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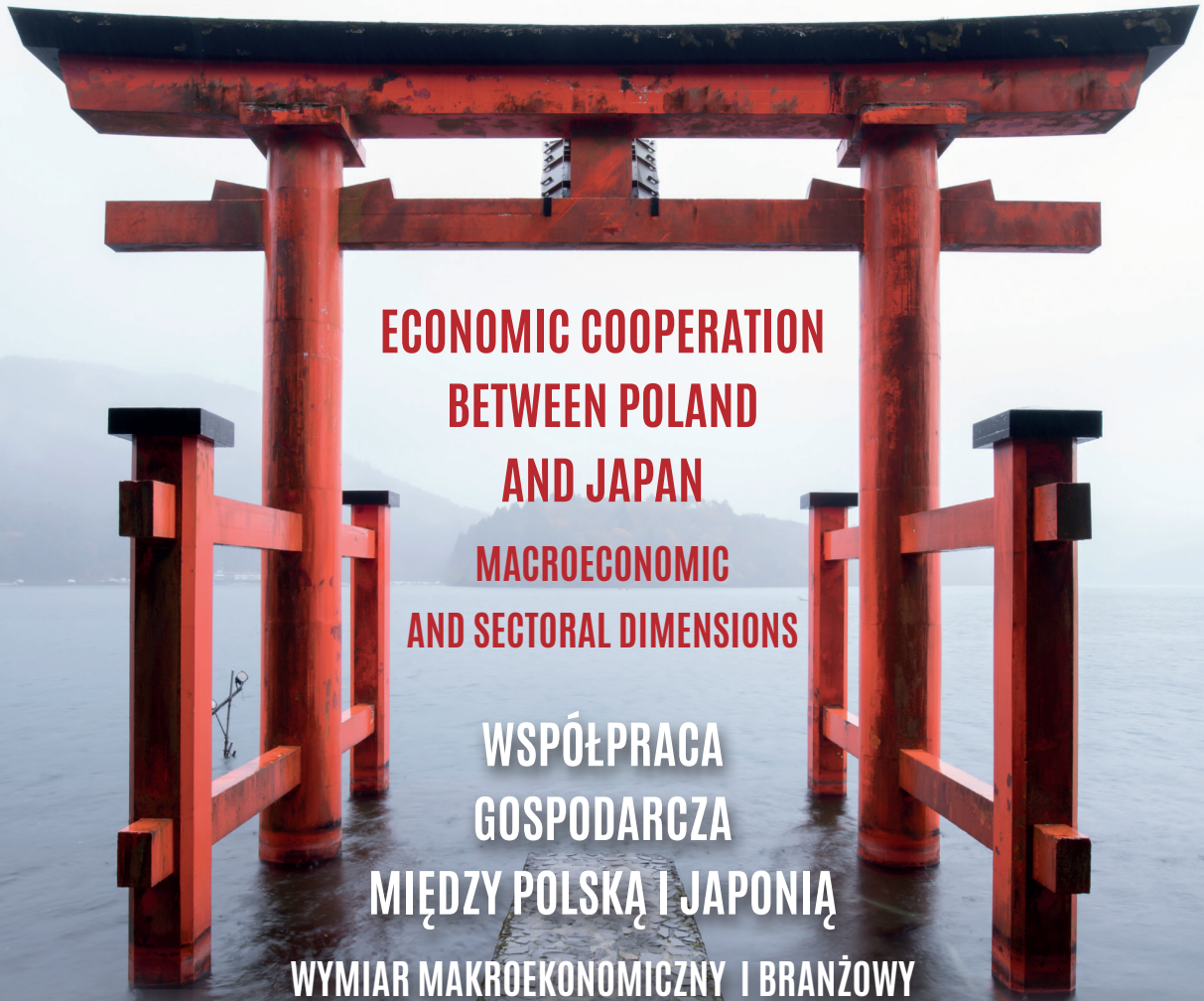

ECONOMIC COOPERATION BETWEEN POLAND AND JAPAN

MACROECONOMIC AND SECTORAL DIMENSIONS

WSPÓŁPRACA GOSPODARCZA MIĘDZY POLSKĄ I JAPONIĄ

WYMIAR MAKROEKONOMICZNY I BRANŻOWY

ポーランドと日本の経済協力

マクロならびに産業的側面

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ECONOMIC COOPERATION BETWEEN POLAND AND JAPAN

MACROECONOMIC AND SECTORAL DIMENSIONS

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INDUSTRY REPORTS ON POLISH-JAPANESE COOPERATION

Foreword

Today's global economy is undergoing dynamic changes that are setting new directions and posing challenges to countries and economic organizations. One of the key actors in the international arena is Japan – a country with a unique combination of tradition and modernity, which for decades has played a leading role in areas such as technology, industry and international cooperation. The analysis of Japan's competitiveness and its economic relations with Poland is an interesting research area, opening up opportunities to better understand the mechanisms affecting the growth and development of modern economies.

Japan has been consistently developing high-technology industries for years, placing particular emphasis on investment in the science sector and research and development. In this context, the potential and opportunities for the development of Polish-Japanese cooperation can be seen not only in the area of the economy, but also in the wide range of initiatives undertaken by institutions of the higher education and scientific and research centers. Interest in the peculiarities of Japan's economy and culture is also taking place among researchers at the Warsaw School of Economics, which is reflected in this monograph.

The research, the results of which are presented in this publication, shows that there is significant, although still not fully exploited, potential for the development of Polish-Japanese cooperation, especially in the area of trade and foreign investment. This points to the need to further explore opportunities for international economic cooperation between the two countries. The Japanese direction, despite the geographical distance and cultural differences, offers unique opportunities for Poland in the field of economic and scientific cooperation. Japan offers ample opportunities for the involvement of Polish entrepreneurs and scientists, both in areas related to exports and imports, as well as in joint investment and R&D projects. This cooperation, based on mutual understanding, exchange of knowledge and technology, and development of innovative solutions, can bring significant benefits to both sides.

For the realization of the potential for the development of Polish-Japanese cooperation, it is extremely important to popularize knowledge about the economy and culture of Japan. In this context, this publication, prepared in the year of the World Expo 2025 Osaka, can play an important role, providing valuable knowledge,

information and inspiration for scientists, entrepreneurs and politicians. I hope that it will contribute to arousing even more interest in Polish-Japanese cooperation and to initiating specific activities in this regard.

Magdalena Skarżyńska
Deputy Chairman of the Board Polish Investment and Trade Agency

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Introduction

Arkadiusz Michał Kowalski

Poland and Japan, two countries with different cultures, economies, histories and geographical locations, are moving closer together through growing economic cooperation. This monograph provides a wide-ranging analysis of this cooperation, both from a macroeconomic, microeconomic (case studies of selected companies) and mesoeconomic (industry-specific analyses) perspective. Mutual trade, investment relations and cultural conditions of cooperation are key aspects of this analysis. Not only is the current state of Polish-Japanese cooperation presented, but also the prospects and possibilities for further development of this cooperation.

The aim of the monograph is to comprehensively present the conditions, determinants, and prospects of economic cooperation between Poland and Japan, with a particular focus on selected sectors of the economy: cosmetics, medicine and pharmaceuticals, agri-food, green technology, information technology (ICT) and gaming. The book is divided into two main parts. The first part focuses on the analysis of international competitiveness and innovation of both countries, bilateral trade relations and investments, as well as cultural conditions of Polish-Japanese cooperation. The second part provides a detailed analysis of selected industries, identifying development trends and cooperation potential.

Economic cooperation between Poland and Japan is of particular importance in the context of global economic and geopolitical changes. Japan, being one of the world's largest economies, offers Poland unique technological and investment opportunities. In turn, Poland, as a rapidly growing economy in the European Union, can become an important partner for Japan in Europe. However, in identifying opportunities for Polish-Japanese cooperation and its potential significance for economic growth, technological progress and sustainable development, a relatively small scale of trade or investment relations between these countries should be noted. In 2021, Japanese exports to Poland amounted to only 0.44% of Japan's total exports, while Polish exports to Japan amounted to only 0.26% of Poland's exports. At the same time, a constant characteristic of Polish-Japanese trade relations is that Poland records a deficit and

Japan a surplus of the bilateral trade balance. Similarly, the stock of foreign direct investment (FDI) between Poland and Japan, as well as the income received from these investments, is at a relatively very low level, with Polish investors' activity in Japan being at a lower level than Japanese investors' activity in Poland.

A challenge for cooperation between Poland and Japan is not only the geographical distance, but also the cultural differences between the two countries regarding, among other things, attitudes towards hierarchy, individualism and communication style. The high contextualisation of communication in Japan, which requires attention to non-verbal cues and situational context, can be a challenge for Polish business partners who prefer more direct and unambiguous communication. Understanding and respecting cultural differences can help avoid misunderstandings and misinterpretations, which is important in building effective business cooperation between Poland and Japan.

Several research methods were used in the development of this monograph, including statistical data analysis, case studies, interviews with company representatives and analysis of the literature on the subject. Such a multi-faceted and interdisciplinary approach allows for a comprehensive picture of economic cooperation between Poland and Japan. A limitation of the study is the relatively small size of the Polish-Japanese trade or investment cooperation and the related impossibility of a broader identification of Polish companies present on the Japanese market, and in statistical analyses different classifications of industries or differences in methodologies for calculating different types of values in Poland and Japan.

This monograph may contribute to a better understanding of the dynamics of cooperation between Poland and Japan and help both entrepreneurs and decision-makers to make informed business and strategic decisions. The Japanese market offers many potential business or technological advantages, therefore it is advisable to popularise the knowledge of opportunities related to the establishment of relations between Polish and Japanese entities, especially given the current marginal level of Polish-Japanese economic cooperation. Developing economic cooperation between Poland and Japan also requires considering the dynamically changing global context in which both countries operate. Faced with challenges such as climate change, global health crises or transformations in international supply chains, Poland and Japan can find common areas for cooperation that will contribute to mutual development and strengthen their position on the international stage. Examples of such areas include green technologies and innovation in renewable energy sources, which are a priority for both Poland and Japan. Integration of resources and competencies in these areas can lead to significant benefits for both countries, both economically and environmentally. It is also worth noting the potential for cooperation in the education and research

and development sectors. Joint research projects, academic exchanges and scientific cooperation programmes can lay the foundation for long-term relations between Poland and Japan, fostering mutual understanding and knowledge transfer. Through such initiatives, Poland and Japan can build a solid foundation for future economic cooperation based on innovation and shared values.

Part I

DETERMINANTS OF POLISH-JAPANESE COOPERATION

Chapter 1

Economic competitiveness of Poland and Japan in an international comparative perspective

Marzenna Anna Weresa, Arkadiusz Michał Kowalski

Introduction

The purpose of the chapter is to characterize the competitive position of Japan and Poland, taking into account the socio-economic situation and to compare the level of innovation, which is a key factor of competitiveness. The basic indicators of the size of the economy as measured by GDP (Gross Domestic Product) and wealth as measured by GDP per capita, population, and land and urban area are outlined first, making it possible to compare these indicators and get an overview of the similarities and differences between the countries. Next, Japan's and Poland's income competitiveness, understood as changes in GDP per capita, is analysed in dynamic terms, covering the period 1990–2020. The next section of the chapter covers the innovation potential and innovation position of Poland and Japan, which can be gauged by the amount of spending on research and development (R&D) activities in relation to GDP, the resources of research personnel, the availability of venture capital, the number of publications and patents.

The analysis is summarised by comparing changes in the competitiveness of the two countries from 2010 to 2023 as measured by a synthetic index developed by the Institute for Management Development (IMD) based on statistical data and opinions of executives collected through a survey method [IMD, 2011, 2023].

1.1. Comparison of the socio-economic situation of Japan and Poland

A comparative analysis of Japan and Poland faces all sorts of challenges due to different political, geographic, climatic, social and economic factors. Data for the basic indicators characterising Japan and Poland are summarised in Table 1.1.

Table 1.1. Basic indicators for comparing Japan and Poland

Country	GDP (USD billion, 2022)	GDP per capita (USD, 2022)	Population (million, 2022)	Land area (thousand sq. km, 2021)	Urban area (sq. km, 2015)
Japan	4256.41	34 017	125	364.5	53 452
Poland	688.13	18 688	37	306.1	14 774
European Union	16746.54	37 433	447	3996.6	169 850

Source: data from the World Bank's World Development Indicators database, latest database update: 30.05.2024, access: 1.06.2024.

The most commonly used indicator for measuring the size of an economy is GDP. It determines the value of all goods and services produced both by the residents of a country and by foreign entities present in that country, over a certain period of time. Data from Table 1.1 shows that the size of Japan's economy as measured by GDP (USD 4256.41 in 2022) is more than six times the size of Poland's economy (USD 688.13 in 2022). Whereas, taking into account population, Japan's GDP per capita (USD 34 017) is almost twice as high as that of Poland (USD 18 688), indicating greater affluence of Japanese society.

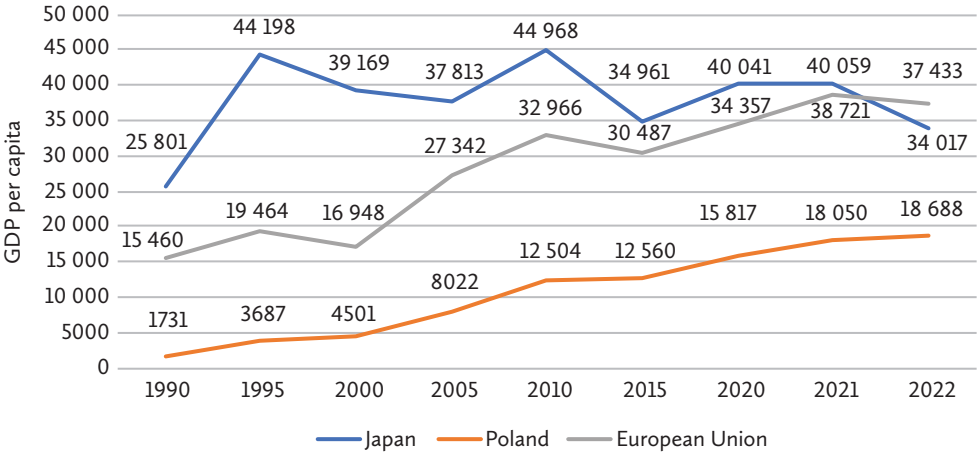
Japan's population (125 million) significantly exceeds that of Poland (37 million), while the land area (excluding inland water bodies) of the two countries is similar (364.5 sq. km for Japan and 306.1 sq. km for Poland), indicating Japan's higher population density. In addition, Japan's urban area (53 452 sq. km) considerably surpasses that of Poland's (14 774 sq. km), indicating that Japanese areas are more heavily urbanised compared to Polish ones. This has important implications for the analysis of international competitiveness, since urban centres are major hubs of the economic structure of regions and countries. Urbanisation processes are inseparable from social and economic development and technological progress, mutually conditioning each other [Kowalski, 2018]. At the same time, it is worth noting the phenomenon of population ageing and the related population decline that are affecting both Japan and Poland, as well as many other developed countries. In Japan, however, the population crisis is a phenomenon of particular severity, and Japan's Ministry of Health, Labour and Welfare, accounting for a population decline of a record 831 800 in 2023 compared to the previous year,

assessed the country's demographic situation as critical [The Japan Times, 2024]. Simultaneously, it stated that the birth rate is expected to continue to decline in the medium to long term due to the sparse population of young people, late marriages and late births of children, and the consequences of the coronavirus pandemic, which has reduced the number of marriages. At the same time, population ageing and low birth rate are creating significant challenges for the health care system and the labour market.

1.2. Comparison of Japan and Poland's GDP per capita in dynamic terms

While GDP is an indicator that primarily determines the size or strength of an economy, the GDP per capita ratio is used to analyse the average wealth of a society. This indicator – despite its various drawbacks and attempts to alternatively measure the competitiveness of economies – has for decades remained the primary determinant of income competitiveness, illustrating the polarisation in terms of many spheres of life of the citizens of each country [Kowalski, 2020]. In order to capture long-term trends, including Poland's transformation from a centrally planned to a free market economy and Japan's reversal of development trends in the 1990s, a long time series covering data since 1990 is analysed. Long-term data in dynamic terms for GDP per capita are summarised in Figure 1.1.

Figure 1.1. GDP per capita ratio in Japan and Poland compared to the European Union in 1990–2022 (in USD, current prices)



Source: data from the World Bank's World Development Indicators database, latest database update: 30.05.2024, access: 1.06.2024.

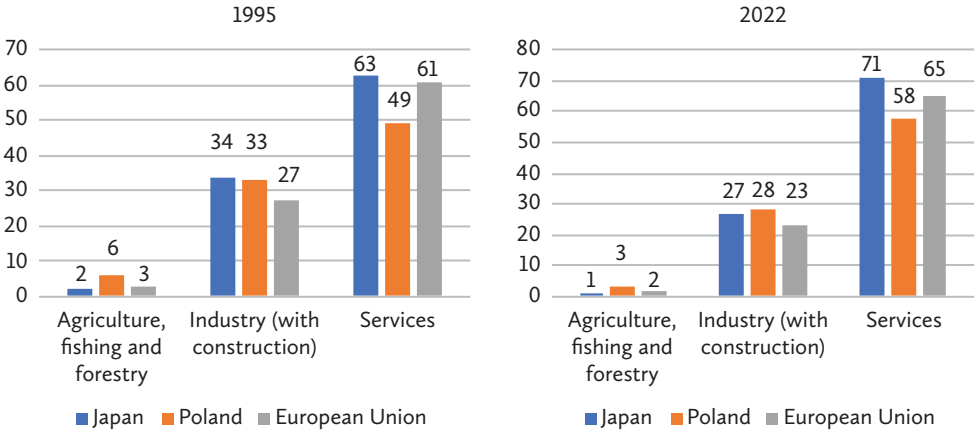
The analysis of the development of GDP per capita over an extended period makes it possible to grasp the long-term trends of economic growth in the economies studied. The analysis shows that a higher rate of GDP per capita growth from 1990 to 2022 took place in Poland (from USD 1731 in 1990 to USD 18 688 in 2022, an increase of about 10.8 times) compared to Japan (from USD 25 801 in 1990 to USD 34 017 in 2022, an increase of only about 1.3 times). Moreover, there was a noticeable drop in Japan's GDP per capita at the start of the COVID-19 pandemic (from USD 40 059 in 2021 to USD 34 017 in 2022), enabling the European Union to surpass it in 2022 (USD 37 433).

1.3. Comparison of the structure of the economies of Japan and Poland

One of the key dimensions of economic development is the structure of an economy, i.e. the share of the service sector, industry and agriculture in the economy. The structure evolves as economies grow and develop, typically moving from agriculture to industry and then to services. This transition reflects changes in productivity, technological advances, and changes in domestic and international demand [Herrendorf, Rogerson, Valentinyi, 2014]. We are currently witnessing the phenomenon of servitisation, characterised by the growing presence of the service industry in the economy, as well as the expansion of service functions in industry and agriculture. This indicates a growing importance of the service industry for social and economic development. Data on the evolution of the share of value added of the service sector, industry and agriculture in GDP from 1995 to 2022 are shown in Figure 1.2.

Figure 1.2 indicates that the share of the service industry in Japan is larger than the EU average, and, most importantly, Poland's share. At the same time, a long-term increase in the significance of this industry in the structure of the Polish economy is observed (a rise from 49% in 1995 to 58% in 2022). This is part of a broader structural transformation seen in advanced economies around the world, where the service industry is becoming increasingly dominant over manufacturing and agriculture. This transformation is being driven by productivity growth, technological advances and changing consumer preferences.

Figure 1.2. Comparison of the structure of the economies of Japan, Poland, and the European Union in 1995 and 2022 (value added, % of GDP)



Source: data from the World Bank's World Development Indicators database, latest database update: 30.05.2024, access: 1.06.2024.

1.4. Innovation as a factor of competitiveness – a comparison between Poland and Japan

The international competitive position of an economy is closely related to its implementation of scientific achievements in the form of innovative solutions: products, means of production, manufacturing methods, organisational or institutional changes [Porter, 1990, 2008]. Innovations are a result of the development of new knowledge, ingenuity and entrepreneurship. Creating and applying new knowledge in the economy enables better use of existing resources, influencing the rate of economic growth [Aghion, Akcigit, 2017; Grossman, Helpman, 1991; Romer, 1990].

Developed since 2007 by the World Intellectual Property Organisation (WIPO), the most useful tool for international comparisons, allowing for indicating the position of Poland and Japan in terms of the innovativeness of their economies and its changes over time, is the Global Innovation Index (GII). It is a weighted average of 80 indicators which constitute five pillars of the Innovation Input Sub-Index and two pillars of the Innovation Output Sub-Index [Dutta, Lanvin, Rivera León, Wunsch-Vincent, 2023].

Table 1.2 compares the innovativeness of Poland and Japan in 2011 and 2023, taking into account the positions in the ranking also in terms of sub-indices of innovation input and innovation output.

Table 1.2. Innovation in Poland and Japan – comparison of 2011* and 2023

Country/Year	Poland		Japan	
	2011	2023	2011	2023
Global Innovation Index (ranking position)	43	41	20	13
Global Innovation Index (index value)	38.02	37.7	50.32	54.6
Innovation Input Sub-Index (ranking position)	41	50	18	11
Innovation Output Sub-Index (ranking position)	55	36	26	14

* Comparison for the earlier period is not possible due to a significant change in the index creation methodology.
Source: own study based on: Dutta [2011]; Dutta et al. [2023].

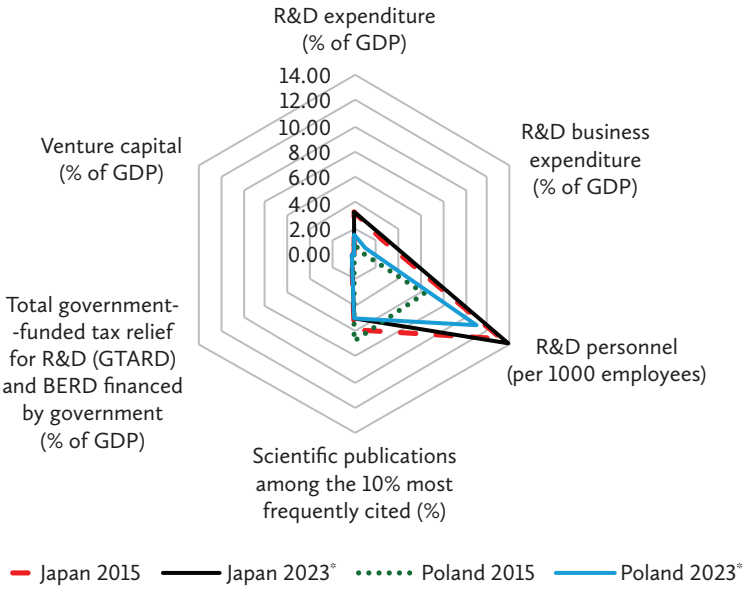
The data presented in Table 1.2 confirm Poland's comparatively significantly weaker position in terms of innovation and indicate a growing innovation gap between Poland and Japan. In 2011, Japan was ranked 20th on the world innovation map, and Poland was ranked 43rd. Twelve years later, in 2023, Japan moved up in the ranking to 13th position, while Poland advanced by only two places, taking 41st place among the 132 countries analysed and achieving a lower innovation index value than in 2011. This was the result of a weakening of the relative position in terms of the Innovation Input Sub-Index (a decline in the analysed period from 41st to 50th place in the ranking), which was only to some extent compensated by an improvement in the ranking according to the Innovation Output Sub-Index (a move up from 55th to 36th place). Conversely, Japan significantly improved its position in the ranking in terms of both sub-indices in the period under analysis [Dutta, 2011; Dutta et al., 2023].

The GII allows for a comparison of the innovativeness of Poland and Japan, but a more detailed picture can be obtained by comparing the individual partial indicators that make up this index. Therefore, a more disaggregated analysis of selected innovation metrics and their changes over time is needed (see Figure 1.3).

Japan is a country with high research and development (R&D) spending by both the public and private sectors. These expenditures taken as a whole as a share of GDP remained steady at around 3.2% of GDP in 2015–2023, as did business sector spending on R&D, which increased slightly from 2.4 to 2.6% of GDP. During the same period in Poland, total R&D spending was much lower, but increased from 1% to 1.5% of GDP, while business sector spending increased from 0.5% to 0.9% of GDP [OECD, 2023]. A significant gap also exists between Poland and Japan in terms of research personnel per 1000 employees, but over the period it can be seen that the gap has been slowly closing. In Japan, the ratio remained stable, oscillating around 13 researchers per 1000 employees, while in Poland it grew rapidly from 6 to 11 researchers per 1000 employees in the 2015–2023 period. An important factor for stimulating innovation

is the availability of venture capital. Both countries diverge in this regard from world leaders such as the United States, Israel and Finland, where venture capital funds as a percentage of GDP account for about 0.3–0.6% [Weresa, 2022]. In Japan, the percentage ranged between 0.02% and 0.05% during the period under analysis, while in Poland it was five times lower, accounting for 0.0096% of GDP in 2022.

Figure 1.3. Selected indicators of innovation of the economies of Poland and Japan – comparative analysis of 2015 and 2023



* Data for 2023 or the last year for which statistical data is available.

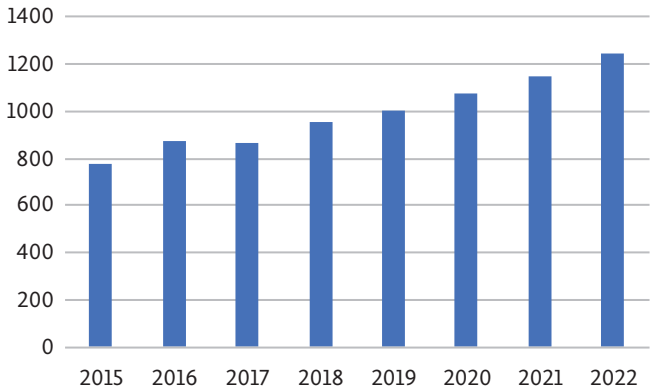
Source: own study based on: OECD [2023]; OECD Data Explorer [2024].

Another source of funding for innovation is business support in the form of tax relief for R&D (GTARD) and direct public funding for companies' research activities. In Japan, these two sources combined remained stable over the 2015–2023 period, accounting for 0.14% of GDP. Conversely, Poland saw a dynamic increase in this form of innovation support from 0.047% to 0.148% of GDP (see Figure 1.3).

In terms of R&D and innovation performance, it is worth noting that the countries are similar in terms of the percentage of scientific publications that are among the 10% most cited published works in the world. This value, in both Poland and Japan, oscillates around 5% of total publications, but it is much lower than the OECD average, which in 2022 was 10.9%.

Research cooperation between Polish and Japanese scientists is also gradually developing, as evidenced by an increase in the number of joint scientific publications, but the extent of this cooperation is still limited (see Figure 1.4).

Figure 1.4. Joint scientific publications by authors from Poland and Japan in 2015–2022



Source: own study based on: OECD Data Explorer [2024].

On the one hand, a large disparity in favour of Japan exists in terms of patenting rates. Patents obtained simultaneously in the Triad countries (triadic patent families) accounted for about 30% of total patents in Japan, while only 0.13% in Poland. On the other hand, there are no major differences between the countries in terms of the internationalisation of inventive activity. The percentage of inventions that were created through international cooperation (as a percentage of total inventions) increased in Japan from 64.2% to 67.4% during the 2015–2023 period. There was a similar trend in Poland, where the rate increased from 68.3% to 69.9% [OECD Data Explorer, 2024].

Summarising the analysis of detailed innovation indicators, it should be noted that Poland, although lagging behind Japan in many areas (especially in R&D spending and patents), has a higher rate of innovation change than Japan.

1.5. Changes in the competitiveness of Poland and Japan in 2015–2023

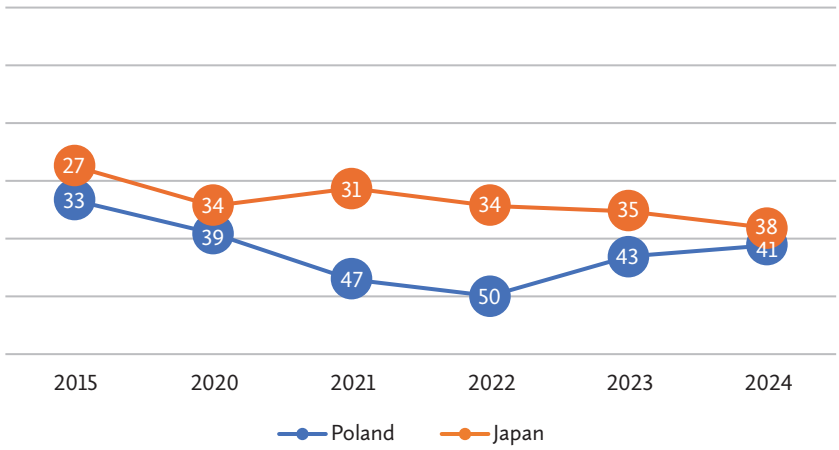
Innovation, characterised in the previous section, is one of the factors determining the competitiveness of economies. A broader look at the competitiveness of Poland and Japan in its macroeconomic dimension can be obtained from the competitiveness ranking prepared by the Institute of Management Development in Lausanne.

The ranking, which has been published annually for several decades in the *IMD World Competitiveness Yearbook*, analyses the ability of countries to create and maintain an environment conducive to business competitiveness. The methodology identifies four main groups of factors that make up competitiveness [IMD, 2024]:

- economic performance;
- government efficiency;
- business efficiency;
- infrastructure.

The determination of a competitive position is made by taking into account statistical data and opinions collected in a survey of executives. The results of the latest edition of the report [IMD, 2024] indicate that Poland and Japan differ little in terms of their place in the global competitiveness ranking. In 2024, Japan ranked 38th, while Poland ranked 41st. In addition, both countries dropped places compared to 2015, when Japan was ranked 27th and Poland 33rd (see Figure 1.5).

Figure 1.5. Position of Poland and Japan in the competitiveness rankings – changes in 2015–2024

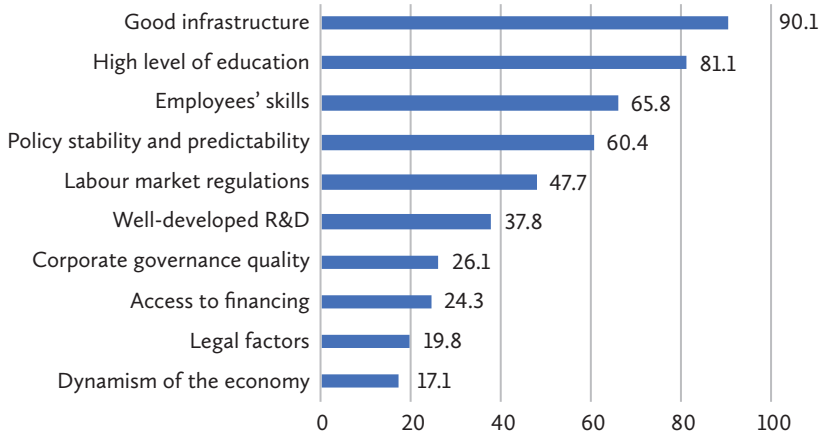


Source: own study based on: IMD [2015, 2023, 2024].

The ranking shown in Figure 1.5 determines the position of Poland and Japan in a given year among the more than 60 countries under analysis. The dynamic approach refers to changes in the indicators that make up competitiveness over time. The main areas of greatest progress in 2024 compared to the previous year are the increasing dynamics of the long-term growth rate of employment and labour resources, improvement in the current account balance, dynamics of gross fixed capital formation, exchange rate stability and transparent economic policies [IMD, 2024]. In contrast,

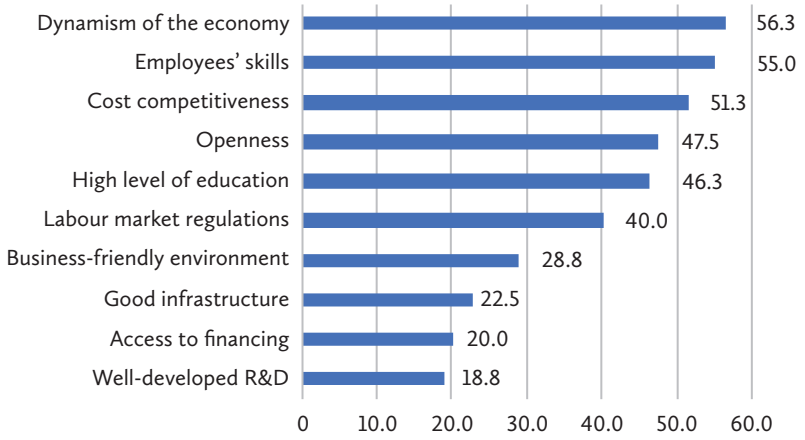
in Japan, the greatest gains in competitiveness indicators concern gross fixed capital formation growth, GDP and GDP per capita growth, improvement in the current account balance, and international trade performance [IMD, 2024].

Figure 1.6. Japan's main areas of attractiveness in 2024 as assessed by executives (%)



Source: own study based on: IMD [2024].

Figure 1.7. Poland's main areas of attractiveness in 2024 as assessed by executives (%)



Source: own study based on: IMD [2024].

IMD's surveys of senior executives help identify the key factors that constituted the competitive strengths of each of the analysed economies in 2024. The most frequently cited factors for Japan's attractiveness were: good infrastructure, high level of education and skills of employees, policy stability and predictability, labour market

regulations, and well-developed R&D (see Figure 1.6). In Poland, the features of the business environment positively influencing competitiveness that are best rated by managers included: dynamism of the economy, education and skills of employees, cost competitiveness, openness to change, high level of education, and labour market regulations (see Figure 1.7).

Nevertheless, challenges remain that require active, pro-competitive policies. In both countries, these relate to productivity improvements and innovation growth, demographic issues, and the transition to a green economy. In addition, Poland points to the need to reform the energy sector and agriculture. In Japan, the challenge is to make labour more flexible and invest in human capital [IMD, 2024].

Summary and conclusions

The chapter examines the competitiveness of Poland and Japan by analysing key economic indicators, the dynamics of economic growth, the structure of their economies, the level of innovation, and their positions in international competitiveness rankings. The analysis highlights both differences and similarities in their economic development and identifies the main challenges currently facing each country.

Japan stands out as a more developed economy, with higher societal wealth and a greater degree of urbanization compared to Poland. However, over the past two decades, Poland has made significant strides in narrowing these gaps, particularly in GDP per capita growth and structural transformation, marked by the increasing importance of the services sector. Both countries grapple with similar demographic challenges, including an aging population and the imperative to transition to a low-emission economy.

Japan demonstrates a considerably higher level of innovation than Poland, as evidenced by its greater expenditure on research and development and its substantial patent activity. Nevertheless, Poland exhibits a faster growth rate in certain innovation metrics, such as the number of researchers per capita and support for innovation through tax incentives and public funding.

Despite these disparities in innovation levels, both countries occupy comparable positions in the global competitiveness rankings. According to the IMD report [2024], Japan ranked 38th, while Poland ranked 41st.

Both countries face pressing challenges that demand active and pro-competitive policies, including enhancing productivity, fostering innovation, addressing adverse demographic trends, and advancing toward a green economy. For Poland, reforms in the energy and agriculture sectors are critical, while Japan's economic strategy should prioritize making its labour market more flexible and boosting investments in human capital.

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Chapter 2

Trade and investment relations between Poland and Japan

Artur Franciszek Tomeczek, Tomasz Marcin Napiórkowski

Introduction

International economic cooperation between countries takes place primarily at two levels, namely trade and mutual Foreign Direct Investment (FDI). The purpose of the chapter is to determine the extent of this cooperation between Japan and Poland. To achieve this purpose, desk research was primarily used.

2.1. Foreign trade

Poland and Japan are countries that have historically played a radically different role from the perspective of international economics. Poland is an economy that, despite its high importance on a European scale, is not one of the key players on the global stage. While Poland's economy has grown rapidly over the 20 years of its membership in the European Union, its trade ties continue to focus primarily on regional partners, particularly the economies of Germany and other neighbouring countries. Japan, on the other hand, has consistently been one of the world's most important economies and exporters for decades [Tomeczek, 2022]. Japan's network of major trading partners is far more global than is the case with Poland. At the same time, unlike Poland, in the decades at the turn of the 20th and 21st centuries, the Japanese economy experienced a period of economic slowdown and strenuous stagnation.

The origins of economic cooperation between Poland and Japan date back to 1919, when the countries first officially established bilateral diplomatic relations, and 1957, when those were resumed after World War II [Ministry of Foreign Affairs of Japan,

2024]. Bilateral trade between the two countries faced many challenges. According to the assumptions of the gravity model of international trade, the value of bilateral trade is proportional to the size of the two economies and inversely proportional to the distance (representing primarily the cost of transportation) between them [Bergstrand, 1985; Chaney, 2018]. Due to the large geographic distance separating Poland and Japan and the relatively small size of the Polish market, the expected value of trade was relatively low. With the increasing globalisation and economic development of Poland, trade has clearly increased, but it still remains relatively low.

However, in analysing the importance of economic cooperation between Poland and Japan, it is necessary to take into account the fact that the modern world economy is governed by complex processes. The global value chains of large multinational companies are now much more extensive than in the early 1990s [Antràs, Chor, 2021; Kano, Tsang, Yeung, 2020]. As a result, more countries are involved in the production of Japanese goods than in the past. Another important aspect is that, according to the eclectic paradigm, companies with ownership, location and internalisation advantages will make the decision to invest directly in a country [Dunning, Lundan, 2008]. Many Japanese companies have invested in Poland, allowing them to circumvent the high cost of exports by moving some production to Europe.

2.1.1. Foreign trade data

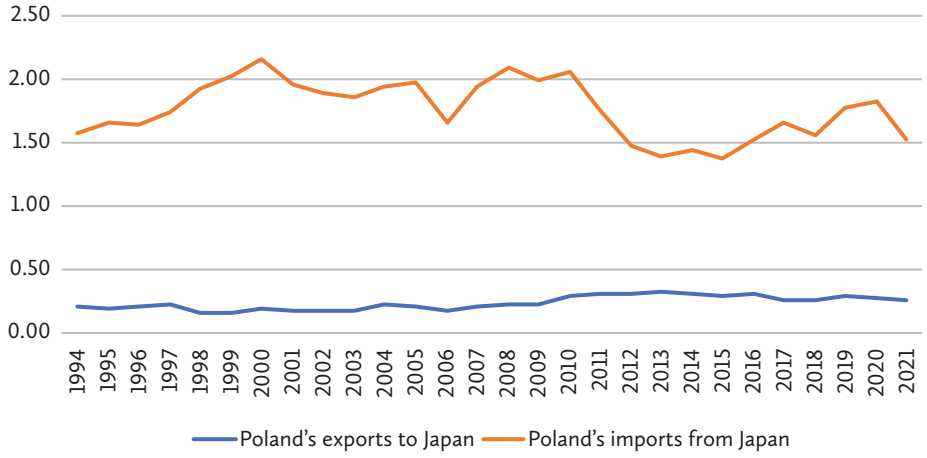
The primary source of quantitative data on international trade is the UN Comtrade database [United Nations Statistics Division, 2024], on which the World Integrated Trade Solution (WITS) [World Bank, 2024] and Trade Map [International Trade Centre, 2024] databases are based. The latest available data presented in the Trade Map database come from Eurostat data for Poland (as of 2023) and Japanese Ministry of Finance data for Japan (as of 2015). The Polish names of the HS4 codes come from the ISZTAR4 system [Ministerstwo Finansów, 2024].

