The 4th industrial revolution's challenges at the wood industrial manufactories

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Substantial technological advances appeared in the industrial sector in the last years. Developments are based on the "Internet of things" idea, called as "Industry 4.0" in Europe. The name is referring to the phenomena that many experts think this is the fourth industrial revolution. The goal of these projects are to create live connections among all industrial machines, tools and the central units. Some techniques and tools, e.g., sensors, big data, cloud computing, 3D printing, robotics and artificial intelligence, support the IT developments also. The decision making in the industry will be automated and quick because of the new methods and tools.

The Industry 4.0 project is at the beginning in the Hungarian manufacturing sector. However, the digitalization of the Hungarian industry is on the higher level. There are different financial sources from European Union and the Hungarian government to support this digitalization process. To have a better understanding of the Hungarian industry from the viewpoint of Industry 4.0, we have analyzed the report of Roland Berger, e.g., European countries' Industry 4.0 Readiness Index (this can be seen in Fig. 1.).
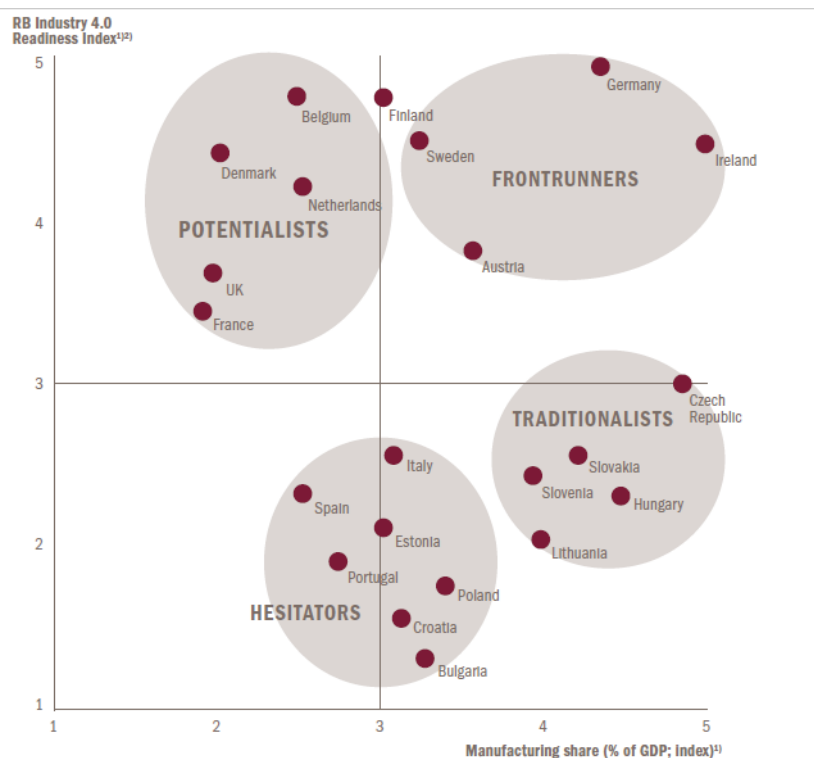

Figure 1. RB's Industry 4.0 Readiness Index (Source:
https://www.rolandberger.com/publications/publication_pdf/roland_berger_tab_industry_4_0_20140403.pdf)

In this paper, we are focusing on the wood industrial companies. Their main goal is to reduce their costs and waste. Therefore, they have to (1) integrate their separated systems, (2) collect their data from different sources, (3), analyze their data (4) connect their machines to each other, (5) control their processes etc. We are collaborating with several companies in the wood industrial sector helping them to reach the high level of integration. There are two parts of integration: horizontal and vertical. The horizontal integration means that the company and its partners (suppliers, customers etc.) are in one integrated system. The products can be tracked and traced from the suppliers to the costumers. The vertical integration means that every machine in the factory are connected to the decentralized headquarters. These machines' data are the bases of the managers' analyzes. These computes may be run in the cloud, because this computing is one of the Industry 4.0's standards. The analyzation of big data collection becomes simpler this way.

There are different production systems and techniques. Every company is unique in the industrial field and they have unique production systems. But they have similar problems in their production progress. We summarize these problems and give solutions to solve them.

In general, Hungarian wood industrial companies had to implement several unique developments before they propose a new plan for dealing with Industry 4.0's standards.

In our first case study, two different problems are mapped:

1. The managers have to make the RFID[1] installation for identifying all components, which are connected to the full package of the wood-houses.

2. The company has to launch a software and hardware development for determining timbers' color value.

By solving these problems, they will be able to collect and analyze their data for getting information about their processes.

In our second case study, the main problem is the diversity of the systems. The company has several systems (ERP[2], DBMS[3] etc.) and a lot of disconnected sensors. An integrated building supervision system could control the production machines' current supply.

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[1] Radio Frequency IDentification
[2] Enterprise Resource Planning
[3] Database Management System