

Elżbieta Bombińska

dr, Uniwersytet Ekonomiczny w Krakowie
ORCID 0000-0002-0929-0150

**SERVICIFICATION OF MANUFACTURING –
THE CONCEPT AND CONSEQUENCES
FOR INTERNATIONAL TRADE IN SERVICES**

Introduction

Services have long been considered as natural “non-tradeables” due to their attributes of being intangible, non-storable and often requiring face to face proximity of the producer and the consumer. Technological progress, especially in information and communication technologies, along with offshoring of service activities and development of trade within the global value chains have made services increasingly tradeable, leading to a rise in international trade in services. This phenomenon has attracted growing attention from the researchers as well as policy makers, giving momentum to studies on the importance of services for the contemporary economies and, in particular, for international trade in services.

One of the effects of the research on the role of services was the emergence and development of the concept of “servicification of manufacturing”. This term means the growing importance of services in manufacturing activities resulting in the fact the manufacturing companies became ever more dependent on services: their purchasing, production and selling. The main purpose of the paper

is presentation of this concept and discussion of the role of servicification of manufacturing for international trade in services and for the changes of services supplying modes.

As the article is mainly of a theoretical and conceptual nature, the basic research method is a comprehensive literature review. The paper consists of three parts discussed successively: modes of direct trade in services, the concept of servicification of manufacturing and its constituent elements, and finally, the effect of servicification of manufacturing on the modes of direct and indirect trade in services.

Direct services supply and its modes

Trade in services, that we can conceptualize as the direct service supply modes, was determined more than two decades ago in the General Agreement on Trade in Services (GATS) which is the Annex 1B to the Agreement Establishing World Trade Organization (WTO). GATS defines trade in services as “the supply of a service” by a natural and juridical person (service supplier) from the territory of a WTO member to a service consumer in the territory of another WTO member. The term “service” is not defined in the Agreement¹, but accordingly to GATS there are four different ways in which a service can be supplied. These are:

- Mode 1. The cross-border supply of services from the territory of one country into the territory of another country;
- Mode 2. The consumption abroad – the supply of services in the territory of one country to a service consumer of another country;
- Mode 3. Commercial presence – the supply of services by a service supplier of one country through a commercial presence in the territory of any other country;
- Mode 4. Presence of natural persons – the supply of services by a service supplier of one country through the presence of natural persons in the territory of any other country.

Although the scope of GATS’ modes of supplying services is very wide it does not exhaust all the ways services could be supplied as many services contribute to manufacturing production and being embodied or embedded in exported or imported goods are traded indirectly across borders.

¹ The range of services with which GATS is concerned was precisely determined in the Services Sectoral Classification List (MTN.GNS/W/120 (W/120), issued in 1991 by the secretariat of WTO and based on consultations with the WTO members.

Servicification of manufacturing – the concept and constituents

Indirect trade in services is grounded in the term of ‘servicification of manufacturing’ introduced by National Board of Trade² and developed in a number of studies in recent years³.

Related work based on the same idea of servicification makes definition to servicingizing⁴ and the “manuservice” economy⁵.

The servicification means the growing importance of services in manufacturing activities resulting in the fact the manufacturing companies became ever more dependent on services and they redefined the way of producing value: from the manufacturing of a good to the provision of value-in-use⁶. As a consequence it is difficult to qualify many manufacturing products, especially high value ones, as ‘products’ in their traditional sense anymore; they should rather be perceived “as complex bundles or hybrids of goods and services interactions”⁷. Essentially, the servicification of manufacturing “can be defined as the fact that manufacturing increasingly buys, produces and sells service”⁸. Thus the phenomenon of servicification comprises three constituents displayed in Figure 1.

² National Board of Trade, *Servivification of Swedish manufacturing*, National Board of Trade, Sweden 2010.