In theory, Poland's exports to Japan and Japan's imports from Poland should be equal, but in practice a data mirroring problem occurs, the source of which is differences in the methodologies used by each country to calculate exports and imports. In data published by UN Comtrade and Eurostat, the value of exports is given FOB (free on board), while that of imports is given CIF (cost, insurance, and freight). As a result, Polish exports to Japan will be lower than Japanese imports from Poland, since the costs associated with transportation between the two countries must be added to the latter value. Similarly, Japanese exports to Poland will be lower than Polish imports from Japan.

2.1.2. History of cooperation and foreign trade of Poland and Japan (1994–2021)

Figure 2.1 presents Polish-Japanese commodity exports and imports from Poland's perspective, expressed as a percentage of Poland's total exports and imports. Poland is a reporter, while Japan is a partner. Japan's importance as a market for Polish exporters has remained steadily low since 1994. In the first of the observed years, it was only 0.21% of Poland's total exports, and in the last (2021) it was 0.26%. The share of exports to Japan has never exceeded even 0.5%, the closest being in 2013, when 0.3% was recorded. On the other hand, Poland's imports from Japan were considerably higher in all of the years analysed: in 1994 they amounted to 1.56% of all imports to Poland that year, in 2000 they reached 2.15%, which turned out to be the highest value in the period analysed, and in 2021 they were at 1.51%. The disparity in exports and imports is not surprising, especially given the global position of Japanese companies and the difficulty for European competitors to gain a strong foothold in this market.

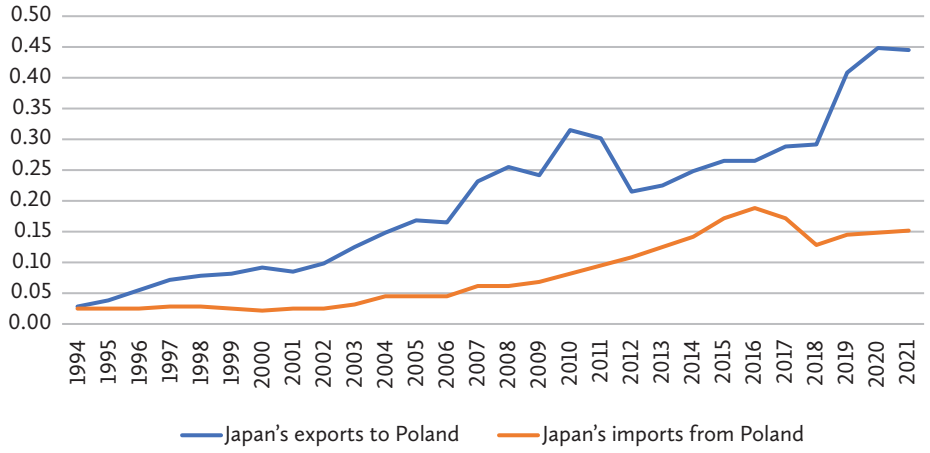
Figure 2.1. Commodity trade in 1994–2021 from Poland's perspective (% of Poland's total exports/imports)



Source: World Bank [2024].

Figure 2.2 presents an analogous situation from the perspective of Japan. This time Japan is a reporter, while Poland is a partner. While Poland is still not one of Japan's top trading partners, a definite increase in the importance of bilateral trade flows is evident. In 1994, Japanese exports to Poland amounted to only 0.03% of Japan's total exports, while imports of goods from Poland were even less, at just 0.02% of Japan's total imports. In 2021, the values stood at 0.44% for Japanese exports and 0.15% for Japanese imports.

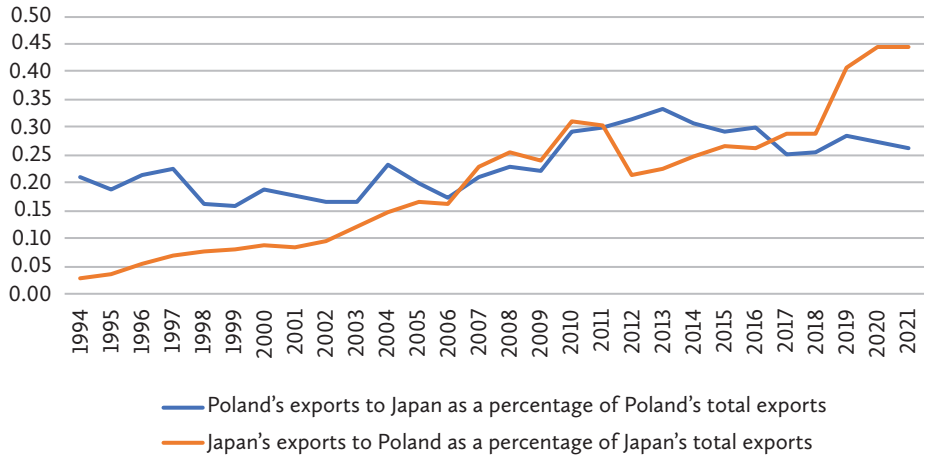
Figure 2.2. Commodity trade in 1994–2021 from Japan's perspective (% of Japan's total exports/imports)



Source: World Bank [2024].

Figure 2.3 compares the aforementioned data on bilateral exports expressed as a percentage of a country's total exports. Since 1994, Poland's exports to Japan have remained a relatively constant proportion of Poland's total exports. In contrast, Japan's exports to Poland have increased significantly since 1994. Currently, the value for Japan (0.44%) is a larger share than the corresponding figure for Poland (0.26%).

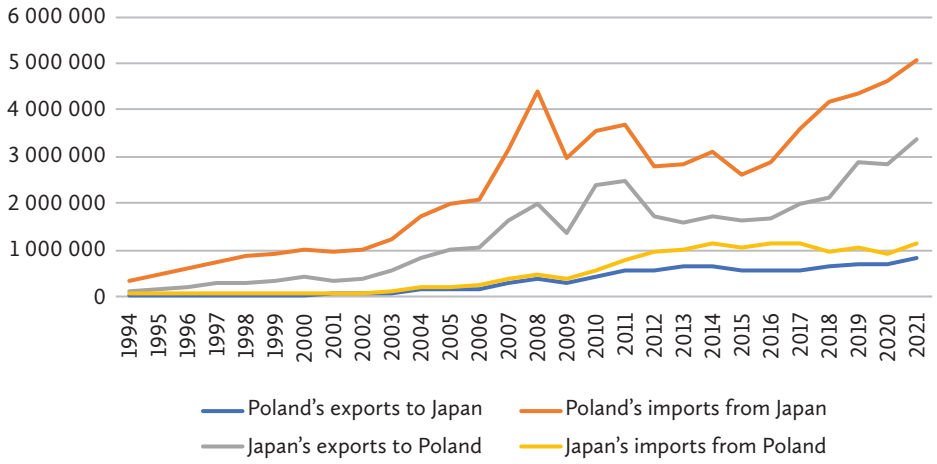
Figure 2.3. Bilateral exports of Poland and Japan in 1994–2021 (% of total exports of a country)



Source: World Bank [2024].

The historical value of Polish-Japanese bilateral commodity trade is definitely higher than it was in the 1990s, but the numbers still remain relatively small considering the needs of both countries (see Figure 2.4). Figure 2.4 clearly illustrates the problem of mirror data discrepancies, namely the disparity between the value of Polish imports from Japan and Japanese exports to Poland (and vice versa) caused by a difference in methodologies for calculating these figures. In 1994, Polish exports to Japan amounted to USD 36.5 million, while Polish imports from Japan amounted to USD 335 million (deficit in Poland's trade balance: USD –298.5 million). In 2021, Polish exports to Japan stood at USD 830.2 million, while Polish imports from Japan stood at USD 5.08 million (deficit in Poland's trade balance: USD –4.25 million). From Japan's perspective, the trade balance surplus in 1994 was USD 46.9 million, and by 2021 it was USD 2.19 billion. For each of the years shown in Figure 2.4, Poland recorded a deficit and Japan a surplus in the bilateral trade balance.

Figure 2.4. Commodity trade of Poland and Japan in 1994–2021 (value of exports/imports of a country in USD thousand)



Source: World Bank [2024].

2.1.3. Contemporary structure of Polish-Japanese commodity trade (2022–2023)

In 2023, the predominant Polish exports partners were Germany, the Czech Republic, France, the United Kingdom and Italy (Japan was 46th). The most important suppliers of products imported by Poland were Germany, China, the Netherlands, Italy and the Czech Republic (Japan was 24th). From Japan's perspective, the chief partners for the country's exports were the United States, China, South Korea, Taiwan and Hong

Kong (Poland was 26th). In contrast, from the perspective of Japanese imports, the most significant product suppliers were China, the United States, Australia, the United Arab Emirates and Taiwan (Poland was 52nd). In view of the above, two conclusions can be drawn. First of all, the two countries are not among each other's most important partners in commodity trade for the time being. Second, Japanese companies export more to Poland than Polish companies export to Japan. The next step in the analysis is to look at the structure of contemporary Polish-Japanese trade.

Table 2.1 shows the structure of Polish exports to Japan at the HS4 code level in 2022 and 2023, the last two years for which data are available in May 2024 (Poland is the reporter). Considerable fluctuations in the value of individual categories of commodities can be seen. This is primarily due to relatively low nominal values of the trade flows analysed. It should also be taken into account that the International Trade Centre data presented in the table is based on different data sources for each of these years (UN Comtrade for 2022 and Eurostat for 2023), as hinted at earlier in this text. The most important products exported by Poland to Japan were turbo-jets, turbo-propellers and other gas turbines (valued at USD 172.8 million in 2023). Other categories worth noting are motor cars and other motor vehicles (USD 52.6 million in 2023), ceramic wares for laboratory, chemical or other technical uses (USD 40.2 million in 2023), and electrical transformers (USD 37.5 million in 2023). Regardless of the year, Polish exports to Japan have never exceeded USD 1 billion.

Table 2.1. Polish exports to Japan by HS4 code in 2022–2023 (in USD thousand)

HS4 code	Name	2022	2023
Sum total	All products	783 930	897 163
8411	Turbo-jets, turbo-propellers and other gas turbines	69 147	172 849
8703	Motor cars and other motor vehicles principally designed for the transport of persons (other than those of heading 8702), including station wagons and racing cars	60 946	52 578
6909	Ceramic wares for laboratory, chemical or other technical uses; ceramic troughs, tubs and similar receptacles of a kind used in agriculture; ceramic pots, jars and similar articles of a kind used for the conveyance or packing of goods	28 013	40 242
8504	Electrical transformers, static converters (for example, rectifiers) and inductors	37 941	37 473
9021	Orthopaedic appliances, including crutches, surgical belts and trusses; splints and other fracture appliances; artificial parts of the body; hearing aids and other appliances which are worn or carried, or implanted in the body, to compensate for a defect or disability	24 462	28 974

HS4 code	Name	2022	2023
8525	Transmission apparatus for radio-broadcasting or television, whether or not incorporating reception apparatus or sound recording or reproducing apparatus; television cameras, digital cameras and video camera recorders	169	28 318
8708	Parts and accessories of the motor vehicles of headings 8701 to 8705	25 579	26 816
8413	Pumps for liquids, whether or not fitted with a measuring device; liquid elevators	20 790	24 979
8409	Parts suitable for use solely or principally with the engines of heading 8407 or 8408	16 395	19 173
7404	Copper waste and scrap	14 692	17 653
0202	Meat of bovine animals, frozen	41 578	17 447
3801	Artificial graphite; colloidal or semi-colloidal graphite; preparations based on graphite or other carbon in the form of pastes, blocks, plates or other semi-manufactures	25 370	13 277
8001	Unwrought tin	13 091	12 880
0206	Edible offal of bovine animals, swine, sheep, goats, horses, asses, mules or hinnies, fresh, chilled or frozen	13 821	12 317
2404	Products containing tobacco, reconstituted tobacco, nicotine, or tobacco or nicotine substitutes, intended for inhalation without combustion; other nicotine containing products intended for the intake of nicotine into the human body	0	12 126
3402	Organic surface-active agents (other than soap); surface-active preparations, washing preparations (including auxiliary washing preparations) and cleaning preparations, whether or not containing soap, other than those of heading 3401	212	12 079
4011	New pneumatic tyres, of rubber	11 453	9229
8426	Ships' derricks; cranes, including cable cranes; mobile lifting frames, straddle carriers and works trucks fitted with a crane	8928	9164
9018	Instruments and appliances used in medical, surgical, dental or veterinary sciences, including scintigraphic apparatus, other electro--medical apparatus and sight-testing instruments	7314	8966
8471	Automatic data processing machines and units thereof; magnetic or optical readers, machines for transcribing data onto data media in coded form and machines for processing such data, not elsewhere specified or included	14 548	8299

Source: International Trade Centre [2024].

Table 2.2 shows the structure of Japanese exports to Poland at the HS4 code level in 2022–2023 (Japan is the reporter). Japan's top exports to Poland were motor cars and other motor vehicles (valued at USD 1.67 billion in 2023), salts of oxometallic or peroxometallic acids (USD 496.9 million in 2023), instruments and apparatus for physical or chemical analysis (USD 259.9 million in 2023), parts and accessories for

motor vehicles (USD 131.7 million in 2023), and air or vacuum pumps, compressors and fans (USD 124.8 million in 2023). The value of goods exported from Japan to Poland was significantly higher than that of exports from Poland to Japan.

Table 2.2. Japanese exports to Poland by HS4 code in 2022–2023 (in USD thousand)

HS4 code	Name	2022	2023
Sum total	All products	4 210 739	4 195 184
8703	Motor cars and other motor vehicles principally designed for the transport of persons (other than those of heading 8702), including station wagons and racing cars	1 049 038	1 665 990
2841	Salts of oxometallic or peroxometallic acids	808 309	496 901
9027	Instruments and apparatus for physical or chemical analysis (for example, polarimeters, refractometers, spectrometers, gas or smoke analysis apparatus); instruments and apparatus for measuring or checking viscosity, porosity, expansion, surface tension or the like; instruments and apparatus for measuring or checking quantities of heat, sound or light (including exposure meters); microtomes	277 997	259 931
8708	Parts and accessories of the motor vehicles of headings 8701 to 8705	143 335	131 668
8414	Air or vacuum pumps, air or other gas compressors and fans; ventilating or recycling hoods incorporating a fan, whether or not fitted with filters; gas-tight biological safety cabinets, whether or not fitted with filters	128 347	124 756
9999	Commodities not specified according to kind	132 867	113 495
8503	Parts suitable for use solely or principally with the machines of heading 8501 or 8502	116 446	74 260
8477	Machinery for working rubber or plastics or for the manufacture of products from these materials, not specified or included elsewhere in this chapter	66 383	61 721
7607	Aluminium foil (whether or not printed or backed with paper, paperboard, plastics or similar backing materials) of a thickness (excluding any backing) not exceeding 0.2 mm	66 137	58 800
9504	Video game consoles and machines, table or parlour games, including pintables, billiards, special tables for casino games and automatic bowling equipment, amusement machines operated by coins, banknotes, bank cards, tokens or by any other means of payment	75 658	51 225
8483	Transmission shafts (including cam shafts and crank shafts) and cranks; bearing housings and plain shaft bearings; gears and gearing; ball or roller screws; gear boxes and other speed changers, including torque converters; flywheels and pulleys, including pulley blocks; clutches and shaft couplings (including universal joints)	50 368	45 702

HS4 code	Name	2022	2023
7225	Flat-rolled products of other alloy steel, of a width of 600 mm or more	18 645	44 609
7208	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, hot-rolled, not clad, plated or coated	119 271	38 454
9032	Automatic regulating or controlling instruments and apparatus	38 875	34 609
8543	Electrical machines and apparatus, having individual functions, not specified or included elsewhere in this chapter	3729	34 476
3921	Other plates, sheets, film, foil and strip, of plastics	62 717	34 323
8507	Electric accumulators, including separators therefor, whether or not rectangular (including square)	48 627	34 004
8479	Machines and mechanical appliances having individual functions, not specified or included elsewhere in this chapter	60 409	33 314
8701	Tractors (other than tractors of heading 8709)	26 502	32 705
8409	Parts suitable for use solely or principally with the engines of heading 8407 or 8408	27 984	30 317

Source: International Trade Centre [2024].

2.2. Foreign Direct Investment

Foreign Direct Investment is an indispensable part of international relations between economies. UNCTAD [2023] defines FDI as "investment reflecting a lasting interest (usually 10% or more) and control by a foreign direct investor, resident in one economy, in an enterprise resident in another economy (foreign affiliate)". Both making and hosting FDI entail a number of benefits for related companies and their entire economies. For those engaging in FDI, it is a form of internationalisation that allows them to reach new markets and production resources [Kang, Liu, 2016; Li, Li, Shapiro, 2012] in order to increase international competitiveness [Chen, Hsu, Wang, 2012]. For hosting entities, FDI (especially from more economically advanced countries) has a positive impact on each of the following factors of production: physical capital (increasing domestic investment in the long term), labour stock (offering higher wages), human capital (through knowledge transfer) and technology. Thus such investment positively contributes to the economic growth of a host country [Napiórkowski, 2017].

Both in terms of the activity of Japanese investors in Poland and in terms of the capital involvement of Polish investors in Japan, the stock of FDI between the two countries is relatively very low. The limited reciprocity in terms of FDI is also evidenced by relatively meagre income received from these investments (see Table 2.3).

Table 2.3. Heat map of FDI from Japan in Poland and from Poland in Japan and related income in 2010–2022 (in USD million)

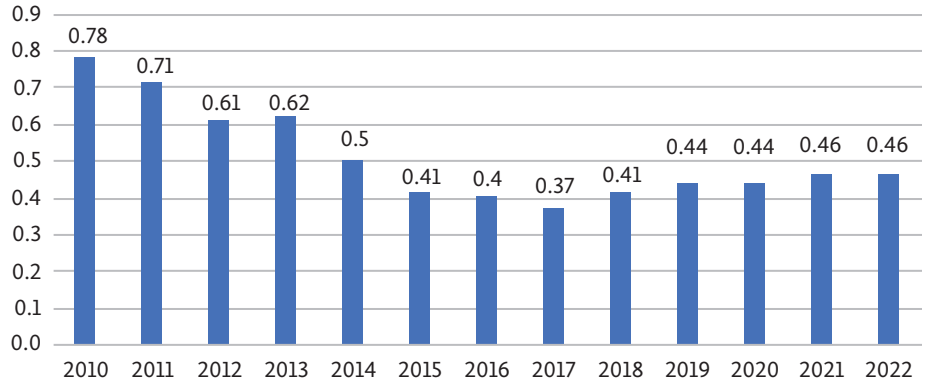
Variable/Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
FDI from JP in PL													
FDI from JP in PL income													
FDI from PL in JP													
FDI from PL in JP income	*	*	*	*		*	*	*	*	*	*	*	

Note: red colour indicates the highest activity (known as warming up), and blue colour indicates the lowest activity (known as cooling down).
Explanation: JP – Japan, PL – Poland, * – value 0.0.
Source: Narodowy Bank Polski [NBP, 2024a, 2024b].

2.2.1. Japan's Foreign Direct Investment in Poland

During the analysed period, the stock of FDI from Japan in Poland reached its highest value in 2010 (USD 1678.90 million), after which the activity of Japanese investors in the Polish market decisively decelerated, eventually falling by 44.92% and reaching a local minimum in 2016 (USD 754.1 million). While an increase in interest in the Polish market in Japan has been evident since then, the figure reached in 2022 (USD 1234.50 million) is lower than that of 12 years ago by about a quarter (in precise terms, by 26.47%). Analysing FDI from Japan in Poland from the perspective of the total stock of FDI in Poland (see Figure 2.5), Japan's share fell from 0.78% (in 2010) to 0.37% (in 2017), reaching 0.46% in 2021–2022.

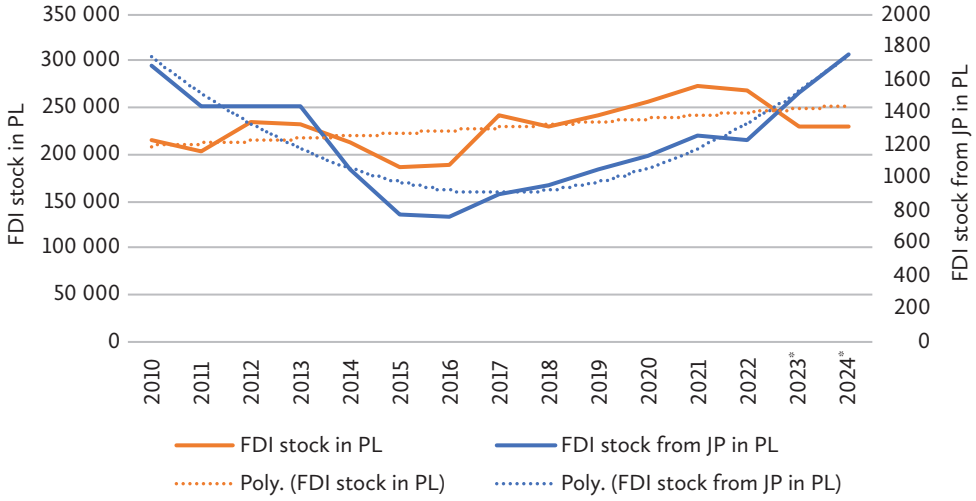
Figure 2.5. Share of FDI stock from Japan in Poland (% of total FDI stock in Poland)



Source: NBP [2024a, 2024b].

Therefore, it can be said that the growth rate of Japan's share of FDI stock in Poland in 2019–2022 is characterised by stagnation. Nevertheless, assuming the apparent long-term trends continue, the share of Japanese FDI in Poland in the coming years should increase to 0.56% in 2024 (see Figure 2.6).

Figure 2.6. Total FDI stock in Poland and FDI stock in Poland from Japan (in USD million) in 2010–2022 with forecast

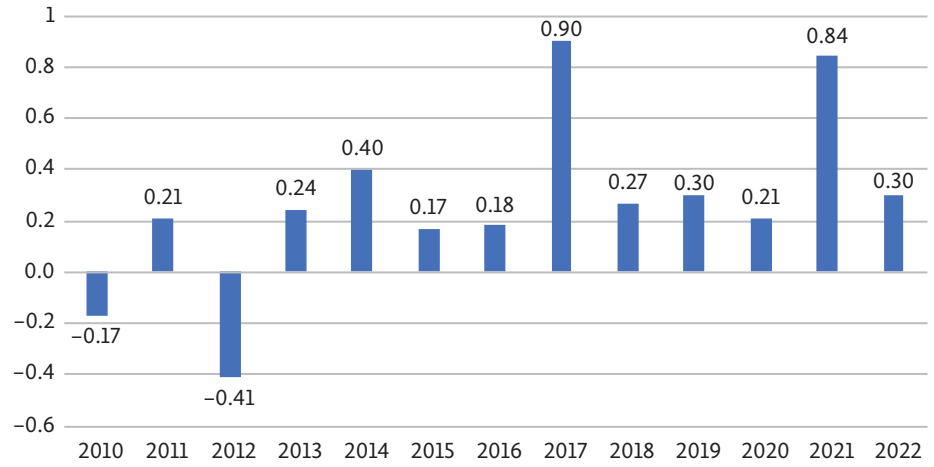


Note: R^2 for the trend used to estimate forecasts for FDI in PL is 64.59%, and to estimate forecasts for FDI from JP in PL – 80.65%.
* Forecast for 2023–2024 (in USD million).
Source: NBP [2024a, 2024b].

The low activity of Japanese investors is undeniably linked to relatively low returns resulting from their involvement in the Polish market in the form of FDI stock. The described income is characterised by very high volatility, which hinders the possibility of its forecasting,[1] and this could be a factor that introduces additional uncertainty (risk) into Japanese companies' decision-making process regarding undertaking FDI in the Polish market. While the lowest value of the described income was recorded in 2012 (a loss of USD 74.20 million) and the highest (USD 260.50 million) in 2021, there is no strong upward trend. The average share of Japanese investors' income in the total income of foreign investors in Poland ranges from –0.41% (2012) to 0.90% (2017), with the average share from 2010 to 2022 equal to just 0.26% (see Figure 2.7).

1 This is evidenced, for example, by the low values of the R^2 coefficients of determination shown below.

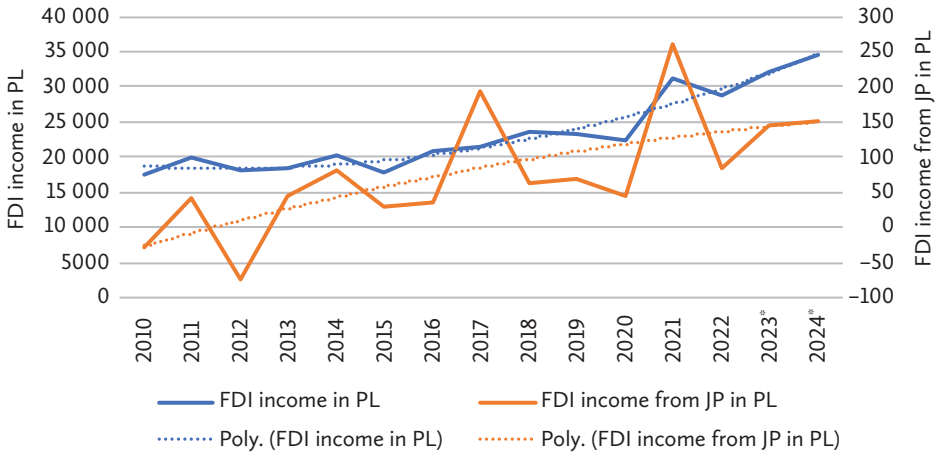
Figure 2.7. Share of income associated with FDI from Japan in Poland (% of total FDI stock in Poland)



Source: NBP [2024a, 2024b].

With long-term trends in mind, in the coming years, Japanese FDI income in Poland and its share in the total FDI income should increase to USD 150.45 million and 0.44% in 2024, respectively (see Figure 2.8).

Figure 2.8. Total FDI income in Poland and FDI income in Poland from Japan (in USD million) in 2010–2022 with forecast



Note: R^2 for the trend used to estimate forecasts for FDI income in PL is 84.10%, and to estimate forecasts for FDI income from JP in PL – 38.96%.

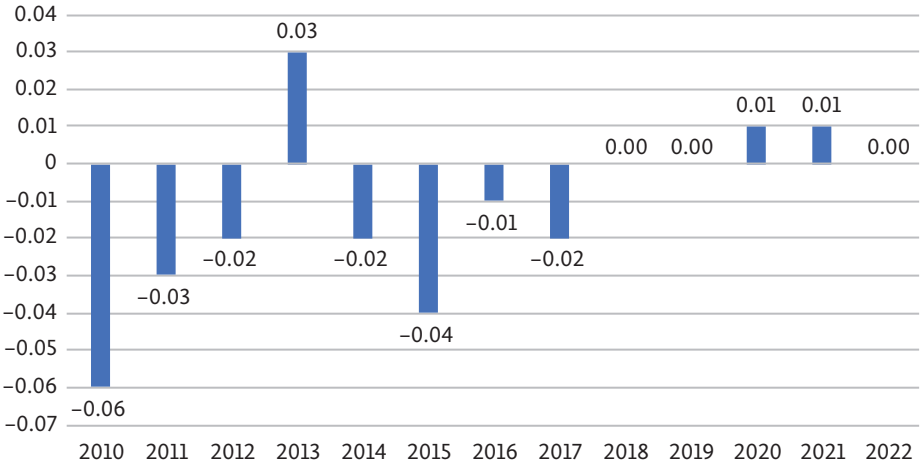
* Forecast for 2023–2024 (in USD million).

Source: NBP [2024a, 2024b].

2.2.2. Poland's Foreign Direct Investment in Japan

Polish investors in Japan are less active than Japanese investors in Poland. After a four-year increase in interest that led to the maximum value of FDI stock from Poland in Japan during the period under analysis (USD 10.50 million in 2013), FDI stock from Poland in Japan experienced an equally sharp decline (to USD –6.50 million in 2017). The following growth is characterised by rather high volatility and a much lower rate (reaching USD 3.8 million in 2020, USD 1.70 million a year later and USD 0.0 million in 2022). The share of Polish FDI in Japan relative to all FDI from Poland does not exceed 0.03% and had stood at less than 0.0% for most of the analysed period (see Figure 2.9).

Figure 2.9. Share of FDI stock from Poland in Japan (% of total FDI stock from Poland)

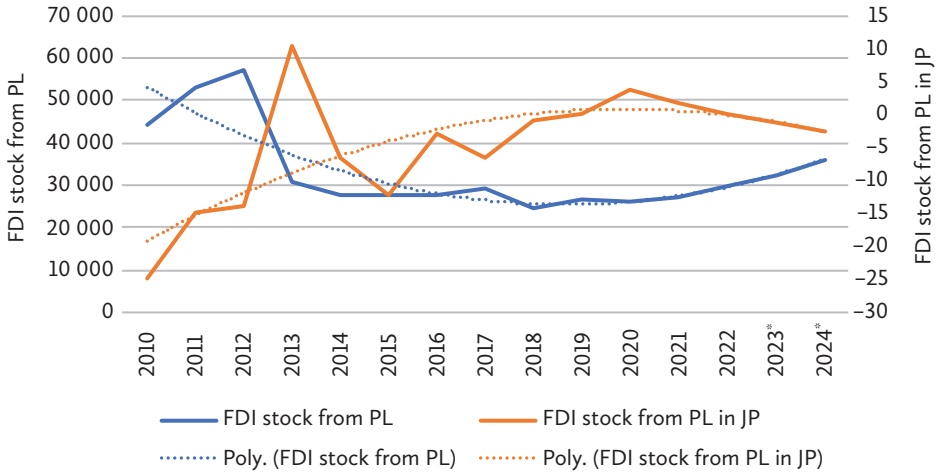


Source: NBP [2024a, 2024b].

In the absence of significant changes in current long-term trends, Polish investors, despite their growing global presence, can be expected not to engage with or even to withdraw from the Japanese economy (as regards FDI) in the coming years (see Figure 2.10).

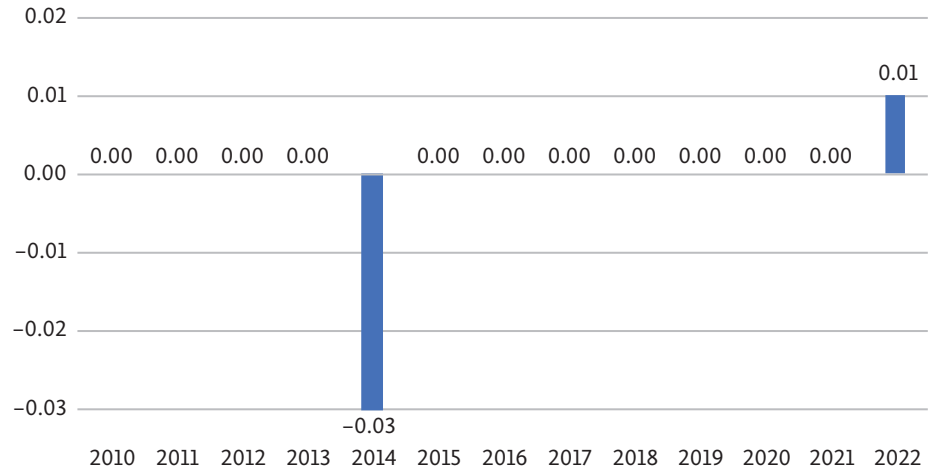
The income earned from FDI stock from Poland in Japan was less than USD 0.0 million during most of the period under analysis, so its share in the income resulting from FDI from Poland in the world is unrecorded (see Figure 2.11).

Figure 2.10. Total FDI stock from Poland and FDI stock from Poland in Japan (in USD million) in 2010–2022 with forecast



Note: R^2 for the trend used to estimate forecasts for FDI from PL is 68.56%, and to estimate forecasts for FDI from PL in JP – 50.90%.
* Forecast for 2023–2024 (in USD million).
Source: NBP [2024a, 2024b].

Figure 2.11. Share of income associated with FDI from Poland in Japan (% of total FDI income from Poland)



Source: NBP [2024a, 2024b].

Summary and conclusions

Poland and Japan are not, historically and currently, among each other's most important partners in bilateral commodity trade. Poland exports to and imports from mainly other European economies (the exception being high imports from China). Japan's foreign trade, on the other hand, is far more global. Japanese companies export more to Poland than Polish companies export to Japan. For each of the years under analysis, Poland recorded a deficit and Japan recorded a surplus in the bilateral trade balance. On a more optimistic note, despite the relatively small value of Poland's exports to Japan, the exports are primarily high-tech and specialised goods. With its economic development, the Polish economy has increased its importance in the international stage. Japanese exports to Poland had grown from just 0.03% of Japan's total exports in 1994 to 0.44% of Japanese exports in 2021 (the percentage of Poland's exports to Japan remains relatively unchanged). It is difficult to clearly assess economic cooperation between two countries solely on the basis of the value of bilateral trade flows, due to the elaborate nature of the post-pandemic global value chains of large multinational companies.

Although elements such as low per capita income and investment risk in Poland – which were reasons for low FDI from Japan as noted by Morita [2008] – have improved significantly, the observations presented in this chapter indicate that international economic cooperation between Poland and Japan based on FDI remains very limited. The presented positive forecasts related to the activity of Japanese investors in Poland are reflected in the literature. Dzienis [2021] stresses, for example, that while the amount of Japanese FDI in Poland is declining, there is a rise in the number of companies with Japanese capital. This could translate into an increase in FDI stock from Japan in Poland in the long term. To boost Poland's attractiveness to Japanese investors, such elements as location, attractive investment climate, low labour costs and tax incentives should be highlighted, as these were the factors considered significant during earlier decision-making processes regarding Japanese investment in Poland [Osmolak, 2019]. Polish involvement in Japan through FDI is marginal and nothing in the data indicates that it is set to grow or even remain steady.

Given the above observations on international economic cooperation between Japan and Poland, if the goal of those responsible for international policy is to revive this cooperation, it is necessary to intervene (provide an impulse external to the market) to increase the mutual attractiveness of these economies to foreign partners.

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Chapter 3

Cultural determinants of Polish-Japanese cooperation

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Introduction

Culture is a multidimensional and complex phenomenon, hence there are hundreds of definitions for the term in the literature [Danik, 2017, pp. 58–67]. In this chapter, we will take after Hofstede that culture is "the collective programming of the mind that distinguishes the member of one group or category of people from others" [Hofstede, Hofstede, Minkov, 2011, p. 21]. In this case, the term "group" is understood as people who are in direct contact with each other, while the "category" is formed by people who have similar characteristics but do not necessarily maintain a direct relationship with each other. The metaphor "programming of the mind" means that the patterns of thinking, feeling and behaviour that make up culture are shaped by the social environment in which people grow up and function [Hofstede et al., 2011, pp. 20–21]. These patterns are acquired and passed on to other members of the community through learning. Subsequent generations inherit culture through non-genetic information [Szacka, 2008, p. 70]. Culture is thus a collective phenomenon, not an individual one. It can evolve over time. It consists of good, beautiful and noble human works and values as well as those that are their opposites [Szacka, 2008, pp. 80–81].

Every social group, such as a family, an organisation, a nation or a group characterised by a similar economic or political system has its own culture. For the purposes of this chapter, we will focus on national culture and further discussion will be continued from this perspective. However, it should be stressed that this requires some simplification and the presentation of norms and values that are typical of the average resident of a given country. Generalisations of this kind can lead to stereotypes, which is why it should be strongly emphasised that human behaviour and values are influenced

not only by the national culture but also by cultures of higher and lower levels than the national culture, as well as by a number of different factors, such as personality [Hofstede et al., 2011, p. 22] and context. In some circumstances, certain cultural norms, values and behaviours may take precedence over others [Osland, Bird, 2000]. In every culture, certain contradictory values co-evolve, reinforce and complement each other, shaping the dynamic creation that is culture [Fang, 2012].

The chapter aims to identify the cultural factors influencing cooperation between Poland and Japan. To achieve this, differences between the Polish and the Japanese culture are briefly outlined, drawing on results of selected international studies. Specific features of the Polish and Japanese business cultures are then presented and particular attention is given to business etiquette. It is especially important to understand the differences in attitudes to hierarchy and individualism, which can affect the way decisions are made and communicated within companies. Differences in the perception of risk and long-term orientation are also identified. This may impact management and planning strategies in the context of international cooperation. Moreover, an analysis of business etiquette, covering aspects such as dress code, punctuality and customs associated with giving gifts, provides a better understanding of ways to avoid potential cultural misunderstandings and build effective business relationships between Poland and Japan.

3.1. Japanese and Polish cultures in the light of selected studies

Studies and comparisons of national cultures employ the concept of so-called cultural dimensions, i.e. certain characteristics of a culture that can be measured and allow determining the position of a given culture in relation to other cultures [Hofstede et al., 2011, p. 46]. Hofstede's pioneering research is used particularly often in analyses of business culture, so this research is described below and then used to compare the cultures of Poland and Japan.

The cultural dimensions according to Hofstede (measured by indicators taking values from 0 to 100) [Culture Factor Group, 2024; Hofstede et al., 2011] are as follows:

- Power distance (measured by the Power Distance Index – PDI) – "the extent to which the less powerful members of organisations and institutions accept and expect that power is distributed unequally" [Hofstede et al., 2011, pp. 73–74]. In countries with high power distance, hierarchy prevails, and unequal access to resources is accepted.
- Individualism (measured by the Individualism Index – IDV) – this dimension illustrates the interdependence between the individual and the group. Individualistic

societies have losed ties between people, with individuals taking care of themselves and immediate family members, and defining themselves as "I" not "we," as opposed to collectivist societies. In the latter, the group protects its members in return for loyalty.

- Motivation towards achievement and success (formerly masculinity and femininity; measured by the Motivation Towards Achievement and Success Index – MAS) – a high MAS, characterising societies described as "decisive", indicates that society is "driven by competition, achievement and success, being defined by the winner" [Culture Factor Group, 2024]. A low score, typical of consensus-oriented societies, indicates the importance of values such as concern for others and quality of life. It is a success to achieve this quality, and doing what one enjoys is what matters.
- Uncertainty avoidance (measured by the Uncertainty Avoidance Index – UAI) – uncertainty avoidance is "the degree of threat perceived by members of a culture when faced with new, unfamiliar, or uncertain situations. This feeling is manifested, among other things, by stress and the need for predictability, which can be satisfied by all kinds of laws, regulations and customs" [Hofstede et al., 2011, p. 200]. In other words, cultures with high uncertainty avoidance try to control the future, while those with low UAI let it unfold.
- Long-term orientation (measured by the Long-Term Orientation Index – LTO) – the dimension refers to how societies relate to their past, present and future. Normative societies, characterised by low LTO, attach importance to traditions and norms, while viewing social change with distrust. In societies with high LTO, it is paramount to prepare for what comes in the future, hence the significance of modern education and savings, among other things.
- Indulgence (measured by the Indulgence versus Restraint Index – IVR) – this dimension indicates "the extent to which people try to control their desires and impulses, based on the way they were raised" [Culture Factor Group, 2024]. In indulgent societies, it is allowed to satisfy basic human natural desires relatively freely, to have fun and enjoy life. In contrast, in restrained societies, characterised by low IVR, it is believed that needs should be suppressed and their satisfaction is regulated by social norms.

Table 3.1 shows the main characteristics of Japanese and Polish cultures described according to Hofstede's cultural dimensions.

