ELECTRICAL ENGINEERING DEPARTMENT
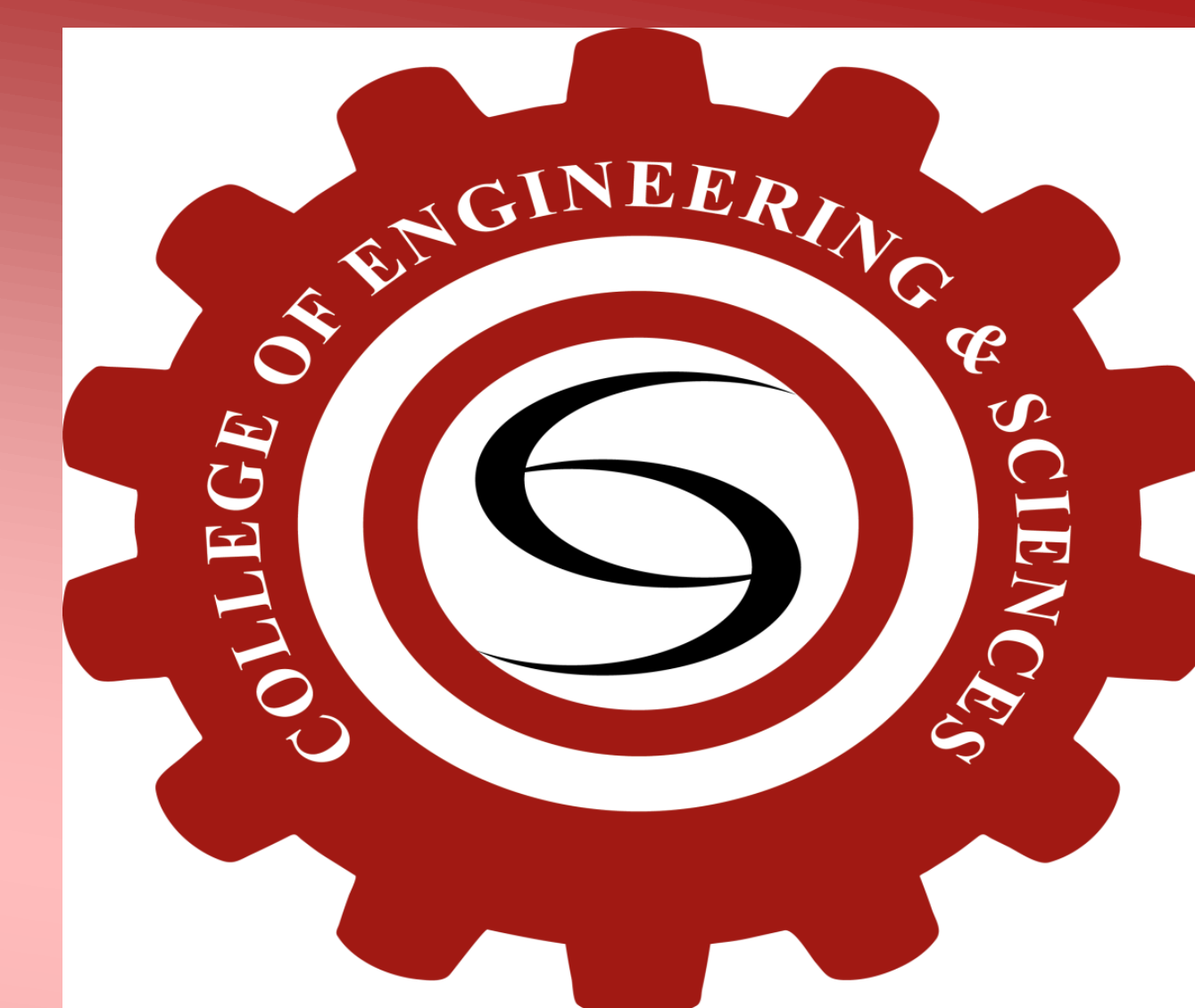# COLLEGE OF ENGINEERING AND SCIENCES
FINAL YEAR PROJECT

SUPERVISOR:
Engr. Tahniyat Aslam

PROJECT:
IoT-Based Garment Manufacturing Management System

GROUP MEMBERS:
Kishore Kumar (20202-27134)
Jeevan Kumar (20202-27138)