³ I.a.: R.E. Baldwin, R. Forslid, T. Ito, *Unveiling the Evolving Sources of Value Added in Exports*, Joint Research Program Series No. 161, Japan External Trade Organisation, Institute of Developing Economics, Chiba 2015; M. Lodefalk, *Servicification of manufacturing – Evidence from Sweden*, “International Journal of Economics & Business Research” 2013, No. 6(1), p. 87–113; M. Lodefalk, *The role of services for manufacturing firm exports*, “Review of World Economics” 2015, No. 150(1), p. 59–82; M. Lodefalk, *Temporary expats for exports: micro-level evidence*, “Review of World Economics” 2016, No. 152(4), p. 733–772; National Board of Trade, *Everybody is in Services – The Impact of Servicification in Manufacturing on Trade and Trade Policy*, National Board of Trade, Sweden 2012; National Board of Trade, *The Servicification of EU manufacturing. Building Competitiveness in the Internal Market*, National Board of Trade, Sweden 2016; H. Nordås, Y. Kim, *The role of services for competitiveness in manufacturing*, “OECD Trade Policy Papers”, No. 148, Paris 2013.

⁴ E.D. Reiskin, A.L. White, J.K. Johnson, T.J. Votta, *Servicizing the Chemical Supply Chain*, “Journal of Industrial Ecology” 1999, No. 3(2–3), p. 19–31.

⁵ J.R. Bryson, P.W. Daniels, *Service Worlds: The ‘Services Duality’ and the Rise of the ‘Manuservice’ Economy*, [in:] *Handbook of Service Science*, eds. P.P. Maglio, C.A. Kieliszewski, J.C. Spohrer, Springer, New York 2010.

⁶ V. Martinez, A. Neely, G. Ren, A. Smart, *High Value Manufacturing: Delivering on the Promise. Executive Briefing*, AIM Research, Cranfield School of Management 2008; T. Baines, H. Lightfoot, O. Benedettini, J. Kay, *The servitization of manufacturing: A review of literature and reflection on future challenges*, “Journal of Manufacturing Technology Management” 2009, No. 20(5), p. 547–567.

⁷ L. Cernat, Z. Kutlina-Dimitrova, *Thinking in a box: A ‘Mode 5’ Approach to Service Trade*, “Journal of World Trade” 2014, No. 48(6), p. 1109–1126.

⁸ National Board of Trade, *The Servicification of EU manufacturing...*, *op. cit.*, p. 10.

Figure 1. Servicification of manufacturing – components and measuring methods



Source: own elaboration.

The first component of the servicification is more intensive use of services inputs by manufacturing firms. Services are, and have been, a central part of manufacturing operations in every stage of production (Figure 2). Case studies by the National Board of Trade on the inputs used by specific manufacturing firms (even relatively small companies operating in different sectors), highlight that they rely on 40–50 different types of services to carry out their activities⁹. The increase in the use of services inputs by manufacturing firms is closely connected to the development of global value chains: geographically split companies need services such as transport, communication, logistics, finance, etc. which could link their manufacturing operations across countries¹⁰. Thus services are perceived as the ‘glue in global value chains’¹¹. Some of service inputs are used by any type of company in any value chain (horizontal service activities), while

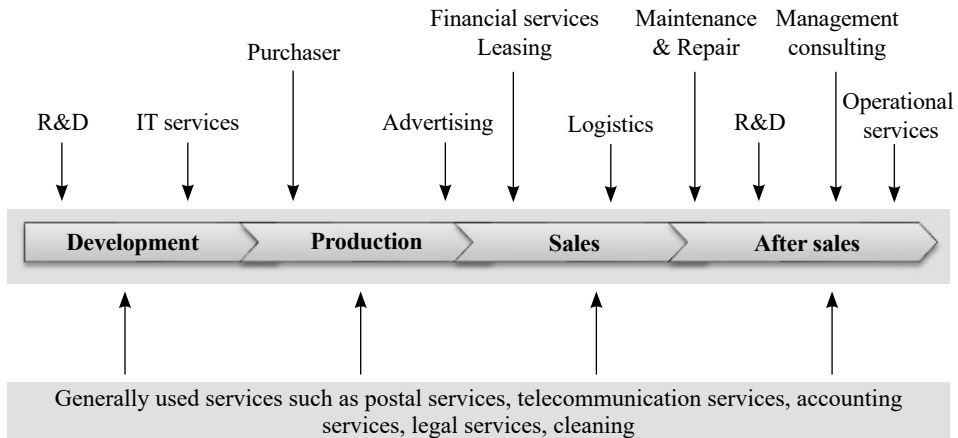
⁹ National Board of Trade, *Servicification of Swedish manufacturing...*, op. cit.; National Board of Trade, *Just Add Services. A Case Study on Servicification and the Agri-Food Sector*, National Board of Trade, Sweden 2013.

