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Academic Skills Technical Report Writing Assessment 1

Academic Skills

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1 Introduction

Robotics and Automation in manufacturing

In this report I will be researching about robotics and automation within manufacturing. This field of work uses multiple engineering disciplines, technologies and machines to automate tasks usually done by human workers in industrial estates. It includes the uses technology and combinations of mechanical, electronic and software engineering so that engineers can increase efficiency of streamline production processes. This deals with designing and creations of robots, which involves the use of information technologies and control systems to help lower the need for human work during the production of service and goods. The importance of these technologies is major and will impact the later years in the future, where automation and robotics can be applied, they will. This will mean less work time and man hours used to construct projects. These two parts of manufacturing are very important. For instance, without having robotics / robot types our lives will be more difficult causing never-ending illnesses and never-ending problems caused by time consuming tasks. Furthermore, robotic intelligence is becoming more advanced by the day, this will lead to the future of medicine becoming more effective. Automation is very important as it offers many benefits that contribute to enhanced efficiency, improved quality and time saving causing projects to be done much cheaper and far quicker than what they have been completed previously. this means higher production rates, far more efficient use of materials and improved safety. Automation is the use of self-operating physical machinery or other software with computers or other technologies to follow a sequence or pattern to complete tasks which were once done by humans.

2 Background

Robotics can take various forms from traditional robots, cobots and collaborative robots. These work alongside humans to help the production of goods and services. Robotics and manufacturing are a growing and evolving market which was expected to reach a value of \$59.9 billion by 2022 however by 2022 it was able to reach 62.7 billion dollars, then for a valuation of up to 16% increase between 2023 – 2030. Japan is the main country who source robotics which makes them the most predominant country throughout the manufacturing industry. Where else in the world has robots that assemble other robots and manufacture them. To go more in depth robotics is the creation, design and use of robots to perform tasks. Whereas automation is the use of self-operating physical machines, computer software, other technologies to perform tasks that are mainly done by people. Automation was designed to follow predetermined sequence of operations or to respond to encoded instructions. Both were made to make life easier for humans and to narrow down manual labour. Also, to improve efficiency, speed, quality and performance during industrial processes. There are many benefits of robotics such as creation of better jobs that would've required human skill and intelligence. Quality improvement and reduction of human errors, less risk of injury or exposure to dangerous environments. This will have a more desirable outcome which will lead to hopefully longer lasting lives. Without robotics and automation jobs and projects will take up most of the people's time, which causes strain and other cases of illness. Companies will decide which activities and jobs they want to automate to make sure they stay cost efficient, what type of level and speed of the automation to use. There are some automations which are used to mimic the back-office tasks of humans. Some of these can include extracting data, moving files and filling in forms and paperwork. There is a difference between these and that is that robotics is the design, creation and use of robots to perform certain tasks. Whereas automation is a process of using different technology to complete tasks that would or have been performed by humans. Together they have transformed the manufacturing and industrial space into places where humans don't get affected or have to be in any sort of hazardous danger and taking over more labour-intensive jobs.

3 Discussion

In this research I found information regarding concept development that is related to automation and robotics. It is stated that this is funded by the Engineering and Physical Sciences Research Council (EPSRC) in the UK. Projects in this field typically focus on early research at Technology Readiness Level (TRL) 1 to 3, whereas Innovate UK is funding translational projects that focus on TRL4 to 6. It shows that there is a growing number of dedicated Research and Technology Organisations (RTOs) such as the Catapult Centres, which also focuses on accelerating the translation of successful proof of concept work (TRL3) to unlock their industrial potential. The European Commission (EC), through its new Horizon Europe framework programme, these are funding collaborative research projects addressing challenges in automation and robotics. The European Research Council (ERC) is funding fundamental research (TRL1-4), while topical Research Actions (RA) and Research and Innovation Actions (RIA) focus on TRL4-6 and TRL5-7 respectively. "Looking at the UK funding landscape, the most relevant automation and robotics projects are generally associated with the EPSRC research topic 'Robotics & Autonomy'. Other topics, such as 'Manufacturing Machine & Plant' and increasingly 'Artificial Intelligence'." Lohse, N, (2020,21) *Robotics and Automation* [automation-and-robotics-research-paper-a4-pages.pdf \(the-mtc.org\)](#) (Accessed: 14/09/2021). In other words, to cover some relevant research. After scanning over the research, I found out that all three are currently in the top 10 of research topics by funding (Automation & Robotics: £233m, Manufacturing Machine & Plant: £425m, and Artificial Intelligence: £603m). During this I have found that Automation and robotics has a much lower number of funded projects (93) compared to the others (254 and 310, respectively). "This is reflecting the fact that a proportional larger number of higher value projects have recently been awarded in the automation and robotics topic area. This includes eight programme grants totalling £48m, five Research Hubs totalling £74m including associated Nodes, and eight Centres for Doctorial Training (CDT) totalling £43m." Lohse, N, (2020,21) *Robotics and Automation* [automation-and-robotics-research-paper-a4-pages.pdf \(the-mtc.org\)](#) (Accessed: 14/09/2021)

