Online Course: Automated Vehicles in Logistics

Lesson 1 Introduction to AGV's

Module 3 Advantages and Disadvantages with AGVs

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Introduction | Advantages and disadvantages

Lesson overview

1. Features of the AGV
   a) 6 Features
2. State of Art
   a) Different types of AGVs; load, speed and environment
   b) Sufficient TRL maturity, to avoid unexpected problems in projects
3. Advantages and disadvantages
   a) When interesting, and when not
4. Use case description

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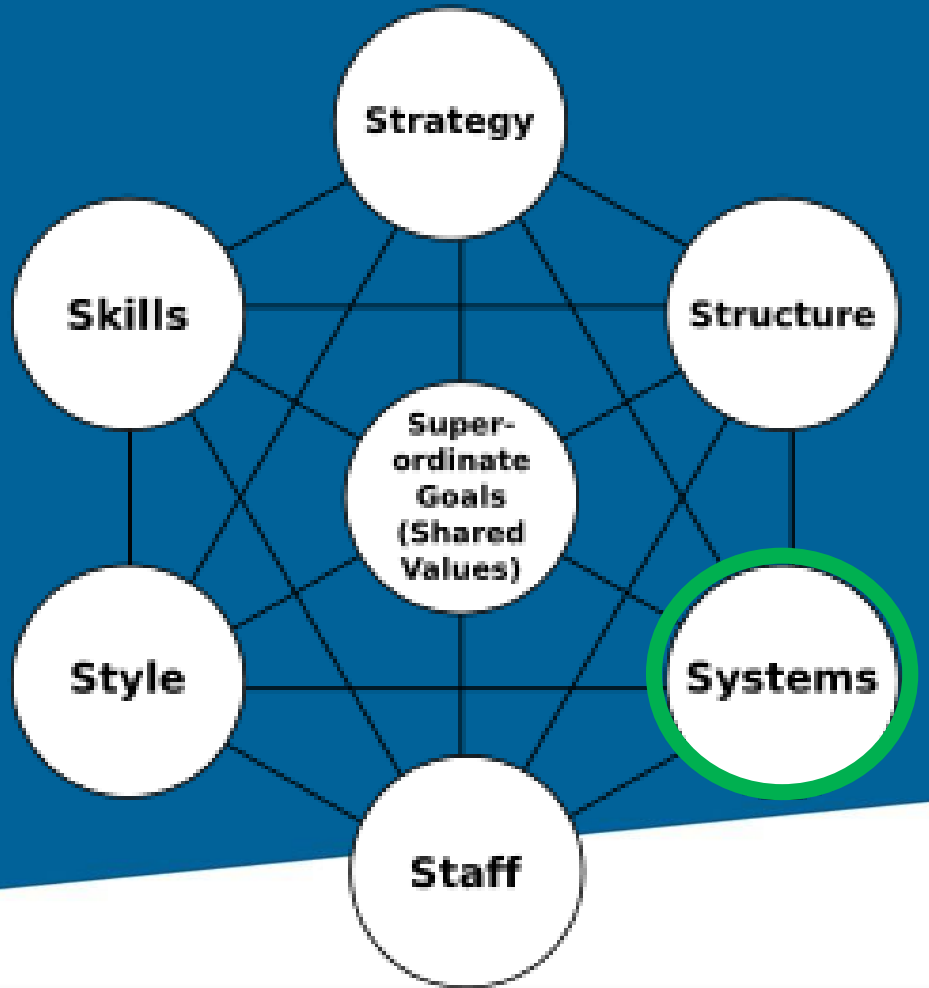
7S Model of Organization, when using an AGV



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Introduction | Advantages and disadvantages