¹⁰ R. Jones, H. Kierzkowski, *The Role of Services in Production and International Trade: A Theoretical Framework*, [in:] R. Jones, A. Krueger, *The Political Economy of International Trade*, Basil Blackwell, Oxford 1990, p. 31–48.

¹¹ P. Low, *The role of services in global value chains*, Real Sector Working Paper, Fung Global Institute 2013.

others are peculiar to specific value chains in the manufacturing sector (vertical service activities)¹².

Figure 2. Sample services used and offered by manufacturing firms



Source: National Board of Trade, *Servicification of Swedish manufacturing*, *op. cit.*

The second component of servicification is in-house provision of services within manufacturing firms. This servicification inside company can essentially be perceived as an alternative to buying services: the same service can either be out-sourced or performed in-house. In other words, the way the firm servicifies (makes or buys) depends on its decisions on whether to internalise a particular activity or keep it external. Among key considerations affecting this decision can be enumerated i.a.: costs factors, the will to have core strategic functions in the firm (e.g. R&D, sales and operations planning, strategic procurement), the need of having service on a continuous basis and with a certain degree of control over it supply, access to qualified employees. Should be noted, that as a result of increasing out-sourcing, aiming at the separation of services functions in manufacturing from core production functions, services previously produced in-house are now purchased externally as inputs, which means that servicification may partly be a “statistical phenomenon”¹³.

The third component of servicification in manufacturing is the growth of the sales of services which are bundled with goods. This phenomenon was initially textualized by Vandermerwe and Rada as “servitisation”¹⁴ and is also related

¹² G. Gereffi, K. Fernandez-Stark, *The offshore services value chain: developing countries and the crisis*, [in:] *Global Value Chains in a Postcrisis World. A Development Perspective*, eds. O. Cattaneo, G. Gereffi, C. Staritz, The World Bank, Washington 2010.

¹³ R.E. Baldwin, R. Forslid, T. Ito, *op. cit.*

¹⁴ S. Vandermerwe, J. Rada, *Servitization of business: Adding value by adding services*, “European Management Journal” 1988, No 6(4), p. 314–324.

to the process described by Tomiyama as “service engineering”¹⁵, aiming at the increase of value by manufacturing firms through combining services and products. Using services as outputs by manufacturing companies is a deliberate strategy to increase the value of products to consumers, differentiate products from competitors¹⁶, customize, upgrade and prolong offers, thus strengthening customer relationships and loyalty¹⁷. All these efforts lead to higher revenues and higher profitability of manufacturing firms¹⁸. Companies try to sell solutions, rather than products, and focusing on a product’s entire lifecycle they develop “sales between sales”, not just “sales after sales”¹⁹. Services as outputs of manufacturing firm are sold at the same time the good is exported (e.g. installation services) or at a later stage as malfunction (repair services) or as a part of the normal operation of the good (maintenance services)²⁰. Many services sold by manufacturing companies are complementary to the product they sell. Cusumano et al. subdivide this group into smoothing and adapting services according to whether they alter or expand the functionality of the product²¹. But some services are not complements but substitutes of the products and they are sold to replace the good previously dealt; for example firms lease products rather than sell them. Some manufacturing companies go even further by shifting their business model from manufacturing to services – probably the most well-known example of this complete reversal is IBM²².

¹⁵ T. Tomiyama, *Service Engineering to Intensify Service Contents in Product Life Cycles*, [in:] *Proceedings of the Second International Symposium on Environmentally Conscious Design and Inverse Manufacturing (EcoDesign 2001)*, IEEE Computer Society, p. 613–618.

¹⁶ P. Baker, I. Miles, L. Rubalcaba, N. Plaisier, S. Tamminen, I. de Voldere, *Study on Industrial Policy and Services. Within the Framework Contract of Sectoral Competitiveness Studies – Final Report – Part I (ENTR/06/054)*, ECORYS, Rotterdam 2008.

