

COOPERATION IN THE AREA OF INNOVATIONS – CRITICAL ANALYSIS OF STATISTICAL DESCRIPTION AND PROPOSALS FOR ITS MODIFICATION

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Abstract

Cooperation in the area of innovations comes down to active participation of enterprises in innovation processes taken up with other commercial and/or non-commercial entities. The data in this respect – in accordance with the Oslo Manual 2005 recommendations – should be collected using the identifying questions: cooperation partners (e.g. competitors, clients, consultants, universities), cooperation objects (innovation types – e.g. product or process specific ones) and the geographical range (local, national, international). It is suggested to apply either binary or ordinal response scale in these arrangements. The recommendations presented in such way are of fairly general nature and can be implemented in various ways in public statistics. The purpose of the presented discussion is to provide the critical analysis of the Oslo Manual 2005 recommendations and a comparative analysis of the suggested (Oslo Manual 2005) and applied procedures (Central Statistical Office; PNT-02, PNT-02/u reports) in terms of collecting information about the cooperation of enterprises with entities operating in their environment regarding innovation oriented processes. The critical observations in this regard were considered the reason for the modification of reports about innovations in the sector of industry and services.

Key words: innovations, cooperation in innovation processes, statistical data collection

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Introduction

The Oslo Manual 2005 (OM 05) identifies three types of relationships referring to innovation activities or the flow of knowledge and technology to enterprises, i.e. open sources of information, the purchase or acquisition of knowledge and technology and cooperation in the area of innovations. Among them the particular importance is assigned to the joint actions of various

entities aimed at the implementation of new or significantly improved solutions. Their statistical identification results in detecting and better understanding of cluster creation processes (clusters, bundles) or innovation networks (e.g. regional innovation systems), however, the conditions for acquiring such knowledge rest in well prepared principles for data collection (Gault, 2013; Keeble & Wilkinson, 1999). The purpose of the presented article is to evaluate the suggested (OM 05) and applied procedures (CSO – Central Statistical Office; reports on innovations in industry – PNT-02 and service sector – PN-02/u) in terms of collecting information about the cooperation of enterprises with entities operating in their environment in the sphere of innovation processes, but also – in case of critical observations – recommending changes in this area.

1. Cooperation in the framework of innovation processes – principles for statistical data collection (Oslo Manual)

Enterprises and other commercial and non-commercial entities, which jointly participate in the activities aimed at the implementation of innovations, represent cooperation partners in the sphere of innovation processes (OECD/European Communities, 2005; Teece, 2010). Such joint actions can be carried out horizontally within a supply chain and cover enterprises, their suppliers and clients (e.g. technological and business information exchange), or vertically by grouping enterprises and units present in their environment (e.g. joint development of new technologies, marketing strategic alliances).

Data resources on cooperation in the area of innovations can present different range and be collected in various ways. The possible variants of suggested solutions refer, in particular, to the considered types of innovation and the choice of possible answers' scale (OECD/European Communities, 2005).

The questions referring to cooperation aimed at the implementation of new or significantly improved solutions can address all innovations as well as to their individual or grouped types (OECD/European Communities, 2005; De Marchi, 2016; Zeng et al., 2010). In case of the first variant the process for data collection is focused on the identification of innovation activity partners without specifying the object of carried out cooperation (product, process, marketing or organization specific innovations). Such generalization seems to be justified by the frequently occurring difficulty in separating innovation types. For example, the implementation of new products is often connected with the introduction of new processes. The aforementioned

relationship can have different dimensions, a narrower one (e.g. new product – new marketing method) or a broader one (e.g. new product – new process – new organization), however each time it seems to undermine the sense of combining cooperation with innovation types or their groups. A more important issue – ignored in the Oslo Manual recommendations – refers to the effects of jointly performed innovation processes. It is worth reminding that based on the terminology used in the discussed Manual, the adopted innovation activity identification criterion does not refer only to the implementation of new or significantly improved solutions, but also to the activities focused on this purpose, however, not necessarily successfully completed (Głuszczyk & Raszkowski, 2016). As a result, joint innovation processes cover the activities characterized by a trifold nature: successfully completed (by an innovation implementation), continued with unknown effects and discontinued, or discontinued prior to the implementation of an innovation.

The identification of cooperation partners and their importance in joint innovation processes can be carried out using either binary (i.e. yes – no) or ordinal response scale, whereas the first one aims at defining mutual relationships (e.g. cooperation between enterprise and university), while the latter refers to the rank of such contacts (OECD/European Communities, 2005). This suggestion is, however, unspecified and quite debatable. For example, the ordinal response scale can take the form of: verbal or numerical or verbal-numerical, odd or even, with larger or smaller number of respondents' opinions (distance between each, adjacent to each other, their pair), unipolar or bipolar, etc. (Mangione, 1999). Moreover, it is not advisable to use the double response scale, because "0" can be entered in the ordinal version, which means the absence of cooperation and then decide about the choices described above.