Table 3.1. Dimensions of Japanese and Polish cultures according to Hofstede

Dimension	Japan	Poland
Power distance	PDI = 54	PDI = 68
	The PDI in Japan is slightly above average. The Japanese are conscious of their hierarchical position and act accordingly; however, their culture is not as hierarchical as in most of other Asian countries. In Japanese business culture, decisions are accepted at multiple levels of the hierarchy, which in effect means that they are made collectively. Modern Japan is characterised by meritocracy, hence the widespread belief that everyone is born equal and everyone can get promoted as long as they are patient and work hard	Poland is a hierarchical society. People here accept an order in which everyone has a place. Hierarchy in an organisation is seen as reflecting innate inequalities. Centralisation is often encountered. Subordinates expect to receive precise instructions on what to do. The ideal boss is a kind autocrat. In this context, effective management relies on leadership skills that take into account both the authoritarian aspect and the understanding of employees' needs, along with the building of trust in the relationship between managers and the team
Individualism	IND = 62	IND = 47
	Interestingly, Japan shows some characteristics of an individualistic society. The social function of the family is not as important here as it is in China or Korea, nevertheless family relations have given rise to a specific order between individuals in the company, school and society in general. It is also noteworthy that, despite the characteristics of an individualistic society, the overriding value here is to ensure that the group functions without conflict. This manifests itself in following defined behavioural norms and in a low tolerance for deviations from them. Japanese employees, for example, are expected to be loyal to the companies they work for. The country has always had a paternalistic system, with the family name and assets being inherited by the eldest son, and younger siblings having to leave home and look after their families themselves. Compared to other Asians, the Japanese value privacy and restraint more	Poles do not have strong collectivist or individualistic preferences. There are many factors influencing this moderation. The history of Poland is an important factor: Poland was often exposed to the influence of different cultures and nations. This has contributed to the development of a society with a complex identity that values both individual freedom and community. Catholicism is another factor: it plays a vital role in Poland's social and cultural life and promotes values such as solidarity, cooperation and concern for the common good, which can influence collectivist tendencies. On the other hand, the social and economic transformation that took place after the fall of communism contributed to the rise of individualism in Poland. This process brought about greater autonomy for individuals, greater freedom of choice of profession or lifestyle, which fostered and continues to foster the growth of individualistic social attitudes
Motivation towards achievement and success	MAS = 95	MAS = 64
	Japan is one of the most achievement- and success-oriented societies. This is particularly true for young people and their choices regarding higher education and, consequently, a correspondingly	Polish culture supports motivation towards achievement and success. People live in order to work*. Managers are expected to be decisive and assertive.

Dimension	Japan	Poland
Motivation towards achievement and success	prestigious employer. Strong assertiveness and individual competition typical of decisive societies are not observed in working life, which involves belonging to a specific group. Instead, severe intergroup competition is prominent. There is also constant striving for perfection in every aspect of life, including in production of tangible and intangible products. The Japanese work culture and the group perception of this culture are linked to the phenomenon of workaholism, which is commonplace. It is still hard for women to pursue a career in Japanese companies, where, among other things, long working hours are cultivated	Values such as fairness, competitiveness and efficiency are strongly emphasised in the business environment, and conflicts are seen as obstacles to be overcome on the way to achieving organisational goals
Uncertainty avoidance	UAO = 92	UAO = 93
	The very high uncertainty/risk avoidance rate is often explained by the fact that Japan is constantly threatened by natural disasters, such as earthquakes, tsunamis, typhoons and volcanic eruptions. Under these circumstances, Japanese have learnt to prepare for uncertain situations. Predictability counts in all aspects of life, which translates into a commitment to social norms, routine and etiquette, as well as reluctance to do things without precedence. Companies attach great importance to developing feasibility studies and identifying risk factors before starting any project. Decisions are preceded by a detailed analysis of facts and figures	Poland has one of the highest uncertainty avoidance rates in the world. This translates into rigid codes of belief and behaviour, as well as intolerance of unorthodox behaviour and ideas. There is a strong emotional need for rules (even if they do not work). People have an inner drive to work hard and keep busy; innovation is implemented reluctantly and security is an important element of individual motivation
Long-term orientation	LTO = 100	LTO = 49
	Japanese culture is one of the most long-term oriented cultures in the world. Japanese see their life as a very short moment in the history of mankind. So, they recognise that all they can do is do their best. In companies, long-term orientation manifests itself in high investment in research and development, larger own capital rate in business, and priority given to market share growth rather than to a quarterly profit. Traditionally, the goal of Japanese companies is not so much to bring in a quarterly profit for shareholders, but to provide employment and prosperity for employees, which translates into the functioning of society at large	Polish culture positions itself in the middle of the long-term orientation scale compared to other countries, meaning that Poles achieve a balance between short-term and long-term perspectives in their approach to life and work. One of the reasons may be Poland's rich history. In the past, the country experienced both periods of long-term stability and periods of short-term change and conflict, which may have had an impact on a flexible approach to time and future planning

cont. Table 3.1

Dimension	Japan	Poland
Indulgence	IVR = 42	IVR = 29
	In a society with a low rate of indulgence, such as Japan, people often tend to be pessimistic and reserved in expressing their desires or emotions. They put less emphasis on leisure and relaxation and instead focus on work and obligations, driven by a strong sense of responsibility	The rate of indulgence in Poland is low, which translates into a very high importance of norms and rules, and a lack of permission to indulge oneself. Polish society often puts great emphasis on work, perseverance and achievement, which can lead to leisure time being minimised or considered less important compared to work or family responsibilities

* There is a marked change in attitude to work among younger generations, for whom, unlike older generations, it is more important for work to allow them to pursue their passions and interests, and to maintain a work-life balance [Gadomska-Lila, 2015; Smolbik-Jęczmień, Żarczyńska-Dobiesz, 2017].

Source: own study based on: Britannica [2024]; Culture Factor Group [2024]; GLC [2023]; Mikuła [2010].

As presented in Table 3.1, the biggest difference between Poland and Japan concerns long-term orientation, which can result in significantly diverse attitudes towards propensity for long-term investments and deferring profits over time, as well as the objectives of the business activity. A relatively significant difference is also found in motivation towards achievement and success. Although it is important in both cultures, in the case of Japan the pursuit of excellence in every dimension has much more weight than in Poland. Although for the other Hofstede's dimensions the differences are not so severe, and in the case of uncertainty avoidance the index levels in Poland and in Japan are very similar, it should be noted that each cultural dimension has a slightly different background in these two countries and may manifest itself in slightly different ways.

Let us also note Hall's concept [Hall, Gozdziak, 2001] of context communication, i.e. "the circumstances of communication" [Zięba, 2008, p. 252]. Japanese culture is characterised by very high context, which is reflected in many aspects of business in this country [Meyer, 2014]. In low-context cultures, the most important in communication is spoken or written word. Value is attributed to concise, unambiguous, straightforward and to-the-point statements. This is different from high-context communication, during which being blunt is avoided, especially when conveying negative information. To properly understand a statement, the recipient of the message must use the context in which it was said [Danik, 2017, pp. 74–75]. In the case of high-context cultures, the message is less explicit and the receiver is responsible for interpreting it through the lens of social norms [Meyer, 2014]. Japanese culture is considered high-context [Noma, 2009]. Similar characteristics of Polish culture are indicated by studies comparing communication in Poland and the UK [Zięba, Borowiak-Dostatnia, 2012]; however,

Meyer's research suggests that Polish culture is much lower-context than Japanese culture [Meyer, 2014, p. 41]. Partners on both sides should attach great importance to the context of communication, while bearing in mind that the interpretation of the context is also culturally determined.

3.2. Selected characteristics of Japanese and Polish cultures

Japan arouses great interest among Poles, and the perception of Japan in Poland is overwhelmingly positive. This includes popularisation of Japanese martial arts: karate, judo, aikido, as well as Akira Kurosawa's films, Japanese cars or cuisine. Indeed, Japan is the world's third largest economy, an industry leader, particularly in the automotive sector, and stands out from other countries in terms of education level and work ethic. At the same time, Japan is, after Monaco, the oldest society among developed countries, with 30% of the population being in the age group of 65 and older [World Bank, 2024]. The phenomenon of population aging (Japanese: *koreika*) is accompanied by low birth rate (*shoshika*), which, combined with a relatively low proportion of immigrants in the general population, is changing the nature of the economy, determined by evolving social needs. We can observe shrinking domestic demand, lower savings levels, and rising healthcare and pension costs. These factors underlie the profound changes that are taking place in the Japanese society [Stewart, 2023].

On the other hand, studying the image of Poland in Japan, especially in a cultural context, allows us to look at the country from a different perspective and it opens up the possibility of better understanding the differences and similarities between the two cultures in the globalisation era.

The works of Polish literature known in Japan include books by Henryk Sienkiewicz, Stanisław Lem, Czesław Miłosz, Wisława Szymborska and Witold Gombrowicz, although the latter author is better known in academic circles [Zajączkowski, 2018].

It is impossible not to mention Polish music, including, of course, the works of Fryderyk Chopin, which were heavily popularised in Japan during the Meiji era (1868–1912). The music of the Polish composer is present in festivals, public concert programmes, phonography and in the music education of Japanese youth. Young pianists from Japan have been successful for years at the International Chopin Piano Competition, one of the most prestigious competitions in the world, which takes place every 5 years in Warsaw [Narodowy Instytut im. Fryderyka Chopina, 2024]. Japan is the only country in the world where the magazine "Chopin" is published; the magazine is dedicated to the life and works of this outstanding Polish composer [Niekrasz, 2010].

The work of another prominent Polish composer, Krzysztof Penderecki, who is more widely known in Japan as the author of the *Threnody to the Victims of Hiroshima*, a composition created in 1960 and commemorating the tragic events of 6 August 1945, is also well known in musicological circles [Historia Poszukaj, 2024].

Finally, it is worth emphasising that "this Japanese Poland is necessarily different from Polish Poland," suggesting that the cultural canon of Poland as it is known to Poles is different from how it is perceived by the Japanese society [Sekiguchi, 2012, cited after: Zajączkowski, 2018].

3.2.1. Importance of nature and its perception in Japan and Poland

Japan is an island country comprising some 6800 islands, with largest being Honshu, Hokkaido, Kyushu and Shikoku. Japan's surface area is similar to that of Poland, but Japan's landscape is dominated by mountains, with Mount Fuji as the highest peak. The main cities are Tokyo (the capital with a population of 35 million), followed by Osaka, Kyoto, Nagoya and Sapporo. Nature and its transient seasons, suggesting the transience and elusiveness of beauty, are key elements of art, theatre, painting and Japanese poetry (Japanese: *haiku*). The colours of nature inspire traditional costumes (kimono) and contemporary clothing. Motifs that are particularly present in the culture include the cherry tree (*sakura*) and plum tree (*ume*), the camellia flower (*tsubaki*) and the chrysanthemum (*kiku*) – the flower of the imperial family. Due to the country's limited natural resources, Japan is successively developing technologies for energy efficiency, and is also a world leader in hydrogen technology, which brings the hope of complete decarbonisation of the industry [Dzienis, 2022].

Interestingly, bonsai, ikebana or Japanese gardens, with their beauty, point to another characteristic of the Japanese, namely a strong need to control nature in their surroundings, which may be due to the numerous natural disasters that have always accompanied Japan (e.g. floods, earthquakes) [Kerr, 2001]. Buddhist temples or Shinto shrines are often fenced parks with the architecture of the buildings and landscaping thought out to the smallest detail. They are often separated from the rest of the city by fences to further mark the boundary between sacred and profane [Pawłowska, 2010].

Poland is predominantly lowland, with the southern part of the country dominated by mountains, including the Carpathian Mountains and the Sudetes Mountains, while the northern part of Poland has areas of the Masurian Lakes and the Baltic coast. Poland's landscape is therefore quite diverse and picturesque, ranging from extensive forests and lakes, through flat lowland areas, to mountain ranges. An important element of the Polish landscape, but also of culture and beliefs, are forests and trees that can be found in these forests, such as oaks, ashes, pines, spruces and birches. Since the time

of ancient cultures, the oak has been considered a sacred tree, so much so that in rural areas of ancient Poland, it was believed that oak leaves applied to the forehead of a dead man could resurrect him. The linden tree, on the other hand, planted on the borders of villages or near churches and cemeteries, was supposed to ward off demons. It was also believed that linden trees could not be struck by lightning. And, to prevent witches from harming fishermen, maple branches used to be laid at the bottom of cutters and boats [Kujawska, Łuczaj, Sosnowska, Klepacki, 2016]. In Poland, a bee is an animal considered to be particularly laborious and noble. In many cultures, including Polish culture, it was considered a sin to kill a bee [Eichstaedt, 2018]. The peasants of old times also held the stork and swallow in special reverence, forbidding the killing and eating of these birds. To date, there is a belief in Poland that a house with a stork's nest is protected from evil spirits, while a swallow's nest brings good luck and protects against fire [Eichstaedt, 2018].

3.2.2. Society in Japan and Poland

Japanese society is characterised by a paternalistic view of leadership. Meyer [2014, p. 131] describes it as a "father knows best" society and the patriarch, situated at the top, is rarely questioned. At the same time, informal networks are of great importance in Japan. This is because consensus is more important in this country than legal codes. Confucian teachings emphasise interpersonal relationships, particularly loyalty and trust [Okimoto, 1989, p. 156]. Consensus is an operational norm in policy making, and continuous informal negotiation between stakeholders is a standard for conflict resolution [Okimoto, 1989, p. 32]. According to Meyer [2014], the strongly consensual nature of the Japanese society is an exception among hierarchical societies. The author points out that both traits are firmly rooted in Japanese culture, and are reflected in a way of decision making called *ringi*, in which lower-level managers discuss new solutions and reach consensus before presenting the idea to senior managers. The whole process starts with informal conversations, personal discussions and consolidation of support, and is called *nemawashi* [Meyer, 2014, p. 155]. This way of working out a decision distributes responsibility for it over the whole group.

Polish society, like any contemporary society belonging to European civilisation, is characterised by diversity and pluralism of consciousness, but many researchers are of the opinion that it is a "peasant society," as it is this section of society that dominated it for centuries and left its deep mark. Typical traits that are still strongly present in the Polish society include attachment to family and tradition, the ability to cope with difficult situations, saving and care for the household, willingness to work, a high moral value of work, humility towards nature and historical hardship,

aversion to risk and a certain distrust of strangers, solidarity towards the immediate group and an awareness of the uncertainty of the future [Wasilewski, 2011]. It is also important to bear in mind that there are significant differences between the regions of Poland. For example, the importance of family is much greater in the south-eastern region of Poland, i.e. former Galicia. A very traditional family pattern is emphasised there and family ties are strongly cultivated. Family support for both younger and older generations is evident. People of this region are strongly attached to the Church; religion is strongly practised and religious holidays are an integral part of family life [Bartkowski, 2010].

3.2.3. Religion and its significance in Japan and Poland

The main religions with which most Japanese identify are Buddhism (in several varieties) and Shinto. While Buddhism developed in Japan under the influence of China, Shintoism is Japan's indigenous belief system and the *shinto* literally means "way of the gods." Shintoism is deeply rooted in Japanese culture and tradition, and practised mainly in Japan. The coexistence of the two religions has resulted in the formation of a specifically Japanese religiosity [Pieścik, 2020]. It is generally said that joyful celebrations and events are held in Shinto rites and those sad and serious are more associated with the Buddhist rituals. Although it is less often mentioned, the value systems and hierarchies present in various aspects of everyday life derive in large part from Confucianism. Ancestor worship is strong. The most important holidays are the New Year celebrations (Oshogatsu) and the August festival of the dead – Obon, and no less important is the long May weekend – Golden Week. The Japanese visit their family homes *en masse* at this time, and the intensity of internal migration can be compared to that seen in Poland during Christmas, May Days (*majówka*) or All Saints' Day.

In Poland, Catholicism is the dominant religion, and the Catholic Church is for many believers one of the important, if not the most important, opinion-forming institutions in the country [Pietrzak, Mikołajczak, 2010]. According to an Ipsos survey [2023], conducted on representative samples of adults in 26 countries around the world, as many as 75% of adult Poles declared themselves to be Christians, while only 19% of the population describe themselves as atheists. In the same survey, only 40% of Japanese claim to be religious, while 46% declare themselves to be non-believers. Nearly 40% of Polish adults attend church or other religious gatherings on a regular basis, compared to only 5% in Japan. Belief in a god or other supernatural force helps to overcome a crisis for 76% of Polish respondents, while in Japan the declaration rate was 37%, the lowest of the entire sample of 26 countries surveyed.

In both Poland and Japan, respondents declared a high degree of tolerance for people of other faiths (80% in Poland and 59% in Japan). Religion is a very important element in reinforcing morality in Poland, as declared by 48% of respondents, while in Japan the percentage was only 25% of the total number of those surveyed. In contrast, more than half of the Japanese respondents (52%) believe that religion does more evil than good in the world. In Poland, the percentage was 44%. According to 10% of Japanese and 15% of Polish respondents, religiosity influences the respect that a person receives, while, for example, as many as 73% of Indian respondents link a person's religiosity to the respect given to that person [Ipsos, 2023].

3.2.4. Role of education in the lives of people in Japan and Poland

Education is an important element in the life of every Japanese person. Educational choices determine childhood, youth and translate into the employment form. Traditionally, the key motivation is to shape an individual so that they get into the best possible university in the country and then find a job "for life" in a large Japanese company – this is evidence of unquestionable success [Dzienis, 2023]. Even in early childhood, Japanese students are taught to function according to desirable social norms, starting with uniforms, frequent weekend club and sports activities or cleaning the school together. In accordance with the philosophy of Confucius, the education system acts as the main mechanism for elite selection and social mobility [Okimoto, 1989, p. 156]. The educational pathway to the end of secondary school is ultimately subordinated to examinations and culminates in university admissions. The pressure of examinations has even lived up to the term *shiken jigoku* (literally: "examination hell").

In Poland, too, education is seen as a means to raise social status and as a tool for personal and cultural development. Some professions, such as a physician or lawyer, require a long and demanding education process, and contribute to the prestige of those who practise them. The education system in Poland has been reformed in recent years with the abolition of lower-secondary schools (Polish: *gimnazjum*) and a return to an 8-year primary school. After this, students choose post-primary schools, that is general secondary schools (*liceum*) (4 years), technical secondary schools (*technikum*) (5 years) or sectoral vocational schools (*szkoła branżowa*) (3 years). The changes were intended to simplify the structure of education and better prepare students for their future careers. However, the education system in Poland faces numerous challenges, such as the availability of quality education for all social groups or the adaptation of curricula to the changing needs of the labour market [Eurydice, 2024].

3.2.5. Labour market conditions in Japan and Poland

In Japan, the predominant form of work is career-long employment (Japanese: *shushin koyo*) with one company. This results in an organisational hierarchy based on seniority (*nenko sei*) and in less employee mobility. It also contributes to the competition between companies for graduates, especially as the annual recruitment process traditionally takes place simultaneously across the country. New employees, usually with a bachelor's degree, start work in April. The company trains them according to the nature of its business. Lifelong employment with one company and an employee's skills compatible with that particular company intensify the problems of worker mobility. It is difficult not to agree with Schaede [2020, p. 15] that the company (*kaisha*) still acts as a social actor, shapes the identity of its employees and strengthens the community.

Higher education is often regarded in Poland as the only path to success, although in many cases a master's degree does not guarantee employment. This is due to the increasing mismatch between higher education and the changing needs of the labour market and results in the phenomenon of over-education, combining with underemployment [Messyasz, 2021]. On the other hand, there is apparent pressure to acquire higher education and new qualifications, and non-university graduates are pushed out of the labour market. However, Generation Z, i.e. those born between 1997 and 2012, seem to be adapting to this new situation, at least according to their declarations. Job stability, understood as fixed working hours and a contract of employment, is no longer a priority for them, while more flexible forms of employment or even self-employment provide a sense of freedom and independence, representing a value in itself [Defratyka, Morawski, 2019].

3.2.6. Working hours in Japan and Poland

According to the Japanese Labour Standards Act, a full-time employee can only work a total of eight hours per day and 40 hours per week. Companies usually work from 9 am to 6 pm with a one-hour lunch break between 12 pm and 1 pm. Despite work style reforms, the phenomenon of overtime is still widespread. On average, the fewest overtime hours were recorded in assistant-type positions. Occupations with the highest incidence of overtime were online publishers and producers, as well as business consultants (in both cases, the overtime hours averaged 37.1 per month) [Nippon, 2023]. It is also common to participate in informal meetings outside of work and in other activities that significantly reduce the employee's private time.

In Poland, working time is regulated by Article 129(1) of the Labour Code, which states that working time is eight hours per day in an average five-day working week

and 40 hours per week. The issue of overtime, its amount and compensation is also regulated by law. The introduction of a four-day working week has been debated in Poland for a few years. However, there are concerns that such changes may lead to a greater emphasis on increasing the productivity of employees, resulting in undue pressure on labour efficiency. On the other hand, this may contribute to the competitiveness of employers offering reduced working hours [Lewandowska, Dzienis, Kowalski, Majcherek, Poznańska, 2024].

3.2.7. Importance of language and communication in Japan and Poland

Although the Japanese language belongs to a completely different family compared to Chinese (grammatically it is closer to Korean, Mongolian or Turkish), the writing system of the Japanese language is based on Chinese characters (Japanese: *kanji*) and native phonetic notation (*hiragana* and *katakana*). In certain situations, the Latin alphabet notation (*romaji*) is used. Modern Japanese has many words borrowed from English but adapted to Japanese syllabic notation and pronunciation. Interestingly, they are sometimes abbreviated in a typically Japanese way or used to convey a meaning surprisingly different from the original (e.g. *seku-hara* is an equivalent of English *sexual harassment*, while *kanningu* is derived from English *cunning*, but means cheating during an exam). Neutral and polite forms with different levels of honorifics are typical of the Japanese language.

The choice of appropriate words in communication is determined, among other things, by the gender, or social or organisational hierarchy of the interlocutors. It is worth noting that Japan is considered to be the highest cultural-context culture in the world [Meyer, 2014, p. 40]. Meyer [2014] points out that successful communication in Japanese culture is distinguished by its subtlety, multilayeredness, and abundance of subtext. In the Japanese business language, there is even an adjective *KY* (Japanese: *kuki o yomenai*, literally: unable to read the air) to describe a lack of situational awareness [Schaede, 2020, p. 30] and associated communication awkwardness, which can reflect on conducting business in Japan.

If we were to identify Japanese culture with the broader culture of the East, and Polish culture with that of the West, the importance of non-verbal communication should be mentioned. In Japan, especially in formal meetings, important elements include body discipline, economy of movement, and visible focus on listening to the interlocutor. That is the function of, for example, the characteristic Japanese nodding (Japanese: *aizuchi*). Eye contact is often kept brief and selective to avoid appearing presumptuous or rude. In addition, overly expressive facial gestures can also be perceived as inappropriate, so people try to exercise restraint in their emotional responses. In

Western culture, on the other hand, making eye contact with an interlocutor is widely accepted and considered natural, showing respect and engagement in a conversation. This is perceived as a way of building rapport and expressing interest in the other person [Leathers, 2007].

3.2.8. Social norms in business in Japan and Poland

Schaede [2020, pp. 31–32] states that there are three main categories shaping Japanese business reality, i.e. interpersonal interactions, public image and behaviour, and individual choices. The first category includes being courteous and caring towards others, enabling an individual to keep their reputation and avoid embarrassment. Japanese courtesy and care are expressed in the word *omotenashi*, which carries the meaning of responding to the needs of guests/others before these needs are communicated. The second category is about being obedient and modest, respecting status, hierarchy and age. These norms are linked to the cultural distinction between true intention (Japanese: *honne*) and public position (*tatemae*), with the overriding aim of keeping one's reputation and avoiding embarrassment. Even in a win-lose situation, one should behave as if it were a win-win situation. Regard for people's personal space is displayed. This refers not only to physical distance, but also to noisiness (*urusai*), both literal, such as talking on the phone in front of others, or expressed by flashy clothing, colours. The third category covers choices of an individual and the consequences/distortions these choices bring. Causing any inconvenience (*meiwaku*) with one's actions is perceived negatively. As Schaede [2020, pp. 36, 39] points out, "tight" behavioural norms in Japan are a necessary mechanism in times of crisis, e.g. earthquakes, and lead to the maintenance of shared preferences, i.e. primarily safety and risk avoidance, but also confrontation.

An important characteristic of Polish society as such and of its business activity is the low level of trust in people outside the circle of immediate family, acquaintances and friends. In 2018, only 34.3% of Poles said they trusted strangers. The level of trust in courts was 46.6%, the government – 34.1%, and banks – 57.8% [Statistics Poland, 2020]. Low levels of trust translate into attaching high importance to written contracts.

3.2.9. Position of women in business in Japan and Poland

In the traditional model of the Japanese family, the man was the breadwinner and was therefore away from home all day. Meanwhile, the woman would take care of home, supervise the children's education, dispose of the family's income, and contribute to the local community. However, the country's economic downturn and increasing financial

difficulties disturbed the model in which the majority identified with the middle class (by the end of the 1980s, nearly 90% of the population) [Okimoto, 1989, p. 180]. A rising cost of living with stagnant wages is also causing women raising children to take up work. The main obstacles to building such a career are the lack of time flexibility on the part of employers and the lack of required seniority on the part of female candidates. As a result, despite often having the right education and qualifications, women work casually in roles below their capabilities. In an era of chronic labour shortages, this is a pool of untapped talent that is hindered precisely by the traditional employment system and the division of the labour market into privileged full-time workers on the one hand, and all other forms of employment on the other [Dzienis, 2021, 2023]. In the Global Gender Gap Index of 2023, Japan ranked 125th (Poland 60th) out of 146 countries surveyed, nine places lower than the previous year. Among the four subindices, two, "Economic participation and opportunity" and "Political empowerment" for women, scored particularly low [Global Gender Gap Report, 2023].

Conversely, the results of the *Women in Business 2020*, a study on the number of women in managerial positions, show that Poland is among the top countries surveyed. In Polish companies, women account for 38% of senior management. Such a result places Poland among the top countries in Europe and the world, after South Africa (43%) and the Philippines (40%) [GrantThornton, 2020]. Japan has the lowest place on this list, with a score of 12%, far from the government's target of 30% [McKinsey, 2021]. Companies that do not employ a single woman in top positions account for only 9% in Poland (the European Union average is 16%). Japan tops the list, with a percentage of companies not employing a single female executive at 52%, significantly higher than the other 31 countries surveyed.

However, such a high proportion of women in leadership positions has visible consequences for women's fulfilment of the role of mother. The so-called motherhood penalty refers to the negative consequences of motherhood borne by women combining their family and professional roles. Among Polish female managers participating in the FAMWELL survey who have children or plan to have children, the majority (61%) admitted that they had postponed or were still postponing the decision to have children due to their careers [Moczydłowska, 2023].

3.2.10. Traditional food in Japan and Poland

Traditional Japanese food, *washoku*, consists primarily of white rice (Japanese: *gohan*), miso soup (fermented soybean paste) and side dishes (*okazu*) selected seasonally. Popular dishes include ramen, udon, soba (buckwheat) noodles and deep-fried vegetables and seafood in batter (*tempura*). Consumption of eggs and meat, mainly

poultry (interestingly without turkey) and pork, is high in Japan. Japan is famous for its luxury beef – *wagyu*. Meals are accompanied by beer or sake. Asian or American cuisine is generally available; it is somewhat more difficult, outside of Tokyo and major cities, to eat truly European dishes. Although mild flavours predominate, the Japanese have a taste for pickles (*tsukemono*). Almost every dish is seasoned with soy sauce (*shoyu*). Traditional Japanese sweets include red bean paste (*yokan*), mochi (cooked rice cake) or dorayaki (two pieces of pancake-like dough layered with bean paste). Japan is famous for its strawberries, peaches, grapes, melons, watermelons, etc., which are excellent in taste, colour and proportion, and sometimes hit over-the-top prices.

The flavours of Polish cuisine tend to be sour, salty, pungent but not spicy [Makala, 2015]. Classic Polish cuisine is characterised by an abundance of meat, potatoes, groats, cabbage and bread. Popular dishes include *bigos* (stewed sauerkraut and raw cabbage with meat, mushrooms and prunes), pork chop (a piece of pork loin coated in a batter and fried in fat), *pierogi* (dumplings filled with meat, cabbage with mushrooms, cottage cheese, sweet and salty), *gołąbki* (stuffed cabbage rolls: minced meat mixed with groats or rice wrapped in cabbage leaves and stewed in tomato sauce) and, of course, sausages. Soups are an important part of Polish cuisine, and the classics include broth, *żurek*, white and red borscht, cabbage soup and *krupnik* [Łebkowski, 2003].

One of the traditions which is still strongly cultivated in Poland is the Christmas Eve supper, celebrated on Christmas Eve on the 24th December. According to custom, Christmas Eve supper can only be sat down to when the first star appears in the sky, a reference to the Star of Bethlehem heralding the birth of Jesus [Ministerstwo Kultury i Dziedzictwa Narodowego, 2024]. Before the start of the Christmas Eve supper, a prayer is usually said and revellers break a wafer (oblatum, a kind of thin bread baked from flour and water), a symbol of friendship, family love, reconciliation and forgiveness [Dla Katolika, 2018]. There is usually one more table setting on the Christmas Eve table, symbolically intended for an unexpected guest and for the souls of deceased ancestors. As for the menu, a traditional Christmas Eve supper in Poland is meatless, in accordance with the rules of fasting. Christmas Eve dishes include red borscht with mushroom *uszka* (small and twisted dumplings), cabbage and mushroom dumplings, cabbage with peas, fish (traditionally carp), fried and in jelly, marinated herring and herring in cream, poppy seed dumplings, dried fruit compote [Ministerstwo Kultury i Dziedzictwa Narodowego, 2024]. One of the traditional dishes of the Christmas Eve supper, with origins in eastern Poland, is *kutia* (from the Greek word *kókkos*, meaning grain), a dish prepared from boiled wheat grains, honey, poppy seeds and nuts [Państwowe Muzeum Etnograficzne w Warszawie, 2024]. Traditional cakes, such as poppy seed cake, gingerbread and cheesecake, are served at the end of the evening. After the meal, it is customary for the whole family to go to church to attend Midnight

Mass, a service commemorating the waiting and prayer of the shepherds heading for Bethlehem, the birthplace of Christ. This celebration begins at midnight. In more distant times, the leftovers from the Christmas Eve supper were left untouched until the following day, Christmas Day, so that the spirits of ancestors could also consume the festive food.

3.2.11. Beauty ideal in Japan and Poland

The ideal of feminine beauty is, above all, a proportionate and slender figure, clear and flawless skin, and well-groomed hair. In the pursuit of the ideal, not only women but also men avail themselves of an abundant range of cosmetics, often series produced exclusively for the Japanese market, and even from various types of treatments or plastic surgery. The social pressure in this regard is considerable and the dominant ideal of beauty can easily be seen on city streets. During spring and summer, Japanese women pay a lot of attention to protecting their skin from the sun. They use high-quality cosmetics with sunscreen, skin-whitening cosmetics, but also headgear, umbrellas, long gloves or sunglasses, which the shops are filled with during the season. The look is often complemented by carefully selected luxury accessories from these categories.

In European countries, including Poland, beauty canons differ, but it can be seen in media coverage that femininity is still identified with physical attributes: beauty, sensuality and youth, which creates the need to constantly improve the body. Recently, however, the body positive movement has become popular on social media, particularly on Instagram, proclaiming the value of accepting and loving one's body as it is rather than trying to achieve unrealistic beauty standards [Woźniak, 2021]. In the public space, advertising campaigns began to appear where protagonists are "ordinary people," with imperfect looks and of very different ages. The idea of body positivity implies that if a person comes to terms with the appearance of their body, they will cease to feel social pressure and restore balance to their life [Rosicka, 2021].

3.2.12. Leisure activities in Japan and Poland

Japanese people spend their free time travelling around the country, going out together to restaurants or bars (Japanese: *izakaya*), indulging in sports or hobbies. Basically, every Japanese person has a hobby (*shumi*), which is almost a mandatory point in any self-presentation and a standard question when getting to know a new person more closely. Among the popular ones are karaoke, pachinko, TV and computer games. The Japanese enjoy traditional hot springs and spas (*onsen*).

In Poland, on the other hand, as many as 74% of respondents to the Payback Opinion survey, conducted on a representative sample of Poles reflecting the country's demographic structure, declared that they spent their leisure time most often at home. Favourite pastimes include watching films and series (54% of respondents), browsing the internet (47% of respondents), and reading (30% of respondents). Of the group surveyed, 17% cook in their spare time, 16% of respondents take care of their children and only 8% play sports [Payback, 2021].

3.2.13. Elements of business etiquette in Japan and Poland

In Poland, as in Japan, there is a strong emphasis on etiquette and appropriate behaviour in a business context. Although Polish business culture may be somewhat less formal, adherence to established social norms and respect for business partners are key to building successful business relationships.

In Japan, maintaining etiquette and observing business rituals are vital to the success of business relationships. It is particularly important to respect the hierarchy and carefully follow the rules of protocol during business meetings; this facilitates the building of trust and respect among business partners. Table 3.2 shows the most important elements of business etiquette specific to Japan and Poland.

Table 3.2. Elements of business etiquette in Japan and Poland

Business etiquette element	Japan	Poland
Business attire	Formal, conservative – a grey, navy or black suit or a women's suit, a shirt and a tie neutral, unobtrusive	Formal, rather conservative – a suit, a women's suit or a dress in a dark colour. In some companies, less formal attire is allowed on Fridays
Punctuality	Being late is very rude. It is a sign of respect to arrive 10 minutes earlier for a meeting	Being late for an official meeting is rude. For private meetings, a minor delay (a few minutes or so) is acceptable
Gifts	Giving gifts to business partners is popular in Japan. The presentation of both personal gifts (e.g. products of valued Polish brands, a pen, etc.) and a gift for the entire department (e.g. confectionery from Poland) is welcome. Gifts are given and received with both hands. It is appropriate to refuse a gift several times and then only open it in private. Once a person has received a gift, they should return the favour at the earliest opportunity. Packaging should be in pastel colours (white and red should be avoided)	Presenting a gift to a foreign business partner is welcome. The gift must not be of high value (suspicion of corruption). Appropriate gifts include a gadget with the company logo, confectionery or other products typical of the country. The gift should be opened in the presence of the giver and joy should be expressed upon receiving it

Business etiquette element	Japan	Poland
Greeting	The Japanese most often greet each other with a bow. A deep bow is a sign of respect. A nod of the head is used in informal situations. A handshake as a form of greeting is not popular, but when dealing with foreigners, an exception is often made	The most common greeting is a brief handshake. The man should wait for the woman to reach out to him. Women who know each other a little better often greet each other with a kiss on the cheek (there is no rule about the number of kisses)
Names	Both in documents and when introducing oneself, the surname is mentioned first and then the first name. A business partner should be addressed by a surname with the addition of "san" (e.g. Tanaka-san). A business partner should not be addressed by their name until they suggest it	Both in documents and when introducing oneself, the first name is mentioned first, then the surname. In formal situations, a business partner should be addressed using the phrase "Dear Sir" or "Dear Madam." In the case of persons high up in the hierarchy, a title or position is added (e.g. Dear Professor/Director). In the case of people one knows better and who do not stand higher in the hierarchy, one can use the phrase "Ms/Mr + name" (e.g. Ms Anna). A business partner should not be addressed by their name until they suggest it
Business cards	The exchange of business cards (Japanese: *meishi*) is an important part of business protocol in Japan. Business cards are given and accepted with both hands. The presentation of business cards is accompanied by a slight bow. Once a person has received a business card, they should familiarise themselves with its contents. A partner's business cards should be treated with respect (one should not write on them or bend them). Business cards should be put in a business card holder after the meeting (not in a pocket or wallet)	The presentation of business cards is usually informal, with little importance attached to them. The exchange of business cards is being replaced by an invitation to LinkedIn
Removing one's shoes during the visit	When visiting a house, a traditional restaurant or a temple, shoes should be removed. However, going barefoot is not acceptable (socks should be worn)	In formal situations, shoes should not be removed. Poles often walk in slippers or barefoot in their house, but requiring a guest to take off their shoes is a blunder
Seating of guests	It is rude to take a seat before being shown to one's seat by the host. Guests are usually seated far from the door	The most honoured places at the table are to the right of the host/hostess

cont. Table 3.2

Business etiquette element	Japan	Poland
Table manners	It is rude to refuse refreshments. If one does not want an extra or a refill, some food should be left on the plate and some drink should be left in the glass. It is rude to take one's place at the table before all the guests have arrived. Food should not be stabbed with chopsticks. Bad manners: waving chopsticks over food, handing food to someone with chopsticks, pointing at someone with chopsticks, leaving chopsticks stuck in the food, waving hands that hold chopsticks. If sauces are shared with companions at the table, one should not dip a piece of food that has already been bitten into	One should wait until everyone has received a dish before starting to eat. Loud eating, including slurping, is rude. It is rude to blow on a dish to make it cool faster. One should not put food on their plate with one's own cutlery. Elbows should be kept away from the table. Before the meal, a napkin should be spread on the lap. If one would like a dish that is put far away, they should ask a neighbour to pass it over (not stand up or reach far to get it)
Relationships at work	Drinking tea together (Japanese: *chanoyu*) can often be practised as a way to build relationships between employees. This is a time for informal conversation and relaxation. Offering holiday gifts is common in Japanese companies. Employees may receive gifts from their supervisors or colleagues. Many companies also organise special parties or Christmas lunches for employees, where they can exchange wishes and celebrate together	Coffee or tea breaks are also a common practice, but can be more informal in nature. This is a time to talk about topics not directly related to work. Some Polish companies also have a tradition of employees giving each other gifts on the occasion of Christmas, although this is not as common as in Japan. It may be more popular to wish each other Christmas greetings verbally or via the ever-popular Christmas cards

Source: Asialink Business [2019]; Interac [2024]; Japan-Guide [2024]; Japan Living Guide [2023a, 2023b]; Okomato [2024a, 2024b]; Passport to Trade 2.0 [2024]; Plaza Homes [2022].

Summary and conclusions

Culture is a complex set of values, traditions and norms that shape societies and influence their perception of the world. A comparison of the Japanese and Polish cultures can reveal both differences and similarities that stem from the unique histories, geographies and values of the two nations.

The following are the main conclusions and recommendations arising from the analysis:

- **Key cultural differences between Poland and Japan.** Poland (or rather its society) is characterised by a higher power distance and less individualism than Japan, while the latter country is more long-term oriented and more focused on succeeding.
- **Communication context.** Japan's high-context culture requires paying special attention to business communication to avoid misunderstandings. In Poland, more direct and unambiguous communication is preferred.

- **Cultural recognition.** Japanese culture is globally recognised through martial arts, films, cars and cuisine. Polish culture is more recognisable through literature and music.
- **Religion and traditions.** Japan is dominated by Buddhism and Shintoism, which have deep roots in the country's culture and traditions. Holidays and festivals play an important role in community life. Poland is dominated by the Catholic religion, with a strong influence of the Catholic Church on social and cultural life.
- **Society and its values.** The Japanese society is characterised by a strong hierarchy and Confucian values, emphasising loyalty and consensus. Poland is a diverse society where family ties, tradition and religiosity are still of great importance.
- **Labour market and lifestyle.** The Japanese labour market is distinguished by lifelong employment in one company, which has an impact on the professional stability and personal lives of employees. There is strong pressure for higher education in Poland and the labour market is moving towards more flexible forms of employment and self-employment.
- **Business culture.** Business cultures in both countries have its own unique elements that reflect both the tradition and contemporary changes in business behaviour. In both Japan and Poland, attention to etiquette and respect in business relationships is vital, although the details and approach may differ.

