Impact of Autonomous Mobile Robot (AMR) on the Work Environment

Executive Summary

The autonomous mobile robots (AMRs) are AI-embedded robots that are able to understand and move through its environment independently. It has been developed from its predecessors, the automated guided vehicles (AGVs), with the ability to achieve obstacle avoidance by implementing new technologies. With these technological developments, the functional environment is no longer limited to a few sectors with large open spaces and careful mapping of markings to guide the AGVs; instead, the AMRs can be applied to a larger range of workplaces. Therefore, this report aims to examine the integration of AMRs in multiple sectors, including healthcare, logistics, manufacturing, and hospitality sectors.

The study is carried out in the form of analyzing case studies, of where the AMRs have been currently implemented, collaborative concerns, ethical implications, relevant regulations and standards, etc. In these findings, the environmental differences between each sector must be considered. For example, in the healthcare and hospitality sectors, the AMR implementation would be newly introduced; since they are associated with providing services, the guests or patients' perspectives must be considered along with the employer and employees of the industries. Since the logistics and manufacturing sectors are not available to the public, they will have to consider mainly the employees and administration personnel. In the logistics sector, the AMRs may replace employees who were previously responsible for delivery; in the manufacturing sector, the AMRs would alter the existing AGV infrastructure. Nonetheless, there are common technical limitations and financial challenges across the many sectors. Therefore, the next section would analyze the findings and purpose actions for the many stakeholders that are associated with the future implementation of AMRs.

Instead of following the structure of discussing each sector in section 3.0, section 4.0 takes on the perspective of each stakeholder and suggestions on how they could approach this technological advancement. The five parties that are discussed in this section are the administrations and employers, the employees, general public, government and regulators, and AMR vendor. The administrations and employers will be responsible for calculating the financial risks and return of investment of the technology. They will also have to consider whether they can satisfy the needs of their customers and the safety of the employees. The employees have to recognize the change in their workflows with the introduction of the AMRs and the need to improve technical competence to ensure successful collaborations. The general public is only associated with the healthcare and hospitality sectors, as they will be exposed to the AMRs in their physical environment. The government and regulators will be responsible for establishing guidelines and

policies that govern the deployment and operation of AMRs, as well as providing a baseline for safety concerns in the work environment. Additionally, AMR vendors, the suppliers to the other sectors, will be considered as well. They will invest in the research and design of the technology as well as ensuring that their products comply with all relevant regulations and guidelines.

Finally, the report makes recommendations with these analyses and discussions. As the implementations are rather few at this stage, more empirical data is required to prove the effectiveness of the AMRs. Moreover, the AMRs rely heavily on AI development and computer vision; these would require the commercialization of navigation technologies to optimize the performances of the AMRs. The team recommends designing structured environments with predictable workflows to maximize the benefits of the AMRs. Moreover, training sessions should be initiated by the AMR vendors to ensure that the workers are trained to program and operate the AMRs, as well as troubleshooting if issues arise. There could also be improvements on the design of user interfaces, to encourage the acceptance from AMR users. Therefore, with increasing education and accessibility considerations, the implementation of AMRs would become more successful.