ABSTRACT

❖ The garment manufacturing industry often faces inefficiencies and errors due to traditional tracking methods, resulting in delays and difficulties in monitoring production progress. This project introduces an automated system leveraging QR codes and Internet of Things (IoT) technology to enhance operational efficiency, optimize production processes, and ensure real-time data collection and analysis. Our system integrates custom software with an intuitive, user-friendly dashboard accessible to workers, supervisors, managers, administrators, and owners. Key features include a secure login system using JSON Web Tokens (JWT) and QR code generation and scanning. By connecting the customs software with a QR code scanner via an applications programming interface (API), the system facilitates the monitoring of worker's activities and productivity. This IoT-based garment production management system addresses the shortcomings of manual data collection methods, providing stakeholders with valuable insights. The projects aim to improve control over worker's activities, controlling the industry's sustainability and efficiency

PROJECT COMPONENTS AND TOOLS

❖ **Hardware Components:**

1. Arduino UNO (atmega328p)
2. Host Shield (UNO)
3. QR code Scanner (BC1110)
4. WEMOS D1 Wi-Fi Controller (Esp8266)
5. Power Adapter (9V)

❖**Software Tool Used:**

1. **Arduino Ide:** Hardware coding
2. **Frontend:** JavaScript, React.js
3. **Backend:** Node.js
4. **Database:** MongoDB
5. **Security:** Bcrypt for password hashing, JWT for secure token-based authentication
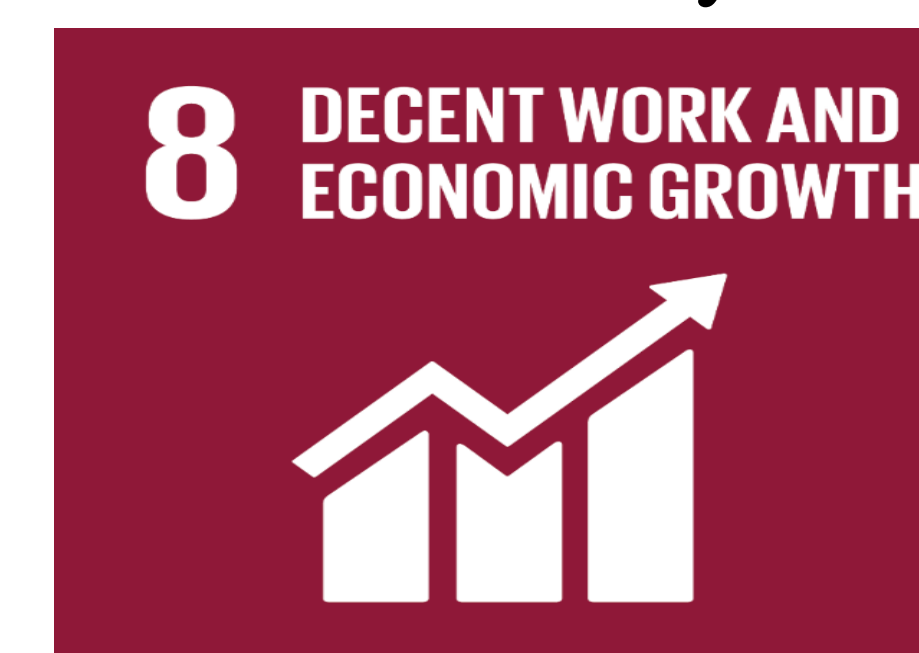6. **Libraries:** QR code. react for QR code generation!

