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## Polish Geography of Industry in Sea Research

**Abstract:** Industry, still one of the most significant sectors of the economy, is undergoing permanent quantitative and qualitative changes. Therefore it should be the subject of not only business analyses, but also research which more broadly explain our reality in the environmental, social and economic dimensions, noting the more and more complex relations between the elements, sets and even entire systems functioning in various spatial arrangements. The research on the changes in industry structures implemented by Polish researchers representing various fields of science has been an essential element of the cognitive process for many years. Among them are also geographers for whom the spatial aspects (the characteristics and issues) of industrial activity seem particularly significant. However, the issues handled by them mostly regard land areas. Therefore, there is also a strong need for wide-range theoretical and applicable research on the identification of sea and coastal areas functioning on the basis of diversified industrial structures, using the previous academic achievements, including the achievements of the Polish economic sea geography.

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## INTRODUCTION

Structural changes of industry, which undoubtedly influence changes in geography of industry, encourage discussion on the state of this geographical sub-discipline, including its current problems, research issues and its place in economic geography, and in geography in general (Rachwał, 2008; Strykiewicz, 2010). In the context of the ongoing socio-economic processes, as well as administrative and legal decisions, the question about the role and importance of geography of industry among the sciences researching the functioning of industrial structures seems particularly essential (Czapliński, 2008). The evaluation of geography of industry regarding its application and related marketing of scientific and research services is also important. Unfortunately, this evaluation,

especially in comparison to economic sciences, is very poor (Łoboda, 2004, and many others). Therefore, it is necessary to extend and promote the diagnostic function of geography of industry, and even more so its prognostic function, which seems to be underestimated by geographers themselves. It should be emphasised that for economic geography, including geography of industry, to further develop it is above all necessary to redefine research priorities. In this context, a return to the geographical and economic research of the sea, under which studies in geography of industry would be undertaken, needs to be considered significant. There is a growing interest in industrial activities at sea and in particular the exploitation of known and new submarine places of occurrence of raw materials. The demand for offshore electricity is growing by its various properties. The demand for industrial products for service sector departments is also growing, both in the coastal areas, as well as in the open sea (e.g. maritime transport). Recognising the ongoing economic processes, it is also worth paying attention to the growing competition between representatives of various sciences for the primacy in the socio-economic research of the sea, which gives many tangible benefits. It seems that geographers cannot be missing in this rating. Therefore, there is an urgent need to verify the current state of geographical and economic knowledge about the sea, and on its basis to identify the challenges facing economic geography, including geography of industry, in the field of marine research. It is mainly related to defining the thematic scope of the sub-discipline and the primary object(s) of research, methodological trends and directions of research, looking at the problem of locating economic activity at sea, and the place of industry in contemporary spatial processes. In turn, it may contribute to the development of analytical research and attempts to build own theoretical assumptions using not only foreign patterns but also the achievements of Polish geographers. It gives a serious argument regarding self-identification of economic geography, including geography of industry.

## RESEARCH CONDITIONS

Researching geography of industry which in its substantive and spatial scope would concern the broadly understood maritime issues is currently a difficult task. It results from many premises, but one of the most important seems to be the terminological one<sup>1</sup>, which concerns not only the very term 'industry' but also concepts describing it, such as, for example, sectors, branches and industries<sup>2</sup>. It should be emphasised that due to the disappearance of the division of economy into three sectors, there is a growing difficulty in defining the scope of the subject of geography of industry, and perhaps the entire economic geography. As Strykiewicz (2010: 31) remarked, "the problems of old geography of industry blend in with the research in the field of economic geography (taken as a whole, i.e. without a sector division)". However, it carries certain consequences, sometimes leading to unjustified abuses, especially in the services sector (e.g. cultural industries) or at least doubts when, for example, maritime transport and logistics, maritime science and education or maritime tourism (e.g. Grzybowski, 2009) are

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<sup>1</sup> The study deliberately omits terminological considerations at the level of geography as a science and its division.

