



Research-based, Factory-Less Enterprises

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Abstract:

Globalization and digitalization gives possibilities for multinational enterprises to establish a global production process. Efficiency and profitability can be raised by localization of production close to final markets. The value chains will be spread out globally while control of the total production chain is kept at the head office. R&D is often a main activity situated close to the head office, but this is not always the rule.

Research-based enterprises can be seen as factory-less enterprises, but there are differences. As ownership of "knowledge and blue-prints" and control of the total production chain is the main activities for the head office, these enterprises are difficult to classify within the present classifications based on ownership of material. To be able to classify these enterprises and split those on a national base regarding value chains in a correct way it is essential to understand how they work and what their main activities are. The paper aims to increase the understanding based on a case studies from Sweden

1. Background

During the last decades globalization has been a driving force for growth. By localizing production close to the final markets it has been possible to increase both efficiency and profits, while exports of goods have been reduced. Internet and digital development has been useful tools in this development as communication works also over long distances.

Many multinational enterprises have changed their behavior from export of goods to export of services such as R&D. At the same time as production is moved abroad, R&D departments and logistics are becoming activities close to the head office.

This change has been noticed in national accounts as it changes the content of exports. One sign of this are a growing part of merchanting income, which is generated from production and sales of goods abroad. The activities of the companies are blurred by the fact that parts of incomes have no direct link to domestic production. This sometimes leads to changes in classifications of companies as



domestic production covers mostly services, while the parts of the value chains that are physical production are outsourced abroad.

2. “Factory-less” production (FGP)

Many research-based producers of high tech goods in Sweden have been outsourcing the stages of physical transformation. The main reason for this behavior appears to be cost-effectiveness due to streamlining of production processes and reduction in cost for freight. Production is often moved closer to the final markets while activities such as product chain management, R&D, product design and production testing are kept in Sweden. These activities are considered to be the comparative advantages of these enterprises, and are kept close to the head office.

When introducing ESA2010 it was made public that R&D / design are main part of activities in several of the large multinational enterprises with headquarter in Sweden. This was no surprise as product development and research are being supported by government and universities as innovation is regarded crucial in maintaining Sweden’s position as a competitive business partner.

In these Swedish companies, product development is dominating R&D together with activities such as marketing, branding and other forms of IPP creation. Although, the IPP creation and research must be seen as an inseparable part of the final product, even though physical transformation of the “hardware” is fully outsourced.

At first sight it seems that these enterprises are transforming their business toward service production as their main activities are R&D, software development, design, trading, etc. But as income is mainly from sales of goods, this is not evident. When asking the enterprises whether they are a producer of goods or services the answer will be that they are selling “products” that are a good with large value added services. Although, the good and the service parts are both parts of a package and cannot be sold separately.