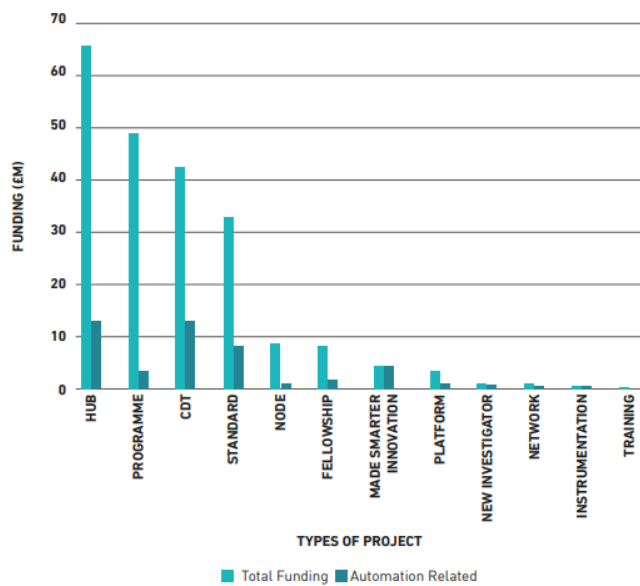


Figure 3: EPSRC A&R project funding by project type

Lohse, N, (2020,21) *Robotics and Automation*' [automation-and-robotics-research-paper-a4-pages.pdf \(the-mtc.org\)](#)' (Accessed: 14/09/2021)

This graph shows the types of projects with the amount of funding used. Which has been added in writing within this report.

Whilst analysing the aims and objectives of the recent EPSRC project portfolio within automation and robotics. Less than 25% (by funding) directly focus on these two topics automation and robotics. However, a small number of projects, mostly related to manufacturing, heavily focus on industrial automation challenges. The most current is a new 'Made Smarter Innovation - Research Centre for Smart, Collaborative Industrial Automation' (£4.8m) has recently been funded as part of the Industrial Strategy Challenge Fund (ISCF). "Many of the projects focus on 'High-accuracy robotic system for precise object manipulation (HARISOM)', 'Human Centred Robotics for Next generation Flexible Manufacturing', 'Industrial Robots as a service (IRaaS)', 'huMAN-inspired robotic MANipulation for advanced MANufacturing (MAN³)', 'Robotic disassembly technology as a key enabler of autonomous remanufacturing', and 'Visual-Tactile Synergy for Handling Flexible Materials'." . " Lohse, N, (2020,21) *Robotics and Automation*' [automation-and-robotics-research-paper-a4-pages.pdf \(the-mtc.org\)](#)' (Accessed: 14/09/2021).

4 Conclusion

In this research report I gained information and knowledge whilst reviewing and writing about this chosen topic. During my time looking at Robotics and Automation I learnt that using these is more time efficient and cost efficient. Rather than using human power and time on these we can use many different types of robots to conquer those projects. Furthermore, automation has many benefits that contribute towards enhanced efficiency, time saving and improved quality. Nevertheless, both are as important as another, can't have robotics without automation. The value of this industry is slowly rising year by year which shows that at some point in the future there will not be any man labour hours or work hours at all. In conclusion I found that robotics and automation are a necessary factor in our day to day lives now and without those we wouldn't be in a position we are now and would be behind with projects / jobs. I've found a few cons of having these also but not to major to worry about. These are that if the way of robotics and automation increases highly during the future it'll cause for many people to be without jobs or work of some sort. This shows that those that do lose their jobs will not be able to provide for their families anymore. Certainly, means these can cause distress and trouble. However, we need these. Robots and automation are frequently said to be solutions to many industries worldwide to make the productivity go up as well as decreasing costs and improving quality control.

5 References

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