A comparison of the Japanese and Polish cultures reveals the diversity and richness of both nations, highlighting their unique characteristics as well as the influence of globalisation. Understanding these differences and similarities can contribute to better mutual understanding and intercultural cooperation in an era of globalisation.

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Part II

INDUSTRY REPORTS ON POLISH-JAPANESE COOPERATION

Chapter 4

Cooperation between Poland and Japan in the cosmetics industry

Weronika Daniłowska, Małgorzata Stefania Lewandowska

Introduction

The cosmetics industry, which includes production and distribution of skin care, beauty and hygiene products, is a key segment of the economies of many countries, and has a direct bearing on the quality of life of consumers and setting standards of beauty and health. In 2024, the global market for cosmetic products is estimated to be worth EUR 646.2 billion, with a stable annual growth rate of 3.33% until 2028 [Statista, 2024]. The Japanese market for cosmetic products is the third largest in the world, after the US and China. It is forecast to generate sales revenue of USD 47.3 billion in 2024.

In 2023, 3000 cosmetics companies were operating in Japan [EU–Japan Centre for Industrial Cooperation, 2024a]. Notably, despite a decrease in the number of consumers purchasing these goods, as well as a reduction in inbound tourism caused by the COVID-19 pandemic, the Japanese market is still showing stable growth.

The Polish market for cosmetic products, compared to the global market, plays a much more modest role than the Japanese market. It is expected to be worth USD 5.7 billion in 2024, which will account for a 0.88% share of projected global sales revenue. Despite adverse macroeconomic factors experienced by Polish cosmetics producers in 2023, the market for cosmetic products is growing [PKO Bank Polski, 2024]. Although demand from Polish buyers has declined due to the decrease in real wages, weak consumer sentiment or a more conservative approach to purchasing decisions, there has been a steady increase in exports, with a 39% growth in volume to USD 5.4 billion from 2018 to 2023. At the end of 2023, manufacture of perfumes and toilet preparations (Polish Classification of Activities – PKD 20.42) was the business

of 1292 operators. It must be noted that 90% of them were micro-enterprises, which indicates the high fragmentation of the Polish cosmetics industry.

Poland and Japan, despite their different geographic and cultural settings, are pursuing a common goal of developing the cosmetics industry.

Global trends such as sustainability, product customisation, digitisation of sales and marketing, and robotisation of production are unlocking new opportunities for cooperation between Poland and Japan. Both countries can benefit from exchanges of experience and technology, which will contribute to further development and innovation in the cosmetics industry.

The chapter presents an analysis of the current state and development trends of the cosmetics industry in both countries. It looks at the structure of the cosmetics industry in Poland, situation of the cosmetic products market in Japan, and the level of trade, and identifies major challenges and opportunities for cooperation between the two countries.

4.1. Development of the cosmetics industry in Poland and Japan

Today's organisations, including those in the cosmetics industry, are operating in a dynamic and turbulent environment marked by constant change, increasing risks, economic crises, political volatility, an overabundance of information which is often contradictory, as well as evolving consumer lifestyles and purchasing preferences. In such an environment, confidence in long-term forecasts, which often fail to be accurate, diminishes [Gajewski, Paprocki, Pieriegud, 2015]. Consequently, organisations are increasingly relying on scenarios, foresight studies and megatrend analyses to better prepare for the changes that lie ahead. Rather than focusing on precise forecasts, they concentrate on their awareness of how circumstances could develop and their readiness to adapt to them [Weresa, Kowalski, Lewandowska, 2023].

Trends should be considered in specific time perspectives: the 'now' perspective covers trends already present in the market, and to which many companies are already responding (investment, marketing activities, etc.); the 'new' perspective is a short-term (1–5 years) forecast of trends to which companies are responding to a limited extent; the 'next' perspective covers medium-term (5–15 years) trends at an early stage of development; and the 'beyond' perspective covers long-term (15+ years), mainly technological trends [Infuture Institute, 2024]. The details on current trends in the cosmetic industry are presented in Table 4.1. A global trend, identified as one that will grow and gain in importance over the next 5 years, is sustainability and ethical production [Culliney, 2021]. Consumers are becoming increasingly attentive to cosmetic

ingredients, production methods and environmental impact of products, in keeping with the so-called 'clean beauty' philosophy [PKO Bank Polski, 2024]. There is growing demand for natural, organic and sustainably produced cosmetics [Pienczykowska, 2021]. Awareness of the harmfulness of certain cosmetic ingredients to health and the environment is growing, alongside increasing regulatory pressure and competition in the industry, which encourages companies to make their mark through sustainable practices [Bonecka, Tulikowska, Cabaj, 2022].

Ethical production also includes such aspects as fair trade, cruelty-free (products not tested on animals) and minimising the carbon footprint [Build the Brand, 2023]. The consequences of the trend are, on the one hand, increased customer loyalty and a positive brand image, and, on the other hand, higher production costs due to investments in sustainable technologies and materials. This trend necessitates a shift in supply chains, which need to be more transparent and ethical, and increases pressure for innovation in cosmetic packaging and formulas that minimise environmental impact [Brave in Bloom, 2023].

The development of the cosmetics industry towards sustainable and ethical production is fostered by new technologies such as: biotechnology, which supports the development of natural origin cosmetic ingredients; artificial intelligence, used to optimise production processes and analyse sustainability data; and the Internet of Things (IoT) for real-time monitoring and optimisation of resource consumption [Dziemianowicz, Jurkiewicz, 2023]. Table 4.1 at the end of the chapter presents a classification of several dominant global trends with an impact on the cosmetics industry, along with their detailed description, time perspective, root causes, consequences and supporting technologies.

4.1.1. Development of the cosmetics industry in Poland

The cosmetics industry includes cosmetics and body care products, i.e. make-up products for lips and face, perfumes, skin care products, as well as personal care products such as deodorants and antiperspirants, hair care or shaving products [PKO Bank Polski, 2022]. Cosmetic services such as hairdresser, professional products, cosmetics used primarily for medical purposes and electrical personal care products are excluded from the cosmetics category. The Ministry of Health is in charge of regulating industry requirements. The applicable legal act concerning cosmetic products is the Act of 4 October 2018 on cosmetic products under which "a cosmetic is any chemical substance or mixture intended for external contact with the human body: skin, hair, lips, nails, external genitalia, teeth and oral mucous membranes, the sole or primary purpose of which is to keep them clean, nourish them, protect

them, perfume them, change their appearance or improve their odour." Apart from this document, the cosmetics market is also covered by regulations of the Minister of Health [2019a, 2019b, 2019c] and regulation [2013] and decisions of the European Commission [2013, 2019].

To assess trends in the cosmetics industry in Poland and Japan and its sales potential, the data on changes in trade from 2019 to 2023 were analysed. The analysis of the trade structure was based on data from the Global Trade Map database provided by the International Trade Centre (ITC). The datasets shared by the ITC are based on the so-called national concept, where the import data pertain to the country of origin of the products and not the country of from which the goods are shipped, as is the case with EU data [Kuźnar, Menkes, 2019].

The part covering trade between Poland and Japan presents:

- exports of cosmetic products (section 33) from Poland to foreign countries in 2019–2023, data in USD thousand (see Table 4.2);
- exports of cosmetic products (section 33) from Japan to foreign countries in 2019–2023, data in USD thousand (see Table 4.3);
- imports of cosmetic products (section 33) to Poland from foreign countries in 2019–2023, data in USD thousand (see Table 4.4);
- imports of cosmetic products (section 33) to Japan from foreign countries in 2019–2023, data in USD thousand (see Table 4.5);
- exports of cosmetic products (section 33) from Poland to Japan in 2019–2023, data in USD thousand (see Table 4.6);
- imports of cosmetic products (section 33) from Japan to Poland in 2019–2023, data in USD thousand (see Table 4.7);
- total trade balance for Poland and Japan (trade for foreign countries) for the category of cosmetic products (section 33), and trade balance between Japan and Poland for the category of cosmetic products in 2019–2023, data in USD thousand (see Table 4.8);
- leading cosmetic products exported from Poland to Japan in 2019–2023, data in USD thousand (see Table 4.9);
- leading cosmetic products imported from Japan to Poland in 2019–2023, data in USD thousand (see Table 4.10).

The above-mentioned summaries lead to the following conclusions.

Beauty and make-up preparations (49% in the cosmetics category), shaving preparations, deodorants (14% in the cosmetics category), and hair preparations (13% in the cosmetics category) accounted for the highest share of global exports of cosmetics from Poland in 2023, data in USD thousand. Exports of cosmetics from Poland grew by almost 40% from 2019 to 2023. The largest increases in 2023 can be

seen in categories such as essential oils, mixtures of odoriferous substances, beauty and make-up preparations (see Table 4.2).

Beauty preparations (77% in the cosmetics category) and hair preparations (10% in the cosmetics category) accounted for the highest share of global exports of cosmetics from Japan in 2023, data in USD thousand. Exports of cosmetics from Japan fell by 17% from 2019 to 2023. The largest declines in exports in 2023 can be seen in categories such as perfumes and toilet waters, shaving preparations, deodorants (see Table 4.3).

Beauty and make-up preparations (37.5% in the cosmetics category), perfumes and toilet waters (17.3%), and mixtures of odoriferous substances (16.6%) accounted for the highest share of global imports of cosmetics to Poland in 2023, data in USD thousand. Imports of cosmetics to Poland grew by 38% from 2019 to 2023. The largest increases in 2023 can be seen in categories such as perfumes and toilet waters, beauty and make-up preparations (see Table 4.4).

Beauty and make-up preparations (43.6% in the cosmetics category), hair preparations (11.6%), and mixtures of odoriferous substances (10.3%) accounted for the highest share of global imports of cosmetics to Japan in 2023, data in USD thousand. Global imports of cosmetics into Japan increased by an average of 1% from 2019 to 2023. The largest increase in 2023 can be seen in perfumes and toilet waters (11%). By contrast, categories such as essential oils, hair preparations and mixtures of odoriferous substances show a decline in imports in the analysed period of 2019–2023 (see Table 4.5).

Exports of cosmetics from Poland to Japan fell by 60% from 2019 to 2023 from USD 3194 thousand to USD 1289 thousand. Hair preparations (43% in the cosmetics category) accounted for the highest share of exports of cosmetics from Poland to Japan in 2023, data in USD thousand. The largest increase in 2023 can be seen in toilet waters and shaving preparations. By contrast, a significant decline in exports can be seen in other categories in the analysed period of 2019–2023 (see Table 4.6).

Imports of cosmetics from Japan to Poland grew by 67% from 2019 to 2023 from USD 5449 thousand in 2019 to USD 9111 thousand in 2023. Mixtures of odoriferous substances (72% in the cosmetics category) accounted for the highest share of imports of cosmetics from Japan to Poland in 2023, data in USD thousand. The largest increases in 2023 can be seen in categories such as hair preparations, mixtures of odoriferous substances (see Table 4.7).

Poland's **foreign trade balance** for the general category of cosmetics (category 33), data in USD thousand, is positive throughout the analysed period of 2019–2023. In 2023, it grew by 30% compared to the previous year.

Japan's foreign trade balance for the general category of cosmetics is positive throughout the analysed period of 2019–2023. In 2023, it fell by 60% compared to the previous year.

Exports from Poland to Japan fell by 53% from USD 2722 thousand in 2022 to USD 1289 thousand in 2023. In the analysed period of 2022–2023, imports from Japan to Poland grew by 14% from USD 7981 thousand in 2022 to USD 9111 thousand in 2023.

In 2023, the trade balance between Poland and Japan grew from USD 2255 thousand in 2019 to USD 7822 thousand in 2023 (see Table 4.8).

Top products from the category of cosmetics **exported from Poland** to the Japanese market **in 2023** are:

- preparations for use on the hair (excluding shampoos, preparations for permanent waving or straightening);
- make-up preparations and preparations for the care of the skin (other than medicaments);
- personal deodorants and antiperspirants (see Table 4.9).

Top products from the category of cosmetics **exported from Japan** to the Polish market **in 2023** are:

- mixtures of odoriferous substances;
- make-up preparations and preparations for the care of the skin (other than medicaments);
- shampoos (see Table 4.10).

4.1.2. Development of the cosmetics industry in Japan

In Japan, the government office that supervises the cosmetics market is the Ministry of Health, Labour and Welfare, and the legislation governing this area is the Act on Securing Quality, Efficacy and Safety of Products Including Pharmaceuticals and Medical Devices [EU–Japan Centre for Industrial Cooperation, 2024a]. A government organisation which cooperates closely with the Ministry is the Agency for Pharmaceuticals and Medical Devices, which monitors the safety, efficacy and quality level of cosmetic products marketed or prepared for marketing in Japan. Based on the Ministry's guidelines, two categories of cosmetic products are distinguished: cosmetics and so-called 'quasi--drugs.' Comparing it to the Polish reality, the Japanese definition of 'cosmetics' includes goods that are also identified as cosmetics in Poland; while the effects of quasi-drugs are stronger than those of cosmetics, but milder than those of medical devices [Polska Agencja Inwestycji i Handlu, 2022].

According to Japanese legislation, cosmetics include: perfumes and colognes, make--up products, skin care and hair care products, special purpose products, and cosmetic soaps. Quasi-drugs include a wide range of products such as disinfectants, vitamin supplements, hair dyes and hair growth stimulants, deodorants and antiperspirants, and bath products [EU–Japan Centre for Industrial Cooperation, 2024b].

To assess trends in the cosmetics industry and the sales potential in Japan, data on changes in trade from 2019 to 2023 was analysed. The total trade balance between Poland and Japan was also covered. Again, the analysis of the trade structure was based on data from the ITC Trade Map global database.

The above-mentioned summaries lead to the following conclusions.

Beauty preparations (77% in the cosmetics category) and hair preparations (10% in the cosmetics category) accounted for the highest share of global exports of cosmetics from Japan in 2023, data in USD thousand. Exports of cosmetics from Japan fell by 17% from 2019 to 2023. The largest declines in exports in 2023 can be seen in categories such as perfumes and toilet waters, shaving preparations, deodorants (see Table 4.3).

Beauty and make-up preparations (43.6% in the cosmetics category), hair preparations (11.6%), and mixtures of odoriferous substances (10.3%) accounted for the highest share of global imports of cosmetics to Japan in 2023, data in USD thousand. Global imports of cosmetics into Japan increased by an average of 1% from 2019 to 2023. The largest increase in 2023 can be seen in perfumes and toilet waters (11%). By contrast, categories such as essential oils, hair preparations and mixtures of odoriferous substances show a decline in imports in the analysed period of 2019–2023 (see Table 4.5).

Imports of cosmetics from Japan to Poland grew by 67% from 2019 to 2023 from USD 5449 thousand in 2019 to USD 9111 thousand in 2023. Mixtures of odoriferous substances (72% in the cosmetics category) accounted for the highest share of imports of cosmetics from Japan to Poland in 2023, data in USD thousand. The largest increases in 2023 can be seen in categories such as hair preparations and mixtures of odoriferous substances (see Table 4.7).

Poland's **foreign trade balance** for the general category of cosmetics (category 33), data in USD thousand, is positive throughout the analysed period of 2019–2023. In 2023, it grew by 30% compared to the previous year.

Japan's foreign trade balance for the general category of cosmetics is positive throughout the analysed period of 2019–2023. In 2023, it fell by 60% compared to the previous year.

Exports from Poland to Japan fell by 53% from USD 2722 thousand in 2022 to USD 1289 thousand in 2023. In the analysed period of 2022–2023, imports from Japan to Poland grew by 14% from USD 7981 thousand in 2022 to USD 9111 thousand in 2023.

In 2023, the trade balance between Poland and Japan grew from USD 2255 thousand in 2019 to USD 7822 thousand in 2023 (see Table 4.8).

Top products from the category of cosmetics **exported from Japan** to the Polish market **in 2023** are:

- mixtures of odoriferous substances;
- make-up preparations and preparations for the care of the skin (other than medicaments);
- shampoos (see Table 4.10).

4.2. Development trends of the cosmetics industry and the potential for expansion of cooperation between Poland and Japan

To analyse the size of the markets in the cosmetics industry in Poland and Japan, we looked into data on the projected sales revenue from 2024 to 2028. The analysis of the market structure was based on data from the Statista global database. The information published by Statista is subject to a six-stage methodological process that involves data acquisition, processing, modelling, forecasting, quality control, and updating. The part on the structure of markets presented sales revenue forecasts broken down into segments (with separate categories) (see Tables 4.11 and 4.12):

- personal care cosmetics;
- make-up cosmetics;
- skin care cosmetics;
- perfumes;
- Beauty-Tech.

Both the Polish and Japanese markets for cosmetic products are steadily expanding. The cosmetics market in Poland will be worth USD 5.7 billion in 2024. It is estimated that by 2028, the revenue from this area will see an average acceleration in growth rate to 3.08% per year, and by the end of the period it is expected to be worth USD 6.6 billion. According to forecasts, the most rapidly growing segment is make-up cosmetics, whose sales value in 2028 (USD 0.8 billion) is expected to be as much as 51% higher than that recorded in 2022 (USD 0.5 billion). The most popular segment is personal care products, which include hair care, shower and bath preparations, oral hygiene products, deodorants, and shaving products. Its market share is 48.8%, and sales in 2024 in Poland are estimated at USD 2.75 billion.

Meanwhile, forecasts show that the cosmetic products market in Japan in 2024 will be worth USD 47.3 billion, which is over eight times that of Poland. The country's sales are estimated to reach USD 51.1 billion in 2028, with an average annual growth rate of up to 2.41%. Japan is the third largest market for the cosmetics industry in the world. In 2023, its sales figure (USD 46.14 billion) represented 7.33% of the worldwide value. Whereas, similar to Poland, the personal care products segment is expected to have a significant market share of 32.9% (USD 15.58 billion) this year, the skin care

products segment, i.e. face and body care preparations, sun protection, children's products, and natural skin care preparations, has the highest value (47.16%, USD 22.31 billion). A remarkably large share of the cosmetic products market is taken by face care preparations (face creams and scrubs, eye creams and lip balms). Sales revenue for this product category in Japan will reach USD 17.99 billion, i.e. 38% of the market, in 2024. Japan is the world leader here and is estimated to retain this position until 2028, when sales will reach USD 20 billion.

In the case of personal care products, there is a growing demand both in Poland and Japan for organic preparations with natural ingredients. These preferences become more evident among Polish consumers, who are increasingly looking for sustainable and eco-friendly solutions. The Japanese, for their part, expect high product quality and innovativeness, as well as references to their culture and local skin care rituals.

The skin care cosmetics segment in Poland is also demonstrating a growing demand for natural and organic preparations. At the same time, emphasis is placed on purity, safety of product ingredients, and sustainable production of cosmetics. There is also a growing awareness among Poles of the risk of skin cancer, which contributes to the forecast of stable growth in sales of the sun protection products category. Japan shows a strong commitment to its extensive tradition of beauty care, which results in the ability to use preparations in a multi-step skin care ritual being prioritised. The Japanese are also looking for this type of solutions when it comes to make-up products. The cosmetics in this segment are supposed to enable consumers to express their commitment to culture and tradition, and to stand out for their high quality and innovation. Among Poles, there is a trend to look for cosmetics with natural ingredients that allow them to emphasise their individual and unique identity (eye make-up products), or that originate from the home market (lip make-up products).

For the perfume segment, in both countries there is demand for national brands that include local, organic ingredients in their formulas. In the case of the Beauty--Tech segment, on the other hand, consumers are looking for new innovative offerings. Beauty-Tech is defined here as the area of development and implementation of digital tools and devices that improve the beauty-related experience, enhance the effects of beauty treatments, and provide personalised solutions. In Poland, there has been a turn towards virtual make-up fitting rooms, while in Japan, artificial intelligence--assisted beauty smartphone apps and state-of-the-art personal care devices are becoming popular.

The markets in Poland and Japan are expected to grow steadily. An average Pole will spend USD 142.1 on cosmetic products in 2024, while an average Japanese will spend more than two and a half times as much, i.e. USD 386. Poles still shop primarily at brick-and-mortar locations, although the importance of online distribution channels

is growing. In 2018, 11.6% of revenue was generated through online sales, and by 2024 this figure will increase significantly: to as much as 20.9%. It is predicted that in 2026, 23.5% of revenue from sales of cosmetic products will come from online transactions [PKO Bank Polski, 2024]. In Japan, the popularity of online sales is comparable and is expected to account for 20.7%, i.e. USD 9.79 billion in 2024. The significant increase in the worldwide uptake of e-commerce was driven by restrictions related to the global COVID-19 pandemic, which had a significant impact on the ability to purchase goods through traditional distribution channels.

One element that is common to the Polish and Japanese markets for cosmetic products is the shift towards organic preparations with natural ingredients. While this trend is currently under significant development in Poland, it has become well established in Japan by now, and Japanese consumers are also becoming more interested in innovative and sustainable solutions [EU–Japan Centre for Industrial Cooperation, 2024]. Two categories (top market products) are expected to account for the largest share in sales revenue in 2024 for both countries. The first is face care preparations (skin care cosmetics segment), with an estimated share in the total value of this market of 38.03% (USD 17.99 billion) in Japan and 17.14% (USD 0.97 billion) in Poland. The other is hair preparations (personal care cosmetics segment): Japan – 15.64% (USD 7.4 billion), Poland – 16.96% (USD 0.96 billion). Also, it is worth noting that Japanese consumers are loyal to products and brands from domestic manufacturers and have a strong preference for purchasing goods that fit into their cultural framework. By contrast, Polish buyers are not strongly attached to domestic suppliers of cosmetic products. Therefore, the receptiveness of the Polish market to Japanese cosmetics may be greater than the receptiveness of the Japanese market to cosmetics from Poland.

Summary and conclusions

In this chapter, the current state and the prospects for change in the cosmetics industry in Poland and Japan were presented. The structure of the cosmetic products market in Poland and Japan was analysed, based on forecast sales revenue from 2024 to 2028. The structure and dynamics of trade in cosmetics from 2019 to 2023 were also investigated.

The chapter concludes with a presentation of key findings, which include:

- **Value of the market in Poland and Japan in 2024.** According to forecasts for 2024, the revenue from sales of cosmetic products in Poland (USD 5 676 610 thousand) will be more than eight times lower than that in Japan (USD 47 303 210 thousand).

- **Growth dynamics of the value of the market in Poland and Japan.** From 2024 to 2028, the Polish market for cosmetic products is estimated to grow by 16% to USD 6 557 349 thousand, while the Japanese market by 9% to USD 51 499 508 thousand.
- **Top performing products in the Japanese and Polish markets in 2024.** These include face care preparations (skin care cosmetics segment), hair preparations (personal care cosmetics segment).
- **Japanese consumers** are looking for innovative, high-quality cosmetic products with natural ingredients that draw on the rich local tradition of skin care rituals.
- **Polish consumers** are becoming increasingly focused on the eco-friendliness of cosmetic products, expecting natural, organic ingredients and sustainable solutions. Safe use of preparations is also crucial.
- **Trade between Poland and Japan in 2023.** Exports from Poland to Japan fell by 53% from USD 2722 thousand in 2022 to USD 1289 thousand in 2023. Imports from Japan to Poland grew by 14% from USD 7981 thousand in 2022 to USD 9111 thousand in 2023.
- **The trade balance** between Poland and Japan grew from USD 2255 thousand in 2019 to USD 7822 thousand in 2023.
- **Top products exported from Poland to Japan in 2023.** These include preparations for use on the hair (excluding shampoos, preparations for permanent waving or straightening), make-up preparations and preparations for the care of the skin (other than medicaments), personal deodorants and antiperspirants.
- **Top products exported from Japan to Poland in 2023.** These include mixtures of odoriferous substances, make-up preparations and preparations for the care of the skin (other than medicaments), shampoos.

Table 4.1. Trends that will have an impact on the cosmetics industry in the near or long term

Trend	Description	Time perspective	Root causes	Consequences	Supporting technologies	The industry most sensitive to the trend
Biomaterials	natural or synthetic materials that react with biological systems, are derived from living organisms, and are used in manufacturing in the broadest sense	1–5 years	growing environmental awareness; raw material crisis; legislation; medical needs; construction materials needs; packaging needs	improving health of the population; stimulating innovation; developing a circular economy	biotechnology; genetic engineering; regenerative medicine; bioinformatics	medical industry; pharmaceutical industry; automotive industry; **packaging** (and the entire FMCG industry); construction
Lab Grown	transfer of production from the natural world to the laboratory	1–15 years	overexploitation of the environment and impact of conventional agriculture on the environment	reduction in consumption of natural resources; sustainable access to food	biotechnology; genetic engineering	food industry (cultivated meat, synthetic leather); agriculture; clothing industry; **beauty**; pharmaceutical industry
Population ageing	ageing populations, especially in developed countries where the elderly population is growing rapidly	1–15 years	a decline in birth rate; increasing life expectancy; advances in technology and medicine	change in social structure; increased awareness of healthy ageing	monitoring technologies; independence-supporting technologies; mobility-supporting technologies	pharmaceutical industry; medical industry; insurance industry; food industry; **beauty**; wellness; entertainment; FMCG
Synthetic biology	designing, modifying biological organisms to obtain specific functions or characteristics	5–15 years	climate change; food crisis	independence of natural resources; deepening of social inequalities	DNA sequencing and synthesis; gene editing technologies; automation	medicine; pharmaceutical industry; biotechnology; agriculture; power industry; IT industry; **cosmetics industry**; FMCG
Editable nature	human interference with living organisms (humans, animals, plants) and modifying them by means of technology	5–15 years	development of genetic engineering; growing demand for food; sustainability	improving public health; increasing the productivity of agriculture; protecting the environment	tissue engineering; bionanotechnology; artificial intelligence	medical industry; pharmaceutical industry; food industry; agriculture; environmental protection; **cosmetics industry**

Trend	Description	Time perspective	Root causes	Consequences	Supporting technologies	The industry most sensitive to the trend
Elimination of ageing	scientific, medical and technological activities aimed at delaying, suppressing or even reversing the ageing process of the human body	5–15 years	growing number of the elderly in the population; awareness of maintaining health and fitness; life quality expectations	improving the quality of life; changes in the labour market; changes in consumption patterns	biotechnology; regenerative medicine; genetic engineering; artificial intelligence	financial industry; pharmaceutical industry; medical industry; **cosmetics industry**; wellness; healthcare

Source: own study based on: Infuture Institute [2024].

Table 4.2. Exports of cosmetic products from Poland to foreign countries (section 33) in 2019–2023 (in USD thousand)

Code	Exports from Poland to the rest of the world	2019	2020	2021	2022	2023	Category share in 2023 (%)	Change 2019/2023 (%)
	Category 33	3 906 066	4 210 123	4 562 222	4 518 394	5 432 090	–	39
3301	Essential oils	2824	4986	15 743	37 719	50 036	1	1672
3302	Mixtures of odoriferous substances	56 883	66 494	74 623	92 717	105 985	2	86
3303	Perfumes and toilet waters	537 509	592 735	615 171	530 530	634 169	12	18
3304	Beauty and make-up preparations, preparations for the care of the skin, including sunscreen or suntan preparations, manicure preparations	1 703 278	1 954 336	2 160 231	2 197 113	2 637 653	49	55
3305	Hair preparations	539 198	568 882	599 246	569 258	682 682	13	27
3306	Preparations for dental hygiene	482 653	433 887	507 687	513 657	549 053	10	14
3307	Shaving preparations, deodorants, bath preparations, depilatories	583 721	588 803	589 521	577 400	772 512	14	32

Source: own study based on: ITC [2024].

Table 4.3. Exports of cosmetic products from Japan to foreign countries (section 33) in 2019–2023 (in USD thousand)

Code	Exports from Japan to the rest of the world	2019	2020	2021	2022	2023	Category share in 2023 (%)	Change 2019/2023 (%)
	Category 33	5 653 799	6 557 468	7 648 009	6 172 947	4 715 204	–	–17
3301	Essential oils	8070	8702	7546	7308	6869	0.1	–15
3302	Mixtures of odoriferous substances	222 109	233 931	257 113	239 549	240 971	5.1	8
3303	Perfumes and toilet waters	7222	5993	7255	4809	4290	0.1	–41
3304	Beauty and make-up preparations, preparations for the care of the skin, including sunscreen or suntan preparations, manicure preparations	4 417 880	5 260 979	6 233 553	4 951 248	3 642 739	77.3	–18
3305	Hair preparations	510 958	532 781	626 314	572 881	481 574	10.2	–6
3306	Preparations for dental hygiene	95 848	122 306	116 461	91 116	82 458	1.7	–14
3307	Shaving preparations, deodorants, bath preparations, depilatories	391 712	392 776	399 767	306 036	256 303	5.4	–35

Source: own study based on: ITC [2024].

Table 4.4. Imports of cosmetic products to Poland from foreign countries (section 33) in 2019–2023 (in USD thousand)

Code	Imports to Poland from the rest of the world	2019	2020	2021	2022	2023	Category share in 2023 (%)	Change 2019/2023 (%)
	Category 33	2 828 688	3 000 696	3 355 459	3 349 579	3 907 282	–	38
3301	Essential oils	15 981	43 239	41 741	27 912	22 882	0.6	43
3302	Mixtures of odoriferous substances	584 647	606 157	621 070	615 882	646 751	16.6	11
3303	Perfumes and toilet waters	415 021	426 050	501 693	541 531	675 275	17.3	63

Code	Imports to Poland from the rest of the world	2019	2020	2021	2022	2023	Category share in 2023 (%)	Change 2019/2023 (%)
3304	Beauty and make-up preparations, preparations for the care of the skin, including sunscreen or suntan preparations, manicure preparations	927 557	1 020 515	1 171 673	1 220 058	1 466 912	37.5	58
3305	Hair preparations	389 153	404 066	455 067	432 780	517 341	13.2	33
3306	Preparations for dental hygiene	190 859	179 802	201 907	175 006	186 225	4.8	–2
3307	Shaving preparations, deodorants, bath preparations, depilatories	305 470	320 867	362 308	336 410	391 896	10.0	28

Source: own study based on: ITC [2024].

Table 4.5. Imports of cosmetic products to Japan from foreign countries (section 33) in 2019–2023 (in USD thousand)

Code	Imports to Japan from the rest of the world	2019	2020	2021	2022	2023	Category share in 2023 (%)	Change 2019/2023 (%)
	Category 33	3 637 501	3 348 422	3 565 604	3 530 141	3 658 473	–	1
3301	Essential oils	206 699	175 995	143 973	159 939	159 147	4.4	–23
3302	Mixtures of odoriferous substances	401 026	387 054	411 112	364 436	375 638	10.3	–6
3303	Perfumes and toilet waters	253 201	191 581	197 011	214 379	280 102	7.7	11
3304	Beauty and make-up preparations, preparations for the care of the skin, including sunscreen or suntan preparations, manicure preparations	1 529 974	1 388 820	1 474 404	1 497 890	1 593 775	43.6	4
3305	Hair preparations	515 402	448 626	458 552	444 610	423 559	11.6	–18
3306	Preparations for dental hygiene	196 760	231 217	232 477	212 260	193 969	5.3	–1
3307	Shaving preparations, deodorants, bath preparations, depilatories, toilet preparations	534 439	525 129	648 075	636 627	632 283	17.3	18

Source: own study based on: ITC [2024].

Table 4.6. Exports of cosmetic products from Poland to Japan in 2019–2023 (in USD thousand)

Code	Exports from Poland to Japan	2019	2020	2021	2022	2023	Category share in 2023 (%)	Change 2019/2023 (%)
	Category 33	3194	2890	3472	2722	1289	–	–60
3301	Essential oils	1	3	0	0	0	0	–100
3302	Mixtures of odoriferous substances	896	748	976	387	16	1	–98
3303	Perfumes and toilet waters	44	15	16	13	67	5	52
3304	Beauty and make-up preparations, preparations for the care of the skin, including sunscreen or suntan preparations, manicure preparations	1231	1092	1285	887	486	38	–61
3305	Hair preparations	894	833	830	712	558	43	–38
3306	Preparations for dental hygiene	0	1	0	0	0	0	0
3307	Shaving preparations, deodorants, bath preparations, depilatories, toilet preparations	128	198	365	723	162	13	27

Source: own study based on: ITC [2024].

Table 4.7. Imports of cosmetic products from Japan to Poland in 2019–2023 (in USD thousand)

Code	Exports from Japan to Poland	2019	2020	2021	2022	2023	Category share in 2023 (%)	Change 2019/2023 (%)
	Category 33	5449	13 010	13 227	7981	9111	–	67
3301	Essential oils	0	0	2	0	0	0	0
3302	Mixtures of odoriferous substances	3518	10 897	11 520	6937	6571	72	87
3303	Perfumes and toilet waters	0	0	0	0	0	0	0
3304	Beauty and make-up preparations, preparations for the care of the skin, including sunscreen or suntan preparations, manicure preparations	1383	1362	671	471	1540	17	11
3305	Hair preparations	185	642	805	400	854	9	362
3306	Preparations for dental hygiene	0	0	0	14	27	0	–
3307	Shaving preparations, deodorants, bath preparations, depilatories, toilet preparations	363	109	229	159	119	1	–67

Source: own study based on: ITC [2024].

Table 4.8. Total trade balance for Poland and Japan for cosmetic products, and trade balance between Japan and Poland for cosmetic products in 2019–2023 (in USD thousand)

	Trade in cosmetic products in Poland and Japan				
	2019	2020	2021	2022	2023
Exports from Poland to the rest of the world, category 33	3 906 066	4 210 123	4 562 222	4 518 394	5 432 090
Imports to Poland from the rest of the world, category 33	2 828 688	3 000 696	3 355 459	3 349 579	3 907 282
Poland's trade balance, category 33	**1 077 378**	**1 209 427**	**1 206 763**	**1 168 815**	**1 524 808**
Poland's trade balance, category 33, year-on-year change (%)	–	12	0	–3	30
Exports from Japan to the rest of the world, category 33	5 653 799	6 557 468	7 648 009	6 172 947	4 715 204
Imports to Japan from the rest of the world, category 33	3 637 501	3 348 422	3 565 604	3 530 141	3 658 473
Japan's trade balance, category 33	**2 016 298**	**3 209 046**	**4 082 405**	**2 642 806**	**1 056 731**
Japan's trade balance, category 33, year-on-year change (%)	–	59	27	–35	–60
	Trade in cosmetic products between Poland and Japan				
Exports from Poland to Japan, category 33	3194	2890	3472	2722	1289
Exports from Poland to Japan, category 33, year-on-year change (%)	–	–10	20	–22	–53
Imports from Japan to Poland, category 33	5449	13 010	13 227	7981	9111
Imports from Japan to Poland, category 33, year-on-year change (%)	–	139	2	–40	14
Poland's and Japan's trade balance, category 33	**–2255**	**–10 120**	**–9755**	**–5259**	**–7822**
Poland's and Japan's trade balance, category 33, year-on-year change (%)	–	349	–4	–46	49

Source: own study based on: ITC [2024].

Table 4.9. Exports of cosmetic products from Poland to Japan in 2019–2023, leading product in each section (in USD thousand)

Code	Exports from Poland to Japan	2019	2020	2021	2022	2023
33059000	Preparations for use on the hair (excluding shampoos, preparations for permanent waving or straightening)	691	677	667	547	459
330510	Shampoos	202	158	142	149	105
33049900	Make-up preparations and preparations for the care of the skin (other than medicaments)	1121	1016	1138	814	342
330720	Personal deodorants and antiperspirants	116	194	330	693	125

Source: own study based on: ITC [2024].

Table 4.10. Exports of cosmetic products from Japan to Poland in 2019–2023, leading product in each section (in USD thousand)

Code	Exports from Japan to Poland	2019	2020	2021	2022	2023
330290	Mixtures of odoriferous substances	3244	10 888	11 518	6928	6546
330499	Make-up preparations and preparations for the care of the skin (other than medicaments)	1208	1266	593	374	1382
330430	Manicure and pedicure preparations	169	88	78	97	158
330590	Preparations for use on the hair (excluding shampoos, preparations for permanent waving or straightening)	123	358	483	217	467
330510	Shampoos	62	284	323	184	388

Source: own study based on: ITC [2024].

Table 4.11. Predictions of the value of the cosmetic products market in Poland in 2024–2028, measured by sales revenue (in USD thousand)

Item	Value of the cosmetics market in Poland	2024	2025	2026	2027	2028	Segment share in 2024 (%)	Market share in 2024 (%)	Change 2023/2028 (%)
A	**Personal care products segment**	**2 759 200**	**2 843 536**	**2 930 555**	**3 020 344**	**3 112 994**	–	**49**	**13**
A1	Hair preparations	960 000	991 008	1 023 018	1 056 061	1 090 172	35	17	14
A2	Bath preparations	500 000	514 350	529 112	544 297	559 919	18	9	12
A3	Preparations for dental hygiene	410 000	424 227	438 948	454 179	469 939	15	7	15
A4	Deodorants and antiperspirants	400 000	414 240	428 987	444 259	460 074	14	7	15
A5	Shaving preparations	278 800	287 080	295 607	304 386	313 426	10	5	12
A6	Natural personal care preparations	210 400	212 630	214 884	217 162	219 464	8	4	4
B	**Make-up products segment**	**660 950**	**692 353**	**725 385**	**760 141**	**796 720**	–	**12**	**21**
B1	Face make-up preparations	177 700	185 181	192 977	201 102	209 568	27	3	18
B2	Lip make-up preparations	128 400	134 897	141 723	148 894	156 428	19	2	22
B3	Eye make-up preparations	161 200	167 342	173 717	180 336	187 207	24	3	16
B4	Manicure, pedicure and nail care preparations	105 500	109 520	113 692	118 024	122 521	16	2	16
B5	Natural make-up preparations	88 150	95 414	103 276	111 786	120 997	13	2	37
C	**Skin care products segment**	**1 547 950**	**1 616 480**	**1 690 436**	**1 770 088**	**1 855 727**	–	**27**	**20**
C1	Face care preparations	970 000	1 033 535	1 101 232	1 173 362	1 250 217	63	17	29
C2	Body care preparations	288 900	300 543	312 655	325 255	338 362	19	5	17
C3	Sun protection preparations	53 110	55 309	57 599	59 983	62 466	3	1	18
C4	Child care preparations	34 740	36 758	38 894	41 154	43 545	2	1	25
C5	Natural care preparations	201 200	190 335	180 057	170 334	161 136	13	4	–20
D	**Perfume segment**	**630 000**	**646 821**	**664 091**	**681 822**	**700 027**	–	**11**	**11**
E	**Beauty-Tech segment**	**78 510**	**81 658**	**84 933**	**88 339**	**91 881**	–	**1**	**17**
A, B, C, D, E	Total value of the segments	5 676 610	5 880 848	6 095 400	6 320 734	6 557 349	–	–	16

Source: own study based on: Statista [2024].