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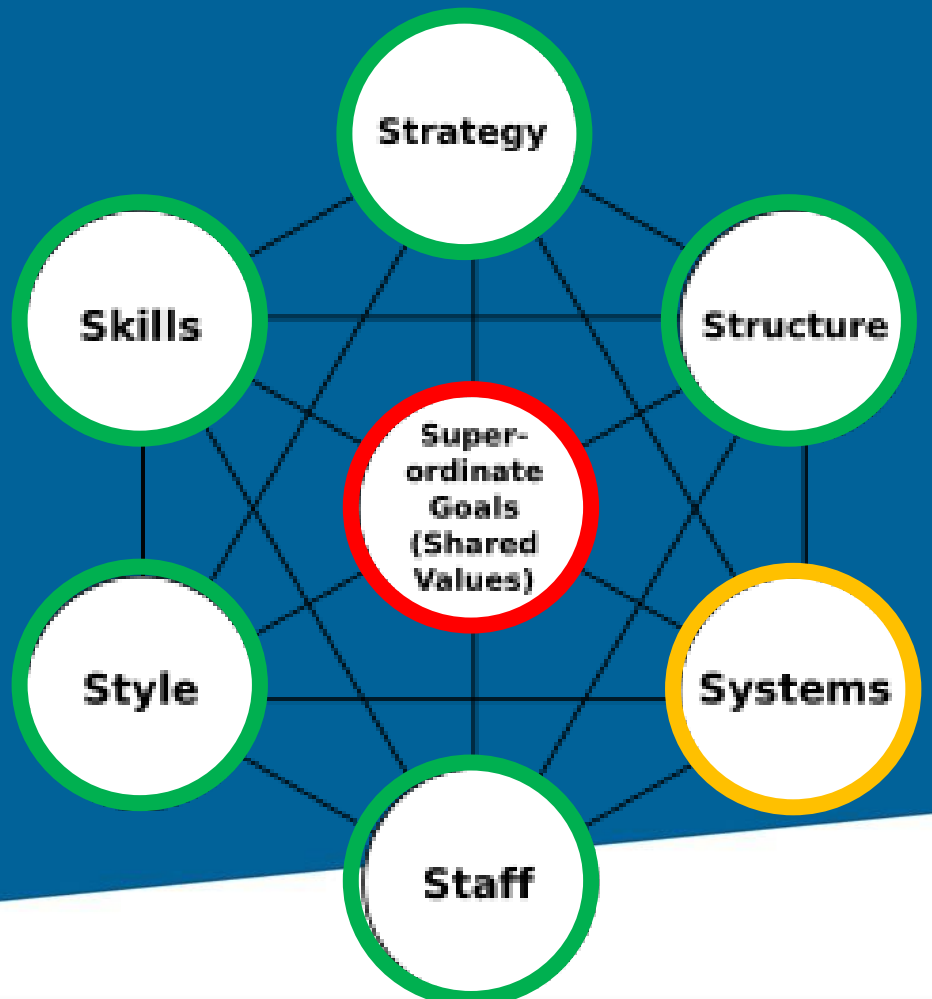

