



Assessing the feasibility of mobile robots at Sony UK Technology Centre

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Introduction

Sony UK Technology Centre in Pencoed, Wales, is a 30,000 m² electronics plant producing Sony cameras and third-party customer products such as the Raspberry Pi.

It is seen that operators spend hours each week transporting materials, also occupying valuable floor space for storage, driving labour and allocation costs. Mobile robot technology is a potential solution to automate and optimise the material handling process.

Project Aim and Objectives

The project aim is to assess the feasibility of mobile robot technology for material handling at Sony, building the foundations for rollout if viable.



Figure 1 - Raspberry Pi Monitor and 500 [1].

Objectives:

- Analyse current material handling on Pi Monitor and 500 products as a case study
- Evaluate technical, operational, safety and economic feasibility
- Estimate costs and potential savings
- Simulate mobile robot material transport
- Asses scalability for wider rollout

Methodology

The study followed a DMADV Six Sigma framework [2].

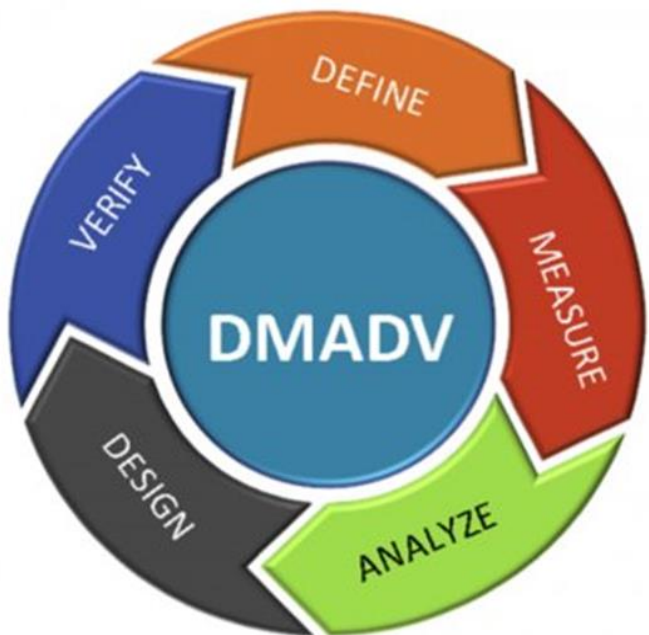


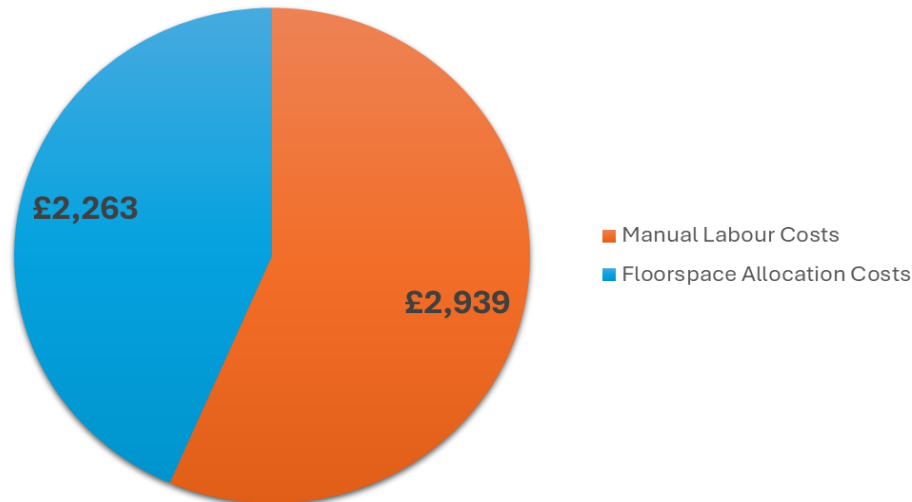
Figure 2 - DMADV Framework [3].

Baseline measurements of the two Pi processes taken, capturing the current material handling process data.