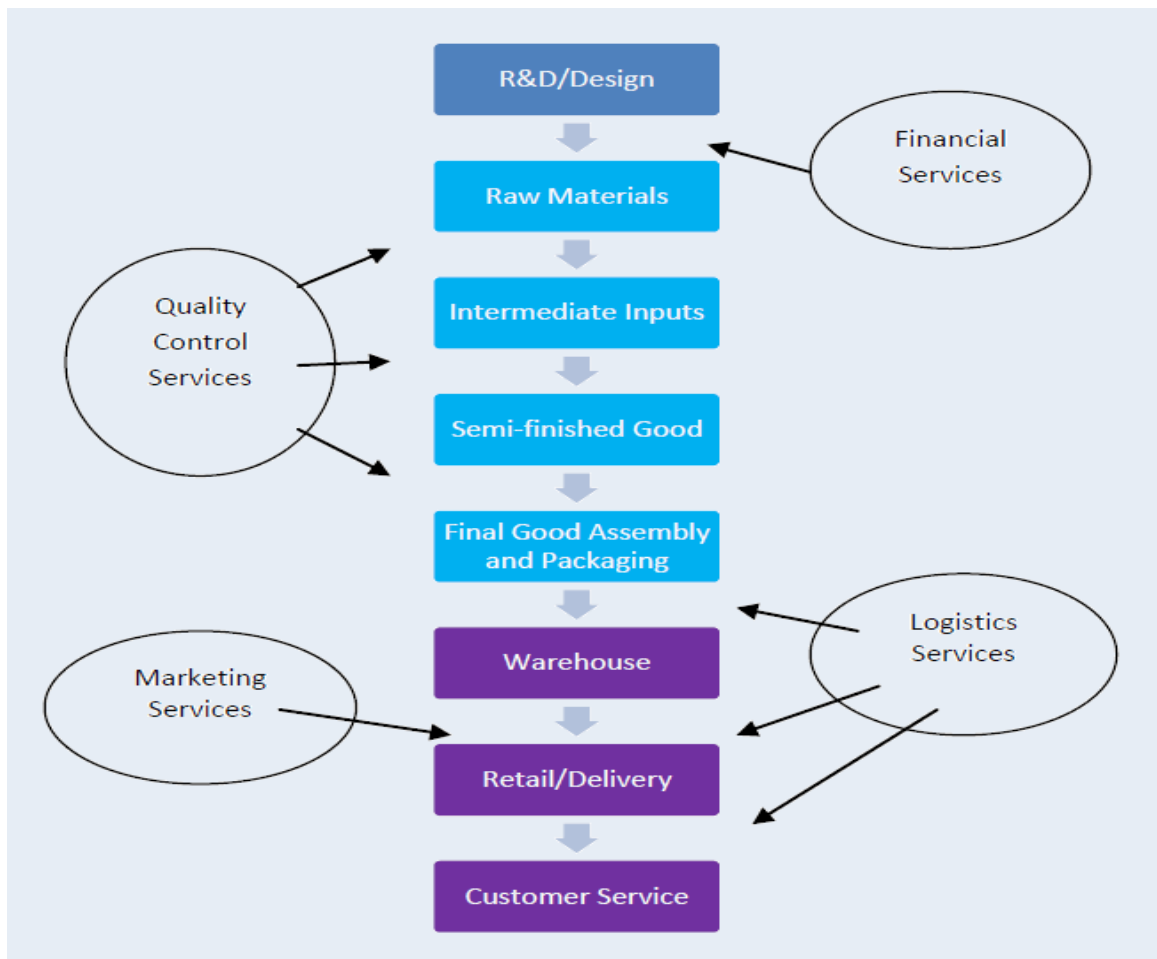
By separating these activities the enterprises can strengthen the final product in terms of competitiveness. Software and product design are often developed and tested in Sweden, while production is performed by the supplier under a license agreement to secure the content. The supplier then provides the Swedish principal with a manufacturing service.

From a national point of view no physical production is taking place in Sweden. At the same time the main part of incomes are related to sales of goods, which contain a high-level of hi-tech content. These companies are then “factory-less enterprises” (FGP:s) in the sense that

production is performed outside Sweden, closer to final markets. Although, the main value added of the product are still produced in Sweden and control of the total production process are maintained from the Swedish head-office.

Statistics link value added to the physical input of the product and take no account to input of digital knowledge. As digitalization is transforming products during “the internet of things”, this is becoming an important issue to discuss as the value added in new products will mainly come from input of IPP and R&D/design.

