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Industry 4.0 – A Glimpse

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**Abstract**

Digitization and intelligentization of manufacturing process is the need for today's industry. The manufacturing industries are currently changing from mass production to customized production. The rapid advancements in manufacturing technologies and applications in the industries help in increasing productivity. The term Industry 4.0 stands for the fourth industrial revolution which is defined as a new level of organization and control over the entire value chain of the life cycle of products; it is geared towards increasingly individualized customer requirements. Industry 4.0 is still visionary but a realistic concept which includes Internet of Things, Industrial Internet, Smart Manufacturing and Cloud based Manufacturing. Industry 4.0 concerns the strict integration of human in the manufacturing process so as to have continuous improvement and focus on value adding activities and avoiding wastes. The objective of this paper is to provide an overview of Industry 4.0 and understanding of the nine pillars of Industry 4.0 with its applications and identifying the challenges and issues occurring with implementation the Industry 4.0 and to study the new trends and streams related to Industry 4.0.

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**1. Introduction**

Since the first Industrial Revolution, subsequent revolutions have resulted in manufacturing, from water and steam powered machines to electrical and digital automated production which makes manufacturing process more complicated, automatic and sustainable so that people can operate machines simply, efficiently and persistently [1]. "The term Industry 4.0 stands for the fourth industrial revolution which is defines as a new level of organization and control over the entire value chain of the life cycle of products, it is geared towards increasingly individualized

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customer requirements [2]. The central objective of Industry 4.0 is fulfilling individual customer needs which affects areas like order management, research and development, manufacturing commissioning, delivery up to the utilization and recycling of products [3]. The main difference between industry 4.0 and Computer Integrated Manufacturing (CIM) is the concern of the human role in production environment. Industry 4.0 has an important role of human worker in performing the production where as CIM considered workerless production [4]. The Industry 4.0 paradigm promotes the connection of physical items such as sensors, devices and enterprise assets, both to each other and to the Internet [5]. Designing and drafting methods in all disciplines should be reviewed and their suitability be checked for a modern, interdisciplinary approach model for product development and transferred to a common, integrated and interdisciplinary methods, process and IT solution [6]. The production process is divided into small value oriented units which shares information of the consecutive process steps only which helps in increasing flexibility and probably results in reduction of complexity of coordination [7].

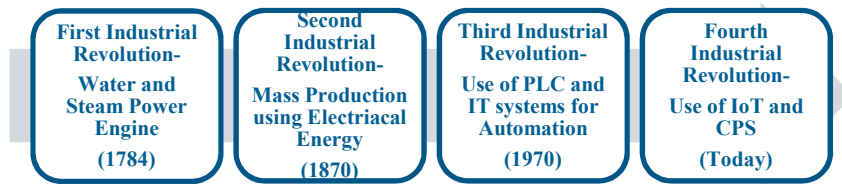


Figure 1. Four Industrial Revolutions

### 1.1. Need of Industry 4.0

The need of industry 4.0 is to convert the regular machines to self-aware and self-learning machines to improve their overall performance and maintenance management with the surrounding interaction [8]. Industry 4.0 aims at the construction of an open, smart manufacturing platform for industrial-networked information application [9]. Real time data monitoring, tracking the status and positions of product as well as to hold the instructions to control production processes are the main needs of Industry 4.0 [10].

## 2. Literature Review

The German Federal Government presents Industry 4.0 as, an emerging structure in which manufacturing and logistics systems in the form of Cyber Physical Production System (CPPS) intensively use the globally available information and communications network for an extensively automated exchange of information and in which production and business processes are matched [9]. The four main drivers of Industry 4.0 are Internet of Things (IoT), Industrial Internet of Things (IIoT), Cloud based manufacturing and smart manufacturing which helps in transforming the manufacturing process into fully digitized and intelligent one [11]. The nine pillars of Industry 4.0 will transform isolated and optimized cells production into a fully integrated, automated, and optimized production flow. This leads to greater efficiency and change in traditional production relationships among suppliers, producers, and customers as well as between human and machine [2].

### 2.1 Big Data and Analytics

The collection and comprehensive evaluation of data from many different sources production equipment and systems as well as enterprise and customer-management systems will become standard to support real-time decision making [2]. According to Forrester's definition, Big Data consists of four dimensions: Volume of data, Variety of Data, Velocity of generation of new data and analysis, Value of Data [12]. The data analysis of previously recorded data is used to find out the threats occurred in different production processes earlier in the industry and also forecast the new issues occurring as well as the various solution to stop that from occurring again and again in industry [13].

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