

# APS1012 – Team 1 – AI in Manufacturing

## Executive Summary

Although Artificial Intelligence (AI) has a tremendous influence in people's day-to-day lives through various forms of technologies, the benefits of AI have not been fully realized in manufacturing. Industry 4.0, or the fourth industrial revolution, is referred to as the emergence of AI in manufacturing with few academic research conducted; however, application of such technology in the real world has been limited.

Management team of a manufacturing plant would be the first barrier before starting the implementation process due to their perception of AI being too costly, risky and perhaps unneeded. At this first stage, the key to diffuse the concept of AI is to communicate its potential application and benefits to the management team. With AI's clear contribution to improve quality of products and processes, ensure safety of workers, enhance delivery of products to customers and minimize overall cost, AI-integrated manufacturing plants are an inevitable future, which only means that an organization adopting to AI sooner means being the "head of the pack". A future-vision of an AI-integrated plant is lean, agile, effective and efficient.

However, at the second stage of such implementation, other barriers are encountered. Some of those barriers may be technical such as issues with cyber security, poor data quality, fairness of decisions not integrated into the software and high fidelity requirements. Some may also be non-technical such as a cultural gap, fear of change, lack of talent etc. Many of the technical challenges will be overcome with the technologies behind AI gradually improving over time. However, organizations can proactively mitigate many of those barriers by involving industry experts and consultants throughout the implementation process, challenging internal employees to improve the IT/software system with a sense of human-driven continuous improvement, hiring forward-thinkers and early adopters as well as AI experts to join the team, etc.

At the third and final stage, with AI's benefits fully realized and diffused, and the technology slowly being integrated into a manufacturing plant, the human-AI dynamics become the key factors in determining its eventual success. With no consideration given to this dynamics, or the socio-political shadow system, strictly focusing on the financial gains may result in negative impact to human creativity and effective teamwork (IPT). Moreover, even the smallest failure in the AI system may result in chaos if the knowledge is not retained by humans. Improving this dynamics and preventing such chaos from occurring comes down to the mindset of AI being used merely as a tool rather than the "holy grail" of all decision-making, and continued prioritization of adequate knowledge management practices. Moreover, the business processes will entirely reform as accountability of each individual will be broadened and many of the positions that currently exist will no longer exist as a result. In addition, governments of the future will have to make critical policy changes to avoid a social crisis from happening as a result of rapid unemployment caused by AI adoption. Policy changes will be aimed at funneling wealth generated by AI back to society to avoid the income gap from growing too large.