Graph 1: The Production chain



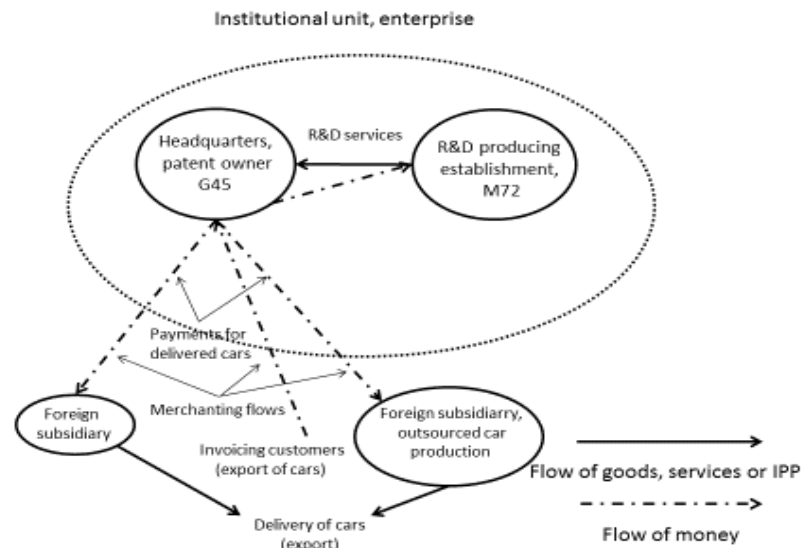
Source: Guide to Measuring Global Production, UNECE 2015

Research-based producer – a special case of FGP

In Sweden the name of “research-based producer” has on occasion been used to indicate this class of newly emerging companies. The income from production in these companies is generated from products that are considered as a good, but with a large content of services. For these products it is very difficult to decide whether the product should be treated as a good or a service.

The “research-based producers” can be seen as a form of factory-less producers i.e., their main activity are in services but incomes relates to sales of products. This is explained in the cases below..

Graph 2: The factory-less goods producer



Source: Wolf M (2015) *Factory-less goods producers*..

One specific feature of the “research-based producers” in Sweden is that, besides the typical FGP activities such as R&D and supply chain management, these companies are also responsible for software development and production testing.

Further they may also be selling services directly to customers using the final product as part of their business, or distributing products supplied by others within its merchandise networks and under its own brand name. So, these companies output will be a composite of products and services while their values added is mainly service dominated

According to Wolf (2016) is possible to regard the R&D part of these companies as a separate unit within the research-industry. A problem

arises when it comes to management and licenses, which should be seen as part of production.

The UNECE TF on Global Production has handled the issues on Factory-less goods producers (FGP:s) and one way forward might be to change classifications regarding these kinds of enterprises. The new concept of FGP:s might be a solution also for research-based enterprises.

3. Digitalization creates “mixed” products

Digitalization is a new concept which is rapidly implemented in industry. One part of this is the “Internet of things”, which imply that many types of goods, such as automotive, kitchen appliances etc. will have a large content of digital services, developed through IPP such as R&D. The main part of value added in these products comes from the service content, but income from products is still related to goods. Two examples of this are the telecom-products and the automotive products.

Case 1: The telecommunication enterprise.

The product sold is a telecommunicating net which is adapted to the customers’ needs regarding what services that will be provided. The net can only be used for the services supplied by the seller, and the services can only be used on this net, for which they are developed.

The seller controls all parts of the production chain, but the goods production are performed by a supplier who are working on a license agreement. This will mean that the ownership of the input material will be owned by the supplier through the whole production process – but the design and blue-prints, without which no production can be made - are controlled by the seller. Thereby, the seller is in control of the product process through the whole production chain.

Case 2: The automotive enterprise

The product sold is a car supplied with comprehensive digital equipment. The car has many IT-functions and thereby a large content of service value added. The R&D of this content is performed by the seller and different suppliers. The seller has control of the R&D-process and the IT- service are adapted in such a way that it may only be used as an input to the final product.

The product can be assembled in Sweden or abroad, depending on final markets. R&D are developed at the head-office and transferred to the producing units in the enterprise.

Both cases above show products that are treated as goods in national accounts, but the value added are mainly service related.

Income comes from selling goods with high service content. Production in Sweden is mainly services but these will be input to a good that is produced abroad under a license agreement.

