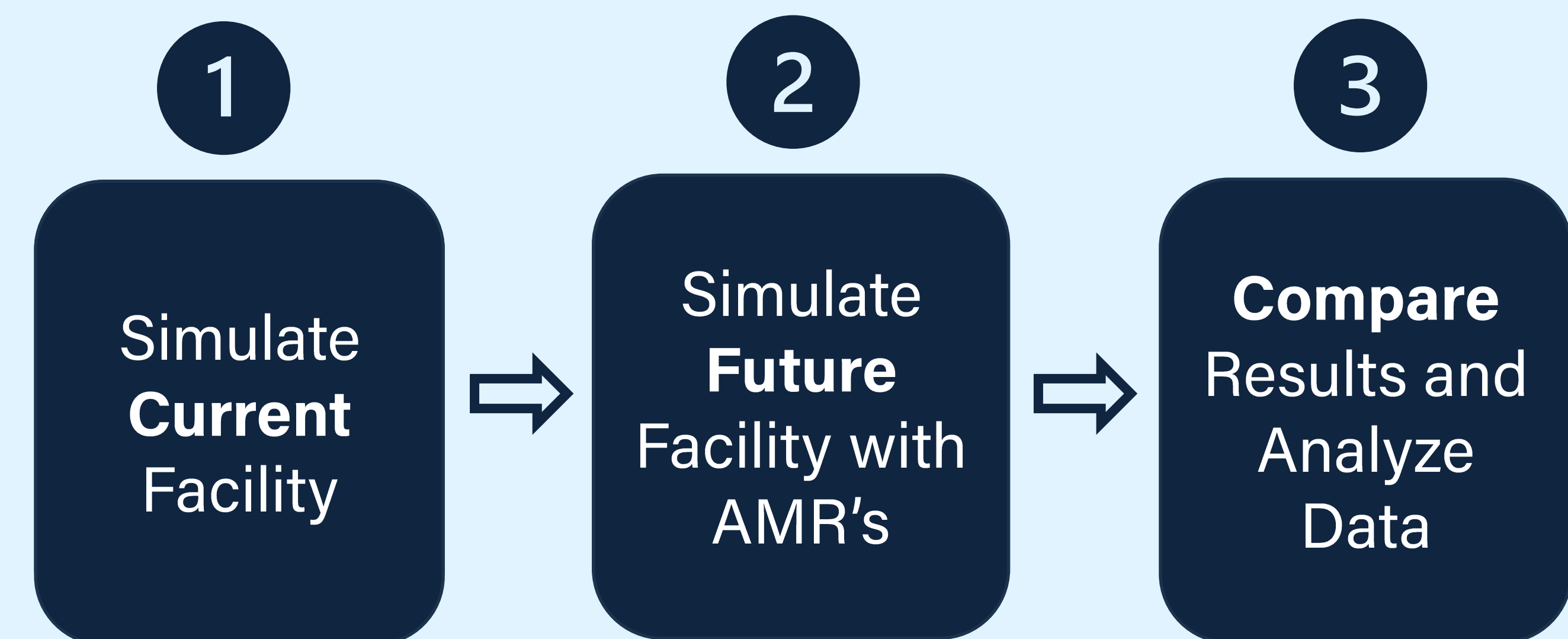


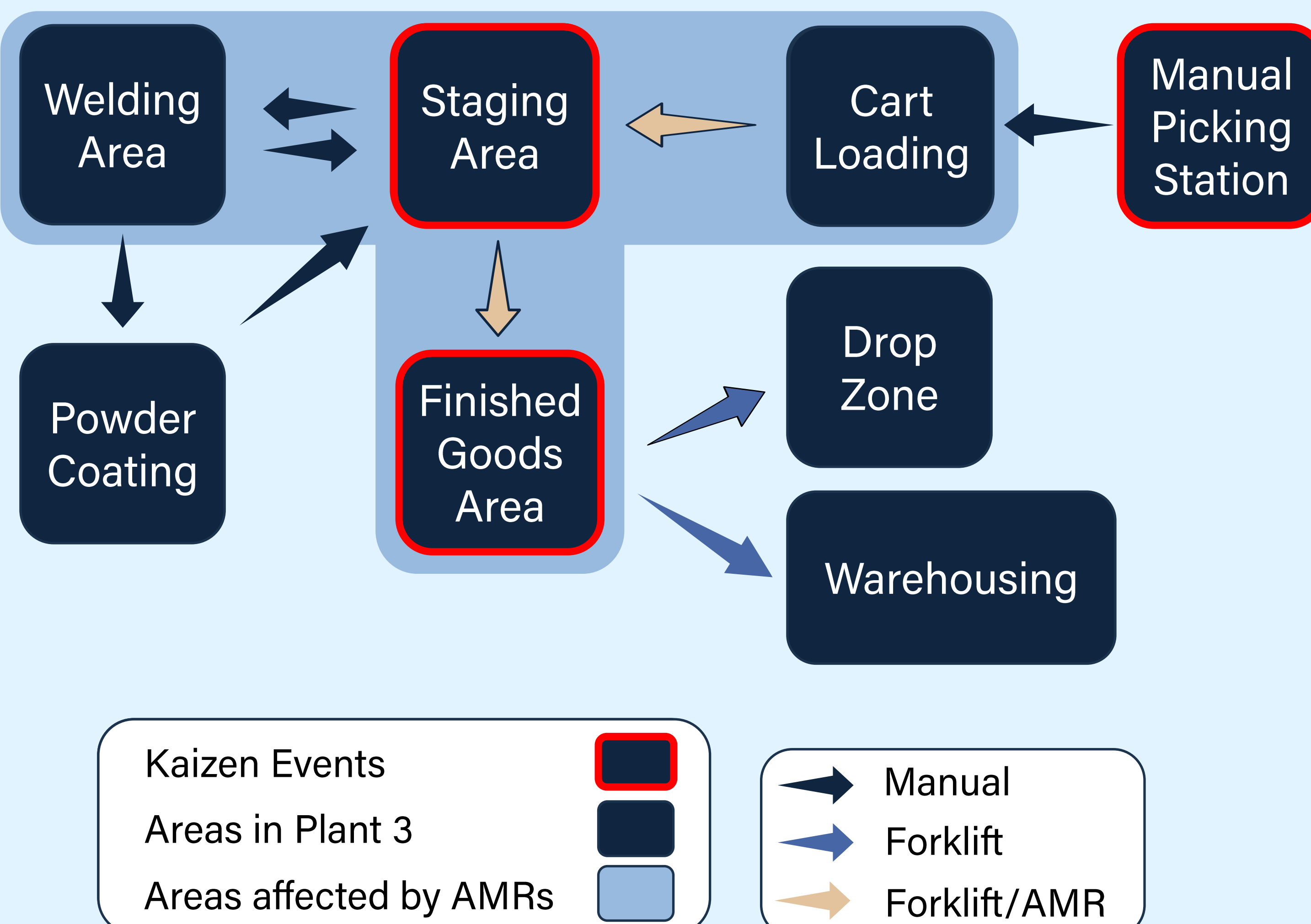
PROBLEM STATEMENT

BraunAbility lacks a digital twin simulation model to accurately predict how AMR implementation within their plant will affect production, space savings, and fulfill their Just-in-Time objectives. BraunAbility's CapEx team cannot currently model operations to assess ROI timeline and scalability. Without optimizing AMR utilization prior to their arrival in June 2025, the company risks production inefficiencies and safety concerns.

