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Innovations in the Service Sector in Poland and the World*

Abstract. *The paper has carried out empirical research of innovations in the service sector that allow us to draw the following conclusions: 1. Innovations in the service sector are not of marginal importance – as the literature on this subject claims – they are of an ancillary nature, complementary with respect to the industry and the entire manufacturing sector; 2. There is a synergy and feedback between the service and production sectors in creating innovations; 3. Innovativeness of the entire economy and its particular sectors may be measured by the Solow residual, namely the total factor of productivity (TFP), as the TFP causes innovation growth. Moreover, the research on all signs of TFP growth is a basis for looking for sources of innovation growth in all sectors of the national economy.*

Keywords: *innovations, service sector, the Solow residual*

Introduction

F.A. von Hayek in *The Constitution of Liberty* published in 1960 wrote: „most benefits of social life, especially in its more developed forms called „civilization” are derived by a unit using broader knowledge than it is aware of. One may say that civilization begins when striving for the goals, a human being uses more knowledge than they actually acquired and when they go beyond boundaries of their ignorance by using the knowledge they do not have” [Hayek 2006, p. 36].

* The paper translated by Beata Koźmińska.

I have quoted Hayek to raise awareness that a civilization progress, an innovation progress and innovation depend on knowledge and development of science. If it is so, science is an integral part of culture which in turn is part of the service sector and not the sector of industrial production or construction or agriculture.

The Central Statistical Office on its website defines innovation in the following way: "Implementation of a new or improved product (or service) or a process, a new organizational method or a new marketing method to the business practice, a workplace or relations with the environment."¹

This definition complies with the definition provided by Oslo Manual recommended by OECD in 2008. The definition of innovation quoted shows multiple aspects of this phenomenon and various difficulties with measuring innovation of the economy as well as defining what innovation means.

Generally, according the literature, innovation originates in production activities and service-related innovations are of marginal importance [Miles 2000]. In my opinion this is an incoherent approach towards researching the phenomenon of innovation. On one hand, the literature on the subject "suggests" that the service sector including "science" and "culture" makes use of innovation originated from production activities and on the other hand the most important measures of innovation include: expenditure on scientific research in activities in production companies. We do not need to prove that without scientific research there is not innovation, namely without development of the service sector there will be no innovation in the production activities.

Surely, there is a synergy between production activities and activities of the service sector which leads to a civilization progress and an innovation growth. Schumpeter considers innovation as a creative destruction whereas Hayek thinks that innovation cannot be planned and he wrote: "We are not able to imagine what the civilization will be or may be like in five hundred years or fifty years just like our ancestors or even great-grandparents were not able to predict our present lifestyle" [Hayek 2006, p. 37]. That is, why I think we need to approach the analysis of innovation in the entire national economy in a diversified way. Firstly, we should examine separately innovation processes in production activities and separately in service activities and secondly we should look for innovation synergies between the two types of activities. Certainly, such an approach to innovation will impact changes to measurement of innovation in the economy.

The paper aims to analyse innovativeness of the service sector in Poland and the world and to make an attempt to apply the concept of the Solow residual for the purposes of measuring innovativeness of the service sector. In order to achieve the above objective of the paper I am going to analyse the following issues: 1. Definitions of service activities, services of the service sector, 2. The

¹ http://old.stat.gov.pl/GUS/definicje_PLK_HTML.htm?id=POJ-7060.htm [access: 3.11.2014].

essence and measurement of innovation; 3. Incentives of innovations in the service sector; 4. Application of the Solow residual to measure innovativeness of the service sector. The paper finishes with recommendations and the conclusion.

1. Service activities, services and the service sector

The literature on economics misses an explicit definition of the notion of a service. The scientific discussion on service was began by J.B. Clark, I. Fisher and J. Fourastié who tried to describe the economy by means of a three-sector economic model where, in simple words:

- sector 1 comprised agriculture, forestry, fishery,
- sector 2 included industry with construction and architecture
- sector 3 consisted of services in their broad understanding.

It is worthwhile paying attention to the fact that in the above approach sector 3, namely the service sector, was obviously a residual sector comprising activities of people which could not have been accounted for in sector 1 or sector 2.