Putting forward the evaluating judgments about the importance of cooperation in the sphere of innovation activities also makes it possible to ask about the creator of innovations for a given entity. In the suggested spectrum of responses it is recommended to determine whether:

- “innovations were created predominantly by the same enterprise,
- innovations were created by a given enterprise in cooperation with other enterprises or institutions,
- innovations were created primarily by other enterprises or institutions.” (OECD/European Communities, 2005)

The respective comments on the presented solutions should take into account two issues. Firstly, the set of suggested responses is almost of dichotomous nature and thus it is difficult to evaluate

the significance of any cooperation on its basis. Secondly, each response variant indicates that “innovations were created”, which means that the evaluated object remains this part of innovation activities which was successfully completed, i.e. finalized by the implementation of an innovation. Such approach seems justified and it should be supported in many other suggestions.

The variant oriented nature of OM 05 recommendations does not refer to the classification of cooperation partners and their geographical location. In the first case it is suggested to separate (OECD/European Communities, 2005): other enterprises in the group of enterprises; competitors; other enterprises performing the same type of activities; clients; consultants and consulting companies; suppliers of equipment, materials, components, software or services; commercial laboratories; universities and other higher education institutions; state, public research institutions; private non-commercial research institutes; specialized public and semi-public auxiliary services.

The presented list of potential cooperation partners is closed and seems not to consider the entire spectrum of entities which can participate in innovation processes. This recommendation does not take into account that innovation oriented activities cover the entire range of scientific, technical, organizational, financial and commercial activities, which actually result in or intend to result in the implementation of innovations and – more importantly – that some of these activities lack the component of novelty, however, remain indispensable for an innovation implementation (OECD/European Communities, 2005; Singh & Singh, 2009). In this context, e.g. venture capital funds can become partners of the successfully completed innovation activities.

Fewer reservations refer to the recommendations about determining geographical directions of cooperation (territorial range). Their objective is to obtain additional information, useful in revealing and explaining the essence of cluster formation process (bundles, clusters), as well as networks in the sphere of innovation. In this case it should be helpful to determine the location of pro-innovation initiative partners, along with distinguishing local, national and foreign entities by a region or a country (OECD/European Communities, 2005). The identification itself of the cooperating units does not bring about any remarks, however, their location variants should be presented in more detail. Regions in country perspective should not be disregarded, since in such territorial systems:

- the majority of feedback occurring between diverse socio-economic life entities is concentrated, which is caused by the proximity of these units and their mutual trust (Szultka et al., 2004),
- human capital is concentrated, including tacit, uncodified knowledge (Grosse, 2007),

- the best conditions are established for creating knowledge and learning (Florida, 1995; Keeble & Wilkinson, 1999).

In the Oslo Manual – apart from the aforementioned recommendations – it is also suggested to apply other indicators of dependencies related to cooperation in the area of innovation. Their task is to collect information about (OECD/European Communities, 2005): type of the transferred knowledge and its transfer method; formal regulatory requirements for cooperation; cooperation partners (sector, size, business history – functioning duration); number of cooperation partners, including those within the framework of their specified categories; duration of cooperation relationship.

2. Cooperation within the framework of innovation activities – Central Statistical Office practice vs. Oslo Manual 2005 principles

The Oslo Manual recommendations regarding data collection on cooperation within the framework of innovation activities are not fully respected in the presentation of Polish public statistics. In the reports on innovations in industry and service sector, covering 2014-2016, choices are made within the framework of the suggested, variant type of solutions (regarding innovation types, response scale), however, all other, simultaneously presented recommendations are not implemented (the classification of partners, geographical range of cooperation, additional dependence indicators).

The questions about cooperation aimed at the implementation of new or significantly improved solutions refer to all innovations in general – without separating their types (product, process, marketing or organization specific innovations) – and refer to the broadly approached innovation activities (successfully completed, continued and also given up). The adopted method of data collection allows the respondent to disregard an obligation of identifying innovation types and, at the same time, ignores the results of innovation processes.

The prepared response options to particular questions use various solutions, not always meeting the OM 05 recommendations. Dichotomous “yes – no” was used in the question “A. Was your enterprise cooperating with other enterprises or institutions in the area of innovations in the years 2014-2016?” (CSO 2016a, CSO 2016b). The significantly limited information collected in this way is extended by the request to indicate (mark with X) the category of partnership institutions and their countries of origin. In the first case the OM 05 recommendations are respected almost entirely (duplication of classification problem). The case is quite different in terms of geographical

range of joint innovation activities. Here the following are listed: 1) Poland, 2) EU Member States, 3) USA, 4) China or India and 5) other countries. Such systematics is based on ordering cooperation partners by their country of origin and thus ignores the local (the identification recommended by OM 05) and regional relationships.

Larger discrepancies between the OM 05 recommendations and the CSO practice can be identified in the question focused on the evaluation of a particular cooperation importance (“B. Which cooperation, out of the partnership institutions type listed in part A, do you consider the best for innovation activities of your enterprise?” (CSO 2016a, CSO 2016b). Any judgments in this respect should be put forward - as it has rightly been observed in the OM 05 - using the ordinal scale. It is, however, missing in the reports on innovations in industry and the sector of services, where the respondents are requested to indicate just one, the most important in their opinion, cooperation partner (the group of potential partners defines question A). This deficiency is even deeper due to the absence of a question about an innovation author in a given enterprise.