¹⁷ T. Baines, H. Lightfoot, *Made to Serve: How Manufacturers Can Compete Through Servitization and Product Service Systems*, Wiley 2013; M.A. Cusumano, S.J. Kahl, F.F. Suarez, *Services, Industry Evolution, and the Competitive Strategies of Product Firms*, “Strategic Management Journal” 2015, No. 36(4), p. 559–575; R. Oliva, R. Kallenberg, *Managing the Transition from Products to Services*, “International Journal of Service Industry Management” 2003, No. 14(2), p. 160–172.

¹⁸ M. Crozet, E. Milet, *Should everybody be in services? The effect of servitization on manufacturing firm performance*, “CEPII Working Paper”, No. 2015-19; F.F. Suarez, M.A. Cusumano, S.J. Kahl, *Services and the Business Models of Product Firms: An Empirical Analysis of the Software Industry*, “Management Science” 2013, No. 59(2), p. 420–435; I. Visnjic, F. Wiengarten, A. Neely, *Only the Brave: Product Innovation, Service Business Model Innovation, and Their Impact on Performance*, “Journal of Product Innovation Management” 2016, No. 33(1), p. 36–52.

¹⁹ National Board of Trade, *Everybody is in Services...*, *op. cit.*

²⁰ S. Miroudot, C. Cadestin, *Services In Global Value Chains: from Inputs to Value-Creating Activities*, “OECD Trade Policy Papers” No. 197, Paris 2017.

²¹ M.A. Cusumano, S.J. Kahl, F.F. Suarez, *Services...*, *op. cit.*, p. 559–575.

²² Z. Ahamed, T. Inohara, A. Kamoshida, *The servitization of manufacturing: An empirical case study of IBM Corporation*, “International Journal of Business Administration” 2013, No 4(2), p. 18–26.

Thus, manufacturing merchandise can no longer be seen as only tangible product, but rather as a mix of goods and services. As the latter are used in operations of manufacturing firms in different ways, the concepts of “embodied” and “embedded” services have been developed²³. Embodied services are defined as services which constitute an input into the manufacture of a good (e.g. transport, telecommunications, financial services and business services) meanwhile the embedded services are those that pose an input into the sale of a good (e.g. retail, after-sales support inventory management). The key difference between service embodied and embedded is the possibility to separate it from the product: only embedded service, which is added to the product at the point of sales seems to be separable from it. Applying this taxonomy to the process of servicification the embodied services could be linked to its ‘buying’ and ‘producing’ components whereas embedded services to “selling” one (figure 1).

Servicification of manufacturing and modes of service supply

The servicification of manufacturing substantially affects international direct trade in services and this influence encompasses all the four GATS’ modes of supply. As Table 1 illustrates, trade dimensions of servicification can be discerned in all the components it comprises i.e. buying, producing and selling.

The servicification in terms of “buying” can involve either domestic sourcing or international sourcing, i.e. offshoring, of services. In the first case services are purchased at home thus no cross-border trade in services is carried out. Nevertheless, there might still be services trade if domestic services inputs are derived from locally established commercial presence of a foreign company. In this case service imports in the form of Mode 3 takes place. Another option of buying services by manufacturing firm is sourcing them from abroad. It could either has the form of rendering services by independent foreign suppliers (offshore outsourcing) or within the boundaries of the firm when it relocates service activities from the domestic to a foreign economy by establishing foreign affiliate (offshore insourcing). Regardless of the ownership links between the firm and the service supplier exist or not, such international sourcing results in direct cross-border services imports (Mode 1). Import of services arising from offshore sourcing could also adopt the form of Mode 4 as services might be provided locally by contractual foreign service supplier, either self-employed or an employee of a juridical person.

²³ J. Drake-Brockman, S. Stephenson, *Implications for 21st Century Trade and Development of the Emergence of Services Value Chains*, International Centre for Trade and Sustainable Development Working Paper 2012; G.O. Pasadilla, A. Wirjo, *Services and Manufacturing: Patterns of Linkages (Policy Brief APEC)*, APEC Policy Support Unit, Singapore 2014.

