Exploring Reediness of the Manufacturing Industry for Industry 5.0

Conor Holmes K00268721

TUS

Aim of the Project

The Aim of the project is to To investigate and evaluate the ways in which Industry 5.0 technologies support manufacturing methods, emphasising the advantages disadvantages and potential opportunities for improving the environment efficiency in the manufacturing industry.

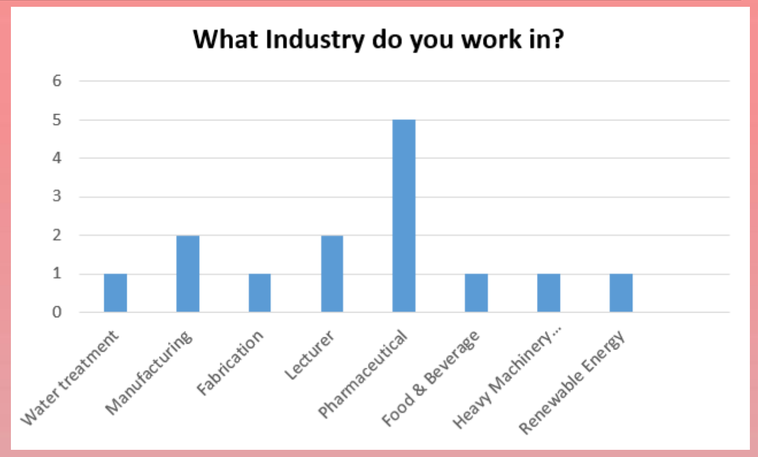
Objectives

1. To conduct a Critical Literature Review to find trends and gaps
2. Establish the benefits and challenges of Industry 4.0 in manufacturing companies
3. Explore the future of manufacturing in an industry 5.0 environment
4. Identify potential advantages, disadvantages and challenges for implementing industry 5.0
5. Look into Online case studies to find practical examples and their challenges

Methodology

This mixed-method approach explored The Effects of Industry 5.0 on manufacturing through an organised framework. A critical literature review found trends and gaps in the field. Online surveys gathered qualitative data from manufacturing professionals about benefits and challenges and other benefits. Semi-structured interviews with industry experts provided qualitative insights into human-centric manufacturing and technology integration. Case studies displayed practical applications, including digital twins in smart factories and predictive maintenance in power plants. The survey responses were analysed using excel and Microsoft forms. This approach ensured a greater understanding and insights into Industry 5.0's impact.

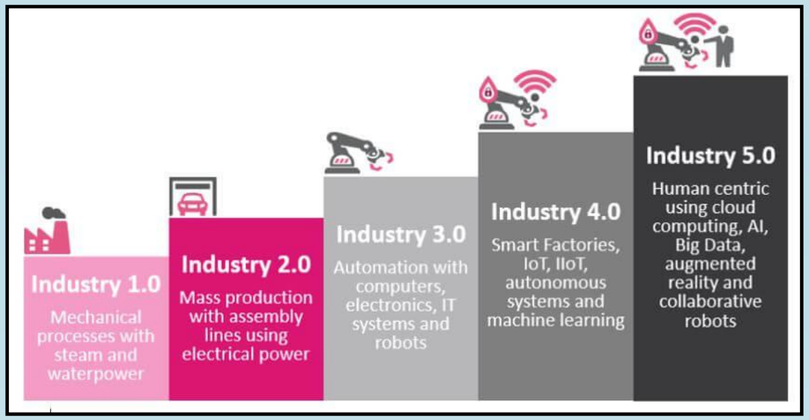
Graph of Industry 5.0 Challenge responses from survey



Industries of survey respondents

Graph of Industry 5.0 Benefits responses from survey

Background



Industry 1.0 to 5.0 explained

- **AI and Big Data** assists in real time analysis and decision making, maximizing processes (Tallat et al. 2024). Two enables industries to reduce resource consumption while maintaining accuracy (Möller *et al.* n.d.).

Background

- **Cobots** are a prime example of industry 5.0 collaboration (Akundi et al. 2022). Designed to work beside humans they improve safety, flexibility and productivity (Tallat et al. 2024).
- **Extended Reality** technologies including Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) could aid training.
- **Edge Computing** strengthen connectivity and computing capabilities (Bazel *et al.* 2024). It minimizes latency by analysing information closer to the source, this makes real time reactions possible.