Table 1 – Current material handling data

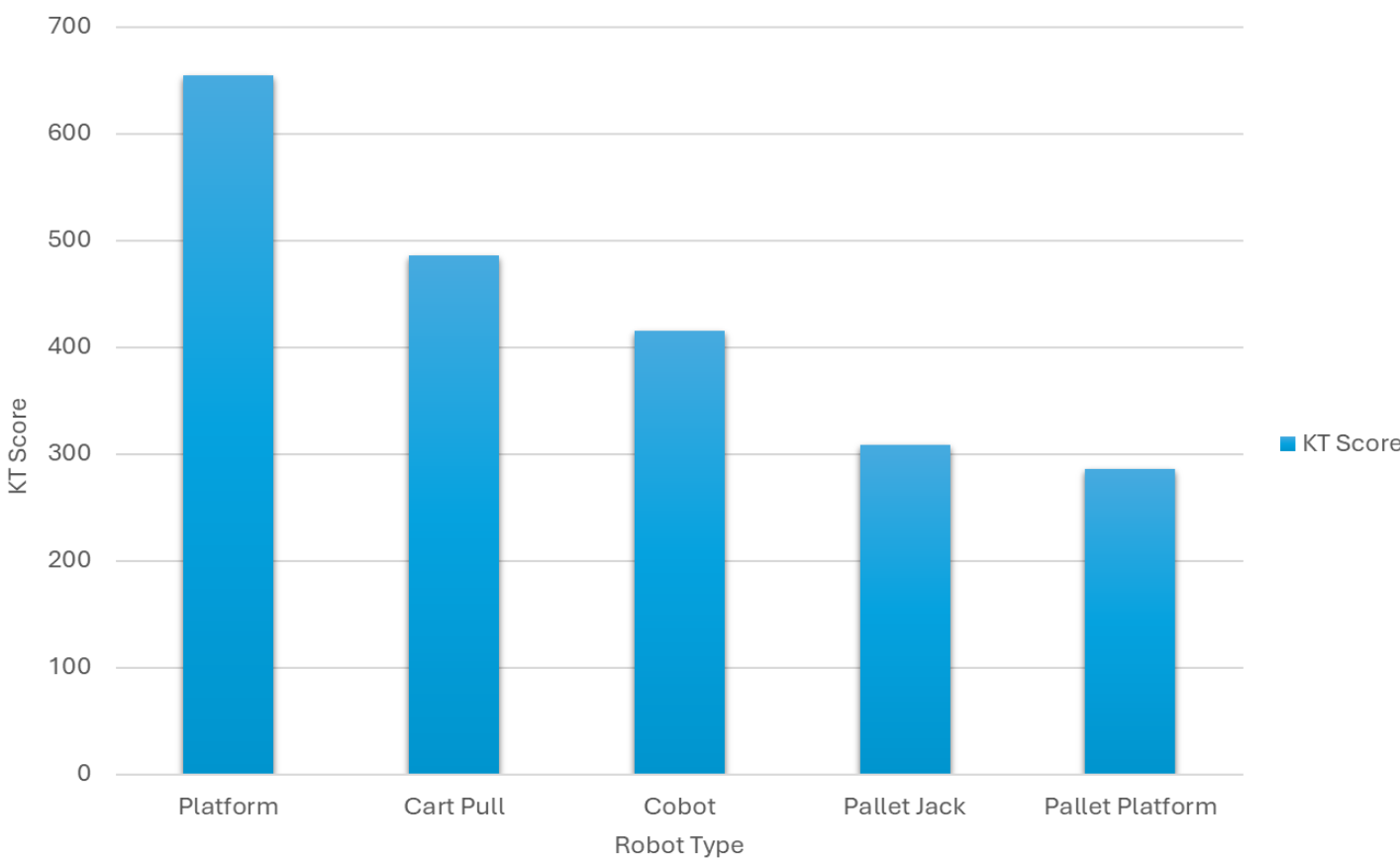
TABLE 1: Current Pi Monitor and 500 Material handling		
Product	Total Distance traveled p/w (m)	Allocate storage space (m ²)
Monitor	13,770	20.4
500	4,590	7.2

Analysis shows the yearly costs of floor space allocation and manual labour, totalling £5,202 for both Pi products.



Graph 1 – Current material handling costs

The Kepner Tregoe decision analysis [4] is effective in highlighting the most suitable robot for the project.



Graph 2 – Kepner Tregoe results for robot type

The platform mobile robot proved the most suitable, scoring the highest.

Reeco Automation, a supplier of mobile robots, provided key data on their platform mobile robot to study feasibility, the LD90.



Figure 3 - LD90 Omron AMR [5]

- | | | | |
|-----------------------|---|-------------------------|---|
| Technical Feasibility | ✓ | Operational Feasibility | ✓ |
| Safety Feasibility | ✓ | Economic Feasibility | ⚠ |

Challenges lie with economic feasibility due to the high implementation costs.

Table 2 – Estimated implementation costs

Item	Quantity	Cost
LD90 AMR and Controls Starter Kit	1	£46,171.00
I/O Door control	1	£1,232.82
Fleet Management System and Control Cabinet	1	£31,200.59
Transport Trolley (1.2mx0.6m)	6	£1,950.00

Totalling £80,554.41, a return is expected in 16.2 years. Additional cost considerations such as licenses will further extend this.

Arena software used to create a discrete event simulation.

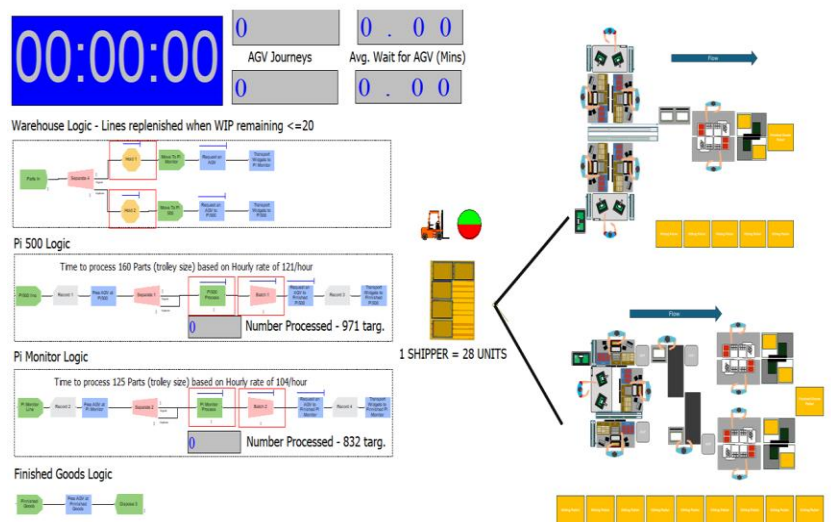


Figure 4 – Discrete event model of material handling

With a single robot, utilisation was 32%, indicating scalability. Expanding to four lines reduced ROI to 4.1 years, though rising supplier costs remain a factor.

Conclusions

- Current material handling process is inefficient and will benefit from automation.
- There are limitations with economic feasibility with only the two Pi products.
- Simulation shows that utilisation is low. Therefore, there is suitable scalability
- While economic feasibility is the main limitation, savings can be increased encompassing further processes.
- The project has potential and further work should be considered.

References

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