Table 4.12. Predictions of the value of the cosmetic products market in Japan in 2024–2028, measured by sales revenue (in USD thousand)

Item	Value of the cosmetics market in Japan	2024	2025	2026	2027	2028	Segment share in 2024 (%)	Market share in 2024 (%)	Change 2023/2028 (%)
A	**Personal care products segment**	**15 580 000**	**15 908 871**	**16 245 129**	**16 588 947**	**16 940 504**	–	**33**	**9**
A1	Hair preparations	7 400 000	7 562 060	7 727 669	7 896 905	8 069 847	48	16	9
A2	Bath preparations	2 310 000	2 351 349	2 393 438	2 436 281	2 479 890	15	5	7
A3	Preparations for dental hygiene	3 180 000	3 250 278	3 322 109	3 395 528	3 470 569	20	7	9
A4	Deodorants and antiperspirants	590 000	604 455	619 264	634 436	649 980	4	1	10
A5	Shaving preparations	970 000	1 003 271	1 037 683	1 073 276	1 110 089	6	2	14
A6	Natural personal care preparations	1 130 000	1 137 458	1 144 965	1 152 522	1 160 129	7	2	3
B	**Make-up products segment**	**7 492 900**	**7 661 337**	**7 834 203**	**8 011 631**	**8 193 760**	–	**16**	**9**
B1	Face make-up preparations	3 680 000	3 738 512	3 797 954	1 858 342	1 919 689	49	8	7
B2	Lip make-up preparations	1 520 000	1 567 728	1 616 955	1 667 727	1 720 094	20	3	13
B3	Eye make-up preparations	1 180 000	1 201 830	1 224 064	1 246 709	1 269 773	16	2	8
B4	Manicure, pedicure and nail care preparations	222 900	226 154	229 456	232 806	236 205	3	0.5	6
B5	Natural make-up preparations	890 000	927 113	965 774	1 006 046	1 047 999	12	2	18
C	**Skin care products segment**	**22 310 310**	**22 651 211**	**23 027 794**	**23 439 413**	**23 885 559**	–	**47**	**7**
C1	Face care preparations	17 990 000	18 479 328	18 981 966	19 498 275	20 028 628	81	38	11
C2	Body care preparations	850 000	911 200	976 806	1 047 136	1 122 530	4	2	32
C3	Sun protection preparations	470 000	484 335	499 107	514 330	530 017	2	1	13
C4	Child care preparations	60 310	62 728	65 244	67 860	70 581	0.3	0.1	17
C5	Natural care preparations	2 940 000	2 713 620	2 504 671	2 311 812	2 133 802	13	6	–27
D	**Perfume segment**	**590 000**	**602 095**	**614 438**	**627 034**	**639 888**	–	**1**	**7**
E	**Beauty-Tech segment**	**1 330 000**	**1 442 385**	**1 564 267**	**1 696 447**	**1 839 797**	–	**3**	**38**
A, B, C, D, E	Total value of the segments	47 303 210	48 265 899	49 285 831	50 363 472	51 499 508	–	–	9

Source: own study based on: Statista [2024].

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Chapter 5

Cooperation between Poland and Japan in the medical and pharmaceutical industry

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Introduction

The medical and pharmaceutical industry is developing dynamically worldwide, and the COVID-19 pandemic has had a significant impact on the growth of trade in medical and pharmaceutical products. At the same time, this industry plays a key role in both Poland and Japan, as it represents an important sector of an economy and has a significant impact on the health and well-being of a society. In Poland, the pharmaceutical industry and medical products manufacture underwent fundamental changes after the political transition in the early 1990s. This included privatisation of companies and harmonisation of regulations with European Union standards. These changes facilitated the export of Polish pharmaceutical and medical products to foreign markets, but low production of basic pharmaceutical preparations indicates a dependence on imports, which poses a challenge to the country's medicine security. Japan, on the other hand, as one of the world's largest manufacturers of medical devices and pharmaceuticals, has a highly regulated market with advanced infrastructure and innovative technologies. The Japanese medical device industry is characterised by a low level of concentration and the presence of many small entities specialising in niche technologies.

The chapter presents the state of development of the medical and pharmaceutical industry in Poland and Japan and cooperation in bilateral trade between the two countries, with a particular focus on structural changes, regulations and development potential of this cooperation. The structure of the chapter comprises several key sections. At the beginning, the development of the medical and pharmaceutical industry in Poland

is described, taking into account structural changes after the political transition, privatisation of companies, harmonisation of regulations with EU standards, value of marketed production of pharmaceutical and medical products sold and an analysis of statistical data on the industry. The next section looks at the development of the industry in Japan, emphasising the importance of Japan as a manufacturer of medical devices and pharmaceuticals, the role of regulatory authorities, the classification of medical devices, the regulatory framework and market characteristics. The rest of the chapter analyses development trends of the industry and the potential for the development of Polish-Japanese cooperation, including the impact of the COVID-19 pandemic, changes in global trade in medical and pharmaceutical products, the position of Poland and Japan in global trade and the potential for harmonisation of norms and standards. The chapter provides a comprehensive picture of cooperation between Poland and Japan in the medical and pharmaceutical industry, covering various aspects such as regulations, production, international trade and specific examples of companies and their activities.

5.1. Development of the medical and pharmaceutical industry in Poland and Japan

5.1.1. Development of the medical and pharmaceutical industry in Poland

After the political transformation in the early 1990s, the Polish pharmaceutical industry and medical products manufacture industry changed fundamentally. These changes affected the ownership structure of companies in the sector, the rules for marketing medicines, the administrative system for the management of public health service, etc. Pharmaceutical companies in Poland were privatised, many of them were taken over by foreign pharmaceutical corporations. The rules for trade in medicines were harmonised with the standards of the European Union, which facilitated the export of Polish pharmaceutical and medical products to foreign markets. These regulations also included registration of medicines, quality control and test procedures.

The medical and pharmaceutical industry in Poland in this chapter can be found under Section C – Manufacturing:

- Division 21 – Manufacture of basic pharmaceutical products and pharmaceutical preparations;
- Group 32.5 – Manufacture of medical and dental instruments and supplies (a part of Division 32 – Other manufacturing).

Table 5.1. Value of marketed production of products of the medical and pharmaceutical industry in Poland in 2022 at producer's prices

Specification	Value of marketed production	
	value (in PLN million)	share in the total value of marketed production of manufacturing products (%)
Manufacture of medical and dental instruments and supplies	5614.6	0.3
Manufacture of pharmaceutical products including:	14 314.6	0.8
▪ basic pharmaceutical preparations	708.9	0.1
▪ pharmaceuticals and other pharmaceutical products	13 605.7	0.7

Source: own study based on databases assigned to a publication by the Statistics Poland [2023].

The value of marketed production of products of the medical and pharmaceutical industry in Poland in 2022 for entities with 10 or more employees is compared in Table 5.1.

The data in Table 5.1 show that the total value of marketed production of medical and pharmaceutical products in Poland in 2022 accounted for only 1.1% of the total value of marketed production of manufacturing products, while the production of pharmaceutical products (PLN 14 314.6 million) was by about 2.6 higher than the production of medical and dental instruments and supplies. At the same time, within the pharmaceutical industry, the low production of basic pharmaceutical preparations compared to the production of pharmaceuticals and other pharmaceutical products indicates that basic pharmaceutical preparations are imported from other countries to Poland. This means that Polish pharmaceutical production is dependent on external supplies, which poses a threat to medicine security. This was clearly demonstrated by the disruption of global value chains as a result of the COVID-19 pandemic crisis.

A more detailed analysis of the products of the medical and pharmaceutical industry in Poland is possible thanks to the data of the Statistics Poland presented in Table 5.2, which is available for entities with 50 or more employees operating in 2022.

According to the data in Table 5.2, the number of business entities employing more than 50 people and operating in 2022 was the same in both categories analysed. However, entities manufacturing pharmaceutical products saw higher numbers in terms of marketed production, employment, monthly salary and gross value of fixed assets. It should be noted that pharmaceutical products, as products for the consumer sector, have much greater economies of scale than medical devices, which mostly include products for the medical service providers sector (doctors' surgeries, hospitals, outpatient clinics, etc.).

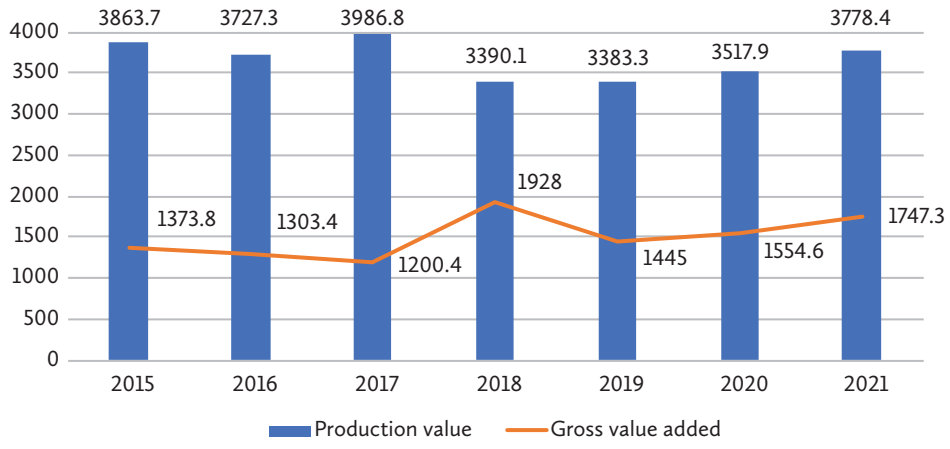
Table 5.2. Characteristics of the medical and pharmaceutical industry in Poland in 2022

Specification	Economic operators	Marketed production (in PLN million)	Average number of employees (in thousand)	Average gross monthly salary (in PLN)	Gross value of fixed assets (in PLN million)
Manufacture of pharmaceutical products	72	16 054.4	25.4	8891.23	13 186.3
Manufacture of medical and dental instruments and supplies	72	6227.9	16.0	6418.91	4170.7

Source: own study based on databases assigned to a publication by the Statistics Poland [2023].

When analysing the medical and pharmaceutical industry in Poland, it is important that the pharmaceutical industry is identified at the level of a section of the Polish Classification of Activities (*Polska Klasyfikacja Działalności* – PKD) whereas the medical device manufacturing industry should be identified at the lower level of a PKD group. As a result, a narrower range of statistical data is available for the latter. A more detailed analysis of the pharmaceutical industry in the context of the dynamic development of production value and gross value added in Poland is possible thanks to Eurostat data (see Figure 5.1).

Figure 5.1. Production value and gross value added of the pharmaceutical industry in Poland (in EUR million, current prices)



Source: own study based on Eurostat databases [nama_10_a64], database last updated on: 7.06.2024, access: 15.06.2024.

According to the data in Figure 5.1, the value of pharmaceuticals produced in Poland remains relatively stable, with a slight decrease from EUR 3863.7 million in 2015 to EUR 3778.4 million in 2021. At the same time, gross value added increased from EUR 1373.8 million to EUR 1747.3 million in 2021. A stable value of pharmaceuticals produced in Poland with a simultaneous increase in gross value added can indicate an increase in production efficiency and better management of production costs. However, Przybyłowski, Świerczyńska, Trębska and Gorzałkowski [2020] point out that the share of the domestic pharmaceutical industry in Polish GDP is declining, which means that this industry is increasingly dependent on foreign supplies. Table 5.3 presents the structure of entities operating in the pharmaceutical industry in 2022.

Table 5.3. Structure of enterprises in the pharmaceutical industry in 2022

Specification	Total	Number of employees (in absolute terms)					
		49 and less	50–99	100–249	250–499	500–999	1000 and more
Number of entities	124	51	22	21	16	10	4
Marketed production (in PLN million)	16 492.7	392.4	691.1	1567.4	3364.7	4731.9	5745.2
Average number of employees (in thousand)	26.5	1.1	1.6	3.2	6.0	6.8	7.8

Source: own study based on databases assigned to a publication by the Statistics Poland [2023].

According to the data in Table 5.3, there were 124 manufacturers of pharmaceutical products in Poland in 2022, responsible for marketed production of over PLN 16 492.7 million. Looking at the size structure of the enterprises in the analysed industry, it can be seen that relatively high results are achieved by small entities with fewer than 49 employees. Their share in the total number of enterprises in 2022 was around 41%. At that time, these entities accounted for only 2.4% of the total value of marketed production in the pharmaceutical industry. Medium-sized companies with 50 to 249 employees accounted for 34.7% of all enterprises and manufactured 13.7% of marketed production. Large companies with more than 250 employees, on the other hand, accounted for the largest share of marketed production in the pharmaceutical industry (84%), although they only accounted for 24.1% of the total number of enterprises. Similar correlations can be observed when analysing the share of employment of the individual groups of enterprises. The share of large enterprises in total employment in the pharmaceutical industry in 2022 was 77.7%, while the share of small and medium-sized enterprises in this case was 4.2% and 18.1% respectively.

5.1.2. Development of medical and pharmaceutical industry in Japan

As one of the world's largest manufacturers of medical devices and pharmaceutical products, Japan remains an important centre of innovation in this industry. There are two regulatory authorities responsible for regulation of medical devices in Japan: Ministry of Health, Labour and Welfare (MHLW) and the Pharmaceuticals and Medical Devices Agency (PMDA). The MHLW is responsible for administrative activities, e.g. guidelines or decisions for product authorisation under the Product Quality, Efficacy and Safety Assurance Act, including pharmaceuticals and medical devices, and for assessing whether a product qualifies as a medical device. On the other hand, the PMDA reviews products and takes safety measures after they have been placed on the Japanese market.

In Japan, medical devices are categorised into four classes depending on the level of risk:

- Class I (very low risk) for devices that are primarily used for diagnosing diseases and where the impact of the accuracy of the information on life support is considered minor, have a standard measurement method and where self-monitoring is easy and the risk associated with the diagnostic information is relatively low.
- Class II (low risk) for devices where the risk associated with the diagnostic information is relatively low when the device is used for diagnosing diseases, etc. and where the impact of the accuracy of the information on life support is considered minor compared to Class III devices and over-the-counter (OTC) devices.
- Class III (medium risk) for devices where the risk associated with the diagnostic information is relatively high when the device is used for diagnosing diseases, etc., and where the impact of the accuracy of the information on life support is considered high.
- Class IV (high risk), for devices that support life or have a direct impact on the functioning of major organs, with a high potential of risk to the patient's health in the event of improper operation or failure.

In order to market medical devices in Japan, a foreign manufacturer must obtain certification or submit a notification through a Japanese marketing authorisation holder (MAH) or a Japanese manufacturer, depending on the level of risk. The procedures required for each category are presented in Table 5.4.

The regulatory framework for medical devices in Japan aims to ensure the safety, efficacy and quality of medical devices available on the market. The classification system categorises devices according to their risk, with higher-risk devices requiring more stringent evaluation and approval procedures. Compliance with technical documentation, QMS system standards and post-market surveillance is critical

to maintaining market authorisation and ensuring patient safety. Regardless of the class of the medical device, the marketing authorisation holder in Japan must ensure its efficacy, safety and quality.

Table 5.4. Four-level risk scale in the procedure for marketing medical devices in Japan

Class	Risk level	Examples	Required procedure
I	very low risk	x-ray film	▪ authorisation of the product is not required, but placing on the market must be notified to the PMDA
II	low risk	catheters	▪ medical devices for which certification standards exist must be certified by a registered certification body ▪ other class II devices must be authorised by the MHLW
III	medium risk	dialysis machine	▪ medical devices for which certification standards exist must be certified by a registered certification body ▪ other class II devices must be authorised by the MHLW
IV	high risk	pacemaker	▪ authorisation by the MHLW

Source: own study based on information from the PMDA [2024].

Japan's medical device industry is characterised by a relatively low rate of concentration, with no single national player controlling the entire sector. There are many small operators, some of which specialise in niche technologies. Japanese medical device manufacturers enjoy a strong position in the areas of diagnostic imaging equipment, therapeutic and surgical devices, monitoring systems and endoscopes. The largest players in terms of sales include Fujifilm, Olympus, Canon Medical Systems, Terumo, and Nipro. The medical devices market is driven by the development of high-tech products and an advanced healthcare infrastructure. For example, the Japanese government has taken various measures to strengthen the healthcare system and provided funding for medical research and development.

Key factors for a successful launch of medical devices in the Japanese market include [Lundin, 2022]:

- understanding of regulatory requirements for authorisation, determining the right reimbursement pathway and identifying a good distribution partner;
- finding a distribution partner and active participation in industry trade shows in Japan;
- involvement of a Key Opinion Leader (KOL) who can help with the market launch in Japan.

The Japanese pharmaceutical market is experiencing a surge in demand for innovative medicines, fuelled by population ageing and an increasing incidence of chronic diseases. Japanese pharmaceutical companies are actively collaborating with artificial intelligence start-ups. The adoption of AI-driven drug discovery techniques

in Japan, including the ability to utilise big data for analytical purposes, is enabling pharmaceutical companies to develop and design pharmaceutical compounds faster. Key factors for the development of the medical AI market in Japan are as follows [Lundin, 2020]:

- increasing availability of healthcare data, including electronic medical records;
- increasing cognitive power of computing technology;
- high healthcare expenditure;
- need to improve coordination between healthcare professionals and patients;
- growing demand for precision medicine;
- shortage of qualified medical professionals;
- ability of AI to improve patient outcomes;
- increase in venture capital funding in the field of artificial medical intelligence.

At the same time, there are a number of challenges currently limiting the development of the Japanese market for medical AI [Lundin, 2020]:

- inadequate regulatory framework and lack of standards against which regulators can assess the quality of digital systems;
- slow progress in the commercialisation of medical AI products;
- reluctance of patients: concerns about artificial intelligence technology, data protection issues;
- limited acceptance by medical professionals (risk of misinterpretation);
- lack of talent in the field of artificial intelligence;
- low interoperability of medical data systems;
- need for clinical validation before the use of algorithms by healthcare providers;
- need for quality assurance mechanisms for AI-based software as a medical device (SaMD);
- ensuring the quality and privacy of data and the security of medical databases;
- gaining the trust of patients and doctors.

The pharmaceutical industry in Japan is highly regulated, as is the medical device industry. This applies to authorisation procedures, quality control, distribution and price maintenance. Although the regulatory authority, PMDA, is increasingly harmonised with international regulations, pharmacodynamic and clinical studies are often required for the Japanese population. Some documents and many consultations require knowledge of the Japanese language and business culture, so Japanese service providers are required [Schmid, 2019]. At the same time, the Japanese pharmaceutical market is one of the largest in the world and open to innovation thanks to participation in many international networks. The data on the number of pharmaceutical manufacturers in enterprises of different sizes in Japan in the period 2015–2021 is shown in Table 5.5.

Table 5.5. Number of pharmaceutical manufacturers by number of employees in Japan, 2015–2021

Year	Number of pharmaceutical manufacturers by number of employees							
	1–10	11–50	51–100	101–300	301–1000	1001–3000	more than 3000	**total**
2015	24	61	28	72	70	44	29	**328**
2016	19	55	31	72	68	41	30	**316**
2017	22	60	33	68	65	45	28	**321**
2018	20	51	29	74	73	45	26	**318**
2019	24	46	33	64	68	42	29	**306**
2020	26	51	35	72	68	41	28	**321**
2021	19	64	31	69	73	45	29	**330**

Source: own study based on databases by e-Stat [2024] and Japan Pharmaceutical Manufacturers Association [2024].

According to the data in Table 5.5, the number of pharmaceutical manufacturers fluctuated in the period 2015–2021, but the total number of manufacturers remained relatively stable, with slight differences from year to year. The lowest total number of manufacturers was recorded in 2019 (306), and the highest in 2021 (330). The biggest changes in the number of manufacturers are seen in the two categories with the lowest number of employees (1–10 and 11–50 employees), while the number of large manufacturers remains more stable.

Data on sales of pharmaceutical products in Japan in the period 2015–2021 is shown in Table 5.6. It is notable that, in contrast to other OECD countries, no statistical data for Poland is available in this database. Consequently, comparisons between Japan and Poland on this basis are not possible.

Table 5.6. Sales of pharmaceutical products in Japan in 2015–2021

	2015	2016	2017	2018	2019	2020	2021
Total sales of pharmaceutical products (in USD million, at exchange rate)	77 228.4	87 553.3	87 437.9	70 638.5	62 200	55 749.3	60 885
Sales of pharmaceutical products (in USD per capita, at exchange rate)	438.6	479.7	472.9	494.7	690	687.8	666.5

Source: data from the OECD.Stat Pharmaceutical Market database.

An analysis of the data in Table 5.6 shows that both total sales and per capita sales fluctuated in the years 2015–2021. Particularly striking is the decline in total sales of pharmaceuticals from USD 77 228.4 million in 2015 to USD 60 885 million in 2021.

This is influenced by complex regulatory and pricing processes as well as regular price cuts, which make it difficult for pharmaceutical companies to introduce new innovative products. In addition, pharmaceutical companies' profit margins are negatively impacted by the subsidisation of generic drugs, which was adopted by the government in 2007 to reduce healthcare spending in Japan. Generic drugs are specific therapeutic agents that are offered by alternative manufacturers after patent protection has expired – usually at a lower price than the original manufacturers who marketed the drug. The share of generic drugs on the Japanese market has more than doubled in the last ten years and continues to grow.

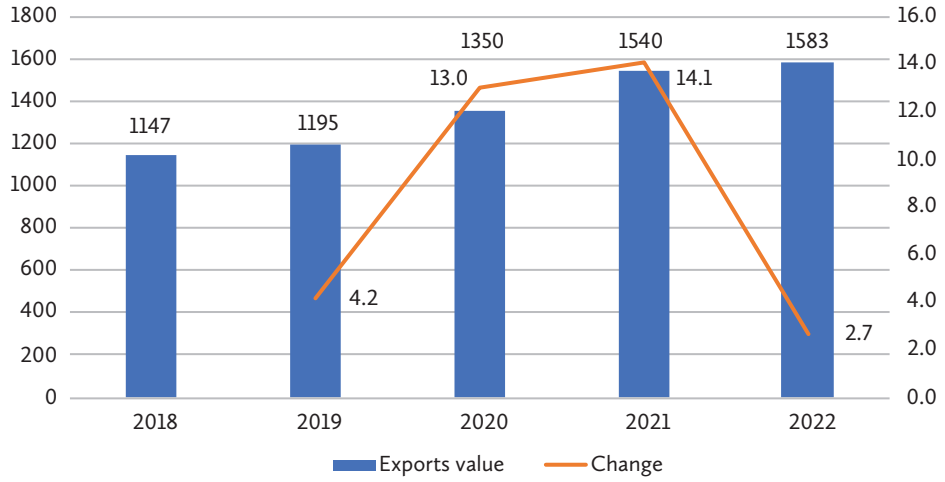
When analysing the possibilities of entering the medical and pharmaceutical market in Japan, one should bear in mind the strong regulation of this market. The Japanese regulatory process is generally lengthy and costly. All documents and regulations are in Japanese, as are required applications. Numerous questions and constant requests for additional information often arise during the regulatory process, so the handling of the regulatory process requires patience and an experienced local partner. In addition, several domestic Japanese manufacturers have extensive experience and market strength, resulting in strong competition [Eriksson, 2021].

5.2. Development trends of the medical and pharmaceutical industry and the potential for expansion of cooperation between Poland and Japan

The medical and pharmaceutical industry is one of the most dynamically developing sectors with a high intensity of expenditure on research and development activities. According to the classification of the World Trade Organization (WTO), products of the medical and pharmaceutical industry are divided into four groups: pharmaceutical products, medical devices and other medical technology products, medical consumer goods, and personal protective equipment [WTO, 2023]. The strategic importance of these products for the medical and pharmaceutical industry stems from the fact that they are crucial for the health and well-being of society. In the first decade of the 21st century, the medical and pharmaceutical industry underwent dynamic structural changes caused by rapid technological development, and this process was accompanied by institutional adjustments [Munos, 2009]. The COVID-19 pandemic was one of the shocks that led changes in the functioning of value chains in this industry, which required adjustments at the level of enterprises and market structure [Mikic, Puutio, Gallagher, 2020]. However, the pandemic was an important factor in the dynamisation of trade in the medical and pharmaceutical industry and changed current trends. Goods

in the medical and pharmaceutical industry, which accounted for 6.4% of total world trade in 2018, increased their share to 8.3% in 2020 [WTO, 2023]. According to the WTO, the sharp increase in international trade in the medical and pharmaceutical industry during the pandemic was mainly the result of the intensification of trade in personal protective equipment and pharmaceutical products. This positive trend continued in 2021 with a further 14.1% increase in trade in medical devices, mainly due to a significant increase in pharmaceutical exports. In 2022, exports grew by a mere 2.7% and the share of medical devices in total world trade in goods returned to pre-pandemic levels, falling to 6.9% [WTO, 2023] (see Figure 5.2).

Figure 5.2. Worldwide export of products of the medical and pharmaceutical industry in 2018–2022 (left axis: in USD billion; right axis: % change)



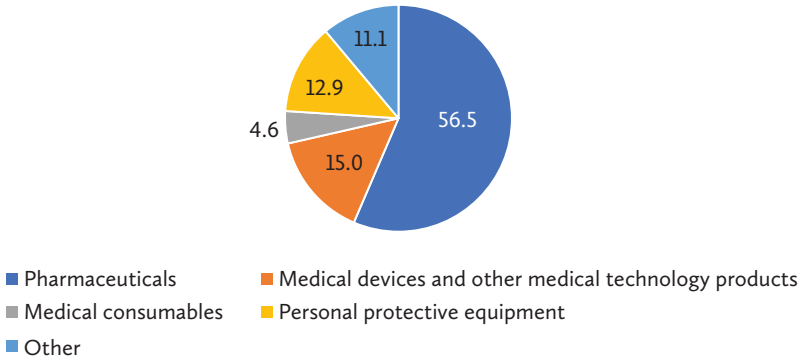
Source: own study based on: WTO [2023].

Pharmaceuticals are the largest product group in the global exports of the medical and pharmaceutical industry. Their share in the exports of the industry as a whole exceeds 56% and even increased slightly (by 2 percentage points) in the period 2018–2022. The second largest product group in terms of the industry's share of international trade is medical devices and instruments (15% in 2022). This is followed by personal protective equipment (12%), medical consumables (5%), and the rest are other medical devices [WTO, 2023] (see Figure 5.3).

The world's largest exporters of medical and pharmaceutical products are Germany, the United States, China, Belgium and Switzerland. The majority of global imports are dominated by the same countries, but in a slightly different order, namely the United States, Germany, Belgium, China and the Netherlands [WTO, 2023].

The potential for the development of the industry and the expansion of sales of medical and pharmaceutical products on international markets depends on the harmonisation of norms and standards. Despite some progress in this area in recent years, this process has been slow. There are still different regulations in different countries, which affects the possibilities of international cooperation [Wiktorowicz, Moscou, Lexchin, 2018].

Figure 5.3. Structure of global exports of medical and pharmaceutical products in 2022 (export shares of the entire industry in %)



Source: own study based on: WTO [2023].

A comparison of the position of Poland and Japan in global trade in medical and pharmaceutical goods shows that both countries rank relatively high as both exporters and importers. Japan ranks 6th as a global importer and 12th as a global exporter of these products. According to WTO estimates, imports of medical and pharmaceutical products to Japan totalled around USD 70 billion in 2022, which was around 25% above the pre-pandemic level. The most important and fastest-growing group of medical and pharmaceutical industry products when it came to Japanese imports of this product group were pharmaceuticals, which accounted for around 57% of total imports of products in this industry in 2022. Another important product group in Japanese imports of this industry was medical devices (about 19% of the industry's imports), including one third of orthopaedic devices.

Japanese exports of medical and pharmaceutical industry products are more than half lower than imports of this industry (about USD 30 billion in 2022), but they were gradually increasing in 2019–2022. In 2022, these exports were about 10% higher than in 2019. Japan's main export items in this industry are medical devices and other medical technology products (almost 40% of the industry's exports in 2022), pharmaceuticals (25%) and personal protective equipment (24%).

According to the WTO [2023], Poland also ranks high in international trade in the medical and pharmaceutical industry (16th in imports and 20th in exports), but much lower than Japan. In 2022, Polish imports in this industry totalled USD 10 billion, an increase of one third since 2019. Polish exports in the medical and pharmaceutical industry also grew at the same pace in the period 2019–2022, reaching USD 5.6 billion in 2022. The most important items of Polish exports in this industry are pharmaceuticals (33% in 2022 with an upward trend), medical devices (27%), including orthopaedic devices (with a share of 11% in total exports of the medical and pharmaceutical industry), and personal protective equipment (24%). Polish imports in the sector are also dominated by pharmaceuticals (over 55% of imports) and personal protective equipment (23%). Medical devices accounted for around 13% of Polish imports in this industry in 2022, although the share decreased slightly compared to 2019.

The dominance of pharmaceuticals in the global trade of the industry's products and in the trade of both Poland and Japan has prompted us to characterise the trade in these products in more detail. Interesting conclusions can be drawn from the analysis of global value chains in the pharmaceutical industry [Reis, Pinto, 2021]. This analysis is based on indicators that characterise the structure of global production of pharmaceutical products, employment, wages, international trade in pharmaceuticals and intellectual property in the industry, taking into account pricing trends. The global production and trading centres of the pharmaceutical industry that specialise in high value-added goods are: the United States, Switzerland and Germany. Poland, like China, India, Mexico and Hungary, is an important exporter of pharmaceutical products and uses the low production costs as a competitive factor. However, these countries are not production centres, and a characteristic feature of exports is the high proportion of foreign value added in the exported pharmaceutical products. Ireland, Israel, Singapore, Austria, Canada, Italy and Spain lie between the centre and the periphery, as they are strong exporters and importers of pharmaceutical products with a medium share of foreign value added in their exports and benefit from surpluses in intellectual property disposal fees. Japan, on the other hand, has a different structure of international relations in the area of trade with pharmaceutical products. On the one hand, Japan is a country with a high proportion of domestic value added in its exports; on the other hand, it imports relatively more expensive pharmaceutical products and produces and exports less, focusing on those that belong to the cheaper group. Therefore, Japan acts as a sales market for foreign pharmaceuticals to a greater extent than their suppliers [Reis, Pinto, 2021]. As the survey research shows, the most important factors for the competitiveness of pharmaceutical companies are human capital and government policies related to this industry [Shabaninejad, Mehralian, Rashidian, Baratimarnani, Rasekh, 2014].

The above remarks on global trade in medical and pharmaceutical industry products point to specific areas where the potential for Polish-Japanese cooperation in this industry can be sought. An analysis of the volume of bilateral Polish-Japanese trade in goods from this sector will make it possible to identify current trends and opportunities for intensifying cooperation in this area. The detailed analysis will therefore cover pharmaceuticals and medical devices, including orthopaedic devices, which play an important role both in Polish exports in this industry and in Japanese imports. This raises the question of what role these product groups play in bilateral trade between Poland and Japan. According to calculations based on data from the International Trade Centre (ITC), the share of medical and pharmaceutical industry products in Polish exports to Japan increased from 1.8% to 4.5% in the period 2015–2022. In the case of Polish imports from Japan, the share of these products fluctuated around 2.5% and fell slightly in the period analysed (see Table 5.7).

Table 5.7. Most important product groups in the medical and pharmaceutical industry – shares of Polish exports to Japan and Polish imports from Japan (%)

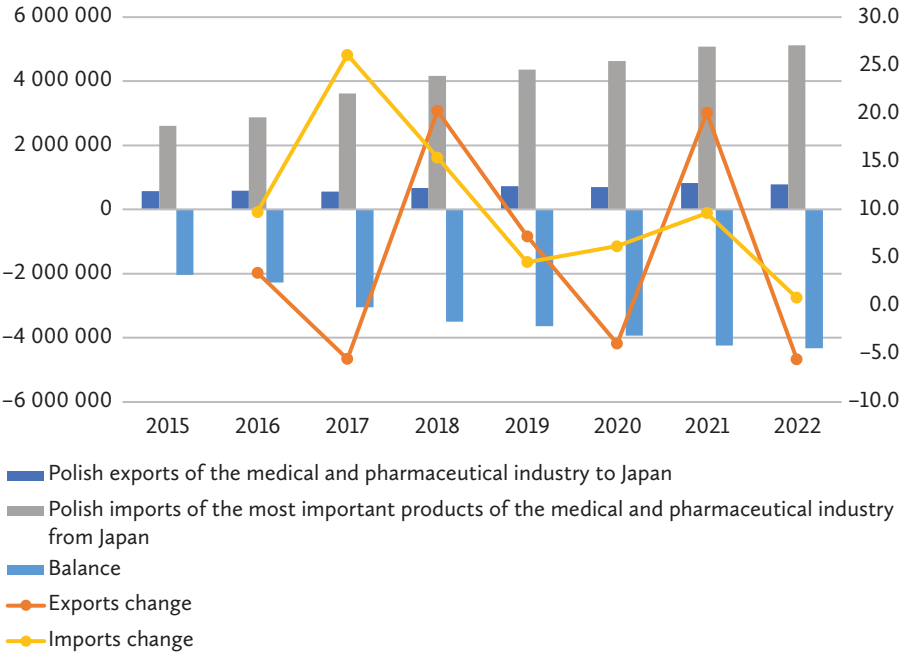
HS code	Name	Share in Polish exports to Japan			Share in Polish imports from Japan		
		2015	2019	2022	2015	2019	2022
30	Pharmaceuticals	0.3	0.5	0.4	0.6	0.4	0.8
9018	Medical, surgical, dental or veterinary instruments and appliances	1.3	0.8	0.9	2.1	1.3	1.1
9021	Orthopaedic appliances, including crutches, surgical belts and trusses; fracture splints and other	0.2	0.7	3.1	0.2	0.0	0.1
Total		1.8	2.0	4.5	2.9	1.7	1.9

Source: own study based on: ITC [2024].

A more detailed comparison of Polish imports from (and exports to) Japan in relation to the most important groups of medical and pharmaceutical products shows the leading trends in bilateral trade in these goods (see Figures 5.4 and 5.5 A, B, C). First, the gradual increase in Polish exports of the industry's products to Japan from USD 571 million to around USD 830 million should be emphasised. However, this growth slowed down from 2015 to 2021. In 2022, on the other hand, the value of exports from this sector fell slightly to USD 784 million. The development of exports varied for different product groups that make up the industry (cf. Figures 5.5 A, B, C; a more comprehensive analysis of the data presented in the figures is included further on in the chapter). Second, Polish imports from Japan had been increasing over the

entire period analysed, from USD 2613 million in 2015 to USD 5119 million in 2022. As with imports, the growth had gradually weakened. Third, Poland's deficit in trade in medical and pharmaceutical products had widened due to the significant imbalance between Polish exports of these products to Japan and their imports from Japan to Poland (see Figure 5.4).

Figure 5.4. Bilateral Polish-Japanese trade in key products of the medical and pharmaceutical industry (left axis: value in USD thousand; right axis: % change) in 2015–2022



Note: the list includes three main groups of medical and pharmaceutical devices with codes HS30 (Pharmaceuticals), HS9018 (Medical, surgical, dental or veterinary instruments and appliances), HS9021 (Orthopaedic appliances, including crutches, surgical belts and trusses; splints and other).

Source: own study based on: ITC [2024].

Among the medical and pharmaceutical products exported by Poland, the most important item in 2022 was orthopaedic appliances. Exports of this product group increased sharply from USD 1 346 000 in 2015 to USD 24 462 000 in 2022 (see Figure 5.5A), and the share of total Polish exports to Japan increased from 0.2% to 3.1% in the period 2015–2022 (see Table 5.7). The second important product group in Polish exports to Japan are medical, surgical, dental or veterinary instruments and appliances, but their share in total Polish exports to Japan decreased from 1.3% in 2015 to 0.9% in 2022. The trends in export value varied over the period 2015–2022. Polish exports of these

products increased rapidly in the period 2015–2017 (from USD 7 156 000 to USD 12 002 000) and, after a sharp decline by more than half in 2018 to USD 5 692 000, gradually increased to USD 7 314 000 in 2022 (see Figure 5.5B).

Similar trends in changes in Poland's exports to Japan concern the third product group in the medical and pharmaceutical industry: pharmaceuticals. This product group had a relatively stable share in Polish exports (0.3–0.5%; see Table 5.7), but the trends in changes in export value varied significantly in the years 2015–2022. Polish exports of pharmaceuticals increased more than fourfold in 2015–2017 (from USD 1 731 000 to USD 9 563 000) and then, after the fluctuations in 2018–2021, reached USD 3 863 000 in 2022 (see Figure 5.5C).

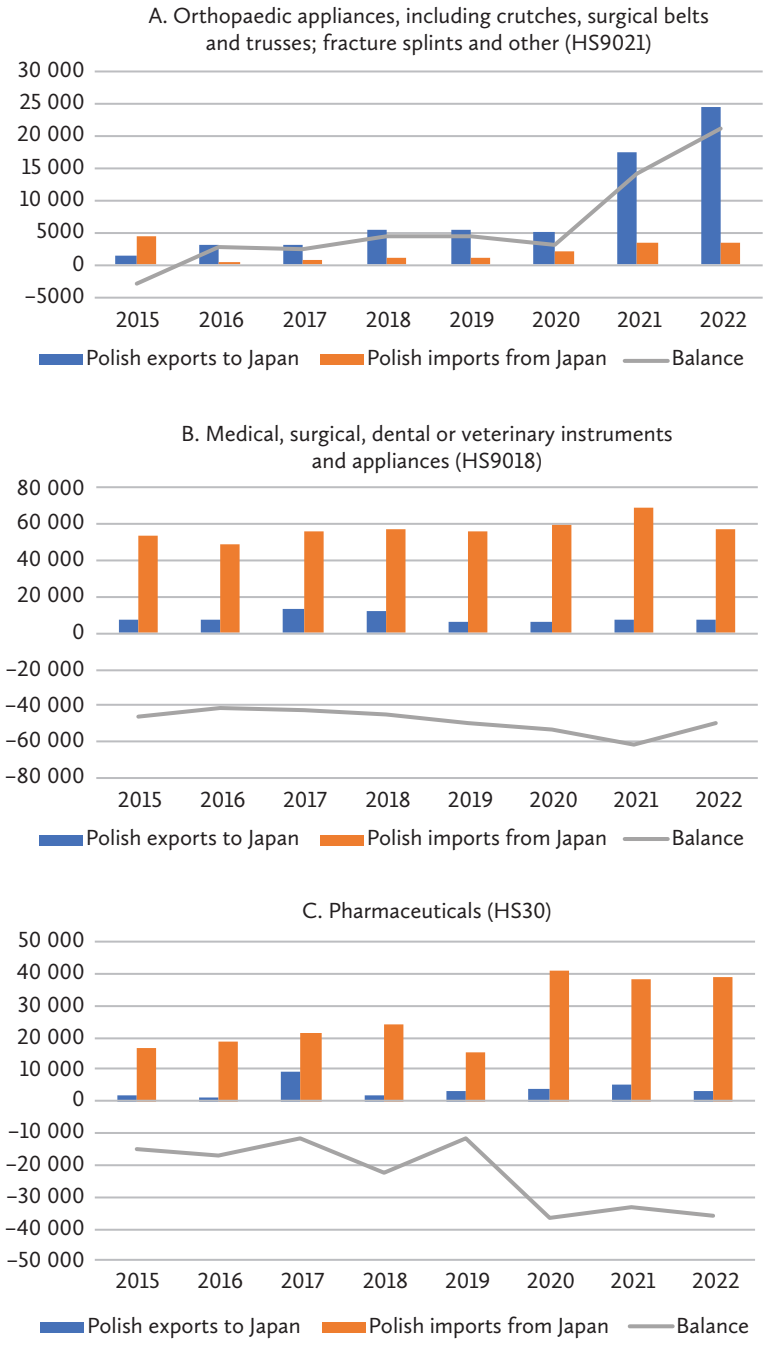
The most important of the three analysed product groups in the Polish medical and pharmaceutical industry's imports from Japan are medical, surgical, dental or veterinary instruments and appliances. However, their share in bilateral imports decreased from 2.1% in 2015 to 1.1% in 2022 (see Table 5.7). Imports from Japan to Poland totalled USD 57 million in 2022, up from USD 53.7 million in 2015.