In the literature on the subject, at the beginning of the discussion not about the service sector as Clark, Fisher and Fourastié discussed, but about the essence of the service, there was an opinion that services involved human activities which

Table 1. Enumeration the following features of defining services

Features of services	Implications for a service oriented enterprise and consumers
Immateriality	<ul style="list-style-type: none"> – services may be evaluated by a potential buyer by means of senses – services cannot be transferred and stored
Simultaneous rendering and consuming processes	<ul style="list-style-type: none"> – limited availability time of the service to the buyer – limited possibilities of increasing the scale of rendering a service – work of the personnel affects results of the process of rendering a service – no possibility of keeping a production secret as well as protecting patents
Heterogeneity of services	<ul style="list-style-type: none"> – inability to offer standard products due to the fact that final features are developed by the personnel of a service company, by the customer or other customers – difficulties with calculating costs of rendering services and applying reasonable pricing policy
Impermanence of services	<ul style="list-style-type: none"> – inability to store services and to produce them to stock – the amount of consumption is limited by the actual capacity of the human and tangible potential engaged in rendering a particular service
No possibility of owning a service	<ul style="list-style-type: none"> – services rendered cannot be traded again

Source: Flejterski et al. 2005, p. 43.

did not lead to production of material goods [cf. views of Lange, Illeris, Kotler, McLuhan, Marshall and others; Dominiak 2011].

However this „path” of defining a service, in my opinion, is a road to nowhere as most services being of intangible nature lead to production of tangible goods e.g. outcomes of design works, science, commerce, transport etc.

However B. Hollins and S. Shinkins distinguish the following aspects of defining a service.

Table 2. Distinguish the following aspects of defining a service

Dimension of defining a service	Description
Materiality	Most services are of immaterial nature, they cannot be touched e.g. legal advice or a trip though outcomes are visible
Transferability	Most services cannot be transferred from one place to the other and thus they cannot be exported
Storage	Being immaterial services cannot be stored
Contact with the customer	In case of material goods there is not contact with their production process, in case of services, production and consumption are simultaneous and the contact occurs, this gives a possibility of a more comprehensive evaluation of the quality of services.
Quality	In case of material goods the quality can be measured more easily and quantitatively, the evaluation of quality of services is mainly qualitative

Source: Hollins & Shinkins 2006: 8.

Considering the features of defining a service as well as dimensions of describing the category of service, providing a simple definition of a service making its essence precise cannot originate good results. That is, why the category of “service” may be defined in two ways:

a) this is an activity of people accounting for five dimensions (aspects of activities) such as:

- materiality,
- transferability,
- storage,
- contact with the consumer,
- quality,

bears signs of:

- immateriality,
- simultaneous rendering and consuming processes,
- heterogeneity of services,
- impermanence of services,
- no possibility of owning a service.

A service „cannot be dropped on legs” but it can originate a material good e.g.:

- an architectural project may result in a HOUSE
- production technology and plastic materials result in a plastic BUCKET, plastic TOYS as well as plastic tools used for producing material goods.

b) a service is an activity of people which according to the Statistical Classification of Economic Activities in the European Union is considered a service activity namely points G, H, I, J, K, L, M, N, O, P, Q, R & S. NACE comprises:

- + AGRICULTURE, FORESTRY AND FISHING
- + B MINING AND QUARRYING
- + C MANUFACTURING
- + D ELECTRICITY, GAS STEAM AND AIR CONDITIONING SUPPLY
- + E WATER SUPPLY, SEWERAGE, WASTE MANAGEMENT REMEDIATION ACTIVITIES
- + F CONSTRUCTION
- + WHOLESALE AND RETAIL; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES
- + H TRANSPORTING AND STORAGE
- + I ACCOMMODATION AND FOOD SERVICE ACTIVITIES
- + J INFORMATION AND COMMUNICATION
- + K FINANCIAL AND INSURANCE ACTIVITIES
- + L REAL ESTATE ACTIVITIES
- + M PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES
- + N ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES
- + O PUBLIC ADMINISTRATION AND DEFENCE: COMPULSORY SOCIAL SECURITY
- + P EDUCATION
- + Q HUMAN HEALTH AND SOCIAL WORK ACTIVITIES
- + R ARTS, ENTERTAINMENT AND RECREATION
- + S OTHER SERVICE ACTIVITIES
- + T ACTIVITIES OF HOUSEHOLDS AS EMPLOYERS; UNDIFFERENTIATED GOODS- AND SERVICES- PRODUCING ACTIVITIES OF HOUSEHOLDS FOR OWN USE
- + U ACTIVITIES OF EXTRATERRITORIAL ORGANISATIONS AND BODIES.²