PROJECT PHASES

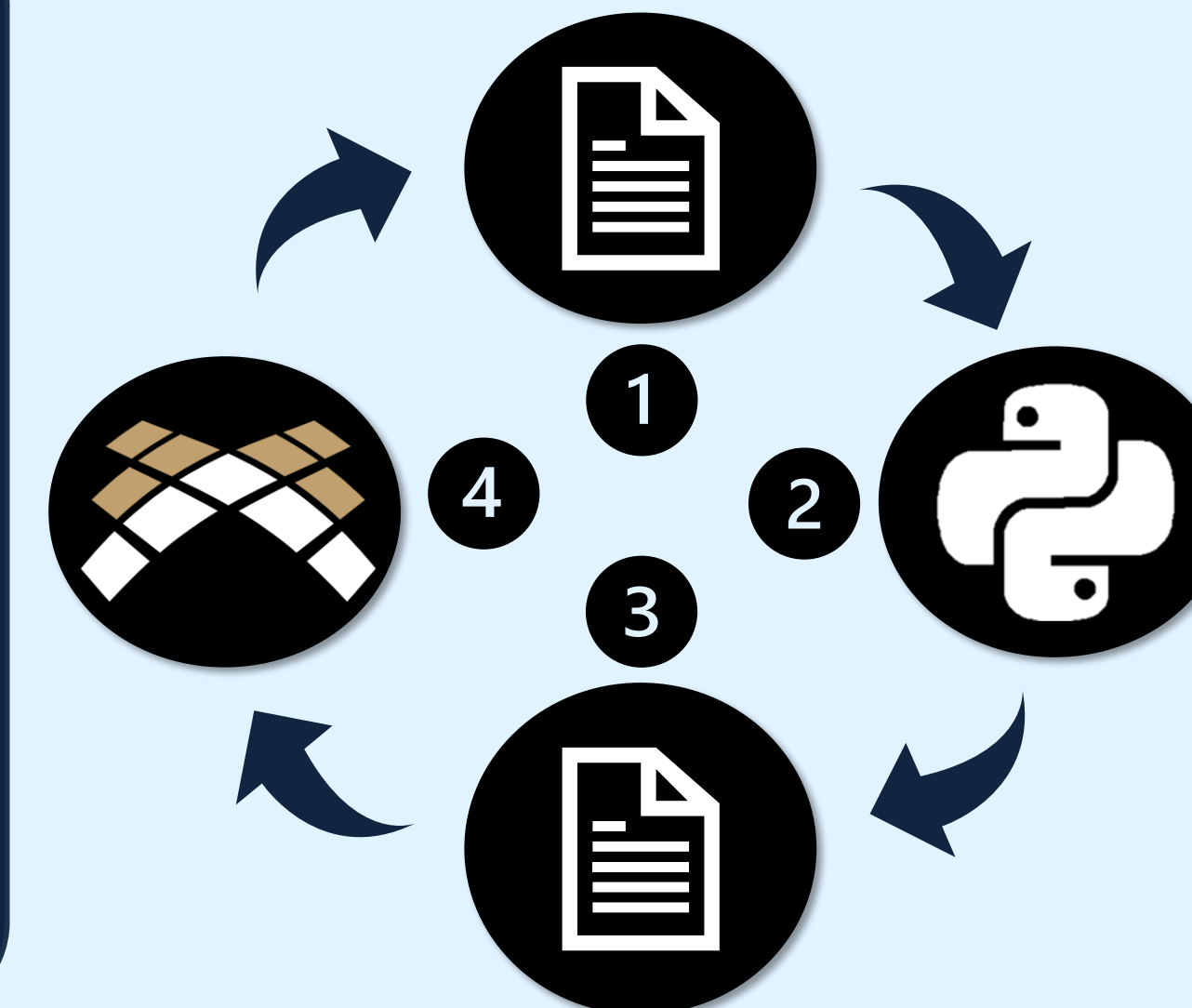


CURRENT STATE