In the solutions adopted by GUS it is not only difficult to understand the identified deficiencies, but primarily the fact of distinguishing two separate questions of which the first (A) identifies cooperation partners and their geographical location, whereas the second one (B) evaluates the importance of cooperation with a given entity. From the formal perspective there are no obstacles for these issues to be referred to in one question with the properly prepared set of responses. It is enough to ask the respondents to use the adequately prepared ordinal response scale.

More significant discrepancies between the OM 05 recommendations and reports about innovations in industry and service sector can be observed in terms of additional indicators of relationships covering cooperation in the sphere of innovation. Out of their suggested spectrum (OM 05) only one question was used, namely about the number of enterprises or institutions a given enterprise was cooperating with within the framework of innovation activities.

The presented questions do not take into account the cooperation within the framework of cluster initiative. These issues are covered by the separate questionnaire part (Section 8B), in which after a dichotomous response (yes, no) to the question “A. Was your enterprise cooperating with other enterprises or institutions within the framework of cluster initiative in the years 2014-2016?” (CSO 2016a, CSO 2016b), the respondents are requested to indicate the category of partnership institutions and their countries of origin. This time the catalogue of potential partners is not significantly different from the classification recommended by the OM 05 (problem duplication)

either, however, the more important deficiency takes the form of cluster limited geographical range to entities from Poland and other countries (CSO 2016a, CSO 2016b).

3. The proposal of statistical perspective of cooperation in the sphere of innovations

The critical remarks about the statistical presentation of cooperation in terms of innovation activities (OM 05 recommendations, CSO practice) remain the sufficient reason for introducing modifications in the reports on innovations in industry and services sector. These proposals are presented in tab. 1.

Tab. 1: Cooperation in the sphere of innovation activities – the proposal of statistical presentation

Cooperation in the sphere of innovation activities comes down to active participation of enterprises in innovation processes taken up with other, commercial and/or non-commercial entities, which were successfully completed by implementing product, process, organization or marketing specific innovations.					
A. Did your enterprise, in the years, cooperated with commercial and/or non-commercial entities within the framework of innovation activities? <i>If yes, please write numbers from 1 to 6 in an appropriate position indicating the type of partnership institution and its geographical location, while the subsequent numbers present judgements about the importance of joint activities, where 1 refers to the lowest and 6 to the highest level of importance.</i>					
Types of partnership entities	Geographical range of cooperation				
	local NUTS3	regional NUTS2	country	EU	outside EU
Independent enterprises					
Subsidiaries (respondent's capital group)					
Research and development institutions					
Universities					
Consulting companies					
Respondent's clients					
Respondent's suppliers					
Venture capital funds (e.g. seed capital)					
Other, what kind?					
B. What number of entities was your enterprise cooperating with within the framework of innovation activities?					
Total	including, according to the geographical range of cooperation				
	local NUTS3	regional NUTS2	country	EU	outside EU

Source: authors' compilation

The suggested statistical presentation of cooperation in the sphere of innovation activities:

- refers to the total number of innovations (one of the Oslo Manual variants, practised by the CSO),
- refers to the successfully completed innovation processes, i.e. the implementation of a new or significantly improved solution (OM 05, CSO: successfully completed, continued or given up),
- specifies the ordinal response scale – recommended by the OM 05 and disregarded by the CSO – in order to determine the importance of joint innovation oriented activities,
- classifies the potential cooperation partners differently than in the OM 05 and the CSO practice, and primarily opens their list which can always be extended by new entities (e.g. local government units),
- introduces additional, not included in the OM 05 and reports on innovations in industry and service sector, geographical range of cooperation – regional, and with reference to PNT-02 and PNT-02u, also the local one,
- resigns from additional questions about cooperation within the framework of cluster initiative, having recognized that the cooperation with a large number of entities at local or regional level proves establishing this kind of lasting relationship, which can be confirmed by the statistical studies.

Conclusion

The purpose of the article was to evaluate the recommended (OM 05) and applied procedures (PNT-02, PNT-02/u reports) in terms of collecting information on the cooperation of enterprises with entities in their environment in the sphere of innovation processes, and also – in case of critical observations – to recommend changes in this regard.

Critical analysis of the OM 05 recommendations and the CSO practice in terms of data collection in the sphere of innovation indicated that the recommended and applied procedure: ignores the results of joint innovation processes; applies the wrong scale of possible responses; uses an incomplete, closed list of potential cooperation partners; disregards the regional dimension of cooperation.

Furthermore, the reports on innovations in industry and service sector, against the OM 05 recommendations: determine the importance of cooperation without using ordinal response scale; disregard the local dimension of cooperation; reduce the geographical range of a cluster to Poland and other countries.

These deficiencies seem to be eliminated by the recommended changes in terms of data collection on cooperation in the sphere of innovations. It is suggested, within their framework, to collect information on joint innovation processes finalised with the implementation of innovation, moreover, a numerical scale of assessments is introduced to determine the importance of joint innovation oriented actions, a list of potential partners is opened and specified and the local and regional dimension of joint initiative is taken into account.

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