Pharmaceuticals are the second product group in the medical and pharmaceutical industry in terms of the value of Polish imports from Japan (see Figure 5.5C). In the period 2015–2022, these imports more than doubled from USD 16.6 million to USD 39.2 million. As a result of faster growth rate of pharmaceutical imports from Japan compared to Polish exports to this market, the trade deficit in this product group had grown.

Orthopaedic devices are the third most important product group in the medical and pharmaceutical industry, which is of crucial importance for Polish-Japanese bilateral trade. As mentioned above, this is the most important group in Polish exports of the industry to Japan, while its weight in imports from Japan to Poland is relatively low (about USD 3–4 million). Consequently, Poland has a significant and growing surplus in this product group in bilateral trade with Japan (see Figure 5.5A).

The above analysis of previous trends in Poland's bilateral trade with Japan in medical and pharmaceutical goods seems to indicate that the greatest potential for the development of Poland's cooperation with Japan in this industry can be seen in Polish exports of orthopaedic devices and trade in pharmaceuticals. This is indicated not only by relatively large shares of these product groups in mutual trade, but also by the growing dynamism of this trade. An additional argument in favour of the potential in trade with orthopaedic devices with Japan is its large and growing demand for these products (cf. the comments on the importance of orthopaedic devices in Japanese imports) and the ageing of the Japanese population. The latter factor applies to Poland as well and will also determine the growing demand for all industrial products in both countries, especially for pharmaceuticals.

Figure 5.5. Trade between Poland and Japan in key products of the medical and pharmaceutical industry, 2015–2022 (in USD thousand)



Source: own study based on: ITC [2024].

Summary and conclusions

The analysis of the development of the medical and pharmaceutical industry shows considerable, but still underutilised potential for the development of mutual business and R&D relationships between Poland and Japan. The industry, which is crucial for the health and well-being of the population of both countries, plays a strategic role in the economy. In Poland, the pharmaceutical industry and medical devices manufacturing underwent major changes after the political transition in the early 1990s. New developments included privatisation of companies and harmonisation of regulations with EU standards, which facilitated exports. Low production of basic pharmaceutical preparations and dependence on imports present a challenge to the country's medicine security. Japan is one of the world's largest manufacturers of medical devices and pharmaceuticals and has a highly regulated market with advanced infrastructure and innovative technologies. The process of registration and regulation of medical devices in Japan is complex and expensive, which requires experience and a local partner.

Based on the analysis of the medical and pharmaceutical industry trade, the following conclusions can be drawn:

- The medical and pharmaceutical industry is of strategic importance in the economy due to its key role for the health and well-being of society.
- Both Japan and Poland are among the top twenty exporters and importers of this industry worldwide. Both countries rank higher as importers (Japan – 6th place; Poland – 16th place) than as exporters (12th and 20th place respectively), with Japan occupying a relatively stronger position than Poland in international trade in products from this industry.
- Pharmaceutical products play an important role in the global trade of both countries, but the export characteristics of pharmaceuticals are different for Poland and for Japan. Japan has a high share of domestic value added in exports, while Poland has a relatively higher share of foreign value added in exports, and our country's trade advantages are largely due to lower costs.
- In Poland's bilateral trade with Japan, the share of medical and pharmaceutical products is gradually increasing, but is still of minor importance. In Polish exports to Japan, the share of products from this industry increased from 1.8% in 2015 to 4.5% in 2022, while in Polish imports from Japan the share of these products was stable and fluctuated around 2.5%.
- The most important product group of this industry in Polish exports to Japan is orthopaedic equipment, and in Polish imports from Japan – medical, surgical, dental or veterinary instruments and devices as well as pharmaceuticals.

- Poland's bilateral cooperation with Japan in the medical and pharmaceutical industry may have potential in terms of trade in pharmaceuticals and medical devices, in particular orthopaedics. Orthopaedic devices and their exports from Poland to Japan are characterised by the highest growth dynamics compared to other product groups in the medical and pharmaceutical industry. Pharmaceuticals, on the other hand, could be an interesting area for cooperation, as the export structures of both countries complement each other with regard to this product group and demand in both countries is increasing, partly due to population ageing.

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Chapter 6

Cooperation between Poland and Japan in the agri-food industry

Lidia Danik, Małgorzata Stefania Lewandowska

Introduction

The agri-food industry (a branch of production encompassing the processing of agricultural products to foods and substances) plays a key role in the economy of numerous countries, directly translating to the food safety and quality of life of consumers. In the age of globalisation, changing climate conditions, technological innovations and growing consumer expectations, this industry is facing multiple challenges and opportunities at the same time. Despite geographical and cultural differences, Poland and Japan share common goals related to the development of the agri-food industry.

In Poland, the dynamic growth of that industry is supported by technological innovations and the growing effectiveness of production. Japan faces challenges arising out of dwindling crop area and population ageing, which forces it to increase food imports. In the context of global trends such as sustainable agriculture, digitisation and robotisation, cooperation between Poland and Japan may bring mutual benefits for the countries.

The chapter analyses the current state and development trends of the agri-food industry in both countries, presents the structure of the agricultural sector in Poland, situation in the market of food products in Japan, the level of trade, and identifies main challenges and opportunities for cooperation between both countries.

6.1. Development of the agri-food industry in Poland and Japan

6.1.1. Development of the agri-food industry in Poland

Poland is among the biggest European food producers. Over the past 15 years, the country has considerably improved its effectiveness and added value in the agricultural sector at current prices. As regards cereals, in 2022 Poland accounted for 12.9% of the EU production, with potatoes at 12.7%, carrots at 14%, cucumbers at 18.8%, apples at 34%, poultry at 21%, and cheese at 9%. Poland also has a considerable share in the EU processing of food and beverage production. Polish employees account for 9.9% of EU inhabitants employed in that industry, and the share of Poland in the resulting added value is 5.7%.[1] In terms of net exports of agricultural, food and beverage products, Poland (with EUR 12.5 billion in trade surplus) ranks third in the European Union, as a runner up to the Netherlands (EUR 35.5 billion in surplus) and Spain (EUR 15.1 billion), where the high surplus of the Netherlands mainly follows the fact that many goods imported to that country are then re-exported to other Member States of the EU [Eurostat, 2023a]. The share of the money spent on food in the consumption expenditure of Polish households is 16.3% for foods (EU average of 12.2%), 3.6% for alcoholic beverages (EU average of 1.6%), 3% for catering services (EU average of 6.7%), and 2.3% for non-alcoholic beverages (EU average of 1.3%) [Eurostat, 2024].

Polish agriculture is mainly based on family-owned farms, where human work is a major factor of production. The level of technical equipment of the farms is below the European Union's average. These factors, combined with low innovativeness and fragmented structure, translate to a relatively limited productivity of around 70% of the EU average [PKO Bank Polski, 2023]. The share of organic crops in Poland in total crops is just below 4% [Eurostat, 2023b]. Retail sales of organic agricultural products in Poland are negligible (EUR 310 million) compared to leaders such as Germany (EUR 15.31 billion) and France (EUR 12.076 billion) [Statista, 2022].

6.1.2. Development of the agri-food industry in Japan

A progressing drop in the crop area over the past decades combined with a shortage of workforce in agriculture and dietary changes have contributed to increased imports of foods to Japan. In 2022, Japan's self-sufficiency in terms of food stood at a mere 38% in terms of caloric content and 58% in terms of production value. Since demand exceeds domestic production capacity, import indicators for products such as potatoes,

[1] This value points to the low productivity of the Polish food industry.

fruit, beef, plant oils, dairy and milk products have been growing. When it comes to fruit and vegetables, import indicators increase despite a drop in consumption per inhabitant because production falls even faster. As regards products such as beef or dairy, consumption grows and drives imports [Satake, 2022]. The goal of the Master Plan for Foods, Agriculture and Rural Areas until 2030 is to increase such indicators to 45% and 75% respectively [JIRCAS, 2024].

6.2. Development trends of the agri-food industry and the potential for expansion of cooperation between Poland and Japan

Traditional Japanese diet is rich in natural, unprocessed, high-quality products. Popular foods include fish, vegetables, seaweed, soy and soy products, and obviously rice, also in the processed form (it is the basic ingredient of rice vinegar, sake and many products made from rice flour). Moderation and food processing techniques such as steaming, stewing or grilling are appreciated. On the other hand, Polish traditional cuisine is largely based on meat, dairy products and vegetables such as potatoes, beets, cabbage and onion, as well as pickled vegetables. Poles often eat fried, stewed and boiled foods.

Agri-food companies operate in a dynamic and unpredictable environment marked by constant macroeconomic and political changes, an increasing business risk, and an excess of often contradictory information. At the same time, constant changes in consumer lifestyle and consumer shopping preferences have been observed. In this context, long-term forecasts conducted by such entities often prove to be imprecise [Gajewski, Paprocki, Pieriegud, 2015]. Organisations willing to improve their preparation for changes in their environment and to respond in a flexible manner to such changes have been increasingly using methods such as scenarios, foresight research and megatrend analysis. The purpose of these tools is not to predict the future precisely but rather to help understand possible directions of development and evaluate an organisation's ability to adapt [Weresa, Kowalski, Lewandowska, 2023].

Trends must be analysed over various timeframes. The 'now' horizon involves the current trends in the market which many businesses respond to by undertaking investment, marketing and other activities. The 'new' horizon is a short-term horizon (1–5 years) that covers trends to which the businesses respond to a limited extent. The 'next' horizon covers the medium term (5–15 years) and involves trends that have just started to develop. The 'beyond' horizon is a long-term horizon (15+ years) that mainly focuses on technological trends [Infuture Institute, 2024]. Details on the trends important for the development of agri-food industry are presented in Table 6.1.

The global trend, described as a growing trend, destined to become more meaningful over the next 5 years, is the sustainable agriculture trend, or an increase in the agricultural output with the minimised negative impact of the industry on the environment or inefficient use of natural resources for crops, mainly water. The goal is to ensure food security and the widest possible access to high-quality food [PWC, 2022]. Because of its reach, it could be deemed global, but given various factors, it may be of greater or lower importance. It encompasses countries such as Australia, China, Denmark, France, the Netherlands, Japan, Canada, Germany, Sweden, Great Britain, the United States.

6.2.1. Development trends and challenges for the Polish agri-food industry

In Poland, the sustainable agriculture trend has been on the rise, especially in the Dolnośląskie, Kujawsko-Pomorskie, Łódzkie, Mazowieckie, Opolskie, Podlaskie, Warmińsko-Mazurskie, Wielkopolskie, Świętokrzyskie and Zachodniopomorskie voivodeships [PWC, 2022]. Factors determining it include growing demand for food (by 2050, the production of virtually all popular cereals, sugar, soybeans and cassava is expected to increase); growing demand for organic products; changes in food preferences and consumers moving away from certain categories, such as meat; development of modern, environmentally-friendly fertilizers; growing awareness of environmental protection and the need to rationalise the use of natural resources in crops; legal regulations [PWC, 2022]. Development of sustainable agriculture will be supported by new technologies such as biotechnology, artificial intelligence, robotisation and automation [Dziemianowicz, Jurkiewicz, 2023]. In this context, Table 6.1 at the end of this chapter presents a classification of several dominant global trends with their description, time frame, causes, consequences and supporting technologies.

Poland has also seen, in one respect, an increase in the consumption of unhealthy food, such as sweets, salty snacks, fast food; yet at the same time there has been a growth in the consumption of cereal products considered health-promoting and rich in dietary fibre (such as whole-grain bread and pasta, oatmeal flakes, bran), vegetables, dry legumes, and vegetarian dishes. More aware consumers have been cutting down on their consumption of meat, cold cuts, fish and dairy products [Białek-Dratwa et al., 2023]. Italian, French and Chinese cuisine is popular in both countries. Poles appreciate Japanese cuisine, although they mainly associate it with sushi. Tokyo and Warsaw ranked 11th and 12th respectively in the ranking of most vegan-friendly cities in 2024 [Happy Cow, 2024].

To meet the growing expectations of consumers and competition in the global market, the Polish agri-food industry has to face major challenges, such as:

- **Digitisation of agriculture**, which comprises, among others, solutions related to GPS control of machinery; monitoring of the phytosanitary condition of crops;

measurements of physiological properties of crops; optimisation of plant nutrition; real-time monitoring; shortened supply chains; use of geofencing for crops and for preparation of the soil and use of fertilizers, etc.; management of the work and work reporting in every dimension [PKO Bank Polski, 2023].

- **Adjustment of agriculture to increasingly more demanding legal standards and the European Green Deal** – a strategy adopted by the EU in 2019 that assumes a green, low-emission economy in all industries [European Commission, 2019]. The European Green Deal puts forward measures such as restricted use of pesticides, fertilizers, and plant protection products, an increased area of ecological crops and stimulating a change in nutritional habits of Europeans. The implementation of the Green Deal provisions may result in a considerable reduction in crop productivity, a drop in production and consequently an increase in prices [Matyka et al., 2022]. On the other hand, it fits the expectations of Polish consumers, with 63% of them claiming that they prefer products that are not harmful to plants and animals and 58% insisting that products made of wood and paper not contribute to deforestation [Michalak, 2023].
- **Environmental impact must be reported** by companies which hire at least 250 persons in accordance with the Corporate Sustainability Reporting Directive (CSRD).
- **Major fragmentation of farms** – the average area of arable land per farm in 2020 was 11.35 ha (9.85 ha in 2010) [Statistics Poland, 2022, p. 33].
- **The need to replace harmful chemical methods of food preservation** with safer solutions, such as ionisation or microwave preservation [Słodzinka, 2023].
- **Development of biotechnology** supporting the production of meat-imitating plant protein [Słodzinka, 2023].
- **Development of new food products** enriched in the food process to include additional ingredients (vitamins, microelements, etc.) in a natural way, e.g. by way of fermentation [Słodzinka, 2023].

The Russian invasion of Ukraine in February 2022 has also considerably affected the agri-food industry and its surroundings. On the one hand, it has led to an increase in prices of energy and inflation, and on the other hand to shortages of certain raw materials at the first stages of the war, and the consequent flooding of the Polish market with Ukrainian grain. At present, it is difficult to forecast the long-term impact of the war on the Polish market.

6.2.2. Development trends of the Japanese agri-food industry

Besides a rapid development of technologies and their impact on the development of agriculture and the food industry, changes in consumer behaviour and purchasing preferences have been observed in Japan. Greater significance has been attached to

sustainable food, in line with global trends, with decreased consumption of plant-based food and fish. Meanwhile, consumption of bread, dairy products, fats and food of animal origin has been increasing, which points to the westernisation of the diet in that country [Murakami, Livingstone, Sasaki, 2018]. The popularity of RTD, ready to drink beverages, has been on the rise [Mordor Intelligence, 2024]. These challenges for the industry have translated to increased imports of foreign food [Satake, 2022].

Challenges and issues of the agri-food industry in Japan include:

- **Population ageing** (the average age of people self-employed in agriculture is 65) and **lack of workforce**, in particular self-employed, as well as seasonal workers at the peak of the season in agriculture [Yoshikawa, 2024] and in the food industry.
- **Dwindling acreage of arable land**. Today, Japan has around 3.2 million ha of crops, of which 1.7 million ha are used to grow rice and wheat. It is estimated that Japan will have to allot 1.13 million ha of land for cultivation to maintain the import of such crops in 2040 at the present level. However, it is estimated that until then only 0.77 million ha will be cultivated, which translates to a shortage of 0.36 million ha [Hirano, Takekawa, 2024].
- **Fragmentation of agriculture** and difficulty in accumulating plots to carry out large-scale farming [Hirano, Takekawa, 2024].
- **Climate change**, also outside of Japan, that may endanger the security of Japan's food supplies [Goedde, Denis, Tanaka, Yamada, Nakada, 2017].
- **Limited supply of rice** in global markets [Galvan, 2024].
- **Very high food quality requirements** of the Japanese market, which reduce the number of potential markets from which Japan can import food [Goedde et al., 2017].
- **Drop of Japan's share in the global GDP** and the related drop in purchasing power that may make it difficult to find food suppliers [Goedde et al., 2017].
- **Growing food quality-related consumer requirements**, more demand for fresh and organic foods, specialised or premium foods (e.g. gourmet coffee, exotic flavoured salt, products resulting from natural fermentation) [SME Japan, 2023].

6.2.3. Potential for Polish-Japanese cooperation

Although the challenges and difficulties related to agriculture in Poland and Japan are of different nature, in both cases, digitisation and robotisation seem to be a remedy to some of the problems (in Poland these could be the solutions to issues with respect to low output and detailed objectives of the Common Agricultural Policy, especially economic, environmental, climate and rural area issues, while in Japan such measures could deal with the lack of workforce). In 2019, Japan's Ministry of Agriculture, Forestry and Fisheries (MAFF) announced a business expansion strategy for smart agriculture

technologies and services. The Ministry has cooperated with private companies, universities and research institutes to achieve a reduction in labour intensity in agriculture while retaining the quality of agricultural production. As part of a widespread pilot run, a total of 205 pilot projects in the field of smart agricultural technologies and services were launched to present them and seek new opportunities [Jie, Teruaki, Yoshihiro, Alwarritzi, 2023; MAFF, 2022]. The modernisation of agriculture and rural areas by supporting and spreading knowledge, innovation and digitalisation is also the main goal of the EU's Common Agricultural Policy for 2023–2027 [European Commission, 2024]. This has created a favourable framework for cooperation between Polish and Japanese companies and institutions which have been developing and offering new solutions in this field.

Based on analyses, by 2040 Japan will have to increase imports of grain by 2 million tons [Hirano, Takekawa, 2024], which opens up new export opportunities for Polish farmers. Also, more processed high-quality food, especially organic and craft food, is an attractive offer for Japanese buyers.

Food exports to Japan involve a series of challenges, especially the extremely high-quality requirements from the Japanese. Key legislation that regulates the market of agri-food products (including imported products) includes:

- Food Safety Basic Act [2003]. The Act establishes rules on food safety and defines the role of the Food Safety Commission (FSC), the body that assesses food risks.
- Food Sanitation Act [1947]. The goal of this Act is to protect public health by ensuring safety and sanitation of food and beverages. The Act establishes specifications and standards for food and beverages, food equipment, food containers and packaging, additives, contaminants and residues of agrochemicals; it also prohibits the sale and import of food and drinks containing harmful substances (responsible institution: Ministry of Health, Labour and Welfare – MHLW).
- Food Labeling Act [2013]. This Act establishes food labelling standards, as well as fines in the event of non-compliance (responsible institution: Consumer Affairs Agency).[2]
- Plant Protection Act [1950]. The goal of the Act is to prevent the occurrence or spread of plant pests and diseases in Japan (responsible institution: MAFF).
- Act on Domestic Animal Infectious Diseases Control [1951]. The purpose of the Act is to prevent the occurrence or spread of contagious animal diseases in Japan (responsible institution: MAFF).
- Health Promotion Act [健康増進法, 2002]. The purpose of the Act is to improve public health by establishing guidelines and measures, including those on nutrition

2 Food labelling guidelines can be found on the Consumer Affairs Agency website [2024].

management. The Act establishes a labelling system for "Food for Special Dietary Use" for specific groups, such as infants, children, pregnant women and ill people (responsible institution: MHLW).

- Act on Japanese Agricultural Standards [1950]. The Act establishes a voluntary quality assurance system for food, non-alcoholic beverages, and forest products [USDA / Foreign Agricultural Service, 2022].

The legal framework for the agri-food industry in Poland is composed of Polish and EU regulations, one of the most restrictive regulations in the world, as well as industry regulations, such as the Code of Good Advertising Practices for Food Supplements [Polish Council for Supplements and Nutritional Foods, 2019]. Key legal acts[3] in this field include:

- Regulation (EC) No. 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety (OJ L 31/1, 1.02.2002).
- European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste (OJ L 365/10, 31.12.1994).
- Regulation (EC) No. 853/2004 of the European Parliament and of the Council of 29 April 2004 laying down specific hygiene rules for food of animal origin (OJ L 139/55, 30.04.2004).
- Commission Regulation (EC) No. 2023/2006 of 22 December 2006 on good manufacturing practice for materials and articles intended to come into contact with food (OJ L 384/75, 29.12.2006).
- Act of 14 March 1985 on the State Sanitary Inspection (consolidated text: Journal of Laws 2019, item 59, as amended).
- Act of 25 August 2006 on food and nutrition safety (consolidated text: Journal of Laws 2020, item 2021, as amended).
- Act of 17 November 2021 on counteracting unfair use of contractual advantage in trade in agricultural and food products (Journal of Laws 2021, item 2262).

Food production and processing in Poland involve the need to obtain mandatory and optional standards and certificates. These include, among others, international standards [European Center for Quality and Promotion, 2024]:

- HACCP – Hazard Analysis & Critical Control Points System that is mandatory in the catering industry, and which ensures the health safety of food [FDA, 1997];

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3 The list of dozens of legal acts applicable to the agri-food industry in Poland is available at the Food Law Information website (https://www.prawozywnosciowe.info).

- IFS Certificate (International Featured Standards) – an international Food Safety Standard required by most retail chains from Western Europe [IFS, 2024];
- BRCGS (Brand Reputation through Compliance Global Standard) – Global Food Safety Standard required by retail chains [BRCGS, 2024];
- GMP+ Feed Standard of Good Manufacturing Practices and Transport (Good Manufacturing Practices) – the standard for the production of animal feed [GMP International, 2024];
- FSSC (Food Safety System Certification) – food safety certificate [FSSC, 2024].

These also include the national legal framework:

- Integrated Production (IP) – indicates a modern, sustainable method of cultivation [State Plant Health and Seed Inspection Service, 2024];
- *Jakość Tradycja* (Quality Tradition) – indicates that only raw materials whose origin is traceable and which do not contain GMO components were used in production [Ministry of Agriculture and Rural Development, 2019a];
- Quality Assurance for Food Products (QAFP) – ensures high quality of pork, poultry, and poultry and pork-beef cold cuts [Ministry of Agriculture and Rural Development, 2019b];
- Quality Meat Programme System (QMP) – guarantees high quality of beef and pork [Ministry of Agriculture and Rural Development, 2019c];
- Pork Quality System (PQS) [Ministry of Agriculture and Rural Development, 2018b];
- *Poznaj Dobrą Żywność* (Meet Good Food) – a mark awarded for a period of three years to high-quality food products from reliable sources [Ministry of Agriculture and Rural Development, 2018a];
- Q quality mark – awarded to domestic and foreign products of above-average quality [PCBC, 2017];
- Ekoland – organic food certificate [Agro Bio Test, 2024].

6.3. Review of the structure of export and import of agri-food products in Poland and Japan

To assess trends in the agri-food industry in Poland and Japan and its sales potential, the data on changes in trade from 2019 to 2023 were analysed. The analysis of the trade structure was based on data from the Global Trade Map database provided by the International Trade Centre (ITC). The datasets shared by the ITC are based on the so-called national concept, where the import data pertain to the country of origin of the products and not the country of from which the goods are shipped, as is the case with EU data [Kuźnar, Menkes, 2019].

The part covering trade between Poland and Japan presents:

- global export of agri-food products (individual categories 1–24) from Poland from 2019 to 2023, in USD thousand (see Table 6.2);
- global export of agri-food products (individual categories 1–24) from Japan from 2019 to 2023, in USD thousand (see Table 6.3);
- global import of agri-food products (individual categories 1–24) to Poland from 2019 to 2023, in USD thousand (see Table 6.4);
- global import of agri-food products (individual categories 1–24) to Japan from 2019 to 2023, in USD thousand (see Table 6.5);
- export of agri-food products (individual categories 1–24) from Poland to Japan from 2019 to 2023, in USD thousand (see Table 6.6);
- import of agri-food products (individual categories 1–24) from Japan to Poland from 2019 to 2023, in USD thousand (see Table 6.7);
- total trade balance for Poland and Japan (trade for countries of the world) and for the category of agri-food products in total (sum of categories 1–24; trade for countries of the world) and the trade balance between Japan and Poland for the category of agri-food products from 2019 to 2023, in USD thousand (see Table 6.8);
- leading agri-food products exported from Poland to Japan from 2019 to 2023, in USD thousand (see Table 6.9);
- leading agri-food products imported from Japan to Poland from 2019 to 2023, in USD thousand (see Table 6.10);
- export of meat and edible offal from Poland to Japan from 2019 to 2023, in USD thousand (see Table 6.11);
- global import and export of meat and edible offal to Japan and global export of meat and edible offal from Poland from 2019 to 2023, in USD thousand (see Table 6.12).

The following conclusions can be drawn on the basis of such summaries.

Meat and edible offal accounted for the largest share of global exports of agri-food products from Poland in 2023 (14% in the category of agri-food products), followed by tobacco and manufactured tobacco substitutes (10% in the category of agri-industrial products) and preparations of cereals, pastrycooks' products (9% in the category of agri--industrial products), in USD thousand. From 2019 to 2023, the export of agri-food products from Poland grew by 63%. The largest increases in 2023 were recorded for categories such as cereals, products of plant origin, fats and oils, although this could be affected by the import of such products from Ukraine and their subsequent re-export. For categories such as trees, plants, flowers and live animals, a drop in exports was recorded in the researched period from 2019 to 2023 (see Table 6.2).

Fish and crustaceans accounted for the largest share of global exports of agri-food products from Japan in 2023 (19% in the category of agri-food products), followed by

miscellaneous edible preparations (189% in the category of agri-industrial products) and beverages, spirits and vinegar (16% in the category of agri-industrial products), in USD thousand. From 2019 to 2023, the export of agri-food products from Japan grew by 15% on average. In 2023, the highest increases were recorded in categories such as dairy products, eggs, natural honey; fats and oils, and beverages, spirits and vinegar. For categories such as seeds and oil plants, products of plant origin or meat or fish processed products, a drop in exports was recorded in the researched period from 2019 to 2023 (see Table 6.3).

Residues and waste from the food industries and prepared animal fodder accounted for the largest share of global imports of agri-food products to Poland in 2023 (11% in the category of agri-food products), followed by fish and crustaceans (9% in the category of agri-industrial products) and fruit and nuts (8% in the category of agri-industrial products), in USD thousand. From 2019 to 2023, the import of agri-food products to Poland grew by 57%. The largest increases in 2023 were recorded for categories such as preparations of cereals, pastrycooks' products, fats and oils, and products of the milling industry, although this could be affected by the import of such products from Ukraine (see Table 6.4).

Meat and edible offal accounted for the largest share of global imports of agri--food products to Japan in 2023 (13% in the category of agri-food products), followed by fish and crustaceans (13% in the category of agri-industrial products) and cereals (11% in the category of agri-industrial products), in USD thousand. From 2019 to 2023, the global import of agri-food products to Japan grew by less than 3%. In 2023, the highest increases were recorded in categories such as products of plant origin, sugars and sugar confectionery, and products of the milling industry. For categories such as tobacco and manufactured tobacco substitutes; products of animal origin and trees, plants, flowers, a drop in exports was recorded in the researched period from 2019 to 2023 (see Table 6.5).

From 2019 to 2023, the export of agri-food products from Poland to Japan fell by 6% from USD 113 908 000 to USD 106 837 000. Meat and edible offal accounted for the largest share of export of agri-food products from Poland to Japan in 2023 (33% in the category of agri-food products), followed by preparations of vegetables and fruit (14% in the category of agri-industrial products) and products of animal origin (11% in the category of agri-industrial products), in USD thousand. In 2023 the highest increases were recorded in categories such as cereals, live animals, and products of the milling industry. For categories such as preparations of meat or of fish and dairy products, eggs, natural honey, a considerable drop in export was recorded in the researched period from 2019 to 2023 (see Table 6.6).

From 2019 to 2023, the import of agri-food products to Poland from Japan fell by 47% from USD 8 351 000 in 2019 to USD 4 446 000 in 2023. Coffee, tea, and spices accounted for the largest share of global exports of agri-food products from Japan in 2023 (25% in the category of agri-food products), followed by beverages, spirits and vinegar (15.6% in the category of agri-industrial products) and miscellaneous edible preparations (14% in the category of agri-industrial products), in USD thousand. In 2023, the highest increases were recorded in categories such as cereals, meat and edible offal. For categories such as tobacco and manufactured tobacco substitutes, and preparations of meat or of fish, dramatic drops were recorded in the researched period from 2019 to 2023 and import of such categories was virtually non-existent (see Table 6.7).

Poland's **foreign trade balance** in the category of agri-food products total (categories 1–24), in USD thousand, was positive over the entire researched period from 2019 to 2023. In 2023, the balance increased by 22% compared to the previous year (but the impact of the trade in grains and related products on statistics should be taken into account).

Japan's foreign trade balance over the entire researched period demonstrated a very strong deficit, which points to the massive import potential of that country when it comes to agri-food products.

In 2023, exports from Poland to Japan fell by 33%, from USD 158 631 000 in 2022 to USD 106 837 000. In the researched period, imports from Japan to Poland fell by 61% from USD 11 492 000 in 2022 to USD 4 446 000.

In 2023, the trade balance between Poland and Japan was basically at the same level as in 2019 (see Table 6.8).

Top products from the category of agri-foods **exported from Poland** to the Japanese market **in 2023** are:

- meat of bovine animals, frozen;
- products containing tobacco;
- feathers used for stuffing and down (see Table 6.9).

Top products from the category of agri-foods **exported from Japan** to the Polish market **in 2023** are:

- tea;
- vegetable waxes, beeswaxes and other insect waxes;
- fresh or chilled boneless beef (see Table 6.10).

The leading category in the export of products from Poland to Japan is meat and edible offal (33% of exports of agri-food products to Japan in 2023), with the meat of bovine animals, frozen accounting for the most (see Table 6.11).

By looking at the structure of global imports of meat and edible offal to Japan, we can see that it is dominated by the import of swine meat (40% in the entire meat category), the meat of bovine animals, fresh or chilled (16%) and the meat of bovine animals, frozen (14%), meat and edible offal of fowls (14%).

The analysis of global exports of meat and edible offal from Poland demonstrates that meat and poultry offal accounted for 55% of Polish export of meat and edible offal in 2023, the export of the meat of bovine animals, fresh or chilled – 22% and the meat of swine – 11%.

The structure of Japanese imports and Polish exports in the category of meat and edible offal demonstrates that categories without a major share in the Japanese import (but which have potential and should be promoted as Polish export products) include the meat of swine, meat of bovine animals, fresh or chilled, and meat and edible offal of fowls (see Table 6.12).

Summary and conclusions

This chapter presented the current state of affairs and prospects of changes in the agri-food industry in Poland and Japan. The structure and growth rate of the trade balance of agri-food products from 2019 to 2023 were also researched.

The chapter summary presents the most important conclusions, such as:

- **Dynamic development of the industry.** In both researched countries, the agri-food industry has developed dynamically and responded to global changes and challenges.
- **Sustainable agriculture.** Sustainable agriculture is a key trend which increases production efficiency with minimal impact on the environment and rational use of resources such as water and soil.
- **Poland as the leader.** Poland is the leading food manufacturer in Europe, focuses on innovations and efficiency in the industry of agriculture and food production, and this strengthens the country's position in the market.
- **Family-owned farms.** Polish agriculture is largely based on family-owned farms which are becoming increasingly more innovative; however, their level of technical equipment is still low, and investments in modern technologies are necessary.
- **Increase in organic farming.** The share of organic farming has been on the increase in Poland, just like the interest in organic products, which answers to the growing expectations of consumers with regard to healthy and organic foods.
- **Challenges for Japan.** Japan has struggled with a shortage of workforce and a drop in the crop area, which has led to increased imports of food to meet domestic demand.

- **Striving for self-sufficiency.** Japan's goal is to achieve food self-sufficiency by 2030, despite current difficulties, by investing in agricultural technologies and production optimisation.
- **High-quality requirements.** Japan has enforced extremely high-quality requirements for agri-food products, which is a challenge for Polish exporters, who need to adjust their products to the strict standards of the Japanese market.
- **Major decline in exports and imports.** In 2023, exports from Poland to Japan fell by 33%, while imports from Japan to Poland decreased by as much as 61% compared to 2022, which points to a considerable deterioration in the trade balance between the countries.
- **Trade balance.** The trade balance between Poland and Japan in 2023 fell by 30% compared to 2022 and, in terms of quantity, it was basically at the same level as in 2019.
- **Top products from the category of agri-foods exported from Poland to the Japanese market in 2023**: the meat of bovine animals, frozen; products containing tobacco; feathers of a kind used for stuffing; down.
- **Top products from the category of agri-foods exported from Japan to the Polish market in 2023**: tea; vegetable waxes, beeswaxes and other insect waxes; boneless meat of bovine animals, fresh or chilled.
- **Need for root cause analysis.** Aa considerable decrease in the balance of trade between Poland and Japan needs to be analysed in detail to explain the reasons for such decreases and to develop strategies to recover and develop mutual trade relations.
- **Polish pork export potential.** The meat of swine, although it does not account for a major share of Japanese imports from Poland, has a considerable export potential and should be actively promoted as a Polish export product.
- **Opportunities for Polish beef.** The meat of bovine animals, fresh or chilled, has a minor share in the Japanese imports from Poland, but given its properties and quality, it may become a major product in Polish exports.
- **Promotion of Polish poultry and edible offal.** Meat and edible offal of fowls, although they do not account for a major part of the Japanese imports from Poland, have growth potential and should be promoted as key Polish export products, which may contribute to the growth of their presence in the Japanese market.
- **Potential for cooperation.** The expansion of the cooperation between Poland and Japan may produce mutual benefits, and facilitate the exchange of technologies and best practices in the agri-food industry.
- **Response to global challenges.** Such cooperation may increase the efficiency and quality of agri-food production and respond to global challenges related to food security and environmental protection.

Table 6.1. Trends which will affect the agri-food industry in the short term or long term

Trend	Description	Time frame	Reasons for occurrence	Consequences	Supporting technologies	The industry most sensitive to the trend
Biomaterials	natural or synthetic materials that interact with biological systems and are created from living organisms and are used in broadly understood production	1–5 years	growing ecological awareness; raw materials crisis; legal regulations; needs in the field of medicine; building materials; packaging	improvement of the health of society; stimulation of innovations; development of the circular economy	biotechnology; genetic engineering; regenerative medicine; bioinformatics	medicine; pharmacy; automotive industries; **packaging** (and the entire FMCG industry); construction
Lab Grown	shift of production from the natural world to the laboratory	1–15 years	excessive exploitation of the natural environment and the impact of conventional agriculture on the environment	reduction in the consumption of natural resources; continuous access to food	biotechnology; genetic engineering	**food industry** (cultured meat, synthetic leather); **agriculture**; clothing industry; beauty; pharmaceutical industry
Fungal pandemics	increasing number of fungal infections, especially among plants and animals	1–15 years	climate changes; growth of tourism; intensive agriculture; antibiotics in animal breeding	loss of biodiversity; fungi as biological weapons; destabilisation of industries	biotechnology; genetic engineering	**agriculture**; **food industry**; pharmacy; medicine; armaments industry
Zoonotic pandemics	spread of infectious diseases (viruses, bacteria, fungi) transmitted from animals to humans	1–15 years	mass animal breeding; development of cities; tourism; anti-science narrative	destabilisation of economies; international tensions; growing expenditure on R&D	biotechnology; genetic engineering; tissue engineering; materials science	pharmaceutical industry; medical industry; armaments industry; **agriculture**; **breeding**; food industry; tourism
Synthetic biology	design and modification of biological organisms so that they can achieve specific functions or features	5–15 years	climate changes; food crisis	independence from natural resources; deepening of social inequalities	DNA sequencing and synthesis; gene editing technologies; automation	medicine; pharmacy; biotechnology; **agriculture**; power engineering; IT industry; cosmetics, **FMCG**
Editable nature	human interference in living organisms (people, animals, plants) and technological modification of living organisms	5–15 years	development of genetic engineering; growing demand for food; sustainable development	improvement of public health; greater agricultural productivity; environmental protection	tissue engineering; bionanotechnology; artificial intelligence	medical industry; pharmaceutical industry; **food industry**; **agriculture**; environmental protection; cosmetics industry

Source: own study based on: Infuture Institute [2024].

Table 6.2. Global export of agri-food products from Poland (sections 01–24) in 2019–2023 (in USD thousand)

Code	Worldwide exports from Poland	2019	2020	2021	2022	2023	Category share in 2023 (%)	Change 2019/2023 (%)
	Categories 01–24	34 522 858	37 672 877	43 346 128	49 819 059	56 268 083	100.00	63
01	Live animals	166 493	161 498	161 714	164 408	159 503	0	–4
02	Meat and edible offal	5 828 408	5 512 985	6 351 024	7 933 206	8 132 048	14	40
03	Fish and crustaceans	1 835 228	1 914 675	2 093 188	2 279 389	2 523 635	4	38
04	Dairy products, eggs, natural honey	2 769 627	2 751 637	3 184 477	4 068 051	3 917 079	7	41
05	Products of animal origin	393 832	382 143	441 257	459 131	468 133	1	19
06	Trees, plants, flowers	254 954	259 520	281 531	212 468	238 148	0	–7
07	Vegetables, roots, tubers	1 365 842	1 312 786	1 483 026	1 563 257	1 851 524	3	36
08	Fruit, nuts	1 255 211	1 323 394	1 642 448	1 543 412	1 610 597	3	28
09	Coffee, tea, spices	642 664	700 576	743 484	836 570	856 474	2	33
10	Cereals	920 588	1 951 342	2 293 169	3 280 204	3 868 079	7	320
11	Products of the milling industry	336 525	350 054	426 033	524 451	531 995	1	58
12	Seeds and oil plants	486 242	574 055	652 327	827 989	979 125	2	101
13	Lac, gums, resins	27 270	27 531	35 874	34 524	38 057	0	40
14	Vegetable products	3717	5286	6094	6971	9771	0	163
15	Fats and oils	519 236	641 500	951 391	1 617 421	1 553 090	3	199
16	Preparations of meat or of fish	2 001 059	2 229 253	2 559 426	2 803 793	3 356 935	6	68
17	Sugars and sugar confectionery	783 927	834 729	969 083	1 019 548	1 518 075	3	94
18	Cocoa and cocoa preparations	1 890 244	2 144 892	2 420 028	2 426 822	2 769 843	5	47
19	Preparations of cereals, pastrycooks' products	2 563 898	2 733 132	3 030 290	4 029 281	5 034 639	9	96
20	Preparations of vegetables and fruit	1 545 182	1 552 467	1 895 307	2 056 332	2 285 341	4	48
21	Miscellaneous edible preparations	2 276 503	2 415 218	2 987 665	3 193 450	3 661 137	7	61
22	Beverages, spirits and vinegar	913 433	1 108 847	1 366 311	1 726 912	1 768 859	3	94
23	Residues and waste from the food industries; prepared animal fodder	1 616 479	1 976 152	2 459 584	2 770 858	3 241 760	6	101
24	Tobacco and manufactured tobacco substitutes	4 126 296	4 809 205	4 911 397	4 440 611	5 894 236	10	43

Source: own study based on: ITC [2024].