The inclusion of digital services in the product is to be treated as a inclusive service for this product. As this service can be consumed multiple times makes this part of the product. The problem arises when different parts of the production chain are performed in different countries. From this point of view we are back to the problem of factory-less goods producers.

4. Confusing classifications

Confusion about the precise nature of these Swedish principals of global production arrangements has led to an undesirable situation in national account as these companies are classified in a variety of industries such as manufacturing, information technology, R&D or wholesale trade.

This has made users react and asking for clarifications on these matters. This issue has been up for discussions in UNECE TF Global Production and has also been raised for a change in the ISIC classifications. So far, nothing has been decided.

A research based producer is typically responsible for the product blueprints, the software related parts and the overall control of the production chain. The fractions typically outsourced relate to the hardware parts of the product while marketing and logistics are in

full control of the Swedish companies. Gross profits are redistributed to the head office in Sweden to be used for funding future research.

The research based producers do not consider themselves as service providers as the final products, consisting of hardware and software component, are core to their business. Using old “blue-collar” and “white collar” perception of product manufacturing does not apply to the kind of activities conducted by the Swedish firms. So, economic classifications are hard to apply.

Similarities with computer-related manufacturing provide a rough indication of where to classify these research based producers. For the time being it is suggested to classify them within manufacturing even though the manufacturing of hardware is not carried out in Sweden.

As present classifications are regarding value added of the product to the owner of input material, further discussion is needed on how to treat this concept. Can blue-prints and IT-tools be seen as input material to a product rather than services?

In Eurona 2014:1 the residual definition of services is discussed. The article by Hill states that “because of the traditional confusion between services and intangibles the rapid growth of intangibles is often viewed as contributing to the growth in service production whereas it actually contributes to the growth of goods production”.

The author states that “the traditional dichotomy which divides outputs into only two major categories, material goods and services, is outdated and needs to be replaced by a taxonomy in which three main categories of output are distinguished namely tangible goods, intangible goods and services. The inadequacy of the existing treatment of intangibles in national accounts has obliged users and researchers to develop their own estimates of intangible assets that differ conceptually from those in the national accounts.”

This matter has also been discussed by Wolf in a paper on goods, services and the excluded third at the WPNA in 2015. The understanding of intellectual property products and their position in the classifications as well as the treatment in the national account should be further elaborated, as digitalization is now increasing these assets in many sectors.

The 2008 SNA revision brought in many new features that need a clearer light on the analysis of services, but this work has to continue. In an article by Broussolle from the review of income and Wealth, 2015:3 is concluded that “the SNA does not consistently follow its own innovative approach, in particular when it creates the peculiar category of knowledge-capturing products which encompass

characteristics of both goods and services, which is somewhat confusing.” The conclusion is that this category” should be recognized as genuine goods and the economic unit that produces them should belong to the manufacturing sector, probably under an information goods heading.” In the ISIC this is possible to do this classification but it will be difficult to trace these products to the original source, i.e. it’s all in the information goods sector.

A more clear approach would be to create a sub-section to production of goods. This is possible with the present classifications, but might be difficult as it demands more detailed data input from the enterprises regarding the digital content of their products.

5. Conclusions

Digitalization is creating products with a large content of IPP such as R&D. Research-based producers have been dealing with this for many years. This is problematic in industry classification of national accounts as a larger content of value added in goods-producing sectors are being generated from service production. This may be treated as information goods, but may also be placed in various industries or treated as services.

As digitalization is spreading it is urgent to broaden these discussions further. The border between the goods and services may become even more blurred as “internet of things” is moving into new areas. The present base for classification – the physical input of material goods– is not enough to define industry classification.

Further elaboration of activities and output of production should be done in order to understand the underlying control and governance of the whole production chain in the enterprise. Definitions of goods and services should also be clarified. Maybe the concept of tangibles, intangibles and service can give a clearer concept, as well as the introduction of the FGP as a separate goods-producing industry.

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