Moreover I would like to pay attention to two facts:

Firstly, nowadays the division of the economy into three sectors [agriculture, industry and services] has been extended by:

² Eurostat, Metadata Combined Nomenclature 2014, RAMON, www.ec.europa.eu/eurostat/ramon/index.cfm?Targeturl=DSP_PUB_WELC [access: 8.11.2014].

- Sector 4 – information or information technology or ICT (Information Communication/Technology),
- Sector 5 – a financial sector connected to finalizing economy on the global scale.

Sectors 4 and 5 are often called modern centres of business services or business services environment.

Secondly, activities of the service sector and its effects are called products by marketing specialists, Theodore Levitt, marketing guru, has developed the concept of the so called augmented product – AP. The AP consists of:

- core product (a pure product),
- actual product expanding the core by a colour and the quality etc.,
- augmenting an actual product with services and guarantees related to consuming the products offer [Levitt 1980].

In the above approach a service does not exist independently and is the same product as other tangible goods e.g. a house or a car. If we are to assume the concept of “total” product, innovation would be researched on the scale of the entire economy. However as I emphasised in the introduction, innovations must be differentiated from the production and service activities. I can see specific features of innovation in service activities in particular. That is why Levitt’s concept of the augmented product (AP) is useful but only in marketing management and not only in growth analysis and economic development. When analysing determinants of economic development we need to differentiate functioning:

1. Physical capital:
 - a) provided by a human being,
 - b) nature capital or environment wellbeing;
2. Intellectual capital:
 - a) human capital understood as the knowledge possessed, experience, professional skills of an employee etc.,
 - b) structural capital (organizational) owned by a company comprising:
 - knowledge of an organization,
 - organizational culture,
 - protected knowledge namely intellectual property,
 - inventions, databases, software;
3. Social capital comprising:
 - a) groups and social networks,
 - b) trust among people,
 - c) ability to cooperate,
 - d) low level of social exclusion,
 - e) information and communication [Noga 2014: 69-70].

At present innovation of the economy is dependent on intellectual capital and social capital which means that it is the service sector and not the production sec-

tor that powers innovations. Obviously the manufacturing sector may demand innovation however a proper progress depends on the process of satisfying human needs and not techniques and technologies of manufacturing.

2. Innovations and their dimensions

In the introduction to this paper I have quoted the definition of innovation proposed by the Main Statistical Office which is as follows: "Implementation of a new or improved product (or service) or a process, a new organizational method or a new marketing method to the business practice, a workplace or relations with the environment." As I have also emphasised that this definition does not cause any controversies and comprises the following innovations:

- marketing,
- organizational,
- process-oriented,
- product-related,
- benefits for the environment.

The Central Statistical Office also introduces the notion of innovation as: „All scientific, technical, financial and commercial activities which lead to or tend to lead to implementation of innovation. Innovation activities also comprise research and development (R&D) that is not directly related to creating a specific innovation.”³ This differentiation also does not provoke any controversies as innovation is a multidimensional phenomenon that cannot be looked at from the point of linear approach to research activities on launching a new product in the market. We need an approach that will enable to look at the innovation process both in terms of potential determinants as well as achieved results. Such a methodology was proposed by a group of experts working within the project called European Innovation Scoreboard (EIS). This team was appointed in 2000 by the European Commission in order to monitor results of the Lisbon Strategy which explicitly considers innovation as a determinant of competitiveness development. The Summary Innovation Index (SII) elaborated is a mathematical and statistical combination of 25 indicators containing the following ingredients:

- innovation drivers: structural conditions making up innovation capital;
- knowledge creation: investment in research and development activities understood as a key element in creating a knowledge-based economy;
- innovation and entrepreneurship: factors informing about innovation-oriented activities on the level of an enterprise;
- application: information about the impact of innovation on employment and economic results;

³ http://old.stat.gov.pl/GUS/definicje_PLK_HTML.htm?id=POJ_1477.htm [access: 8.11.2014].

