

# How will innovations fare in the platform economy? Four challenges and solutions for the manufacturing industry

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## Abstract

This policy brief focuses on the innovation challenges of the platform economy in the manufacturing industry. We discuss four innovation challenges facing the manufacturing industry and the key reasons for them. We present recommendations related to innovation policy that can accelerate the development and growth of the platform economy in the manufacturing industry. The challenges and recommendations are derived from the results of the Policy Rationales in the Shift to Digital Platform Economy research project funded by Business Finland.

## Platform economy innovation challenges in the manufacturing industry

### Challenges

- Only few platforms are created
- Insufficient data sharing
- Lack of shared digital goods
- Competence in exploiting digital networks is lacking

### Reasons

- Lack of competence related to the platform and data-based business
- Closed ICT systems
- Difficulty in determining the value of data
- Restrictive cooperation practices
- Rigid organisational structures
- Incomplete or restrictive legislation

### Policy recommendations

- Recommendation 1** Thresholds for participating in the early stages of development should be lowered
- Recommendation 2** Data sharing practices and obligations should be developed
- Recommendation 3** Open digital goods should be created
- Recommendation 4** Innovation activities should be transferred to digital networks

**Keywords:** platform economy, innovation policy, manufacturing industry, digital platforms

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## Introduction

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The platform economy challenges the traditional innovation activities and competitiveness of companies in the manufacturing industry. On the other hand, the platform economy provides new opportunities for companies to develop innovations, modernise their business operations and find new growth opportunities. The platform economy enables a new type of network-based value creation by combining physical commodities and the labour force with digital technology (Goldfarb & Tucker, 2019). Network-based co-creation and partnerships using digital platform solutions are at the core of future competitiveness.

In the manufacturing industry, the development of the platform economy has not yet been extensive. Digital technology that promotes innovation and productivity has been less extensively deployed in the manufacturing industry than in the service sectors (Gal et al., 2019). This is evidenced by the fact that the manufacturing industry has no longer been a source of productivity growth since 2007 (Pohjola, 2020). ICT investments have been the new key driver for productivity growth. At the level of Finland's national economy, however, these investments are below the OECD average (Pohjola, 2020). The impact of ICT capital on productivity growth in Finland has been one half of that in Sweden (Pohjola, 2020). The level of investment in research and product development in the manufacturing industry is also low (OECD, 2017; Pohjola, 2020).

We discuss in this report four innovation challenges facing the manufacturing industry in the current situation and the key reasons for them. After this, we present recommendations related to innovation policy that can accelerate the development and growth of the platform economy in the manufacturing industry.

## Material and methods

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The policy brief is based on the results of a comprehensive literature analysis of over 100 research articles, books and policy reports and the results of two expert workshops. Top Finnish researchers, key experts from ministries and public institutions, leaders of digital development from large, medium-sized and small companies, and professionals from key intermediary and expert organisations participated in the work.

The first workshop dealt with the key challenges to innovation and growth in the platform economy. The conclusions of the literature analysis and the first workshop have been reported separately as a working paper (Aalto, Gustafsson & Lipiäinen, 2020). The second workshop dealt with the challenges to innovation in the platform economy in the manufacturing industry. This policy brief discusses the key conclusions of the latter workshop.

# Results

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## Challenge 1. Only few platforms are created

In the manufacturing industry, platform-based business activities have not been and are not being created sufficiently. To create a virtuous cycle of participation and growth, a sufficient number of parties becoming involved in digital platforms is required. In the early stages of digital platform development, three factors make companies' thresholds for participating higher: a lack of trust, a lack of competence related to the platform economy, and closed ICT systems.

(1) Lack of trust: The threshold for participating in platforms is high, especially in their early stages, as companies fear that data critical for competition flows to competitors through digital platforms. This distrust also stems from a lack of clear operating models and common practices in data sharing.

(2) Lack of competence related to the platform economy: The industry has not much of experience of multi-party digital platforms. There is little expertise related to operating digital platforms or organising business activities through them. The lack of competence is particularly emphasised in small and medium-sized enterprises and where an organisation is developing its operating practices, for instance by transitioning from the sale of production commodities to the sale of services. In addition, the manufacturing industry is not familiar with the basic principles and calculation methods of digitalisation and data value.

(3) Closed ICT systems: To protect critical competitive advantage, manufacturing industry systems of both vendors and users are often closed, whereas the systems of many machines and devices, including aeroplanes and power plants, may be closed for safety reasons. This is why few open digital and platform-based architectures exist in the manufacturing industry.