Table 6.3. Global export of agri-food products from Japan (sections 01–24) in 2019–2023 (in USD thousand)

Code	Worldwide exports from Japan	2019	2020	2021	2022	2023	Category share in 2023 (%)	Change 2019/2023 (%)
	Categories 01–24	7 488 765	7 986 494	9 639 949	9 293 636	8 613 495	–	15
01	Live animals	36 730	13 400	23 977	26 772	35 793	–	–3
02	Meat and edible offal	300 590	306 483	519 815	415 918	429 556	0	43
03	Fish and crustaceans	1 536 614	1 363 855	1 848 271	1 966 019	1 658 768	5	8
04	Dairy products, eggs, natural honey	51 304	81 849	105 512	149 902	110 787	19	116
05	Products of animal origin	61 684	51 600	50 570	42 465	57 589	1	–7
06	Trees, plants, flowers	97 401	110 939	80 506	72 240	60 784	1	–38
07	Vegetables, roots, tubers	56 049	76 106	68 782	81 387	67 747	1	21
08	Fruit, nuts	228 461	212 045	290 783	294 085	258 400	1	13
09	Coffee, tea, spices	174 004	199 206	244 976	214 408	243 512	3	40
10	Cereals	55 836	59 317	63 666	57 482	69 419	3	24
11	Products of the milling industry	84 162	87 825	99 424	107 431	107 566	1	28
12	Seeds and oil plants	177 697	162 585	165 865	108 299	102 508	1	–42
13	Lac, gums, resins	33 295	38 340	42 662	35 829	31 118	1	–7
14	Vegetable products	1918	1865	2001	1226	1172	0	–39
15	Fats and oils	231 428	245 016	293 054	356 855	357 573	0	55
16	Preparations of meat or of fish	640 117	570 743	612 826	627 640	563 036	4	–12
17	Sugars and sugar confectionery	154 974	137 804	165 398	156 364	158 998	7	3
18	Cocoa and cocoa preparations	84 192	83 920	107 282	105 631	107 074	2	27
19	Preparations of cereals, pastrycooks' products	718 410	803 553	896 851	836 669	765 979	1	7
20	Preparations of vegetables and fruit	130 615	152 646	186 706	175 243	173 784	9	33
21	Miscellaneous edible preparations	1 455 967	1 944 854	2 035 625	1 753 415	1 602 080	2	10
22	Beverages, spirits and vinegar	919 568	1 015 876	1 453 575	1 468 142	1 378 229	19	50
23	Residues and waste from the food industries; prepared animal fodder	107 506	133 592	149 160	142 862	142 858	16	33
24	Tobacco and manufactured tobacco substitutes	150 243	133 075	132 662	97 352	129 165	2	–14

Source: own study based on: ITC [2024].

Table 6.4. Global import of agri-food products to Poland (sections 01–24) in 2019–2023 (in USD thousand)

Code	Worldwide imports to Poland	2019	2020	2021	2022	2023	Category share in 2023 (%)	Change 2019/2023 (%)
	Categories 01–24	23 025 342	25 267 633	29 249 543	33 182 035	36 052 183	–	57
01	Live animals	821 084	781 356	732 173	940 578	1 336 366	4	63
02	Meat and edible offal	1 957 144	1 784 555	1 813 627	2 055 970	2 412 184	7	23
03	Fish and crustaceans	2 387 433	2 379 861	2 720 576	3 018 734	3 272 853	9	37
04	Dairy products, eggs, natural honey	1 182 832	1 193 119	1 515 806	1 741 666	1 793 916	5	52
05	Products of animal origin	302 434	273 207	340 246	367 121	362 588	1	20
06	Trees, plants, flowers	427 146	429 400	558 749	584 294	588 218	2	38
07	Vegetables, roots, tubers	1 134 802	1 134 438	1 278 642	1 282 699	1 676 655	5	48
08	Fruit, nuts	1 802 894	2 302 574	2 594 285	2 499 664	2 755 342	8	53
09	Coffee, tea, spices	814 628	914 172	1 012 715	1 257 272	1 278 353	4	57
10	Cereals	457 506	553 144	572 304	1 185 328	779 401	2	70
11	Products of the milling industry	305 634	323 612	385 250	523 660	586 786	2	92
12	Seeds and oil plants	745 802	746 060	989 394	1 462 748	959 517	3	29
13	Lac, gums, resins	130 181	133 062	153 591	168 819	165 239	0	27
14	Vegetable products	61 522	60 043	38 199	71 072	75 630	0	23
15	Fats and oils	1 049 069	1 302 260	1 889 816	2 767 032	2 174 461	6	107
16	Preparations of meat or of fish	316 731	360 108	429 798	506 036	576 135	2	82
17	Sugars and sugar confectionery	451 486	470 370	542 136	728 067	812 787	2	80
18	Cocoa and cocoa preparations	1 330 595	1 531 381	1 695 192	1 623 737	1 897 931	5	43
19	Preparations of cereals, pastrycooks' products	786 951	1 070 722	1 300 133	1 497 719	1 782 523	5	127
20	Preparations of vegetables and fruit	929 329	999 538	1 158 093	1 238 533	1 358 008	4	46
21	Miscellaneous edible preparations	1 319 564	1 365 626	1 622 610	1 722 793	1 898 034	5	44
22	Beverages, spirits and vinegar	1 077 366	1 330 593	1 485 398	1 620 207	1 824 757	5	69
23	Residues and waste from the food industries; prepared animal fodder	2 245 630	2 591 602	3 171 956	3 406 711	3 819 367	11	70
24	Tobacco and manufactured tobacco substitutes	987 579	1 236 830	1 248 854	911 575	1 865 132	5	89

Source: own study based on: ITC [2024].

Table 6.5. Global import of agri-food products to Japan (sections 01–24) in 2019–2023 (in USD thousand)

Code	Worldwide imports to Japan	2019	2020	2021	2022	2023	Category share in 2023 (%)	Change 2019/2023 (%)
	Categories 01–24	73 396 842	69 786 030	76 036 621	83 132 171	75 907 928	–	3
01	Live animals	261 284	248 367	306 768	291 704	332 138	0.4	27
02	Meat and edible offal	10 843 065	10 284 531	10 987 740	11 322 963	9 903 626	13	–9
03	Fish and crustaceans	11 540 850	9 940 357	10 883 307	11 672 998	10 049 447	13	–13
04	Dairy products, eggs, natural honey	1 920 424	1 859 869	1 819 768	1 986 174	2 030 079	3	6
05	Products of animal origin	716 494	604 644	635 660	637 134	636 524	1	–11
06	Trees, plants, flowers	600 794	553 781	596 219	569 423	540 239	1	–10
07	Vegetables, roots, tubers	2 470 309	2 311 986	2 427 088	2 602 014	2 436 587	3	–1
08	Fruit, nuts	3 465 396	3 522 657	3 567 482	3 273 814	3 121 163	4	–10
09	Coffee, tea, spices	1 754 427	1 649 452	1 838 586	2 332 938	2 078 169	3	18
10	Cereals	5 978 123	5 773 348	7 532 845	9 667 914	8 158 030	11	36
11	Products of the milling industry	520 389	491 164	499 886	616 609	729 928	1	40
12	Seeds and oil plants	4 758 576	4 599 699	5 731 876	6 955 631	5 790 068	8	22
13	Lac, gums, resins	357 740	356 068	325 091	382 987	335 127	0.4	–6
14	Vegetable products	170 690	219 722	330 231	431 919	554 636	1	225
15	Fats and oils	1 429 120	1 400 601	1 658 596	2 056 440	1 751 051	2	23
16	Preparations of meat or of fish	6 607 176	6 102 839	6 207 748	6 706 598	6 218 831	8	–6
17	Sugars and sugar confectionery	709 206	699 641	869 491	1 023 333	1 174 529	2	66
18	Cocoa and cocoa preparations	1 002 280	947 584	1 036 883	1 098 499	1 044 981	1	4
19	Preparations of cereals, pastrycooks' products	1 306 786	1 372 893	1 423 069	1 520 703	1 418 344	2	9
20	Preparations of vegetables and fruit	3 532 825	3 553 939	3 629 688	3 959 442	4 040 621	5	14
21	Miscellaneous edible preparations	1 674 111	1 639 964	1 731 853	1 870 098	1 683 855	2	1
22	Beverages, spirits and vinegar	3 661 705	3 346 120	3 458 228	3 885 360	3 798 534	5	4
23	Residues and waste from the food industries; prepared animal fodder	2 621 786	2 863 288	3 098 970	3 494 927	3 465 138	5	32
24	Tobacco and manufactured tobacco substitutes	5 493 286	5 443 516	5 439 548	4 772 549	4 616 283	6	–16

Source: own study based on: ITC [2024].

Table 6.6. Export of agri-food products from Poland to Japan (sections 01–24) in 2019–2023 (in USD thousand)

Code	Export from Poland to Japan	2019	2020	2021	2022	2023	Category share in 2023 (%)	Change 2019/2023 (%)
	Categories 01–24	113 908	104 334	133 246	158 631	106 837	100	–6
01	Live animals	53	147	207	223	264	0.25	398
02	Meat and edible offal	24 058	26 352	52 058	68 969	35 535	33.26	48
03	Fish and crustaceans	3906	5689	5953	6019	3606	3.38	–8
04	Dairy products, eggs, natural honey	10 311	6552	7363	6535	3651	3.42	–65
05	Products of animal origin	16 500	11 223	13 581	17 175	11 575	10.83	–30
06	Trees, plants, flowers	110	61	38	55	73	0.07	–34
07	Vegetables, roots, tubers	499	774	699	768	419	0.39	–16
08	Fruit, nuts	3671	3504	2621	2872	2731	2.56	–26
09	Coffee, tea, spices	1613	2315	3031	2949	1871	1.75	16
10	Cereals	12	0	9	21	384	0.36	3100
11	Products of the milling industry	850	1193	2006	1763	3684	3.45	333
12	Seeds and oil plants	955	904	898	1272	1226	1.15	28
13	Lac, gums, resins	0	3	17	26	20	0.02	0
14	Vegetable products	0	79	0	0	0	0.00	0
15	Fats and oils	218	120	177	123	146	0.14	–33
16	Preparations of meat or of fish	6731	2825	2552	2435	843	0.79	–87
17	Sugars and sugar confectionery	2038	2623	2834	3695	3229	3.02	58
18	Cocoa and cocoa preparations	2875	4654	4793	5054	5058	4.73	76
19	Preparations of cereals, pastrycooks' products	1940	1473	1558	2482	2086	1.95	8
20	Preparations of vegetables and fruit	16 955	20 849	20 292	18 093	14 983	14.02	–12
21	Miscellaneous edible preparations	2849	2415	3398	5065	3169	2.97	11
22	Beverages, spirits and vinegar	1539	2051	970	1183	958	0.90	–38
23	Residues and waste from the food industries; prepared animal fodder	15 096	6594	6935	10 850	8697	8.14	–42
24	Tobacco and manufactured tobacco substitutes	1129	1934	1256	1004	2629	2.46	133

Source: own study based on: ITC [2024].

Table 6.7. Import of agri-food products from Japan to Poland (sections 01–24) in 2019–2023 (in USD thousand)

Code	Import from Japan to Poland	2019	2020	2021	2022	2023	Category share in 2023 (%)	Change 2019/2023 (%)
	Categories 01–24	8351	274	8862	11 492	4446	–	–47
01	Live animals	2	0	0	0	0	0	0
02	Meat and edible offal	52	64	248	334	448	10	762
03	Fish and crustaceans	313	153	285	235	0	0	–100
04	Dairy products, eggs, natural honey	0	0	0	0	0	0	0
05	Products of animal origin	82	133	69	1	0	0	–100
06	Trees, plants, flowers	37	0	94	31	24	0.54	–35
07	Vegetables, roots, tubers	6	7	7	39	1	0.02	–83
08	Fruit, nuts	7	3	0	3	5	0.11	–29
09	Coffee, tea, spices	430	591	1014	1139	1128	25	162
10	Cereals	4	12	12	9	85	2	2025
11	Products of the milling industry	59	52	180	457	233	5	295
12	Seeds and oil plants	240	190	70	262	208	5	–13
13	Lac, gums, resins	469	424	175	369	365	8	–22
14	Vegetable products	0	0	0	0	2	0.04	0
15	Fats and oils	174	201	258	285	219	5	26
16	Preparations of meat or of fish	218	370	237	229	3	0.07	–99
17	Sugars and sugar confectionery	26	25	23	108	50	1	92
18	Cocoa and cocoa preparations	6	3	1	13	3	0.07	–50
19	Preparations of cereals, pastrycooks' products	163	105	136	212	17	0.38	–90
20	Preparations of vegetables and fruit	169	143	181	300	117	3	–31
21	Miscellaneous edible preparations	1750	1985	2335	3641	613	14	–65
22	Beverages, spirits and vinegar	2746	2454	3237	3443	693	16	–75
23	Residues and waste from the food industries; prepared animal fodder	151	267	299	382	230	5	52
24	Tobacco and manufactured tobacco substitutes	1247	92	1	0	2	0.04	–100

Source: own study based on: ITC [2024].

Table 6.8. Trade balance of agri-food products in Poland and Japan, total, and trade balance of agri-food products between Poland and Japan in 2019–2023 (in USD thousand)

	Trade in agri-food products in Poland and Japan				
	2019	2020	2021	2022	2023
Worldwide exports from Poland, categories 01–24	34 522 858	37 672 877	43 346 128	49 819 059	56 268 083
Worldwide imports to Poland, categories 01–24	23 025 342	25 267 633	29 249 543	33 182 035	36 052 183
Trade balance of Poland, categories 01–24	**11 497 516**	**12 405 244**	**14 096 585**	**16 637 024**	**20 215 900**
Trade balance of Poland, categories 01–24, year-on-year change (%)	–	8	14	18	22
Worldwide exports from Japan, categories 01–24	7 488 765	7 986 494	9 639 949	9 293 636	8 613 495
Worldwide imports to Japan, categories 01–24	73 396 842	69 786 030	76 036 621	83 132 171	75 907 928
Trade balance of Japan, categories 01–24	**–65 908 077**	**–61 799 536**	**–66 396 672**	**–73 838 535**	**–67 294 433**
Trade balance of Japan, categories 01–24, year-on-year change (%)	–	–6	7	11	–9
	Trade in agri-food products between Poland and Japan				
Export from Poland to Japan categories 01–24	113 908	104 334	133 246	158 631	106 837
Export from Poland to Japan categories 01–24, year-on-year change (%)	–	–8	28	19	–33
Import from Japan to Poland, categories 01–24	8351	7274	8862	11 492	4446
Import from Japan to Poland, categories 01–24, year-on-year change (%)	–	–13	22	30	–61
Trade balance of Poland and Japan, categories 01–24	**105 557**	**97 060**	**124 384**	**147 139**	**102 391**
Trade balance of Poland and Japan, categories 01–24, year-on-year change (%)	–	–8	28	18	–30

Source: own study based on: ITC [2024].

Table 6.9. Export of agri-food products from Poland to Japan in 2019–2023, the leading product from each section (in USD thousand)

Code	Export of agri-food products from Poland to Japan	2019	2020	2021	2022	2023
0106	Live animals (excl. horses, asses, mules, hinnies, bovine animals, swine, sheep, goats, poultry)	39	81	181	163	225
0202	Meat of bovine animals, frozen	11 228	13 603	43 151	41 578	17 447
0304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen	2242	2758	2595	3862	5569
0404	Whey, whether or not concentrated or containing added sugar or other sweetening matter; products	1863	3765	6559	3924	2382
050510	Feathers of a kind used for stuffing; down	9420	7478	8066	8559	7039
0602	Other live plants (including their roots), cuttings and slips; mushroom spawn (excluding bulbs, tubers, tuberous plants)	30	17	19	14	7
071333	Kidney beans, including white pea beans (Phaseolus vulgaris)	106	361	212	157	230
081110	Frozen strawberries, uncooked or cooked, sweetened or unsweetened	672	917	655	1,368	1,206
0902	Tea, whether or not flavoured	3920	4119	5492	4152	3774
1008	Buckwheat, millet and canary seed; other cereals (excluding wheat and mixtures, rye, barley, oats)	11	27	42	66	255
1105	Flour, meal, powder, flakes, granules and pellets of potatoes	149	136	529	2174	1356
121299	Fruit seeds and other plant products, including unroasted chicory roots	291	407	541	677	389
1302	Vegetable saps and extracts; pectic substances, pectinates and pectates; agar-agar and other	71	2	15	346	23
14	No exports in this category	–	–	–	–	–
1506	Other animal fats and oils and their fractions, whether or not refined, but not chemically modified	213	24	0	0	94
160431	Caviar	21	48	22	96	68
170211	Lactose and lactose syrup	683	1150	852	2097	986
1806	Chocolate and other food preparations containing cocoa	3020	3963	3926	3176	3305
1905	Bread, pastry, cakes, biscuits and other bakers' wares	698	414	718	868	1032
2009	Fruit juices including grape must and vegetable juices, unfermented	2967	2959	1367	956	2530
2106	Food preparations (not elsewhere specified or included)	993	1627	1100	1962	1566
220890	Undenatured ethyl alcohol of an alcoholic strength by volume of less than 80% vol; spirits, liqueurs and other spirituous beverages	231	583	302	413	232
230910	Dog or cat food, put up for retail sale	3744	3951	8737	8513	8170
2404	Products containing tobacco, reconstituted tobacco, nicotine, or tobacco or nicotine substitutes	0	0	0	0	12 126
2403	Other manufactured tobacco and manufactured tobacco substitutes	548	577	516	791	520

Source: own study based on: ITC [2024].

Table 6.10. Import of agri-food products from Japan to Poland in 2019–2023, the leading product from each section (in USD thousand)

Code	Import of agri-food products from Japan to Poland	2019	2020	2021	2022	2023
01	No imports in this category	–	–	–	–	–
020130	Boneless meat of bovine animals, fresh or chilled	52	64	248	333	448
0307	Molluscs, fit for human consumption, live, fresh, chilled	185	136	250	150	0
04	No imports in this category	–	–	–	–	–
05	No imports in this category	–	–	–	–	–
0602	Other live plants (including their roots), cuttings and slips; mushroom spawn	37	0	92	27	24
0712	Dried vegetables, whole, cut, sliced, broken or in powder, but not further prepared	3	6	4	4	1
0814	Peel of citrus fruit or melons	2	1	0	3	5
0902	Tea, whether or not flavoured	411	569	1000	1124	1125
1006	Rice	4	12	12	9	85
1101	Wheat or meslin flour	58	45	150	307	220
121292	Locust beans (carob)	199	154	25	153	200
1302	Vegetable saps and extracts	469	423	175	369	365
14	No imports in this category	–	–	–	–	–
1521	Vegetable waxes, beeswax, other insect waxes	28	118	162	688	649
160239	Meat or offal from ducks, geese and guinea fowl	74	99	34	115	255
1704	Sugar confectionery (including white chocolate), not containing cocoa	15	21	11	29	49
1806	Chocolate and other food preparations containing cocoa	6	3	1	13	3
1902	Pasta	86	45	28	64	7
200899	Fruit and other edible parts of plants	26	23	19	23	82
210390	Preparations for sauces and ready-made sauces; mixed spices and spices	487	424	606	1103	160
210310	Soya sauce	545	707	598	866	238
2202	Waters, including mineral waters and aerated waters, containing added sugar or other sweetening matter	71	133	444	304	170
2208	Undenatured ethyl alcohol of an alcoholic strength by volume of less than 80% vol; liqueurs	1810	1375	1642	2159	171
2206	Cider, perry, mead and other fermented beverages	278	245	266	337	191
230990	Preparations used in animal feeding (excluding dog or cat food)	147	258	274	333	213
2402	Cigars, cheroots, cigarillos and cigarettes, of tobacco or of tobacco substitutes	5	2	1	0	1

Source: own study based on: ITC [2024].

Table 6.11. Export of meat and edible offal from Poland to Japan in 2019–2023 (in USD thousand)

Code	Export of meat and edible offal from Poland to Japan	2019	2020	2021	2022	2023	Category share in 2023 (%)	Change 2019/2023 (%)
02	Meat and edible offal	20 711	21 320	57 016	57 357	31 519	–	52
0201	Meat of bovine animals, fresh or chilled	0	4	293	62	0	0	0
0202	Meat of bovine animals, frozen	11 228	13 603	43 151	41 578	17 447	55	55
0203	Meat of swine, fresh, chilled or frozen	0	0	1	0	0	0	0
0204	Meat of sheep or goats	0	0	0	0	0	0	0
0205	Meat of horses, asses, mule	3614	2267	2167	1896	1755	6	–51
0206	Edible offal	4895	5305	11 404	13 821	12 317	39	152
0207	Meat and edible offal of fowls	974	141	0	0	0	0	–100
0208	Meat and edible offal of rabbits, hares	0	0	0	0	0	0	0
0209	Pig fat	0	0	0	0	0	0	0
0210	Meat and edible offal, salted	0	0	0	0	0	0	0

Source: own study based on: ITC [2024].

Table 6.12. Global import of meat and edible offal to Japan and global export of meat and edible offal from Poland in 2019–2023 (in USD thousand)

Code	Products	Global import of meat and edible offal to Japan						Global export of meat and edible offal from Poland					
		2019	2020	2021	2022	2023	Share in 2023 (%)	2019	2020	2021	2022	2023	Share in 2023 (%)
		10 843 064	10 284 530	10 987 740	11 322 963	9 903 627	100	5 828 407	5 512 985	6 351 026	7 933 207	8 132 048	–
0201	Meat of bovine animals, fresh or chilled	2 125 183	1 961 729	2 202 269	1 860 546	1 568 892	16	1 145 446	1 152 067	1 386 461	1 573 325	1 804 354	22
0202	Meat of bovine animals, frozen	1 402 405	1 382 343	1 512 496	1 906 921	1 360 987	14	409 757	394 646	491 961	624 778	578 644	7
0203	Meat of swine	4 634 288	4 451 561	4 450 258	4 240 072	3 940 210	40	954 981	879 362	896 261	856 428	894 633	11
0204	Meat of sheep or goats	193 524	189 975	193 375	239 322	155 748	2	2972	3830	6893	4074	4857	0.06
0205	Meat of horses, asses	47 718	34 970	34 154	44 982	37 168	0.38	38 692	38 118	42 435	37 918	40 625	0.50
0206	Edible offal	979 479	965 438	1 235 898	1 308 620	1 209 001	12	131 169	162 678	166 402	161 954	184 442	2.26
0207	Meat and edible offal of fowls	1 304 535	1 139 858	1 245 169	1 591 529	1 429 003	14	2 918 220	2 651 632	3 206 925	4 510 885	4 451 197	55
0208	Meat and edible offal of rabbits, hares	11 372	3354	4362	4231	29 514	0.30	56 375	49 619	63 162	66 833	67 877	0.83
0209	Pig fat	77 502	95 277	48 520	76 112	120 083	1	59 975	55 805	55 929	67 760	70 423	0.87
0210	Meat and edible offal, salted	67 058	60 025	61 239	50 628	53 021	0.54	110 820	125 228	34 597	29 252	34 996	0.43

Source: own study based on: ITC [2024].

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Chapter 7

Cooperation between Poland and Japan in the clean-tech industry

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Introduction

Poland and Japan share ambitious plans to decarbonise their economies, which heavily depend on fossil fuels. As part of its commitment to the United Nations Convention on Climate Change, Japan has pledged to reduce its greenhouse gas (GHG) emissions by 26% by 2030 (compared to 2013). As announced by the Prime Minister in 2020, Japan is expected to become a net-zero economy in terms of GHG emissions by 2050 [Ministry of Economy, Trade and Industry, 2024]. Meanwhile, Poland, as a Member State of the European Union (EU), should reduce net GHG emissions by at least 55% by 2030 compared to 1990 levels [European Commission, 2024]. In addition, the European REPower EU programme [Council of the European Union, 2024] aims to make the EU completely independent of Russian fossil fuels while increasing the pace of the Community's decarbonisation. Renewable Energy Directive – Directive (EU) 2023/2413 of 18 October 2023 (RED III) – which concerns renewable energy sources (RES), seeks to increase the share of RES in total EU energy consumption to at least 42.5% in 2030 (aiming for 45%), to be achieved collectively by all Member States.[1] Directive RED III sets an obligation of a 49% target for renewable energy share in buildings. This target is to be reached by facilitating investment in smaller photovoltaic or heat pump installations. Additionally, to arrive at a more thorough decarbonisation of transport, RED III introduces an obligation to reduce greenhouse gas emissions by 14.5% by 2030 through the use of RES in transport. This goal is to be

1 The Directive does not specify individual targets for Member States but allows the Community to monitor progress towards the targets.

attained by increasing the share of biofuels and so-called green hydrogen – derived from renewable sources. Directive RED III came into force on 20 November 2023, and Member States have 18 months after the directive's entry into force to transpose its provisions into national law.

At this point, it should be noted that the definitions of so-called green technology or green products are sometimes disjointed. For the purposes of this chapter, it is assumed that green technology includes those technologies that have the potential to reduce greenhouse gas emissions either directly (by changing the fuel used) or indirectly (by avoiding potential emissions), as well as circular-economy solutions. Hence, this group comprises not only hydrogen technologies or RES technologies but also innovative water-treatment solutions, and others. However, the authors are aware that the catalogue of green technologies or products could be much broader. The aim of the study is to present trends in the development of clean technologies in Poland and Japan in the years 1990–2022 and to indicate possible directions of cooperation between both countries in the coming years.

The chapter consists of four parts. The first two sections present developments and trends in the clean-tech industry in Poland and Japan, while the following section describes expansion of European enterprises in the Japanese market along with presentation of potential partners for cooperation on the Polish side. The summary contains recommendations for public administrations and businesses, arising from the research work as conducted. The study employs desk research based on data extracted from international databases, and an analysis of information obtained in in-depth interviews.[2]

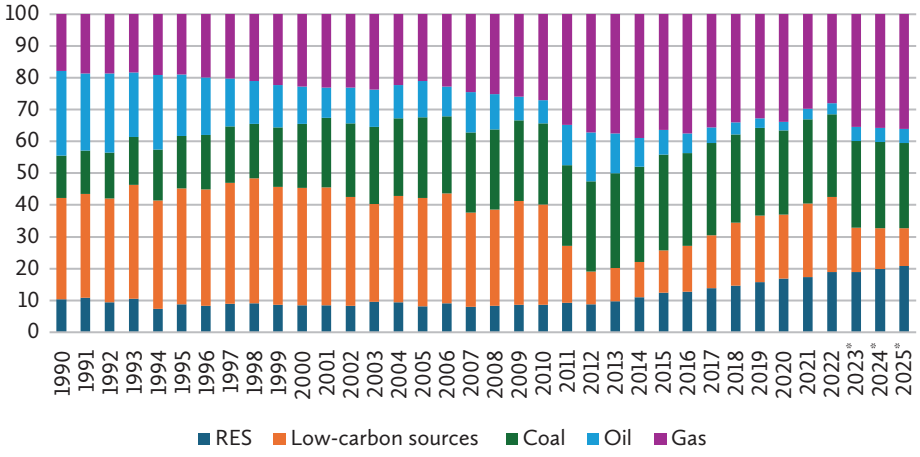
7.1. Development of the clean-tech industry in Japan and Poland

7.1.1. Development of the clean-tech industry in Japan

Japan has a relatively diverse energy mix (see Figure 7.1). Its energy production process in the 1990–2022 period saw a significant growth of the share of gas (from 19.50% to 33.30%) and twofold increases in the share of coal (from 14.50% to 30.90%) and RES (from 11.30% to 22.50%). At the same time, the share of low-carbon sources decreased (from 34.70% to 28%), and the use of oil was significantly reduced (from 38.90% to 4%).

2 A list of interview participants can be found in the acknowledgements.

Figure 7.1. Share of RES, low-carbon sources, and fossil fuels in Japan's energy production in 1990–2025 with forecast (%)

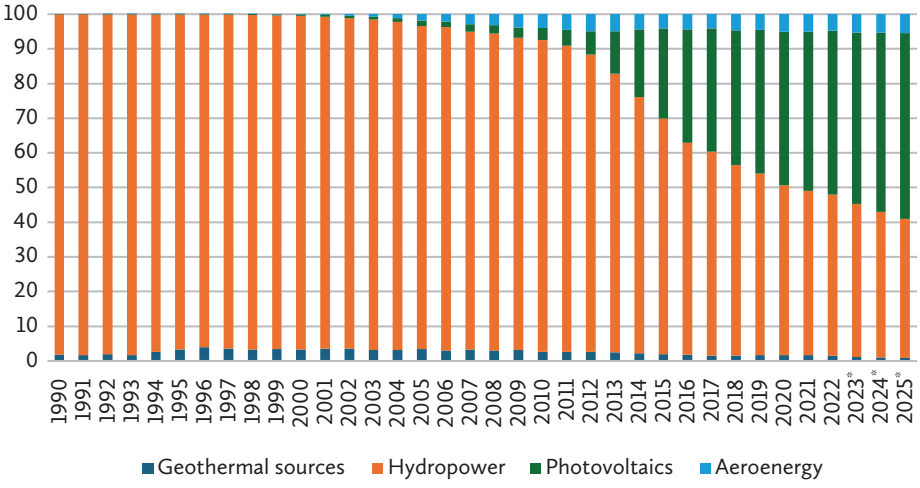


* Forecast for 2023–2025.

Source: own study based on International Energy Agency data [IEA, 2024].

The key RES used for electricity production in Japan is hydropower, which has been steadily replaced by photovoltaics and (minimally) aeroenergy since around 2012 (see Figure 7.2).

Figure 7.2. Share of RES in Japan's energy production in 1990–2025 with forecast (%)



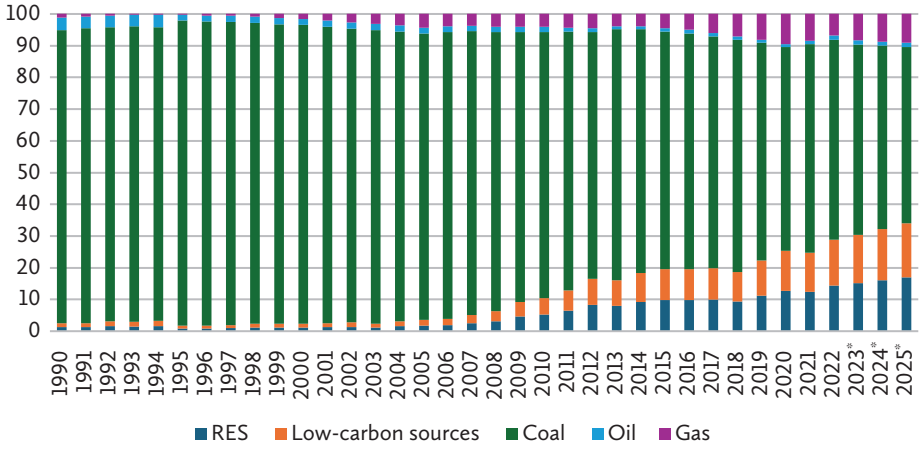
* Forecast for 2023–2025.

Source: own study based on IEA data [2024].

7.1.2. Development of the clean-tech industry in Poland

In the years 1990–2022, the share of renewable sources in Poland increased from 1.30% to as much as 16.70%, while the use of fossil fuels as energy sources was significantly reduced (coal: from 93.20% to 73%, and oil: from 3.90% to 1.60%). The exception to this is gas, whose share increased from 1.20% to 7.80% (see Figure 7.3).

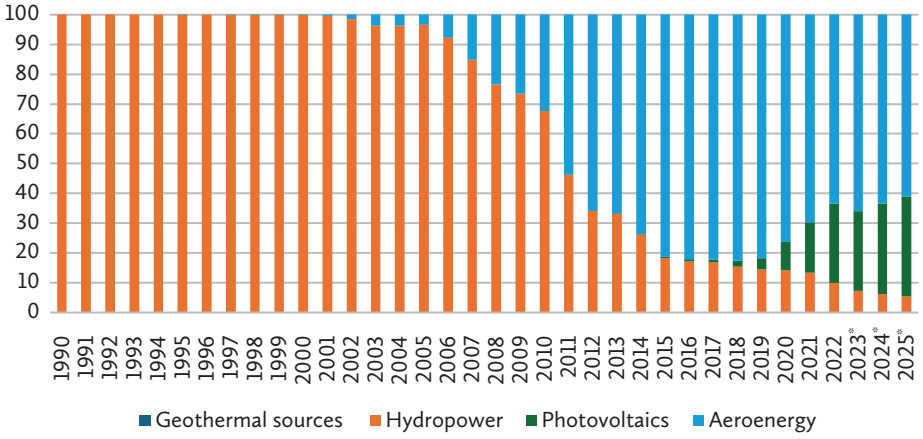
Figure 7.3. Share of RES, low-carbon sources, and fossil fuels in Poland's energy production in 1990–2025 with forecast (%)



* Forecast for 2023–2025.

Source: own study based on IEA data [2024].

Figure 7.4. Share of RES in Poland's energy production in 1990–2025 with forecast (%)



* Forecast for 2023–2025.

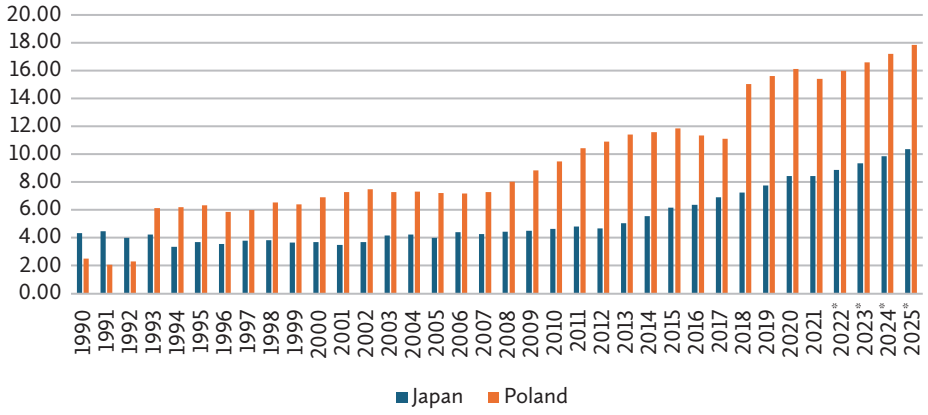
Source: own study based on IEA data [2024].

In Poland, as in Japan, the use of hydro energy for electricity production declined in the years 1990–2022 (especially after around 2008), and the share of wind and solar energy increased (see Figure 7.4).

7.1.3. Comparative analysis of clean-tech industry development in Japan and Poland

Both Japan and Poland are increasingly including RES in their energy mix (see Figure 7.5). While in 1990, only 4.33% of the energy used in Japan came from renewable sources, by 2020, this share almost doubled (8.45%). An even greater change was recorded in Poland, where RES accounted for as much as 16.13% of energy consumption in 2020, more than six times the share recorded 30 years earlier (2.50%). The fact that the share of RES in energy consumption is growing in importance much faster in Poland than in Japan is also confirmed by average annual changes. In Poland, the share of RES in energy consumption grew by an average of 0.40 percentage points per year from 1990 to 2020, while in Japan, it grew by less than half as much, i.e. by 0.17 percentage points. This difference, as a result of the compounding percentage, explains the significant variations in the described energy mixes between the analysed economies in 2020.

Figure 7.5. Share of RES in energy consumption in Japan and Poland in 1990–2025 with forecast (%)



* Forecast for 2021–2025.

Source: own study based on IEA data [2024].

7.1.4. Growth prospects for the clean-tech industry in Japan and Poland

Provided that current trends continue, in 2025, Japan – thanks to a significant change in trend in 2012 – will catch up to but not overtake Poland in terms of the share in question (Japan: 10.37%, Poland: 17.83%; see Table 7.1).[3] Although Japan is currently employing RES more intensively in energy production, Poland is undergoing a more dynamic energy transition using RES, as confirmed by projections for the years 2023–2025 (see Table 7.2).

Table 7.1. Projection of RES shares in the energy mixes of Japan and Poland in 2021–2025 (%)

Year	1990	...	2020	2021*	2022*	2023*	2024*	2025*	R^2 (%)
Japan	4.33	...	8.45	8.43	8.88	9.36	9.85	10.37	96.24
Poland	2.5	...	16.13	15.4	15.99	16.59	17.20	17.83	90.06

* Projected values.

Source: own study based on IEA data [2024].

Table 7.2. Projection of shares of RES, low-carbon sources, and fossil fuels in energy production in Japan and Poland in 2023–2025 (%)

Year		1990	...	2022	2023*	2024*	2025*	R^2 (%)
Japan	RES	11.3	...	22.5	22.33	23.69	25.10	91.96
	low-carbon sources	34.7	...	28	16.34	15.34	14.34**	53.63
	coal	14.5	...	30.9	32.17	32.22	32.23	95.64
	oil	28.9	...	4	5.35	5.30	5.29	95.64
	gas	19.5	...	33.3	41.79	42.60	43.42***	79.03
Poland	RES	1.3	...	16.7	17.69	18.96	20.28	96.79
	low-carbon sources	1.3	...	16.7	17.69	18.96	20.28	96.79
	coal	93.2	...	73	69.9946	68.06	66.06	98.35
	oil	3.9	...	1.6	1.4381	1.496	1.560	78.25
	gas	1.2	...	7.8	9.7647	10.27	10.79	90.46

* Projected values.
** Value underestimated due to the trend reversal to an upward trend in 2012.
*** Value overestimated due to the trend reversal to a downward trend in 2014.

Source: own study based on IEA data [2024].

3 The projections presented in this chapter were made using exponential trend equations with the highest *R*-square determination coefficient values and adjusted for recent trends where necessary.

If the trends observed in the data from 1990 to 2022 continue, photovoltaics will account for more than half of Japan's electricity generation after 2023. In Poland, apparent trends suggest that the use of wind and water for electricity generation will steadily (but, in the case of water, more slowly than before) decline in favour of photovoltaics (see Table 7.3).

Table 7.3. Projection of shares of RES used for electricity production in Japan and Poland in 2023–2025 (%)

Year		1990	...	2022	2023*	2024*	2025*	R^2 (%)
Japan	geothermal sources	1.76	...	1.48	1.11	1.00	0.90**	28.70
	hydropower	98.17	...	46.44	44.11	42.02	40.04	21.52***
	photovoltaics	0.07	...	47.29	49.46	51.59	53.61	94.20
	aeroenergy	0.00	...	4.79	5.31	5.39	5.46	94.20
Poland	geothermal sources	ND	...	ND	ND	ND	ND	ND
	hydropower	100.00	...	9.86	7.28	6.21	5.33	51.70
	photovoltaics	0.00	...	26.58	26.66	30.27	33.51	89.39
	aeroenergy	0.00	...	63.55	66.06	63.52	61.16	96.71

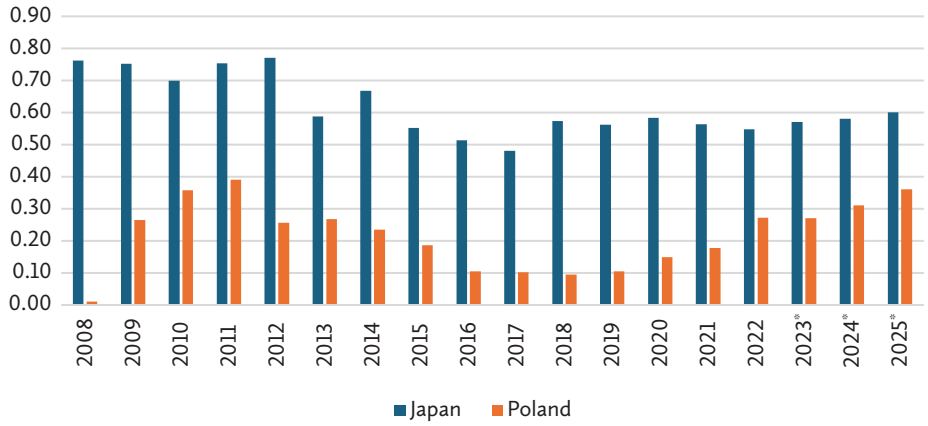
* Projected values.
** Value underestimated due to a trend reversal in the last years of the analysis.
*** The low determination coefficient is due to the very high dynamics of the process in question, which is moving in a relatively stable sideways trend.