– intellectual property: factors informing about the extent of involvement and the usage of rights protecting intellectual property.⁴

In 2013 Poland ranked 45th in the world achieving the SII = 0,279 and surpasses EU countries:

- Bulgaria 0.188,
- Latvia 0.221,
- Romania 0.237.

Top EU countries:

- Sweden 0.750,
- Denmark 0.728,
- Germany 0.709,
- Finland 0.684,
- Luxemburg 0.646,
- Holland 0.629,
- Belgium 0.627,
- Great Britain 0.613,
- Ireland 0.606,
- Austria 0.599,
- France 0.571.

The average for the EU amounts to 0.554 and the above top exceeds the EU average SII. However the other countries including Poland are below the EU average.⁵

The Summary Innovation Index has been used since 2006 and as I have already said it accounts for innovations of the service sector. Innovation of the service sector may be measured by means of the SII in a multidimensional approach (Performance Stores per Dimension) where out of 8 dimensions 5 may be included in the service sectors namely:

- human resources,
- research systems,
- finance and support,
- linkages and entrepreneurship,
- intellectual assets.

According to the above data from the internet source, 28 EU states achieved the following SII:

– as regards human resources Poland attained results close to the EU average and places us on 18th place,

⁴ www.globalinnovationindex.org/userfiles/file/reportpdf/GII-2014-v5.pdf [access: 8.11.2014].

⁵ www.ec.europa.eu/enterprises/policies/innovation/files/ius/ius-2014_en.pdf, Annex E: Summary Innovation Index (SII) time series [access: 8.11.2014].

– as regards finance and support we rank 15 among all EU countries. There is no doubt that Polish banking system is one of the most stable systems in the world and not only in the EU.⁶

These two facts confirm that the Polish service sector is on the innovation path.

3. Is the service sector innovative?

J. Dominiak has compared innovations in the industry and services and found out about nine differences, namely:

1. Innovations in services do not require as much R&D support as industry.
2. Service firms are less inclined to invest in fixed assets to support innovations.
3. Service firms spend less money on the purchase of patents and licences.
4. Innovations in services are easier to imitate.
5. Importance of human resources in creating innovations is much higher in services than in industry.
6. In the development of service innovativeness, technology plays a minor role.
7. The chief barrier to the development of service innovativeness is lack of well-educated labour force.
8. Organisational aspects are of key importance.
9. Innovations in services are not restricted to changes in the properties of a product; they also include changes in the process of service provision and contacts with clients [Dominiak 2011].

In my opinion, this way of addressing the scientific problem of differentiating innovativeness in services and production activities does not provoke any controversies.

Creating innovations in services is specific however this process occurs on the basis of known methods of originating ideas such as heuristic methods, spontaneous idea search or methods of coerced contrasting. Table 3 shows how blue ocean ideas are generated as opposed to red ocean.

I think that the blue ocean strategy gives the service sector greater possibilities of designing and implementing innovations. Nevertheless it does not mean that this sector cannot pursue the red ocean strategy.

In my opinion innovativeness including the innovativeness of the service sector may be measured not only by means of the SII but also by the Solow residual [Blanchard 2011: 397-399].

⁶ www.ec.europa.eu/enterprises/policies/innovation/files/ius/ius-2014_en.pdf, Annex E: Summary Innovation Index (SII) time series [access: 8.11.2014].

Table 3. Strategy of red and blue ocean

Red ocean strategy	Blue ocean strategy
Competing in the existing market space	Creating free market space
Fighting with competition	Competition becomes insignificant
Usage of the existing demand	Creating and taking over a new demand
Necessity of finding a compromise between the value and the cost	Overcoming the compulsion of the compromise between the value and the cost
Organizing the entire corporate activities in line with its strategic choice between exceptionality and low costs	Organizing the entire corporate activities in line with its aspirations for exceptionality and low costs

Source: Kim & Mauborgne 2011.

The Solow residual is as follows:

$$\text{The residual} = g_y - [\alpha g_w + (1 - \alpha) g_k]$$

where:

$$g_y - \text{observed output growth} = \frac{\Delta Y}{Y}$$

$$\alpha = \frac{\text{minimum salaries paid}}{\text{nominal output value}}$$

$$g_N = \frac{\text{growth in labour input}}{\text{labour input}} = \frac{\Delta N}{N} = \text{that is a rate of change in the labour input}$$

$$g_K = \frac{\text{growth in labour input}}{\text{labour input}} \text{ that is a rate of change in the capital input}$$

The Solow residual is often called in the literature as the total factor productivity – TFP.

