

The Digital Transformation of Manufacturing Industry - A Scenario Analysis for Germany

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Looking back in time, the economy has been exposed to fundamental changes and transformation each induced by different factors: introduction of mechanical production facilities (first industrial revolution), electronic energy (second industrial revolution) or internet technology (third industrial revolution). Currently, the economy might be at the edge of a similar drastic transformation through the introduction of cyber physical systems (CPS). What is called in Germany "Industrie 4.0" or Industry of Things (IoT), describes the fusion between physical and virtual world in the production process through interconnecting men, machines, products, objects and internet and communication technologies.

Until today, in Germany, IoT is not yet realized, still unknown to a majority of small and medium sized enterprises and little evidence and expertise exist that is able to describe the impact of a digital transformation on the economy. This paper presents a first attempt to capture the economic effects of IoT on the economy in Germany in the long run.

A sophisticated scenario has been developed that addresses especially the following parameters: (i) gross fixed capital formation, (ii) change in inventory (iii) cost structure, (iv) supply chain and (v) private and state consumption, (vi) export. Using the macro-econometric input-output model INFORGE (Interindustry Forecasting Germany), these parameters are altered according to input taken from the literature, expert interviews and own expertise. The scenario assumes a slow transformation process that is realized not before 2025. The results are compared to a baseline scenario with no IoT assumptions.

The results indicate that a digital transformation of the economy leads to a higher growth path. The growth impact is accompanied with a decline in imports which is a positive side effect for a commodity-poor country such as Germany. However, additional growth comes along to the disadvantage of employment. Until 2025, a total of 10,000 jobs are lost. Albeit this is a small number, the digitization supports sectoral change: Especially the agriculture and manufacturing sectors lose jobs, whereas employment is generated in service sectors.