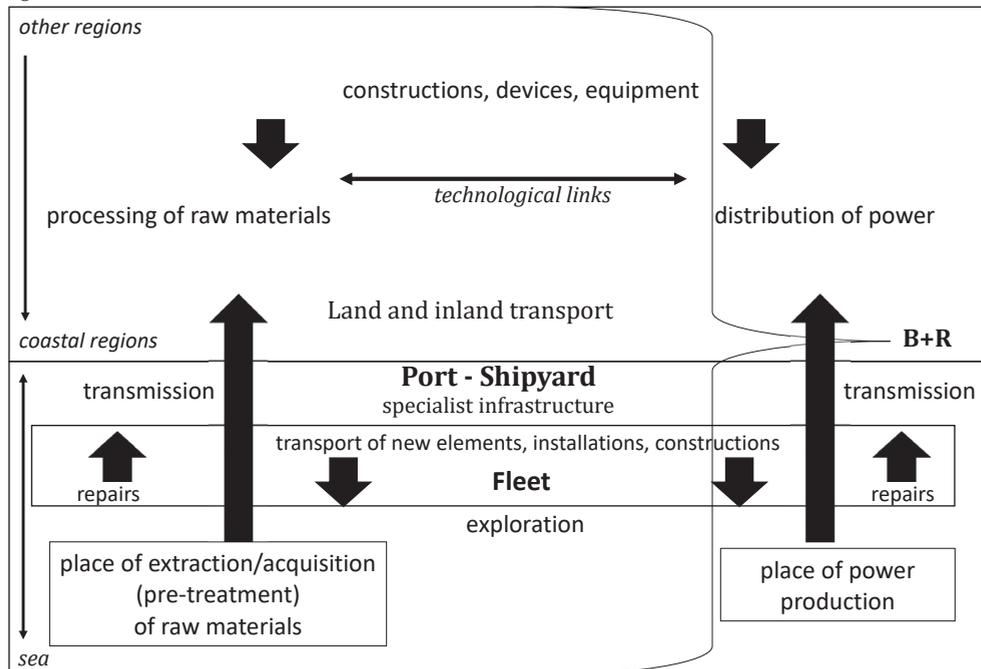
<sup>2</sup> From the point of view of the classification of economic activity in force (PKD 2007), there are 34 branches of industrial activity, while the concept of further subdivisions does not exist. Their widespread use is associated with the classification KGN outdated for more than 20 years.

included in maritime industries. Perhaps it is due to the erroneous historical perception and definition of maritime economy treated *en bloc*. It is confirmed by the definition of maritime economy proposed by Salmonowicz (2010: 2). The author decided that it is “every economic activity (...) which can be carried out only because there is a sea, but it should be borne in mind that it is a complex activity, consisting of many activities and processes, whose common denominator is the use of the sea and its neighbourhood (e.g. the coastal zone) as the key resources in this activity”. Such a broad substantive scope of the concept of maritime economy (which also includes the concept of industry at sea, although it does not exhaust it) meets the EU’s uncritically disseminated administrative terminology, and consequently allows the implementation of application objectives related to the possibilities of obtaining EU funds. In this way, however, the actual picture of the various components of the maritime economy is blurred, generalised and seemingly homogeneous. It is difficult, however, for an unambiguous, coherent arrangement, since for many years it has not been determined legally and administratively.

Another critical problem of the geography of industry is the increasing difficulty in defining the primary research object because the maritime economic activity is usually not one industrial enterprise, but the production chain (Fig. 1), which more and more often fits into global economic networks.

The proposal of the relational approach as the necessary methodological approach in the research of the offshore industry is important. However, it does not exempt from the discussion on the necessary decisions concerning, among others, the spatial extent of the operation of industry at sea, which results, *inter alia*, from legal, administrative, investment and reporting premises. Adopting the criterion of the place of business

Fig. 1. Production chain at sea



Source: Czaplinski (2015: 106) – modified

activity and the division of industry into the seagoing industry (exclusive economic zone), seashore (internal maritime waters and territorial waters) and coastal (coastal regions) seems to be far imperfect. Apart from the signalled complementarity of undertaken actions on land and sea (in its various parts), which from a technological and organisational point of view is an increasingly less critical barrier, the very course of borders (also terrestrial ones) raises serious doubts. Therefore, in solving this problem, it would be more important to adopt specific industrial activities as a criterion for the place, recognising that maritime industry is an economic activity offering production solutions, such as mining raw materials, obtaining other resources and their pre-processing and energy production on and from the sea. A place defined in this way should be identified with the concept of industry at sea (maritime industry) in the narrow sense of the word. Maritime industry in a broad sense could be based on the product criterion, and its definition could apply to all products and semi-finished goods of material nature whose use takes place at sea<sup>3</sup>.