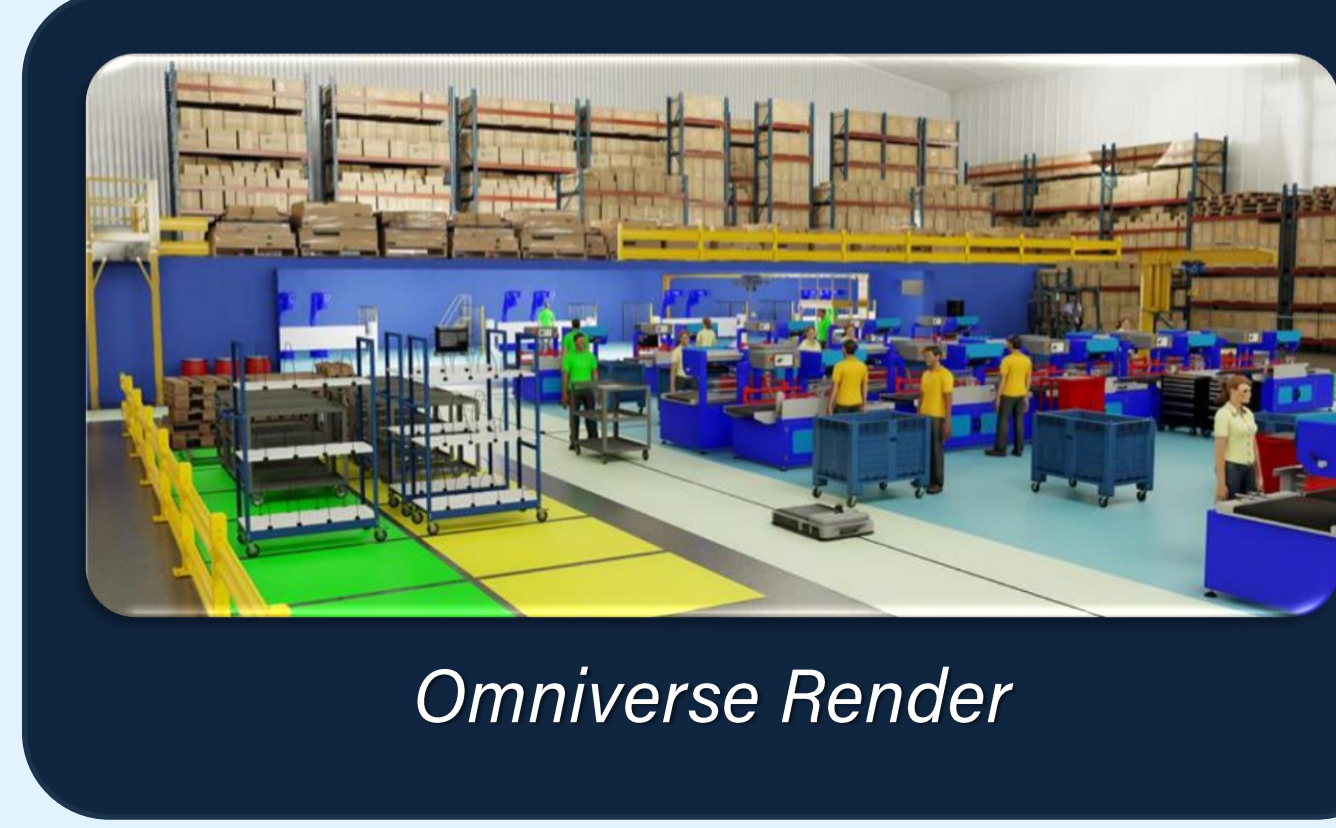
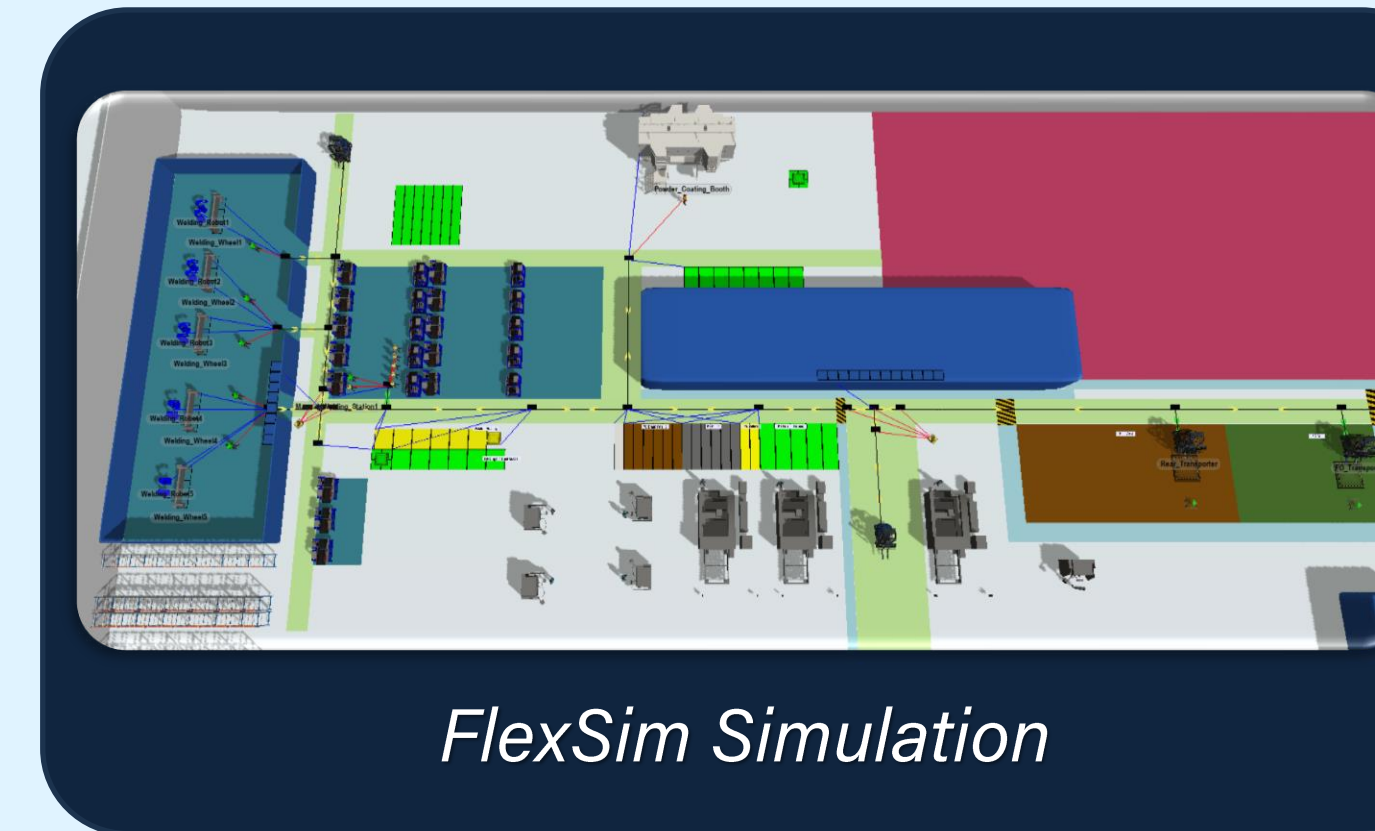