Table 1. Servicification of manufacturing and the modes of direct service supply

BUYING SERVICES	
Sourcing of domestic service inputs <i>Mode 3 imports</i>	Sourcing of foreign service inputs <i>Mode 1 imports or Mode 4 imports</i>
PRODUCING SERVICES	
Manufacturing services on inputs owned by others <i>Mode 2 exports</i>	
SELLING SERVICES	
Services bundled with manufacturing exports <i>Mode 1 exports or Mode 4 exports</i>	

Source: own elaboration based on: R. Lanz, A. Maurer, *Services and Global Value Chains: Some Evidence on Servicification of Manufacturing and Services Networks*, WTO Staff Working Paper, No. ERSD-2015-03.

Servicification could also have direct trade dimension in its “producing” constituent. When foreign company sends its goods inputs to the domestic firm for processing, it “consumes” manufacturing services abroad; consequently, from the domestic firm’s perspective manufacturing services on inputs owned by foreign company represent Mode 2 exports. Finally servicification affects direct trade in services through its “selling” item, when manufacturing products together with embedded services are exported. In this case both cross-border trade (Mode 1) and the presence of natural persons (Mode 4) might be employed as trade patterns.

All the above trade effects of servicification relate to the modes of direct service supply but servicification primarily results in indirect services flows across borders when manufacturing output is exported. The indirect trade in services encompasses services which are inseparable part of manufacturing good i.e. services embodied (both external and in-house inputs) as well as embedded services which are charged for indirectly (sold in a package with a product). Taking account of the interrelationship between merchandise and services trade phenomenon and staying in line with the already existing four modes of direct services supply this indirect way of supply provision was named by Cernat and Kutlina-Dimitrova²⁴ – Mode 5.

Summary

The growing importance of services in the activities of industrial enterprises, referred to as servicification of manufacturing, is of great importance for international trade in services. This process affects the turnover value of all the four modes of service supply, defined by GATS, i.e. direct trade, which is implemented by the cross-border flows of: services, capital and people. However, the most important effect of servicification of manufacturing for trade in services is the indirect trade

²⁴ L. Cernat, Z. Kutlina-Dimitrova, *Thinking in a Box: A ‘Mode 5’ Approach to Service Trade*, “Journal of World Trade” 2014, No. 48(6), p. 1109–1126.

that occurs through the flow of goods in which the services are being embodied or embedded. The analyzes of international exchange of services therefore require the extension of the Mode 5. of service supply.

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Servicification of manufacturing – koncepcja i skutki dla międzynarodowego handlu usługami

Celem artykułu jest prezentacja – dyskutowanego w badaniach prowadzonych w ostatnich latach przez wielu ekonomistów – pojęcia *servicification of manufacturing* oraz analiza skutków tego procesu dla analiz poświęconych międzynarodowemu handlowi usługami. Termin *servicification of manufacturing* oznacza rosnące znaczenie usług w działalności przedsiębiorstw przemysłowych, którego wyrazem jest zwiększenie udziału usług nie tylko w zakupach, ale również w produkcji i sprzedaży tych podmiotów. Uwzględnienie tego procesu ma istotne znaczenie dla analizy międzynarodowego handlu usługami, ponieważ wymiana usług związana jest nie tylko z transgranicznym przepływem usług, osób i kapitału, na które wskazuje GATS (handel bezpośredni), lecz

także z przepływami towarów (handel pośredni). Artykuł ma charakter teoretyczny, a podstawową metodą badawczą jest kwerenda literatury przedmiotu.

Słowa kluczowe: servicification of manufacturing, usługi, międzynarodowy handel usługami, modele świadczenia usług

Servicification of Manufacturing – The Concept and Consequences for International Trade in Services

The aim of the article is to present – discussed in research conducted in recent years by many economists – the concept of servicification of manufacturing and its effects for international trade in services. The term servicification of manufacturing means the growing importance of services in the activities of industrial enterprises, which is reflected by the increase in the share of services not only in purchases, but also in the production and sale of these entities. Including this process is important for the comprehensive analysis of international trade in services as this trade is connected not only with the cross-border flows of services, people and capital, indicated by GATS (direct trade), but also with the flows of goods (indirect trade). The article is theoretical, and the basic research method is the query of the literature on the subject.

Key words: servicification of manufacturing, service, trade in services, modes of service supply