Another critical problem of geography of industry associated with marine research is location factors and location benefits. As a result of the intensification of economic activity at sea, the existing assumptions concerning the place of their location should be verified (Adrianowska, 1977, 1985). It is due to the arrangements above for the networking of the economy, but also to new types of activities emerging at sea (maritime energy, mariculture), new technologies for obtaining raw materials (mining of rare earth metals) or social processes occurring among the population associated with economic activity at sea. In the light of the above, the entire catalogue of industrial location factors should be revised and referred to maritime environment, so different from terrestrial areas regarding, for example, spatial scale, accessibility, borders, the role and location of the human factor and the specificity of sea waters and the seabed.

An equally important and demanding new arrangement seems to be the issue of the forms of concentration of economic activity at sea, and, more precisely, an attempt to develop a comprehensive typology of local production systems, including their spatial scale based, for example, on Porter's cluster theory (Porter, 1990). It seems justified to state that the existing attempts to classify the phenomenon are not satisfactory. What is more, it seems that due to the maritime specificity of the problem, the formation of production systems in precisely defined locations is characterised by specific local conditions.

One of the significant obstacles to this task is the well-known problem of availability, detail, consistency, reliability and quality of information contained in available databases. It does not concern only the described issues but research in general. In geography of industry, this results in data fragmentation which significantly affects the possibilities of researching dynamic terms and comparative research, and consequently results in building generalisations. This growing formal problem causes that some researchers abandon the hitherto directions of research, and therefore there are niches of knowledge rarely penetrated. It applies, among others, to enterprises whose activities are related to the sea.

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<sup>3</sup> An attempt to introduce enumerative definition on the basis of, for example, PKD 2007, seems to be even more complex. It is due to the fact that the offshore industry would not only be included in sections commonly recognised as industrial (especially divisions 25–28 and 32–33), but partly also in other sections. This causes certain descriptive and statistical difficulties. The question is also whether the offshore industry should be treated separately.

The psychological factor should also be added to the outlined research conditions of geography of industry, including the specifics of its research at sea, which relate to selected substantive and formal problems. Its meaning can be reduced to two characteristics which should describe the research community. These are widely understood activity and openness to the environment (including research activities of other researchers, scientific discourse and an attempt to reach a compromise). It is indeed a problem of science in general, but due to the relatively small group of Polish geographers of industry this problem seems particularly important, but at the same time solvable.

#### OUTLINE OF POLISH GEOGRAPHY OF INDUSTRY IN SEA RESEARCH<sup>4</sup>

In the historical development of the geography of industry, also in the part devoted to the problems of the functioning of industrial structures in the coastal regions, the coastal zone and the high seas zone, several research periods can be distinguished. According to Dutkowski's (2018) proposal, the first of them, pre-war, was the initial period in which the studies were mainly descriptive-statistical. An example of a geographical achievement from this period is the publication of Walenty Winid entitled *The Industry of the Free City of Gdańsk* (1938) which was published in the Geographical Magazine. It was not the first study dealing with the industry in Pomerania at that time, but it had a geographical origin and character.

The second research period falls on the time of intense development of the Polish maritime economy in the times of the People's Republic of Poland. It was then that we could talk about the real development of the geographical research of the sea, including research in the field of geography of industry. The Gdańsk geographic centre should be considered a research centre during this period. It is there that numerous studies devoted to the problems of the sea industry were published, the most substantial number of which was devoted to the shipbuilding industry (incl. Kurkiewicz, 1964; Bieliński, 1970, 1987; Adrjanowska, 1971, 1984; Wojewódka, 1979) and fishing industry (incl. Kulikowski, 1952–1954; Kowalewski, 1962; Daszkowska, 1970; Musielak, 1976, 1984), which results from the unique role these industries played in the structure of industry in coastal areas. Following the post-war achievements of the Gdańsk centre in the field of industrial research, we note a gradual shift from the traditional descriptive-statistical direction, through technical-economic and physiographic to theoretical-methodological or synthesising approaches (Portalski, 1998). In this context, the scientific achievements of E. Adrjanowska deserve particular attention. They focused mainly on the issues devoted to the factors and barriers of the location of industry at sea and in the coastal zone (Adrjanowska, 1977, 1985, 1992), as well as geographic-economic research of spatial relations of industry in the coastal zone (Adrjanowska, 1971; Adrjanowska, Niesyt, Skupowa, 1990). It is also important to recognise the achievements of A. Piskozub who attempted to construct a model of location of industry in the Polish

