

**University of Toronto**

**APS1012H**

**Managing Business Innovation and Transformational Change**

**Project Report**

**Data Use in Industry 4.0 Manufacturing Sector and  
its Ethical Implications**

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## Executive Summary

As society and the economy begin to increasingly rely on advance technologies, it is important to understand the evolution of technologies in the past and the current state of digital transformation. We are witness the fourth industrial revolution, known as Industry 4.0, which essentially involves technology that can now communicate between themselves and make more complex decisions through the use of data.

Four areas of data focused Industry 4.0 include cloud technologies, artificial intelligence, augmented reality, and innovative technologies and processes. These technologies have allowed for optimizing process performance, forecasting potential failures, and conducting predictive maintenance, which leads to manufacturing that is cost effective, scalability and performance growth and reliable systems. Though the technology has led to advancement in manufacturing operations, there are broader implications, which should be carefully considered and researched to make more balanced and ethical decisions in the future.

Though it is expected that Industry 4.0 technologies will provide significant economic benefits, there are concerns related to job automation and transformation, wage stratification, and worker skill gaps. Concerning social implications primarily include growing inequality through declining labor shares and wage gaps, as well as increasing corporate influence in the public sector. Although the advance technology has helped make some jobs safer, it has the limited human judgment, and the interconnected nature of assets and systems can make facilities more vulnerable to harmful cyber-attacks. The overall environmental implications are not well researched for the industry 4.0 technologies; however, improved manufacturing allows for smarter use of resources.

There are significant needs for and benefits of the Industry 4.0 technologies. However, there are emerging issues such as cloud security, cyberattacks, lack of legislation for new technologies and processes, growing wealth and skills gaps, and increasing power of large corporations. Recommendations for a way forwards to both improve the use of Industry 4.0 technologies and mitigate impacts on broader society include increasing standardization and data governance in the industry, separating safety systems from other control systems, introducing new legislation, changing the tax system, and increasing education across public sectors and society.

This report focuses on Industry 4.0 and data usage in the manufacturing sector with its implications on society, the economy, the environment, and human safety.