

Since the advent of the industrial revolution, practitioners have strived to find innovative ways to augment the manufacturing process in favor of production efficiency, reduced cost, and product quality. Whereas the industrial age was predominantly based on a top-down leadership paradigm (Uhl-Bien et al., 2007), the modern information age heavily relies on an ever-increasing amount of data (Baron & Rustemi) and on making informed decisions utilizing the data in a timely fashion to staying on top of the competition. 1: the first phase focused on automation through steam and water-powered mechanization; the second phase focused on electrification and mass production; the third phase adopted robotics and digital technologies to gain efficiency; the fourth phase has been focusing on cyber-physical systems and artificial intelligence. The industrial revolution has evolved through four main phases, shown in Fig