## Recommendation 1. Thresholds for participating in the early stages of development should be lowered

- **Supporting the creation of platforms and the early stages of their development.** Public funding instruments should be allocated to financing the creation and development of platforms. Support is also needed to moderate the creation of platforms, where a trusted party brings together others on the platform. Particular attention should be paid to building trust and developing platform business competence.
- **The goal of innovation policy should be to create a platform-based marketplace.** The creation and development of platforms should be the main objectives of innovation funding for the platform economy. For example, lowering the participation threshold should be added to the indicators for assessing the effectiveness of support instruments, besides the novelty value and commercialisation of innovations. Otherwise, the impacts of public support will not go beyond individual development projects and the piloting of commercialisation.
- **Standardisation and regulation of the platform and data economy should be promoted.** National innovation policy actors should collate and integrate standardisation and regulation solutions produced at the sectoral level, in national programmes and by international bodies. The manufacturing industry has already formed several co-creation platforms and consortia, such as DIMECC One Sea and Intelligent Industry, the German Industrie 4.0 and the Business Finland Industrial Internet programme, as well as the International Data Spaces Association and the European Union's DG CNECT. Solutions that have proven good should be scaled, for instance by taking them into account in support instruments and legislation.

## Challenge 2. Insufficient data sharing

The current data market does not encourage data sharing. It discourages efficient data use and sharing for modernising innovation and business activities. There are four reasons for this situation: determining the value of data is difficult, cooperation practices are restrictive, legislation is incomplete or restrictive, and companies have no expertise in data-based business (Sommarberg et al., 2018; Parvinen et al., 2020). These factors slow down the development and growth of the platform economy in the manufacturing industry.

(1) Difficulty in determining the value of data: Data are goods of a very heterogeneous nature. There are different types of data, such as personal data, data from devices and production processes, and data concerning the company's financial performance. The business value of data is difficult to determine before the data reserve has been incorporated into a specific use case and possibly combined with other data reserves.

(2) Restrictive cooperation practices: Sufficient standards and established practices have not been developed for data sharing. In the manufacturing industry, contractual practices slow down data sharing. For instance, intellectual property rights clauses between companies restrict data sharing and the sharing of solutions built by using shared data. In addition, the strict and demanding global competition environment does not encourage data sharing with potential competitors. Data is often collected from devices and processes related to the company's core business. In contract negotiations, companies have the same attitude towards data sharing as towards traditional business, and they are cautious about sharing data with others.

(3) Incomplete or restrictive legislation: Legislation does not currently allow for safe data sharing, nor does it support the creation of effective practices. In certain cases, legislation or market regulation prevents data sharing. For example, the EU's General Data Protection Regulation does not allow telecommunication operators to share individual location data, which restricts their use.

(4) Lack of competence in data-based business: An operating environment in which data reserves from different companies are integrated to develop new business activities and innovations has not yet emerged in the manufacturing industry. The main underlying problem is the lack of competence in the management of processes and capabilities.

Some companies accumulate considerable data reserves. The fact that data is accumulated by a limited number of actors can distort the market, prevent competition and reduce their useful spin-off effects. In particular, this reduces SMEs' opportunities for innovating and developing new data-based businesses.

## Recommendation 2. Data sharing practices and obligations should be developed

- **Data sharing should be made an obligation in exchange for public funding.** Public financial aid to businesses should include an obligation to share data. Data sharing should be the default practice when developing legislation and in requirements put in place by the public sector. In the public sector, the principle of data openness should be a core value.
- **Assessment tools should be created for determining the value of data.** Better models for determining the value of data-based business encourage companies to engage in co-development and extensive investments. Companies should have better financial assessment models to support data sharing. For example, simulation models and artificial intelligence are good tools for examining probable outcomes. Research projects should be launched for determining the value of data and developing the valuation models for data-based businesses.
- **The emergence of data operators should be ensured.** Data operators collect data from different organisations, creating marketplaces for the data. They put in place principles for data sharing and develop operating models for sharing data. They help to dismantle obstacles brought about by licensing, ownership, lack of competence, and contractual practices. The pursuit of operation on market terms over the long-term creates incentives for developing private platform-based data operators. The emergence of data operators can be accelerated with public aid or through PPP models.
- **Supporting the integration of corporate data reserves and the development of new data-based business models.** New data-based business opportunities and innovations can be created by combining multiple corporate data reserves. Collaboration platforms and consortia can develop practical solutions for data sharing. They also produce standards, models and regulation.

### Challenge 3. Lack of shared digital goods

There are few shared digital goods in the manufacturing industry. Shared digital goods are digital infrastructure, open source code, platform interfaces, and open data (Yoo et al., 2010; Karhu et al., 2018). In shared use, these goods can at best compensate for individual companies' lack of expertise and resources and allow for the positive spillover effects of the best practices and solutions. The main reasons for the small number of shared digital goods in the manufacturing industry are the lack of competence in platform and data business, and rigid organisation structures.

(1) Lack of business competence related to digital goods: Companies are not familiar with the business and earnings models of digital goods. Especially in the SME sector, lack of experience and vision concerning the potential of digital goods slows down their deployment.

(2) Rigid organisational structures: Corporate culture and decision-making models do not yet support rapid and experimental opening up and sharing of digital goods.