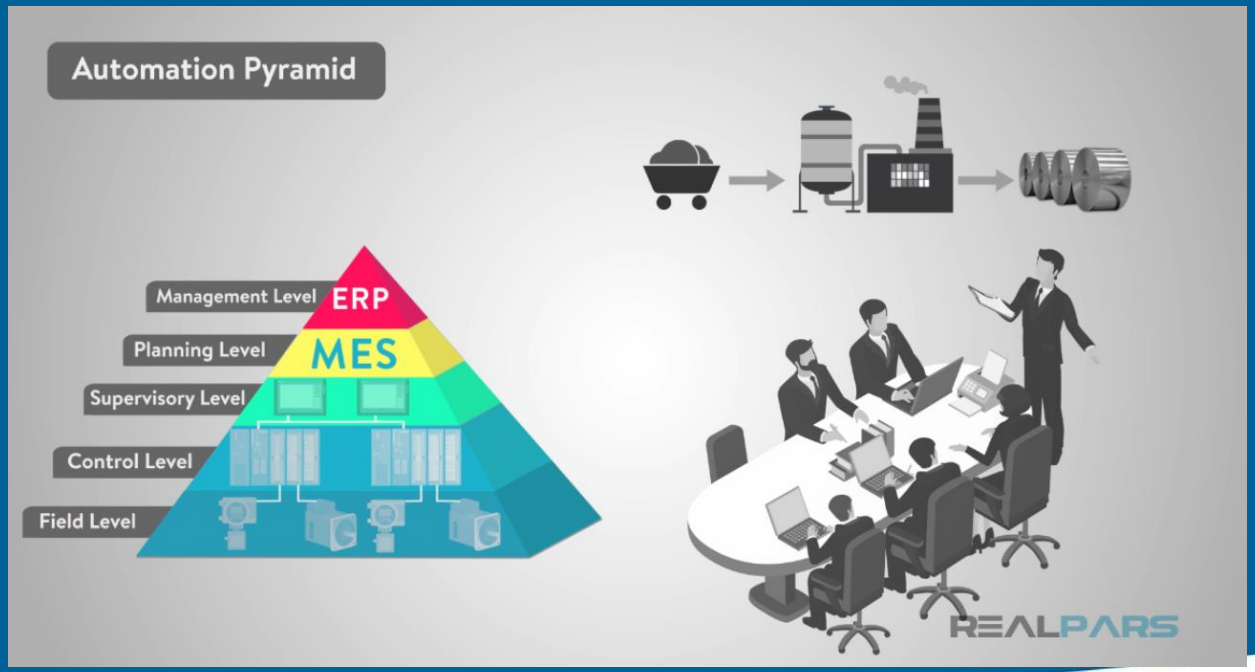

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Introduction | Advantages and disadvantages

Disadvantage; Organization fit

Using AGVs in logistical operations must fit your company as a whole;

- Organization structure based on flow of data, to command and follow up
- Strategy to evaluate performance and do resource planning
- Staff to operate the vehicles
- Skills to analyze data and repair
- Style which promotes evidence based decision making

Outsourcing elements of the operations can be a solution in case of several gaps

Introduction | Advantages and disadvantages

Advantage; 24/7 available logistics

On site logistics are no longer dependent on the presence of a licensed driver, resulting in higher operational effectiveness of continuous manufacturing processes.

- No need to buffer goods in the last shifts
- No need to call drivers during their weekend

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Disadvantage; System failure requires a fall-back solution

The complexity of an AGV and the absence of a “AGV-owner” can result in difficult to understand errors, followed by an unknown period of downtime.

- AGV technology is not as reliable as trucks with drivers
- An AGV can run into unknown failures, requiring specialist involvement for analysis
- AGVs can’t operate under all scenarios
- AGVs have more critical parts then standard trucks

Introduction | Advantages and disadvantages

Advantage; No additional costs for waiting and/or low speed driving

On site logistics are not always balanced. During production, drivers regularly need to wait for a transportation job. The driving speed for on site logistics is relatively low in comparison to truck operations.

- Logistical overcapacity is needed to have a robust production process balance
- Drivers also receive salary during this waiting time
- Driving speed is relatively low
- Average speed of 5-15 kph for on site logistics
- Driver costs are a big portion of the cost per km
- AGV costs are not related to waiting time or low driving speed

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Advantage; Moderate and safe driving style of an AGV

AGVs have a safe and moderate power driving style. When equipped with an electrical driveline, the lifetime expectancy of an AGV can be 3 times the expectancy of a standard truck, and no costs related to damages or accidents.

- Truck drivers regularly go full throttle on the straight
- Also at pick-up and docking drivers have relative high speeds, with limited visibility
- Resulting in more damage and accidents
- AGVs are preferably equipped with an electrical driveline, which has lower maintenance demand
- AGVs have 360 degrees vision around the vehicle
- Final positioning with programmed maximum speed, and sensor vision, does avoid damage and accidents
- Lifetime expectancy of an AGV can be 3x expectancy of standard trucks

Introduction | Advantages and disadvantages

Advantage; Low energy costs for electrical drivelines

Electric AGVs are much more energy efficient than standard trucks, especially if electrical energy is on site generated with own renewable resources.

- Trucks can consume up to 1 ltr of diesel per km, also for heating driver cabin and idle engine running during waiting
- Electric AGVs consume maximum 1 kWh of electricity per km, and eventually no energy during waiting and for heating
- AGVs can recharge automatically, without additional costs for the driver
- With roof installed solar panels, AGVs can provide self-sufficient

energy consumption

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Advantage; Supports continuous improvement of the company

AGVs provide a lot of data, and have many improvement options which become visible after analyzing that data. That continuous evidence based decision making is a solid back bone for decision making in the company.

- Data, analysis and evidence as a basis of decision making
- Instead of internal politics, gut feeling, group thinking or unwilling personnel
- Using AGVs demands a critical organization structure, which is beneficial for all departments in the company.

Introduction | Advantages and disadvantages

Summary

Advantages

- 24/7 available
- No waiting costs > low cost/km
- Moderate driving style > low costs for damage and accidents
- Low energy costs, suitable for self generated renewable energy
- Supports evidence based continuous improvement of the company

Disadvantages

- Organization must fit as a whole
- Long downtime possible with complicated system failures
- Fall-back solution must be available

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Outlook

Module 1.4: Use case description

- How to select viable use cases for AGV operations
- How to describe the specifics of your logistical operations to suppliers

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