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<sup>4</sup> The presented rough outline of the research topic of geography of industry in marine research is based solely on available published sources and therefore does not include various types of expert opinions and a large section of the work carried out as part of nodal problems, undoubtedly important for the full assessment of scientific achievements. It should also be emphasised that the presented output is not a full review of the literature in the field of the discussed issue. These publications are aimed only at closer identification of specific research directions.

port-urban complexes (Piskozub, 1973, 1980). It is worth emphasising that in the discussed period some research traditions which were started in the Gdańsk centre are still being continued. This applies, among others, to the studies on the role of industry in shaping spatial and functional structures in the Gdańsk agglomeration (incl. Gawor-ecki, 1974, 1976; Dutkowski, 1978, 1981, 1986), the impact of processes in industry on socio-economic development on a global, regional and local scale (e.g. Portalski, 1977; Dutkowski, Mohammed, 1984; Musielak, 1986; Skupowa, 1986, and many others) and the idea of Baltic Europe in economic terms (Zaleski, Wojewódka, 1977).

Quite late, because only after 1960, geographers living and working in Central Pomerania (Rydz, 1998) joined the research in the field of the broadly understood geography of industry. Their primary interests include research on location conditions of particular plants and industries, evaluation of social effects of industrialisation, and the impact of industry on the development of urban space (Rydz, 1978). The vast majority of studies from this period concerns coastal regions. However, studies that directly refer to the role of industry in maritime economy and the sea as a place where industrial activities take place constitute a small group (Domagała, 1967; Przeździecka, 1976; Machura, 1982).

The third research period is connected with political changes, and consequently also socio-economic ones that have taken place in Poland since 1989. It is worth adding that at least in the initial phase it was a period of crisis of maritime economy, then its restructuring, and finally rebirth. In the new reality, geographers involved in industrial research began to undertake new research topics related to the spatial adaptation of the industry in the conditions of transformation, while maintaining their interests, however to a different degree, in all components of maritime economy and coastal cities and regions. During the transformational shock, a series of studies were created, in a sense as a continuation of the current problems adapting to socio-economic reality (Adrjanowska, 1990, 1992; Rydz, Zalewski, 1992; Musielak, 1994; Musielak, Małachowski, 1995). However, it soon turned out that the implementation of many studies cannot take the form and content common so far. Hence the studies was often contributory and descriptive, sometimes of very high but local significance (Białasiewicz, Gołębiowska, 1991; Portalski, 1992; Rydz, Jażewicz, 1996). However, from the very beginning, in the field of geography of industry, and especially in the studies concerning marine areas, the weakness of generalisation and international comparative studies was noticeable. An exception is the work of J. Musielak (1991), who aimed to analyse the theoretical and methodological problems of economic geography of the sea and to determine its place in the system of geographical sciences.

Since the 1990s, in geographical research on the functioning of industrial structures in the coastal regions and the high seas, the researchers' inclination towards a comprehensive geographic and economic analysis (without any division into previous industries) could be noticed. It resulted not only from the popularisation of the holistic approach in research and emerging new research problems but also from forced changes in research methodology, among others as a result of the shrinking access to data and the level of their aggregation (e.g. Musielak, Małachowski, 1996). In extreme cases, this resulted in the abandonment of the current scientific path by some researchers, which in turn became one of the reasons for the crisis in geographic-economic marine research in the field of geography of industry. The publications of geographers appearing at the turn of the centuries were few with a very diverse substantive, temporal and

spatial scope, maintained in the information and statistical trend, which did not support the building and development of previous theoretical achievements (Czapliński, 1999; Musielak, 2001; Wendt, Ilies, 2001).

