Are Swedish companies part of the fourth industrial revolution?

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THE FOURTH INDUSTRIAL REVOLUTION, INDUSTRY 4.0, HAS HAD A GREAT POSITIVE IMPACT ON MANY COMPANIES, BUT SMALL AND MEDIUM-SIZED COMPANIES (SMES) SEEM TO LAG BEHIND. AS A BIG PROPORTION OF SWEDISH COMPANIES ARE SMES IT IS OF BIG IMPORTANCE TO ANSWER THE QUESTION: WHAT IS THE CURRENT INDUSTRY 4.0 MATURITY LEVEL FOR SMES?

INDUSTRY 4.0 HAS GREAT POTENTIAL IMPACT - SWEDISH SMES NEED TO TAP INTO THIS

In a world where the rate of technological change is constantly accelerating, it is getting more and more important for companies to adopt new technologies and processes to stay competitive. Most recently, the concept of Industry 4.0 has emerged as the newest technological paradigm within industrial management and has its roots in the German government's technological strategy. On a high level, Industry 4.0 is the industrial usage of new technologies, like big data analysis, autonomous robots, cyber-physical infrastructure, simulation, cloud computing, augmented reality and internet of things (IoT) (Cevikcan and Ustundag, 2018). This is enabling machine-to-machine and human-machine interactions and, when implemented successfully, great value creation potential.

Industry 4.0 is in an early development stage, but it has a potential to improve the manufacturing industry by bringing significant benefits. However, studies have shown that the potential is realized mainly for large corporations. The concept of Industry 4.0 was mainly developed around large manufacturing companies in Germany, which suggests it could be difficult to be implemented in the Swedish market that consists of 99.8% of small and medium-sized companies. Research from Germany shows that there are several problems for German SMEs to adopt and utilize Industry 4.0 to its full potential. The same research states that four out of ten SMEs do not have a comprehensive Industry 4.0 strategy compared with two out of ten among large companies (Schröder 2017). Given this, there is a need to evaluate the Industry 4.0 maturity level of Swedish SMEs. Consequently, the purpose of this project was to assess the current level and challenges for Industry 4.0 adoption among Swedish SMEs by using an Industry 4.0 maturity framework to enable further development of the paradigm in Sweden.

THE RESULTS WERE FOUND THROUGH A THREE-STEP PROCESS

The research methodology that was used in the project can be divided into three steps, see Figure 1 below. Firstly, an Industry 4.0 maturity assessment model was chosen from already existing ones, based on three criteria: comprehensiveness, practicality and proven track-record. The Impuls Industry 4.0 assessment model were chosen, which is survey-based.

Secondly, the survey was sent out to companies and the responses were collected. Lastly, the results were analyzed and discussed based on previous research on the topic.

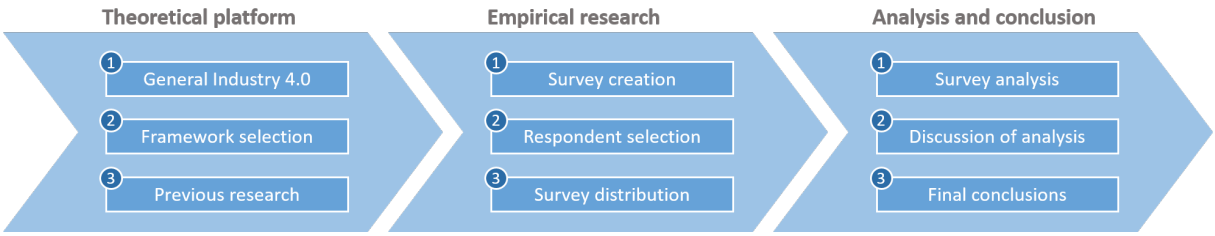

Figure 1. Overview of the project methodology.

The Impulse maturity model was used

The maturity assessment model, the Impuls maturity model, was created by the Impuls Foundation, a think tank part of the mechanical engineering industry association in Germany, VDMA. Their goal is to support German manufacturing companies, in this case by creating an Industry 4.0 maturity model and assessing the current maturity of German manufacturing corporations, as they have identified Industry 4.0 as a pivotal driver of development in the industry (Lichtblau et al. 2015).

As a result of their research, the Industry 4.0 maturity model of the Impuls Foundation of VDMA is based on six dimensions, each dimension being defined by a number of sub-dimensions.

Figure 2. Dimension and associated fields of Industry 4.0. (Lichtblau et al. 2015).

Given this model, a survey was generated where a company is evaluating itself within each sub dimension, based on some pre-defined criteria and its total maturity level is generated by a weighted average of the maturity level within each dimension.

The maturity level is low, but higher than for others

The overall maturity level of Swedish SMEs was found to be low, which probably can be explained by the novelty of this industrial revolution. However, indications of a starting implementation were found. In total, Sweden was found to have a significantly higher maturity level than Germany, indicating that Sweden has come further in the implementation. This could be explained by a number of forefronts, highly innovative companies in Sweden driving the maturity. However, these companies are exposed to different types of challenges. The most common one is a lack of financial resources and this issue has a strong relation to the size of the targeted companies in this study, as the small size of the SMEs typically means financial limitation. There are plenty of other issues that companies experience today when implementing industry 4.0, for example technological issues, know-how, business and customer incompatibilities and sometimes an overall knowledge about Industry 4.0.

Surprisingly enough, the results of this show that revenue does not have any strong correlation with Industry 4.0 maturity levels of the companies, which breaks the stereotypes and contradicts international research. What could possibly be the reason behind this phenomenon? Authors encourage further research with thorough analysis of correlations between different variables and the digital maturity level of organizations.

THESE RESULTS WILL HELP SWEDISH SMES ACHIEVE INCREASED MATURITY

As mentioned above, SMEs are an essential cog in the Swedish business machinery, hence, making sure these companies are competitive is of great importance. A lot of factors indicate that a successful Industry 4.0 implantations being one of the core paths to success for manufacturing companies. This thesis shows that the important company segment, SMEs, still have low maturity when it comes to Industry 4.0 and more specifically, in what way the maturity is low for different sizes of companies, within different sub-industries. In a combined effort of more academic research and the business and public sector, the challenges that are identified in this thesis can be mitigated, leading to an accelerated adoption of Industry 4.0 and ultimately more competitive SMEs. The core contribution of this project is raising awareness and providing a platform for the suggested further research.

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