TFP = the Solow residual

$$\text{TFP} = \alpha \times g_A$$

where:

α – as above

TFP – as above

g_A – a rate of technological progress which may be presented as:

$$g_A = \frac{\text{TFP}}{\alpha}$$

Data included in Table 4 is not interesting. If we assume that the rate of technological progress g_a measures innovativeness – which in my opinion is fully justified then: Firstly, in 2010 the pace of technological progress in the entire national economy (g_a) amounted to 5.19 and is almost five times faster than in the service

Table 4. The SOLOW residual for the national economy of Poland (NE) and for the service sector (SS) in 2010 and 2012

No.	Components of the SOLOW residual*	2010		2012	
		NE	SS	NE	SS
1	g_Y	6.32	4.76	3.40	4.60
2	g_N	2.36	0.93	0.00	0.35
3	g_K	6.06	7.52	6.55	7.00
4	α	0.42	0.42	0.55	0.63
5	$1 - \alpha$	0.58	0.58	0.45	0.37
6	TFP (SOLOW RESIDUAL)	2.18	0.46	0.45	1.79
7	g_A (pace of technological progress = innovativeness)	5.19	1.10	0.82	2.84

* symbols as in the examples above.

Source: calculations of one's own based on Yearbooks of the Central Statistical Office GUS 2011 and 2013.

sector where it reached 1.10. Secondly, two years later, namely in 2012, the pace of technological progress (g_A) in the entire national economy was 3.5 times slower than in the service sector.

How can my research results be interpreted? There may be a few conclusions:

1. The service sector plays an ancillary role with respect of the production sector. To enable innovations in the production activities (industry), the service sector must implement innovations and technological progress.

2. In relation to the above, the pace of technological progress and innovations in the industry determines the pace of innovation growth in the service sector. Certainly there is a feedback and a synergy however industry needs of implementing innovations are decisive.

3. The higher the Solow residual namely the total performance of TFP including a higher rate of technological progress and *eo ipso* innovations. That is why, according to my research results TFP should be examined and we should look for determinants of the growth of this measure as they are fundamental for the innovation growth both in the national economy as well as in the service sector.

Remarks

The analysis I carried out as well as empirical research of innovations in the service sector allow us to draw the following conclusions:

1. Innovations in the service sector are not of marginal importance – as the literature on this subject claims- they are of ancillary nature, complementary with respect of the industry and the entire manufacturing sector.

2. There is a synergy and feedback between the service and production sectors in creating innovations.

3. Innovativeness of the entire economy and its particular sectors may be measured by the Solow residual namely the total factor productivity (TFP) as the TFP causes the innovation growth. Moreover, the research on all signs of TFP growth is a basis for looking for sources of innovation growth in all sectors of the national economy.

These conclusions lead to the following recommendations. The growth in innovations in the service sector and the entire national economy is dependent on the increase of expenditure on education. That is why the measure of innovation based on expenditure on the research and development, *eo ipso*, on science result from earlier outlays on education of all levels i.e. development of:

- primary and secondary education,
- higher education,
- technical culture,
- training scientific staff (PhDs, habilitations, professorships),
- training in economic education of the entire Polish society at the level comparable to the American society, Western Europe or Japan. In this respect Poland is delayed e.g. a pupil of Polish secondary school knows where the Congo or Bhutan lie but he/she does not know what a share, a bond or even GDP is whereas a primary school pupil from USA, Germany, France, Norway or Finland knows it though he or she may not know where the Congo is.

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Innowacje w sektorze usług w Polsce i na świecie

Streszczenie. W artykule dokonano pomiaru wpływu innowacji w sektorze usług na wzrost gospodarczy w całej gospodarce za pomocą reszty Solowa. Otrzymane wyniki są bardzo interesujące i wskazują na duże znaczenie innowacji w sektorze usług dla całej gospodarki, bowiem działają one na zasadzie forward-looking. Wymaga to jednak prowadzenia dalszych badań.

Słowa kluczowe: innowacje, sektor usług, reszta Solowa