection:** Tryton ERP
    b. **Installation/Configuration:** Deploy ERP within a controlled testing environment.
    c. **Data Entry:** Automated Stock & Real-Time Inventory
    d. **Workflow:** The path the product takes through the supply chain (from the original supplier to the destination whether that be consumer or wholesaler)

4. **Decentralized Supply Chain**
    a. **Software Selection:** Modified Tryton ERP
    b. **Blockchain:** Ethereum
    c. **Installation/Configuration:** Deploy ERP within an Ethereum testing environment
    d. **Data Entry:** Automated Stock & Real-Time Inventory
    e. **Smart Contract Development:** Code and deploy smart contracts using the Truffle framework

5. **Experimentation Phase**
    a. **Both ERPs will generate the same inventory. They will share the same locations, suppliers, logistics, Etc.**
    b. **Program to Display Metrics (Python)**
        i. **Front-End API for both PostgreSQL & Ganache**
        ii. **Window will display metrics from each database**
        iii. **Quantitative & Qualitative Analysis**
        iv. **Compare data via additional formulas, tables, graphs and charts (visualization)**