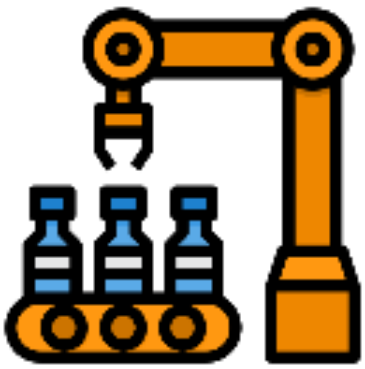
رواد مصر الرقمية

وزارة الاتصـــــالات
وتكنولوجيا المعلومات

Manufacturing Downtime Analysis 2025

Under the Supervision of

Dr. Amal Mahmoud



Project Team:

Nedaa Megahed

Zeinab Shaban

Saber Essam

Mohamed Osman

Mohamed Waleed

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A. Project Planning & Management

1. Project Proposal

Overview:
This project aims to analyze downtime and productivity of a soda bottling production line. Using datasets from production logs, downtime reports, and operator performance, the objective is to identify inefficiencies and their root causes.

Objectives:

- Calculate current line efficiency
- Identify underperforming operators
- Analyze top causes of downtime
- Explore operator-specific error trends

Scope:
The project covers data from batch production records, operator shifts, product types, and downtime factors logged in the system.

2. Project Plan

Timeline Overview (Gantt Chart Suggested Tool: Excel/Power BI/Tableau)

- **December 2024:** Data Collection & Cleaning
- **December 2024:** Exploratory Data Analysis (EDA)
- **January 2025:** Microsoft Excel Dashboard & Insights
- **February 2025:** Microsoft Power Bi Dashboard & Insights
- **March 2025:** Tableau Dashboard & Insights

Milestones:

- Clean data & merge sources
- Calculate KPIs
- Identify patterns & insights
- Deliver dashboard/report

Deliverables:

- Visual dashboard (Excel/Power BI/Tableau)
- Presentation slides

Resources Needed:

- Microsoft Excel, Power BI, Tableau

3. Task Assignment & Roles

Team Member	Roles
Nedaa Megahed	• Clean & analyze data • Microsoft Power Bi Dashboard & Insights
Zeinab Shaban	• Clean & analyze data • Microsoft Power Bi Dashboard & Insights
Saber Essam	• Clean & analyze data • Tableau Dashboard & Insights
Mohamed Osman	• Data Generation using AI • Clean & analyze data • Microsoft Excel Dashboard & Insights
Mohamed Waleed	• Clean & analyze • Microsoft Excel Dashboard & Insights

4. Risk Assessment & Mitigation

Risk	Impact	Mitigation Strategy
Incomplete data	High	Request missing data from team/records
Tool limitations	Medium	Use alternative tools like Excel if Power BI fails
Misinterpreting downtime causes	High	Consult SMEs or supervisors for clarity

5. KPIs (Key Performance Indicators)

- **Line Efficiency:** (Total Time / Minimum Required Time)
- **Operator Efficiency Score**
- **Top Downtime Factors (% of Total Downtime)**
- **Error Type by Operator (Operator Error Patterns)**

B. Literature Review

Feedback & Evaluation – Lecturer's Assessment

- **Data Understanding:** The project shows a clear grasp of production and downtime data across multiple dimensions (batch, operator, product).
- **Tool Usage:** Effective application of Excel, Power BI, and Tableau to extract insights and visualize performance.
- **Presentation:** Report structure is clear and focused on business-relevant KPIs.
- **Recommendations:** Include predictive insights or simulate what-if scenarios for improvement strategies.

Suggested Improvements

- Use **interactive dashboards** to allow filtering by operator, date, and product type.
- Include **real-time data updates** for ongoing operational monitoring.
- Deepen **operator performance reviews** with benchmarking against team averages or historical data.

Final Grading Criteria

Criteria	Weight	Notes
Documentation	25%	Clarity, depth, report structure, and insights presented.
Data Implementation	25%	Data cleaning, merging, calculations, and logic.
Dashboard/Visualization	20%	Use of Power BI/Tableau, interactivity, clarity of visuals.
Testing & Validation	15%	Accuracy checks, formula testing, cross-validation.
Presentation	15%	Clarity, confidence, delivery of findings.

C. Requirements Gathering

Stakeholder Analysis

Stakeholder	Role	Needs/Concerns
Production Manager	Oversees daily operations	Understand efficiency and downtime causes
Operators	Execute production tasks	Insights into personal performance, avoid penalties
Quality Control	Maintain product quality	Understand how downtime affects quality output
IT/Data Team	Maintains systems/tools	Data integration, dashboard deployment
Senior Management	Strategic decision-makers	High-level KPIs, cost of inefficiency

User Stories & Use Cases

User Story 1:
As a Production Manager, I want to view operator performance by batch, so I can identify training needs.

User Story 2:
As an Operator, I want to see the main causes of downtime during my shift, so I can avoid repeated issues.

Use Case Example:
Title: Operator Downtime Overview
Actor: Operator
Description: The system shows downtime reasons linked to their batches in real time.

Functional Requirements

- Import and clean data from multiple batches (Excel).
- Calculate efficiency per batch (actual time vs minimum).
- Summarize downtime per factor and operator.
- Visualize data in dashboards (filters: operator, product, date).
- Export performance reports (Excel).

Non-functional Requirements

Requirement Type	Description
Performance	Dashboards should load within 3 seconds for up to 12 months of data.
Usability	Interface should be user-friendly for non-technical stakeholders.
Reliability	System should accurately reflect batch records and downtime logs.
Security	Role-based access – only managers can see all operators' data.
Scalability	Able to handle additional data sources in the future.