INTRODUCTION

❖ Our project aims to address the inefficiencies in traditional tracking methods by introducing an automated system that utilizes QR codes. Traditional methods of workforce management and production monitoring, often reliant on manual data collection and supervision, have become increasingly inadequate in addressing the complexities of modern manufacturing. The need for real-time insights, predictive maintenance, and seamless coordination among workers, supervisors, and decision-makers has never been more critical. Through real-time data collection, analysis, and visualization, the system empowers workers, managers, administrators, and owners with the tools needed to optimize operations, enhance productivity, maintain quality, and ensure the efficient use of resources. This project uses IoT-Web-based technology to make sure that the tasks of the employees in the garment industry are monitored and controlled. This system also uses the latest technology of the web and IoT for effective communication between management and employees. These two technologies make the project more helpful and efficient.
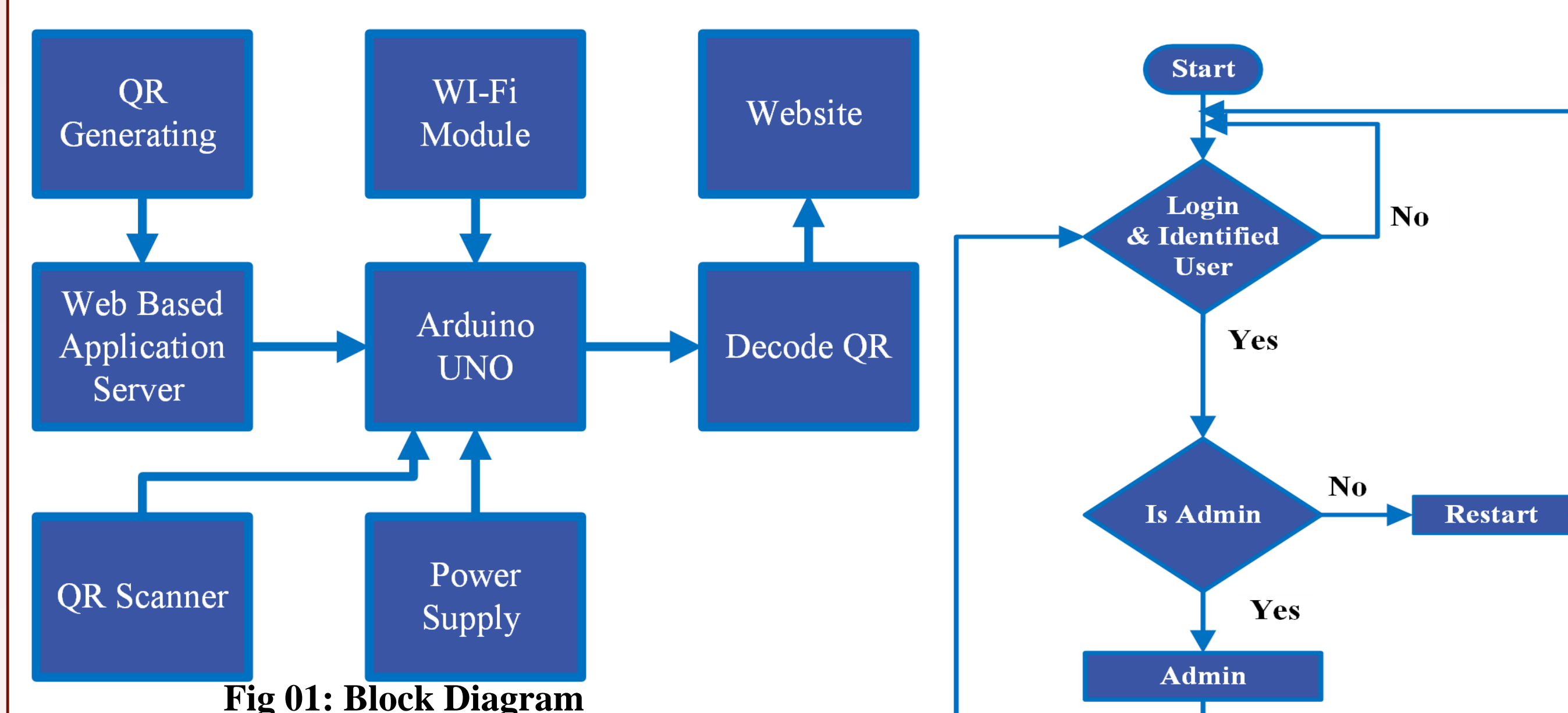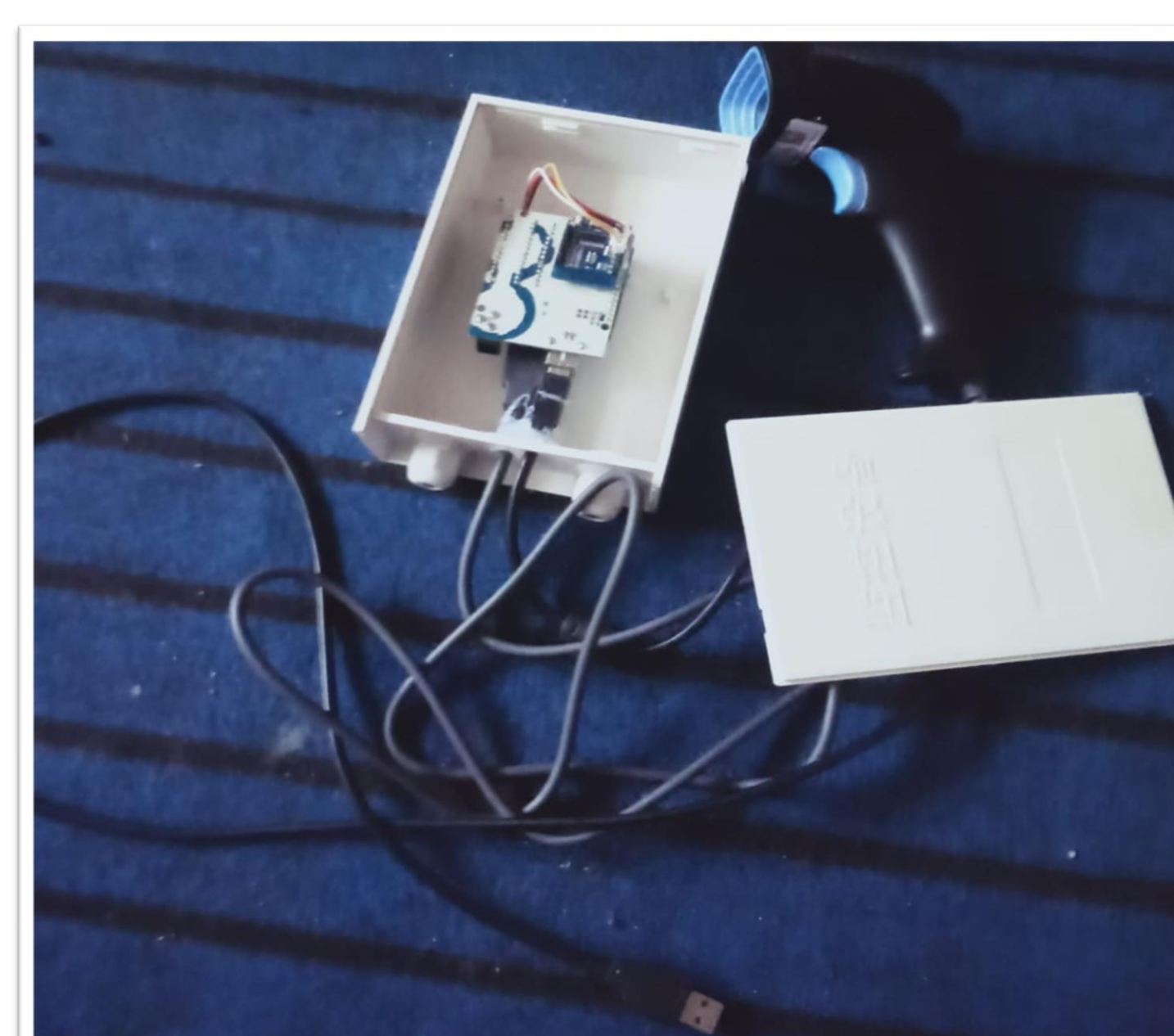
ARCHITECTURE DIAGRAM AND FLOWCHART

Fig 01: Block Diagram

Fig 03: Project Final Hardware

Fig 02: Flowchart

PROBLEM STATEMENT

The garment manufacturing industry faces significant challenges in monitoring workforce tasks in real-time and optimizing production processes. Currently, there is no known real-time system to monitor worker activities, leading to delays in production due to traditional data entry methods. As a result, factory management lacks accurate data on product production from supervisors, hindering the timely completion of orders.

IMPACT & RESULTS (SDGS, CEPS)

❖ **Depth of Engineering Knowledge:** This project requires IoT, software development, and cloud computing expertise to integrate and manage garment manufacturing processes from field-level data collection to cloud-based analytics.

❖ **Depth of analysis required:** Researching IoT and image processing solutions proved too costly. Instead, we decided to implement a QR code-based system using technologies such as QR code generation and scanning, data management software, and cloud storage. This solution is feasible and currently our final approach.

❖ **Familiarity with issues:** The challenges with scanning QR code data via the Application Programming Interface (API), but we ultimately managed to resolve the issue.

❖ **SDGS**

❖ **SDG 08:** Decent Work and Economic Growth.

❖ **SDG 09:** Industry, Innovation and Infrastructure.

INSTITUTE OF BUSINESS MANAGEMENT