METHODOLOGY

1. **FlexSim** outputs standardized **Excel** file for **Python** input.
2. **Python** optimizes sequences.
3. **Excel** file output serves as **FlexSim** input.
4. **FlexSim** runs simulation.



DIGITAL TWIN

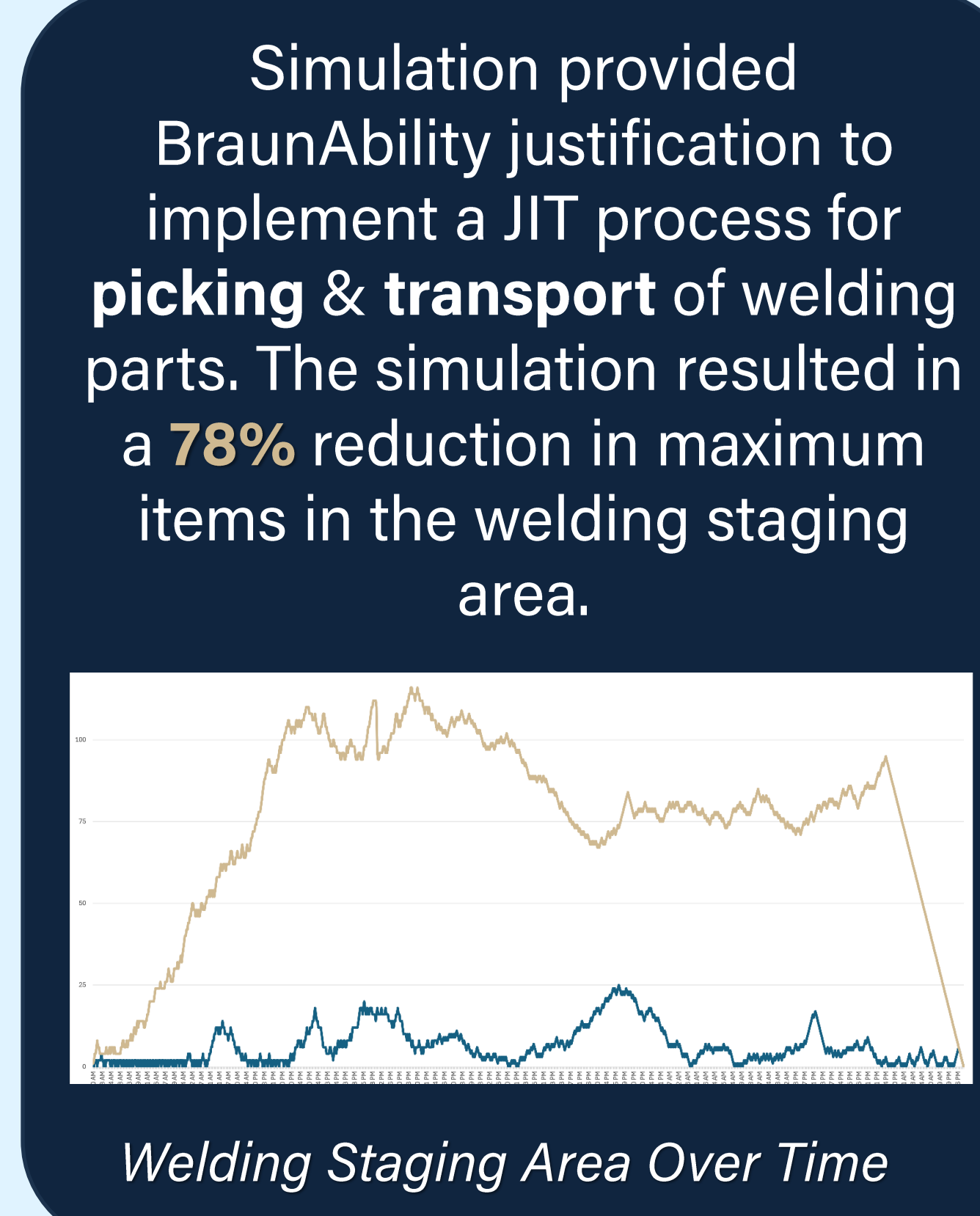


```

9. FOR each job:
  a. ADD Picking Time (from merged data)
  b. SET Transport Time to constant value
  c. CONVERT estimated production hours to seconds for Production Time

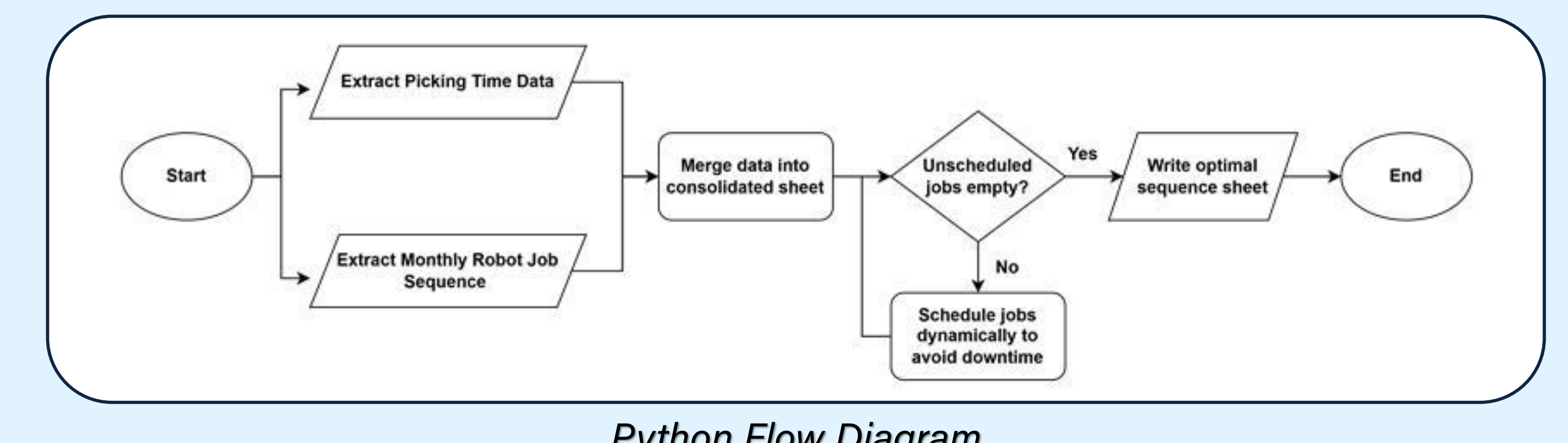
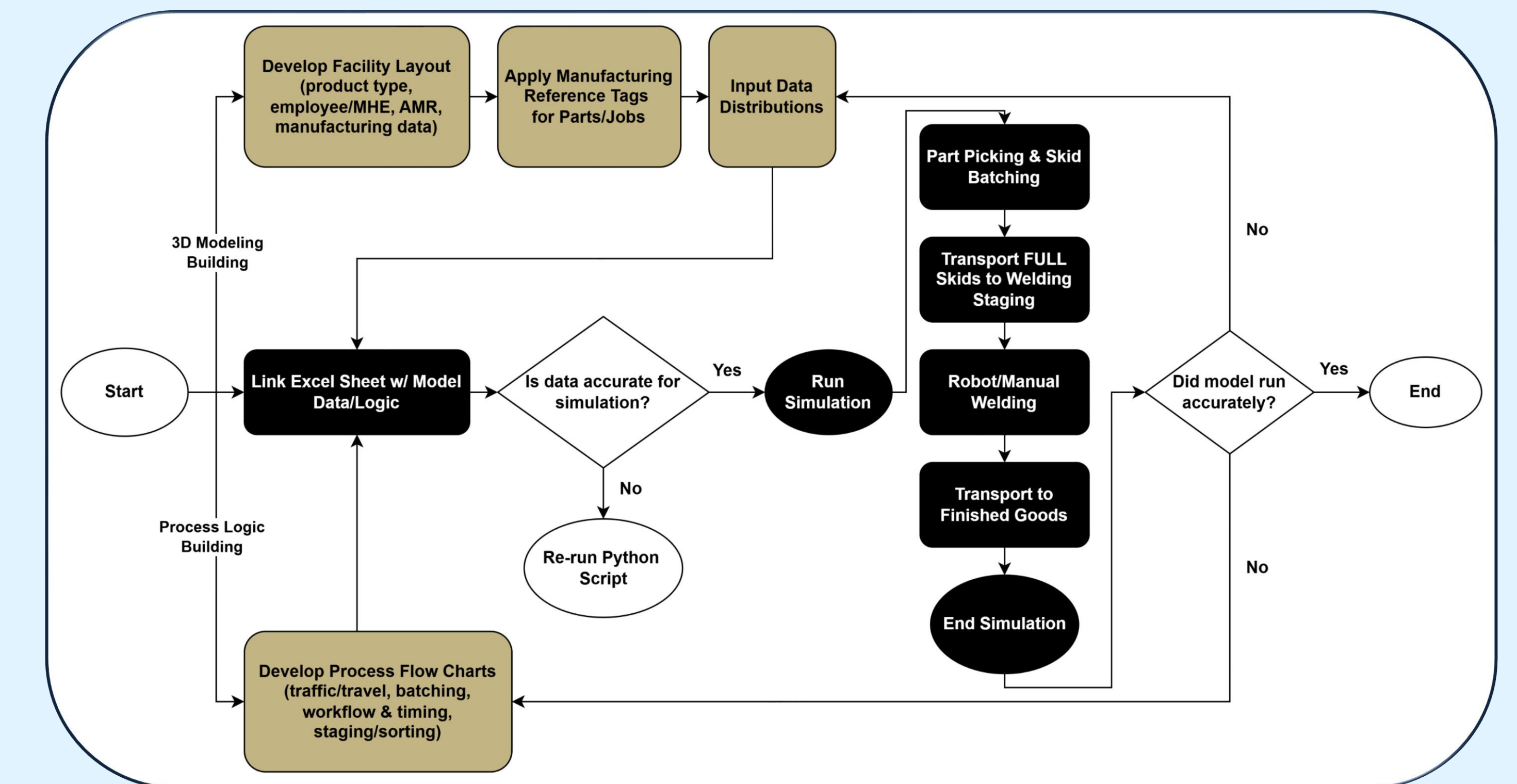
10. INITIALIZE:
  a. Unscheduled job list
  b. Picker availability times by operation code
  c. Robot availability times by operation code
  d. Picker and robot idle time trackers
  e. Transporter availability (3 transporters)
  f. Final job scheduling results list
11. WHILE there are unscheduled jobs:
  FOR each unique operation code:
    a. GET jobs for this operation code
    b. SET robot and picker available times
    c. FIND the job with the earliest possible production start time:
    FOR each job:
      i. CALCULATE when picking starts and ends
      ii. FIND earliest available transporter and calculate transport timing
      iii. CALCULATE when production can start and end
      iv. IF this job starts production earlier than previous best:
        STORE job as best candidate
    d. IF a job was selected:
      i. UPDATE picker, robot, and transporter availability
      ii. ADD scheduled job to results list
  12. SORT the final scheduled jobs by picking start time
  13. EXPORT final schedule to a CSV file
END
  
```

Python Optimizer (Pseudo Code)



Yearly Operational Cost Reduction

\$344,000



CLIENT FEEDBACK & FUTURE STEPS

"You've put us in a much better position with a digital twin model than we ever thought possible."

- Andrew Roberts (Sr. Director, Advanced Manufacturing)