In the last decade, there has been an apparent revival in geographical research on maritime industry. From the point of view of the applied research methods, it was possible to notice the transition from the information and statistical current to the analytical and explanatory one. There were also two very clear and characteristic tendencies regarding the research issues being undertaken. On the one hand, there was a renaissance of maritime issues still being practised in the times of the People's Republic of Poland, but in new social, economic and political conditions. It applies, among others, to shipbuilding industry (Dajczak, 2008; Palmowski, Tarkowski, 2016), fish processing industry (Czapliński, 2011, 2013) and the role and importance of domestic raw material resources from the bottom of the Baltic Sea (Wieloński, Machowski, 2008). On the other hand, there have emerged studies that respond to new phenomena and processes occurring in industry in marine areas. It is particularly true for offshore energy production (Czapliński, 2016) and offshore industry (Czapliński, 2015; Biniek, 2017). However, the rapid growth in demand for spatial and economic research of the sea, also dedicated to industrial geographers, is not accompanied by a marked increase in their scientific activity, including publications. There are also no attempts to generalise and apply new methodological approaches, e.g. evolutionary or relational, and all the mentioned studies from that period should be qualified for the analytical and explanatory current.

## RESEARCH CHALLENGES

Perceived weaknesses in geography of industry in marine research require to set new goals for this geographical subdivision, of which at least some are scientific challenges. One of them is achieving a terminological compromise. The problem is much more comprehensive and seems to affect science in general, but in the case of geography of industry, including geography of sea industry, due to a relatively narrow group of researchers, it seems relatively easy to achieve in the short term. The above-mentioned psychological factor is relevant here. A prerequisite for practising the contemporary geography of sea industry is also interdisciplinarity. This is not a particularly new idea in the geographical and economic research of the sea, because from the period of the People's Republic of Poland there have been many examples of the complementarity of basic and applied research. Therefore, it is necessary to return to previous solutions and invite other researchers and not only geographers to study the geography of marine industry. It would significantly improve the cognitive process and also allow for the development of interdisciplinary methodological foundations. In the long-term perspective, it is necessary to recognise the proposed terminological compromise through co-authored publications (e.g. the textbook of marine economic geography, including geography of industry, and further consistent use of commonly agreed and accepted terminology.) The second necessary condition would be the organisation of cyclical interdisciplinary scientific meetings, which must become not only a place to exchange ideas but also a place for the creation of objective opinions and judgments, which will be heard by all market participants in the field of maritime economy. These vague and somewhat idealistic postulates have a chance of success, but only if the geographical,

scientific environment is much more integrated around the discussed issue, thus giving a clear indication of their identification on the market of scientific research services.

## FINAL REMARKS

It seems that the contemporary economic processes at sea, especially their extent and spatial relations, will force the return of economic geographers, including geographers of industry, to this issue, the use of the current contribution to empirical research, as well as to the construction of theory. Its foundation should be the assumption formulated by Z. Zioło (2006), which states that the adopted economic rules (on a micro-, meso- and macro scale) that have a non-spatial character affect the directions of the geographic space development, in which the socio-economic space is included, including the industrial space created by individual enterprises that are in a very complex relationship determined by socio-economic and cultural conditions, which spatially can bring diverse effects. Therefore, a geographical perspective on the socio-economic reality seems to be a necessary condition for understanding the changes taking place. It applies in a particular way to changes at sea, as the specificity of the environment and the spatial scale enforces a different approach to the meaning of such concepts as location, border, distance and range.

In contemporary world, determined by the processes of globalisation, the free flow of information is growing. Its elements can and should be used in expanding scientific knowledge. However, one must be prepared substantively and emotionally to this change, because unreflective acceptance of new content can lead to incorrect diagnosis of problems, phenomena, processes and, consequently, erroneous perception of reality, including that at sea. Therefore, there is an urgent need for action to develop standard, interdisciplinary terminology in the whole of science, also involving geographers, to carry out the appeal of geographer F. Plit (2018): "we need to know what we are talking about". This seemingly obvious postulate seems to be quite complicated due to the increasing overlap between research fields of scientists representing various scientific disciplines, the growing number of para-scientific studies arising in the business environment, and the growing belief that scientific cognition has an alternative. All of these threats also concern the economic research of the sea. Therefore, it is necessary to increase the geographers' activity in the animation of the interdisciplinary scientific community dealing with this issue and to emphasise the geographical perception of economic reality, including the one at sea. The real geographic, scientific achievements authorise such activities, and at the same time oblige to undertake new research challenges on the dynamically changing economic space of the seas, especially in the planning and prognostic, cartographic and, in part, also raw materials current.

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