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IMPROVING PRODUCTION EFFICIENCY THROUGH MES SYSTEMS IN UZBEKISTAN'S AUTOMOTIVE INDUSTRY

Makhmudjonov Muhammadintizom
MBA Student of Turin Polytechnic University in Tashkent
Email: mmaxmudjonov494@gmail.com

Abstract

This research explains how MES systems help improve production efficiency in automotive factories in Uzbekistan. Today, many factories are changing from traditional production systems to digital systems. MES helps companies control production processes, improve quality, reduce mistakes, and increase work efficiency. This study analyzes MES functions used in an automotive manufacturing company in Uzbekistan. The research also explains the main problems during MES implementation such as high cost, old factory systems, and lack of specialists.
At the end, the research gives recommendations for improving production management and digital manufacturing systems.

Introduction

Nowadays, digital transformation is becoming very important for manufacturing companies. Many factories use modern technologies to improve productivity and quality.

The automotive industry is one of the important industries in Uzbekistan. However, some factories still use manual operations and old systems. Because of this, production processes can become slower and less efficient.

Manufacturing Execution System (MES) is one of the important systems used in smart manufacturing. MES helps companies monitor production processes, control

production data, and improve quality management in real time.

The purpose of this research is to study how MES systems improve production efficiency in automotive manufacturing companies in Uzbekistan.

Literature Review

Many researchers studied MES systems and digital manufacturing technologies. According to Kletti (2007), MES helps improve production control and operational efficiency. McClellan (1997) explains that MES supports quality management and communication between machines and production systems.

Modern MES systems usually include:

- Production planning
- BOM management
- Machine monitoring
- Inspection systems
- Real-time reporting

Industry 4.0 technologies such as automation, PLC systems, and IoT are strongly connected with MES systems.

Methodology

This research uses qualitative analysis and system analysis methods.

The study analyzes MES implementation in an automotive manufacturing plant in Uzbekistan.

The research focuses on:

- Production planning
- BOM management
- PLC communication
- Production monitoring
- Inspection systems

Results and Discussion

The research shows that MES systems improve production efficiency in several ways.

First, MES improves production planning and work order management.

Second, MES supports real-time monitoring through PLC communication systems. Operators can quickly see production problems and solve them faster.

Third, MES improves quality inspection and reduces operational mistakes.

However, some challenges still exist. The main problems are:

- High implementation cost
- Old infrastructure
- Lack of MES specialists
- Integration difficulties

Despite these problems, MES creates many opportunities for smart factory development and better production control.

Conclusion

MES systems are very important for modern automotive manufacturing. They help companies improve production efficiency, quality management, and operational control.

Although some challenges still exist in Uzbekistan's automotive industry, MES technologies create strong opportunities for smart manufacturing development in the future.

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