### Recommendation 3. Open digital goods should be created

Innovation policy should focus on creating open and shared digital goods where they do not emerge naturally or are inadequate. This can take place through regulation, financial support, or active agency.

- **The conditions for public funding should include the use of open-source code and co-development**
  - Increased co-development and the use of open-source code should be a requirement for accessing public funding.
  - The public sector should set an example by emphasising the requirement of open-source code in public procurements.
- **The public sector should create open digital goods**
  - Open digital goods, including telecommunications licences, may be controlled by public authorities through licensing systems instead of being directly operated by the public sector.
  - The public sector should open interfaces that are essential for the manufacturing industry with official register data, such as building permit documents and telecommunications data.
  - The practices and schedules of opening up registers and data reserves of the public sector (ministries and agencies) should be specified.
- **Preconditions for the creation of digital goods should be ensured**
  - Finland and the EU should develop their regulation to provide preconditions for innovators to create and use digital goods.
  - Public-private partnership (PPP) models should be defined for digital goods in the manufacturing industry.

## Challenge 4. Competence in exploiting digital networks is lacking

Companies in the manufacturing industry do not yet exploit the benefits of digital networks in their innovation activities. Digital technology and platform-based operating models radically change the location, organisation, participation, and practices of innovation activities (Parker, & Van Alstyne, 2018). Innovation increasingly takes place in networks forming around platforms and digital architecture structures ('crowdsourcing'). In particular, recent developments include the larger role of hybrid platforms (Cusumano et al., 2019) and new digital tools for innovation (e.g. AI platforms) (Mucha & Seppälä, 2020). In digital networks, solutions can be sought quickly and cost-effectively around the world.

The manufacturing industry is unable to benefit from digital networks because (1) openness is considered a risk, 2) open interfaces that enable innovation are not created, and (3) companies lack the ability to develop service business.

(1) *Openness is considered a risk*: Innovation still largely takes place within companies, and transitioning to networks is a major leap in terms of organisation culture, operating models, and 'openness principles'. The principle of openness is by no means easy to implement, as the company in question would have to partially renounce control of its core functions. In the manufacturing industry, highly critical equipment and machinery which involve major investments could be at stake.

(2) *No open interfaces allowing for innovation are created*: Large corporations with the capacity to create key platforms use their position to protect their own interfaces and standards. Official standardisation is also lagging behind. In the United States, ad hoc standards which subsequently become official are created in companies engaging in rapid experiments. However, these standards are necessary for creating functional and open interfaces in the platform economy.

(3) *Companies lack the ability to develop service business*: The sale of services, such as Software As A Service solutions subject to a monthly charge, differs significantly from the traditional sale of machinery. Individual machines and devices are purchased as one-off investments, and maintenance is often the only additional outsourced service. The sale of more advanced services and software requires more specific insight into customers' value creation, such as processes and offer.

## Recommendation 4. Innovation activities should be transferred to digital networks

- **Supporting the creation of digital innovation networks and their development**
  - The creation of open interfaces should be supported through innovation policy. Attention should also be paid to the development of innovation abilities in networks where shared co-development levels out the risks and costs.
  - When innovation takes place on a platform, any support provided should take the special features of the platform economy into account. While current innovation support often does not accept commercialisation, on platforms a marketplace must be created from the start before innovation is possible.
- **Developing technologies and practices that inspire trust**
  - The development of technologies that will enable the creation of trustworthy, global platforms should be supported. A platform requiring reliable TUPAS identification will remain local, whereas email-based identification allows the marketplace to become global but does not inspire trust as a form of authentication.
  - New operating models that comply with open practices should be supported, financial incentives for them should be secured, and the principles of openness should be included in the eligibility conditions for innovation support. New co-creation platforms can even level out risks and contribute to the development of radical innovations.



## Conclusions

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We have discussed four key policy recommendations in this report that can promote the development of the platform economy in the manufacturing industry. The rapidly developing structures of the platform economy are of strategic importance for companies in terms of innovation, business modernisation, and productivity. Finland's innovation policy should tackle the challenges and grasp the opportunities of the platform economy with determination and increasing precision. Policy measures can promote the development of favourable platform-based structures and business activities and speed up the development of the platform economy in the manufacturing industry. The choice between emphasising either obligations or incentives when implementing policy measures should be carefully assessed.

In order to ensure the greatest possible impact, the recommendations should be implemented in parallel as, if implemented individually, they would be less effective. A precondition for promoting the platform economy in the manufacturing industry is that innovation policy funders and the Ministry of Economic Affairs and Employment plan their policies in parallel and engage in close cooperation to implement the recommendations. In addition, the innovation policy funders and the Ministry should jointly promote standardisation and regulation of the platform and data economy actively and ambitiously. To achieve the growth potential of the platform economy, long-term investments and positioning in the global economy are required. Taking into account the fact that the structures of the platform economy will be of strategic importance for the Finnish economy in the long term is important. Consequently, involvement at the forefront of developing these structures is justified.

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