Source: own study based on IEA data [2024].

7.2. Development trends of the clean-tech industry and the potential for expansion of cooperation between Poland and Japan

In both Japan and Poland, the energy R&D budget as a proportion of gross domestic product (GDP) in the years 2008–2022 resembles a parabola (see Figure 7.6). It is very interesting to observe that for both economies, the turning point was in 2017–2018. While it is Japan that spent more (in relation to GDP) on energy R&D in the entire period under review, it is Poland's budget that had a much faster growth rate. If the observed trends continue, energy R&D expenditure in Poland will surpass that of in Japan in 2030–2031 (see Table 7.4).

Figure 7.6. Expenditure (per 1000 units of GDP) on energy R&D in Japan and Poland in 1990–2025 with forecast



* Forecast for 2023–2025.

Source: own study based on data from IEA [2024].

Table 7.4. Projection of expenditure (per 1000 units of GDP) on energy R&D in Japan and Poland in 2023–2025

Year	2008	...	2022	2023*	2024*	2025*	R^2
Japan	0.76	...	0.55	0.57	0.58	0.60	72.38
Poland	0.01	...	0.27	0.27	0.31	0.36	62.55**

* Projected values.

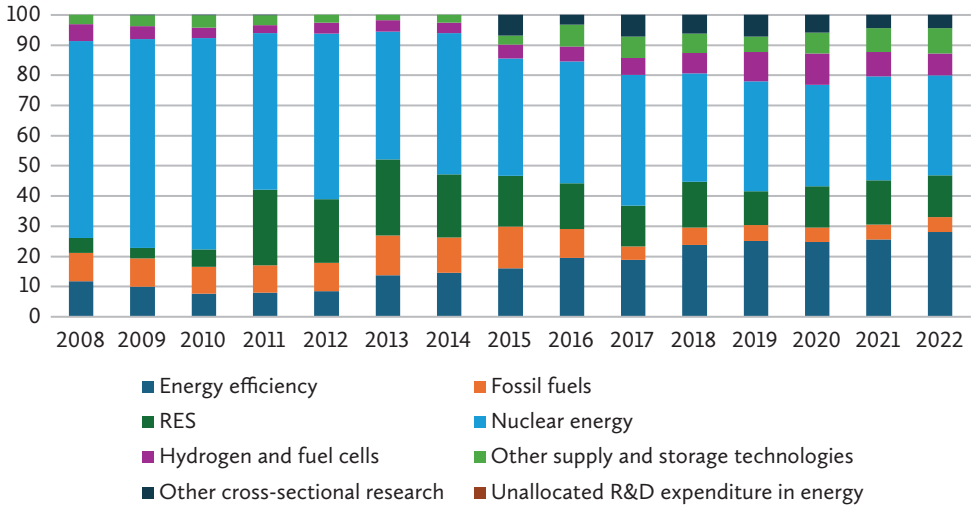
** Projection based on the years 2009–2022 due to a very low and forecast-distorting value recorded in 2008.

Source: own study based on IEA data [2024].

When it comes to the energy R&D budget allocation in Japan (see Figure 7.7), the key expenditure category has continually been nuclear power (65.21% in 2008 and 33.20% in 2022), which is successively being pushed out by investments in other areas – primarily general energy efficiency (11.70% and 28%, respectively) and RES (5.01% and 13.81%, respectively). Fossil fuels have been steadily losing importance (2008 – 9.45%; 2022 – 5.01%). In the analysis of the above changes, it is important to note that for some categories, key tipping points were observed, with shifts in fund allocation policy. For example, the share of fossil fuels in the budget in question fell significantly in the years 2015–2017 (from 13.94% to 4.50%), followed by a stabilisation lasting until 2022. R&D related to RES started to grow in importance from the perspective of this budget in Japan in the years 2011–2020 [sic!] (jumping from 5.88% to 25.07%), but

just two years later, the share of funding allocated to this category started to decline.[4] In the case of Poland (see Figure 7.8), the share of fossil fuels in the analysed budget was reduced by more than half during the period under review (from 26.48% in 2008 to 9.72% in 2022), but nuclear energy lost its importance to a greater extent (falling from 31.48% to 7.73%). Compared to the above changes, the share of RES in the R&D budget fell slightly (i.e. from 15.26% to 15.58%). The category that saw the largest increase (from 0% in 2008 all the way up to 35.85% in 2022) was the unallocated R&D expenditure in energy. As in the case of Japan, specific tipping points regarding the allocation of the energy R&D budget can also be identified in Poland. For fossil fuels, such a turning point occurred after 2013 (from 42.05% to 7.44% in 2021 and to 9.72% in 2022), when the share of funds allocated to RES significantly increased (from 11.13% to 29.46% in 2018). Unfortunately, after 2018, R&D in the field of RES lost ground from a funding allocation perspective (decline and subsequent stabilisation of the share in question to 14.38% in 2020). The above examples suggest that energy R&D in Japan and Poland tends to be characterised by short-term spurts that do not necessarily continue in subsequent years.

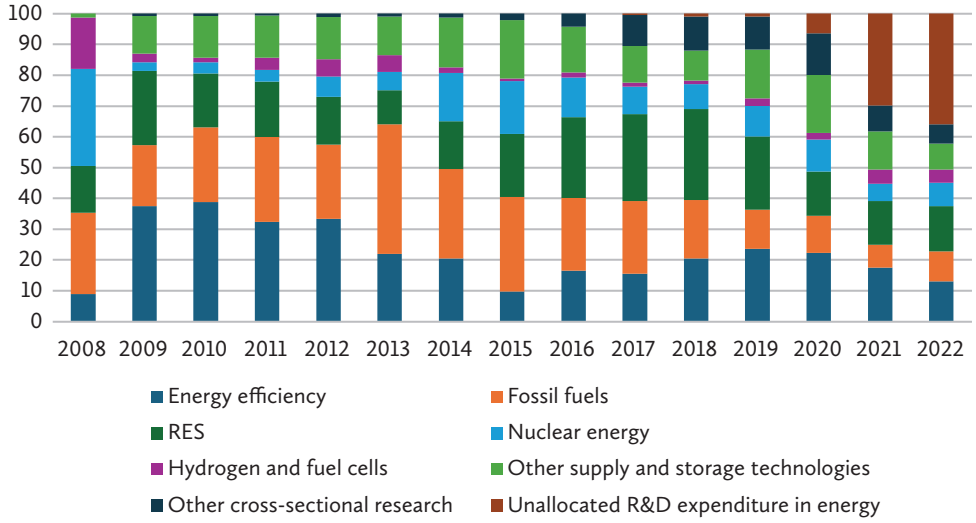
Figure 7.7. Share of R&D budget by technology group in Japan in 2008–2022 (%)



Source: own study based on IEA data [2024].

4 The significant changes in the trends meant that the projected values for the coming years carried too much error. For this reason, projections have been dropped for this data.

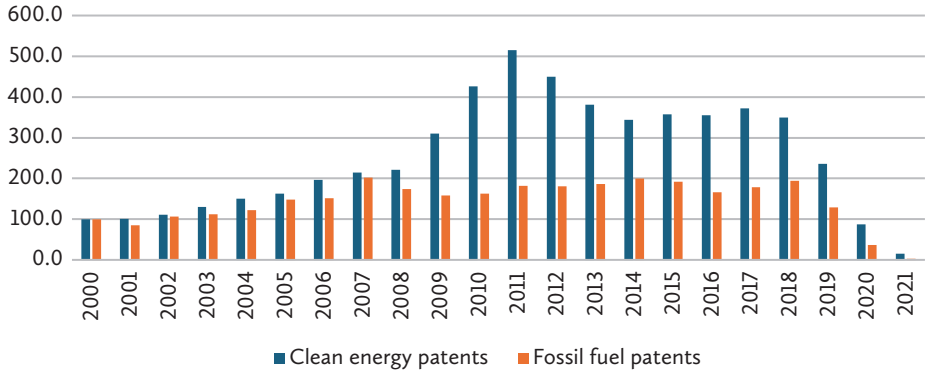
Figure 7.8. Share of R&D budget by technology group in Poland in 2008–2022 (%)



Source: own study based on IEA data [2024].

Poland is more dynamic than Japan when it comes to fossil fuel patents and patents in the field of clean energy (see Figures 7.9 and 7.10). On the other hand, while fossil fuel patents prevail in the case of Poland, activity in the area of clean energy patents is definitely at the forefront in the case of Japan.

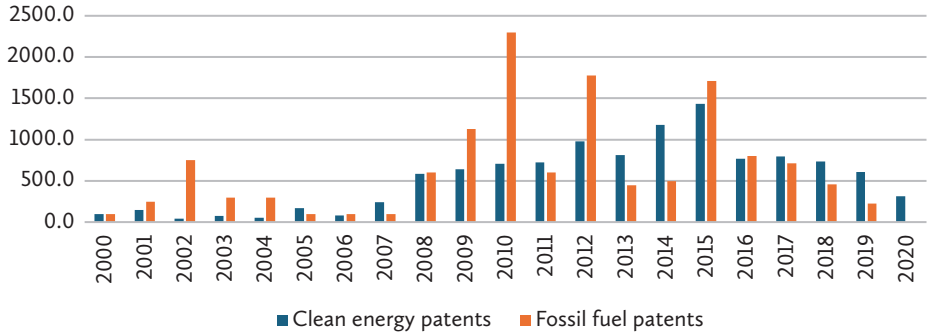
Figure 7.9. Patent dynamics in the fields of clean energy and fossil fuels in Japan in 2000–2021 (index, 2000 = 100)



Note: "The European Patent Office (EPO) classification scheme for climate change mitigation technologies was used to classify clean energy patents. Cooperation has been established with the EPO to search text in abstracts to classify patents within different fossil fuel categories" [IEA, 2024].

Source: own study based on IEA data [2024].

Figure 7.10. Patent dynamics in the fields of clean energy and fossil fuels in Poland in 2000–2020 (index, 2000 = 100)



Source: own study based on IEA data [2024].

7.3. European companies' expansion into the Japanese market

The following overview presents the spectrum of European companies present in the Japanese market. Table 7.5 shows selected European clean technology investors. Significantly, most of these companies are establishing their market presence through partnerships with Japanese companies:[5]

- the French BWIdeol with NewEnergyand Industrial Technology Development Organization (NEDO), Hitachi Zosen, Taisei Corporation, Hitachi Energy;
- the Swiss Almatech with e5 Lab. Inc. (which is a joint venture between Asahi Tanker, Exeno, MOL I Mitsubishi Corporation);
- the Estonian Skeleton Technologies of Marubeni;
- the Swedish Climate View with Nordic Ninja / Information Services International-Dentsu Ltd. (ISID); Climeon with Mitsubishi Corporation / Tomoe Engineering.

Some of the European companies, such as: Cell Impact or skytron energy also benefited from the support of JETRO (Japan External Trade Organisation), in particular when setting up a company in Japan. A JETRO representative provided consultations on company registration, tax and labour matters, market and regulatory information, and also referred to local service providers (certified legal specialist for company registration and visa applications, tax advisor and advisor on social security issues [JETRO, 2019]).

5 Based on a presentation by Peter Popovics entitled *Success Stories of European Clean-Tech Companies in Japan* [Polish Investment and Trade Agency, 2024].

Table 7.5. Selected European clean technology investors in Japan

Country of origin	Company	Type of investment
Denmark	MHI VESTAS	RES – wind energy, wind turbine manufacturing (Tokyo)
	Orsted	RES – production of electricity from wind energy in cooperation with Japan's TEPCO (Choshi)
Estonia	Skeleton Technologies	batteries – ultracapacitors sold by Japan's Marubeni
France	Ciel Terre	RES – floating power plants using solar and water energy (Tokyo, Awa City)
	Energy Pool	energy demand management – a demand management centre in cooperation with TEPCO (Tokyo, Japan)
	IDEOL	RES – floating wind power plant (Tokyo)
	METRON	energy efficiency, optimisation (Tokyo)
	Naskeo	RES – biogas production in cooperation with local partners (Tsurui, Hokkaido)
Spain	Iberdrola	RES – energy service provider
Netherlands	IHC IQIP	RES – (wind) installation of offshore wind base (Akita-Noshiro)
Germany	ConverterTec	RES – (wind/solar) energy converters (Chiba)
	juwiHoldings	RES – (wind/solar) design, construction of RES farms in cooperation with Japan's Shizen Energy (Tokyo)
	Mounting Systems	RES – (solar) mounting systems for photovoltaic panels (Tokyo)
	RWE Renewables	RES – (wind) electricity production – offshore (Tokyo)
	Siemens Gamesa	RES – (wind) wind turbines (Tokyo)
	skytron energy	RES – (solar) monitoring, control and remote management of photovoltaic farms, among others, for a local partner in Hokkaido – HEPCO – Hokkaido Electric Power Co. (Tokyo)
	SYBAC SOLAR	RES – (solar) developer of photovoltaic projects (e.g. in partnership with Japan Green Power Development) (Tokyo)
	VENSYS Energy	RES – (wind) gearless wind turbines (Tokyo)
	wpd	RES – (wind) electricity production – offshore (Tokyo)
	WWS Wasserkraft	RES – (hydro) production of small turbines for hydroelectric power plants (Kyoto)
Sweden	Cell Impact	hydrogen
	ClimeOn	RES – (geothermal) energy/heat production from geothermal water (Okuhida Onsengo Kansaka)
United Kingdom	Xodus Group	energy consulting (Tokyo)
Italy	Infrastrutture	RES – (wind, solar) management and development of RES projects (including greenfield)

Source: own study based on the presentation by Peter Popovics entitled *Success Stories of European Clean-Tech Companies in Japan* [Polish Investment and Trade Agency, 2024].

Other institutions available at the European level to help European companies invest in Japan include: EU–Japan Centre for Industrial Relations, Enterprise Europe Network, but also online platforms dedicated to the clean-tech industry, such as EU–Japan Green Transition or Connecting Green Hydrogen Japan.

Looking ahead to the next few years, the Japanese market, particularly for the clean--tech industry, may prove to be promising not only because of its conditions regarding the need for decarbonisation, but above all because of the EU–Japan Green Alliance established in 2021. It is an initiative that is based on five areas of cooperation between the EU and Japan. They concern cooperation at political, business and research levels in the fields of RES, hydrogen, the circular economy, and others. The programme is expected to start operating in the third quarter of 2024. Such an initiative creates a favourable climate for bilateral clean-tech ventures.

Polish companies with a chance to establish themselves on the Japanese market are, according to the authors of this chapter, winners of Greenevo's Green Technology Accelerator competitions, such as Seedia, Symbiona, the Institute of Power Engineering – National Research Institute, Asket, Dagas, Prote, Izodom 2000, System 3E, Ekoenergetyka Polska SA (Polish Ecoenergetics) and PPHU Agata. Other companies, such as Anwil, Azoty and ORLEN, are some of the largest producers of (grey) hydrogen in Poland, while also possessing significant know-how in chemical synthesis. The group of companies with unique technologies/products includes hiPower Energy, Hydrogenium Prosta Spółka Akcyjna (Joint Stock Company), PAK-PCE Polski Autobus Wodorowy (Polish Hydrogen Bus), Asket, Dagas, Prote, Izodom 2000, System 3E, Ekoenergetyka Polska and PPHU Agata. Some of these companies already have experience in expanding into foreign markets (including Asia) and some combine Asian and Polish know-how (hiPower Energy and Hydrogenium Prosta Spółka Akcyjna).

Research and development institutions with a significant track record in green technology are also worth highlighting. This group includes the Institute of Power Engineering – National Research Institute and the New Chemical Synthesis Institute (in Puławy). The first institution has developed an innovative method of generating hydrogen or electricity/thermal energy, recognised in the Greenevo Green Technology Accelerator. The aforementioned solid-oxide electrochemical cell stack technology enables the generation of electricity, heat or hydrogen. The technology is characterised by high efficiency and a wide range of industrial applications (including transport, chemicals, petrochemicals, and electricity). The second institution is said to have the world's greatest know-how in the synthesis of green ammonia. Both institutes therefore have significant potential for R&D cooperation.

Summary and conclusions

An analysis of developments and trends in the area of green technology in Japan and Poland yields two conclusions and a recommendation. Firstly, while Poland is far more committed to integrating RES into its consumer energy mix compared to Japan, it is Japan that makes greater use of RES in energy production. Secondly, an analysis of the expenditure spent on R&D concerning energy-related technologies in both countries, correlates strongly with their energy mix, and is also an indicator of the energy development trends of both countries. Cooperation aiming at increasing the use of RES in Japan and Poland through the exchange of technology and experience is therefore possible in the field of RES or hydrogen technology. This is particularly justified given the favourable political and regulatory climate, but also the potential for synergies and opportunities to expand business cooperation with an R&D component.

An analysis of the cooperation between Poland and Japan to date in the broad field of green technology shows its moderate scope. The main reasons for this include cultural and language barriers or differences in business models in Polish and Japanese companies. This is compounded by Japan's high level of technological development in general, as well as by the lack of familiarity with the "Poland" brand among Japanese entrepreneurs.

Recommendations in this area include measures for both state administration and entrepreneurs. Firstly, it is necessary to strengthen the Polish national brand in the Japanese market and, in doing so, to position it not only within the framework of established patterns (e.g. Chopin's culture and music), but also in terms of innovative, proven and safe technologies. Secondly, the probability of success for entrepreneurs interested in expanding into the Japanese market in the field of green technology is significantly increased by participating in European, national (government) or regional programmes, as well as by using tools (e.g. online platforms, consultations) offered by investor support institutions. Thirdly, selling technology to the Japanese market requires sustaining long-term (often several-years-long) interest in the market and the partner through participation in trade missions or international fairs. Fourthly, a local partner (investor, distributor), who legitimises the company in the Japanese business community, can be a great facilitator in entering the Japanese clean-tech market. Fifthly, when looking for local partners, one should look beyond the boundaries of their industry or even business. The multiplicity of business lines of Japanese companies, as well as the European "scouting" of Japanese investment firms, encourages diverse, often non-obvious, company combinations. In addition, activities of local governments in Japan in terms of the energy transition, as well as strong regionalisation of the country's power generation segment, are conducive to the involvement of stakeholders, other than just economic actors, in investments.

* * *

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- Agata Karcz-Cholewa (Polish Agency for Enterprise Development, PARP);
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- Artur Racicki (Seedia);
- Marta Szczygieł, PhD (PAIH Foreign Trade Office in Tokyo);
- Julita Turos, Joanna Zdanowska (Ministry of Climate and Environment);
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Chapter 8

Cooperation between Poland and Japan in the ICT Industry

Anna Maria Dzienis, Agata Kapturkiewicz

Introduction

The information and communications technology (ICT) industry is among the critical and rapidly growing sectors of modern economies. It primarily includes infrastructure, products, and services that enable information processing and electronic communication. As a result, the ICT industry combines various service and production industries. In particular, the ICT industry underpins the digital transition of economies and societies, a global trend accelerated by the COVID-19 pandemic. As digitalisation continues, exports and imports of ICT goods and services are rising. Japan and Poland are no different. At the same time, the share of ICT services exports in total services exports is almost twice as high for Poland as for Japan. Taking this perspective, the Japanese market may prove to be a promising destination for Polish exports of these services. For now, Japan is already an important partner, albeit for Polish imports of ICT services; it ranks eighth in the structure of these imports.

The chapter aims to outline the stage of development of the ICT industry in Poland and Japan, to present the industry structure in terms of the size and number of companies and employment, and to provide an overview of international trade in ICT goods and services, including bilateral trade. The chapter also presents the outcome of an analysis on future trends of the pertinent industry and its development potential, also in the context of fostering Polish-Japanese cooperation. First, the characteristics of the ICT industry in the two countries and its importance to their respective economies are described. This is followed by an analysis of international trade in ICT goods and services, including key export and import destinations. Exports and imports of digitally deliverable services are also analysed by categories defined by UNCTAD. The section

on the development trends of the ICT industry and the potential for Polish-Japanese cooperation analyses the factors driving development as well as the industry's trends in Poland and Japan. The analysis of factors employs, among others, the Global Innovation Index (GII) report published by the World Intellectual Property Organisation (WIPO), the *Digital Competitiveness Ranking* compiled by the IMD World Competitiveness Centre, and the results of surveys carried out by the Japan Users Association of Information Systems (JUAS) on IT development in Japanese companies. The statistical data was supplemented with information obtained during in-depth interviews with representatives of two companies operating in Japan or interested in entering the Japanese market: Elmodis and Widmo. The chapter provides a wealth of information on ongoing and potential cooperation between Poland and Japan in the rapidly growing ICT industry, which is increasingly influencing other sectors. It considers industry characteristics and development factors in the countries under study. The chapter also includes real-life examples of companies, their activities, and recommendations for managers planning to expand their ICT businesses into the Japanese market.

8.1. Development of the ICT industry in Japan and Poland

The analysis of the development of the ICT industry in Japan and Poland utilises statistical figures on "Digital Economy" and country profiles published by UNCTAD, along with data from the World Bank and Eurostat. Additionally, the White Paper on Information and Communication in Japan by the Ministry of Internal Affairs and Communications (MIC), the publication of Statistics Poland entitled *Information Society in Poland in 2023*, and materials from the Polish Agency for Enterprise Development (PARP) are also instrumental. Noteworthily, business classification systems used in Poland and Japan differ. In the former country, it is the statistical classification of economic activities in the European Community, NACE for short, whose Polish version and full form is the Polish Classification of Activities (*Polska Klasyfikacja Działalności* – PKD). Japan, on the other hand, employs a system called the Japan Standard Industrial Classification (JSIC), or the Japanese Business Classification.

8.1.1. Japan

According to the Japanese government's statistical figures, in 2021, the information and communications industry's contribution to the gross domestic product (GDP) of major industries was 10.3% in real terms [MIC, 2023, p. 30]. The largest share of the

industry's GDP derives from information services, research, and ICT-related services and production [MIC, 2023, p. 32].

In 2023, the share of Japan's ICT market in the global market was 5.7%, ranking Japan fourth after the US at 35.7%, the EU at 11.8% (Germany at 4.2%) and China at 11.7%, but ahead of the UK at 4.5% and India at 2.4% [Statista, 2024]. The ICT market includes, among others, equipment and devices that serve as user interfaces, communication networks (including operators and broadcasters), clouds and data centres, content services (including video and music distribution), security and artificial intelligence [MIC, 2023, p. 56].

Statistical figures on GDP by type of activity in Japan are as follows. In 2020, the service industry generated 73.1% of GDP, of which 5.1% derived from the information and communications industry [Statistics Japan, 2023, p. 30]. In 2021, employment in companies (excluding enterprises with unknown operational details, central government services, and local authorities) reached 57.9 million people across estimated 5.2 million enterprises. A total of 75.6% of employees worked in companies with fewer than 10 employees. The ICT industry recorded 76 559 active companies employing nearly 2 million people, or 3.5% of the total number of employees in companies [Statistics Japan, 2023, pp. 30–32]. Total employment in the information and communications industry in 2022 was 2 720 000 people, with 71% being men [Statistics Japan, 2023, p. 128]; the largest number of jobs were created by information services, research, and ICT-related services and production [MIC, 2023, p. 39]. Noteworthily, Japan is facing severe labour shortages in the ICT industry, particularly in such areas as data analytics and cybersecurity [Imanishi, 2022].

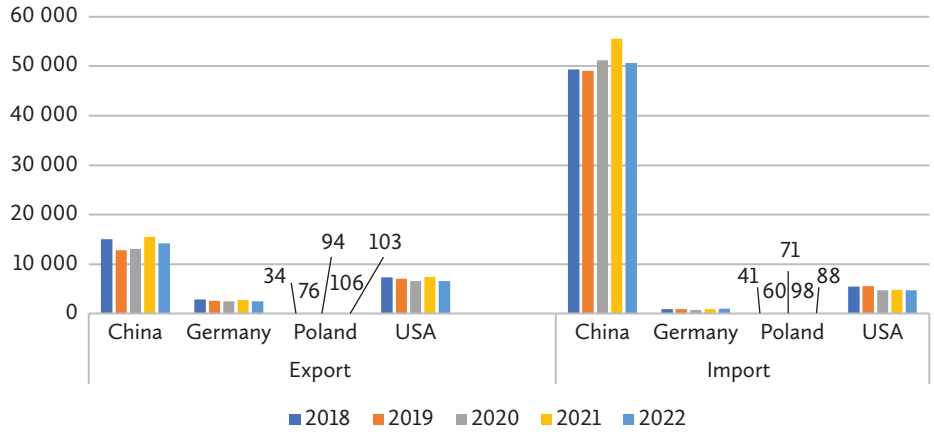
In fiscal year 2021, research spending by ICT companies in Japan accounted for 24.2% of the total expenditure on science, research, and technology development. In recent years, the number has either declined or remained steady [MIC, 2023, p. 61].

In 2022, the share of ICT goods exports [UNCTAD, 2024] in Japan's total exports was 8.16%, while the share of ICT goods imports in total imports reached 11.27%. Figure 8.1 shows Japan's exports and imports from 2018 to 2022 based on bilateral trade flows of total ICT goods. In 2022, Japan's ICT goods exports, valued at USD 60.9 billion at current prices, were primarily destined for China (23%), Taiwan (the Republic of China, 16%), the United States (11%), Hong Kong (Hong Kong Special Administrative Region of the People's Republic of China, 10%), and South Korea (8%). Among European countries, it was Germany (4%) and the Netherlands (2%). Poland ranked 24th in terms of value share in Japanese exports of ICT goods. By comparison, the Czech Republic ranked 20th, Hungary 29th, and Slovakia 49th.

The imports of ICT goods (USD 101.3 billion at current prices) in 2022 came primarily from China (50%), Taiwan (21%), the United States (5%), Thailand (5%), and

South Korea (4%). Among European countries, the main sources of Japanese imports of ICT goods were Germany (1%) and Ireland (0.5%). Poland ranked 26th, the Czech Republic 17th, Hungary 21st and Slovakia 44th. In 2022, the share of high-tech exports in industrial goods exports in Japan was 13% [World Bank, 2024].

Figure 8.1. Japan's exports and imports in 2018–2022 based on bilateral trade flows of total ICT goods (in USD million, current prices)



Source: UNCTAD [2024].

8.1.2. Poland

The ICT industry's contribution to Poland's GDP is estimated at 3.77% [Statista, 2023]. A comparison between Poland and Japan is facilitated by UNCTAD data, which measures the added value of the ICT industry as a percentage share of the total added value of the business industry. In 2019, it was 5.48% for Japan and 3.16% for Poland [UNCTAD, 2023a].

As estimated by Statistics Poland, the ICT industry in Poland in 2022 included 2712 companies employing 10 people or more. A total of 91.9% of these companies provided ICT services. In contrast, more than 75% of the services offered were IT services. Employment in the ICT industry reached 318 000 people, with 87.7% working in ICT services. The IT services had the highest headcount – 79.3% [Statistics Poland, 2023c, p. 23]. ICT companies account for 5% of all Polish enterprises employing at least 10 people. The total number of companies operating in the ICT industry is estimated at 100 000. Most of them are small and medium-sized enterprises (SMEs), and only 2.5% employ 10 people or more [Rutkowski, 2023, pp. 9, 15]. In 2021, sole traders constituted 26.1% of the workforce in the industry. At the same time, the industry's

companies accounted for 6.7% of the total number of microenterprises in services [Skowrońska, 2023, pp. 56, 62].

In benchmarking Poland and Japan, data from the Organisation for Economic Co-operation and Development [2024] can be used as a reference. Although the data for 2020 is incomplete (as Japan's data was not published at that time), data for 2016 is available, including information on the number of companies and employees. According to these statistical figures, in 2016, there were 43 585 companies in the information and communications industry in Japan and 94 054 such companies in Poland (141 594 in 2020), and employment amounted to 1.6 million for Japan and 256 691 for Poland (302 989 in 2020).

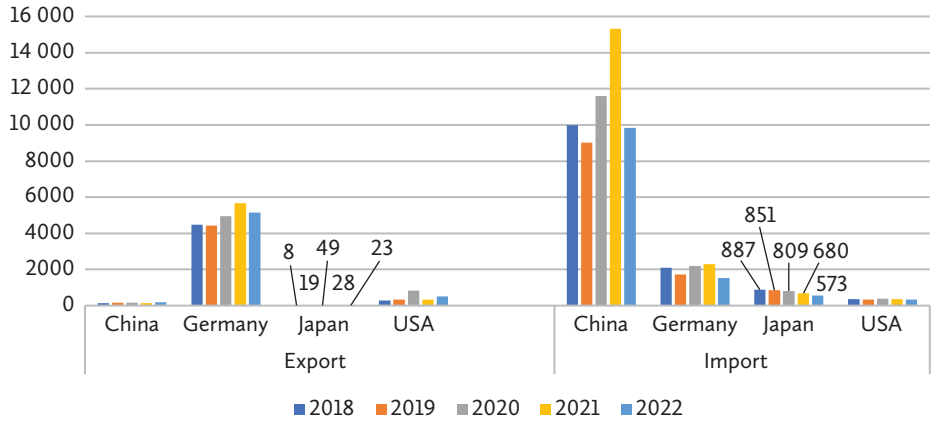
In Poland in 2023, ICT professionals accounted for 4.3% of total headcount, with the average for EU countries standing at 4.8%. Among ICT professionals, 78% of employees had a university degree, 57% belonged to the 35–74 age group, and 81% were men [Eurostat, 2024]. Polish Investment and Trade Agency [PAIH, 2024] highlighted that Poland is home to world-class developers and that Poles demonstrate high social acceptance of technological innovations. This is evidenced by Poland's third place in smartphone usage globally, the rapidly growing Revolut market, and the 90% share of contactless transactions in card payments.

In Poland, ICT companies were more innovative than companies in the overall economy. From 2020 to 2022, roughly one in two companies in the industry introduced innovations (46.8%), compared to 32.2% of all the companies in Poland [Statistics Poland, 2023c, p. 23]. In 2022, R&D expenditure in the ICT industry, which increased by 40.5% compared to the previous year, accounted for 18.6% of the total gross domestic R&D expenditure [Statistics Poland, 2023a, p. 1; Statistics Poland, 2023c, p. 34].

In 2022, the share of ICT goods exports [UNCTAD, 2024] in Poland's total exports was 6.47%, while the share of ICT goods imports in total imports reached 6.34%. Figure 8.2 shows Poland's exports and imports from 2018 to 2022, based on bilateral trade flows of total ICT goods. In 2022, the main recipients of Poland's ICT goods exports (valued at USD 22.2 billion at current prices) were Germany (23%), the Netherlands (14%), the UK (11%), France (7%), and Sweden (6%). Among trading partners in this category, Japan was ranked 42nd.

In 2022, the Polish imports of ICT goods (USD 22.7 billion at current prices) came primarily from China (43%), the Netherlands (10%), Germany (7%), Vietnam (5%) and South Korea (5%). Japan ranked eighth by value in Polish imports of ICT goods with a 2.5% share. In 2022, the share of high-tech exports in industrial goods exports in Poland was 11% [World Bank, 2024].

Figure 8.2. Poland's exports and imports in 2018–2022 based on bilateral trade flows of total ICT goods (in USD million, current prices)



Source: UNCTAD [2024].

8.1.3. Digitally deliverable services in the international trade in services of Japan and Poland

Taking a more detailed view, in 2022, the share of digitally deliverable services (see Table 8.1) constituted 67.9% of Japan's total services exports and 68.94% of its service imports [UNCTAD, 2023b]. The corresponding figures for Poland were 41.9% and 52.45%, respectively. Japan's exports of digitally deliverable services were primarily driven by charges for the use of intellectual property, financial services, as well as telecommunications, computer, and information services. In imports, financial services were not among the leading categories, but professional and management consulting services accounted for a significant share. For Poland's imports, the same categories appeared among the digitally delivered services with the greatest share in total services trade; while Poland's exports included professional and management consulting services, along with telecommunications, computer, and information services.

Table 8.2 shows the three highest year-on-year increases observed in 2022 among categories of digitally deliverable services in the international trade of the surveyed countries. Japan experienced declines in exports (but for audiovisual and related services) and modest increases in imports, with the highest growth in insurance and pension services. In contrast, Poland's trade in digitally deliverable services was marked by significantly higher growth dynamics.

Table 8.1. Share of digitally deliverable services in the value of total services in 2022

Country	Exports	%	Imports	%
Japan	Charges for the use of intellectual property*	27.90	Charges for the use of intellectual property*	13.15
	Financial services	7.14	Professional and management consulting services	10.65
	Telecommunications, computer, and information services	6.18	Telecommunications, computer, and information services	10.61
Poland	Telecommunications, computer, and information services	14.01	Professional and management consulting services	15.23
	Professional and management consulting services	12.97	Telecommunications, computer, and information services	14.79
	Other business services*	3.75	Charges for the use of intellectual property*	6.97

* Not elsewhere classified.

Source: UNCTAD [2023b].

Table 8.2. Year-on-year percentage change in the value of digitally deliverable services in 2022

Country	Exports	%	Imports	%
Japan	Audiovisual and related services	8.2	Insurance and pension services	11.9
	Telecommunications, computer, and information services	–1	Professional and management consulting services	2.3
	Insurance and pension services	–2.9	Research and development (R&D)	1.4
Poland	Audiovisual and related services	28.4	Audiovisual and related services	31.6
	Financial services	22.5	Insurance and pension services	27.0
	Telecommunications, computer, and information services	15.7	Telecommunications, computer, and information services	21.9

Source: UNCTAD [2023b].

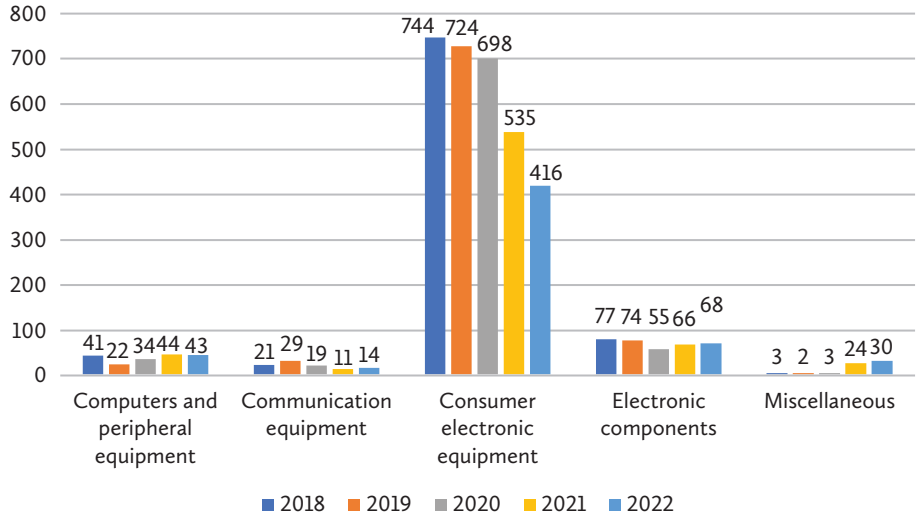
According to UNCTAD figures, in 2022, the value of ICT services exports [UNCTAD, 2023c] was USD 10.1 billion (at current prices) for Japan and USD 12.8 billion for Poland. This placed Japan 17th and Poland 15th in the institution's rankings, respectively. The undisputed world leader in this category is Ireland, whose ICT services exports in 2022 reached USD 204.2 billion, or 22.4% of global ICT services exports. India was second (20.8%), and China third (9.1%). Poland's share of global ICT services exports was 1.4%, while Japan's share was 1.1%. At the country level, the share was 13.4% for Poland and 6% for Japan in total services exports.

For imports, it was USD 21.1 billion for Japan and USD 7.9 billion for Poland. UNCTAD does not publish data on individual countries' shares of global ICT services imports. However, according to the institution's statistical figures, in 2022, Japan ranked 6th and Poland 16th in terms of the value of these imports. The leaders were the United States, Germany, and France. In 2022, ICT services imports accounted for 13.7% of Poland's total service imports, compared to 10% for Japan. Summing up, in 2022, Poland's exports and imports of ICT services increased by 16.5% and 22%, respectively, compared to the previous year. Conversely, Japan's exports in this category decreased by 0.6%, while imports fell by 13.4%.

8.1.4. Bilateral trade flows of total ICT goods between Japan and Poland

In 2022, the share of imports from Japan in Poland's total trade was 1.5%, while that of exports was only 0.2% [Statistics Poland, 2023b]. Consequently, bilateral trade flows of total ICT goods between Japan and Poland were also negligible. Figures 8.3 through 8.6 show the value of trade between the countries from 2018 to 2022 by categories of ICT goods adopted by UNCTAD, i.e. computers and peripheral equipment, communication equipment, consumer electronic equipment, electronic components and miscellaneous.

Figure 8.3. Japanese imports to Poland of ICT goods by UNCTAD category in 2018–2022 (in USD million, current prices)



Source: UNCTAD [2024].

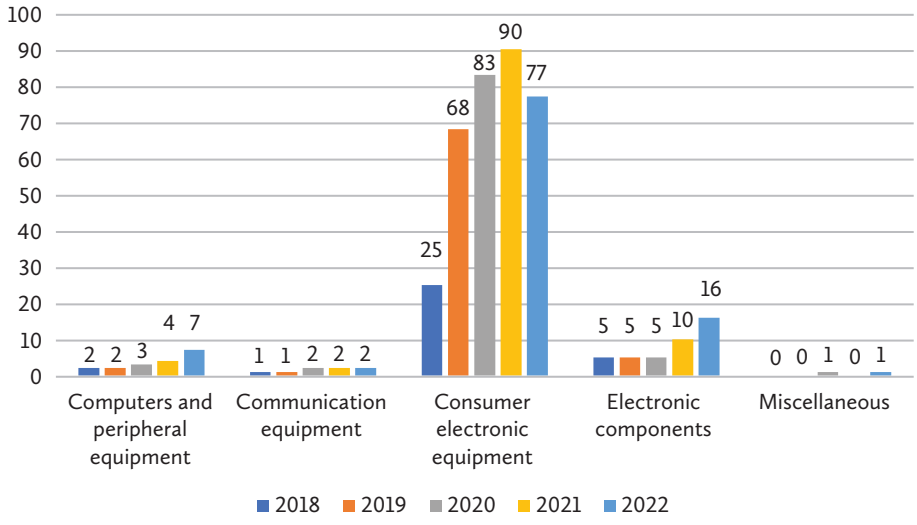
Value-wise, the largest imports from Japan to Poland were of the "Consumer electronic equipment" category of goods (see Figure 8.3). However, it exhibited a downward trend and, in 2022, accounted for 55.9% of the 2018 import value for this category. Increases in imports during the review period were observed in the "Computers and peripheral equipment" and the "Miscellaneous" categories.

In Japan's exports to Poland, the "Consumer electronic equipment" category was also the prevailing one (see Figure 8.4). From 2018 to 2022, the highest export values for these products were recorded in 2020 and 2021, at USD 83 million and USD 90 million, respectively, at current prices. The "Electronic components" category displayed an upward trend during the period under review.

Figure 8.5 shows the imports of the analysed categories of ICT goods from Poland to Japan. Two groups recorded almost zero values – "Electronic components" and "Miscellaneous". Imports of communication equipment and computers and peripheral equipment grew most intensively.

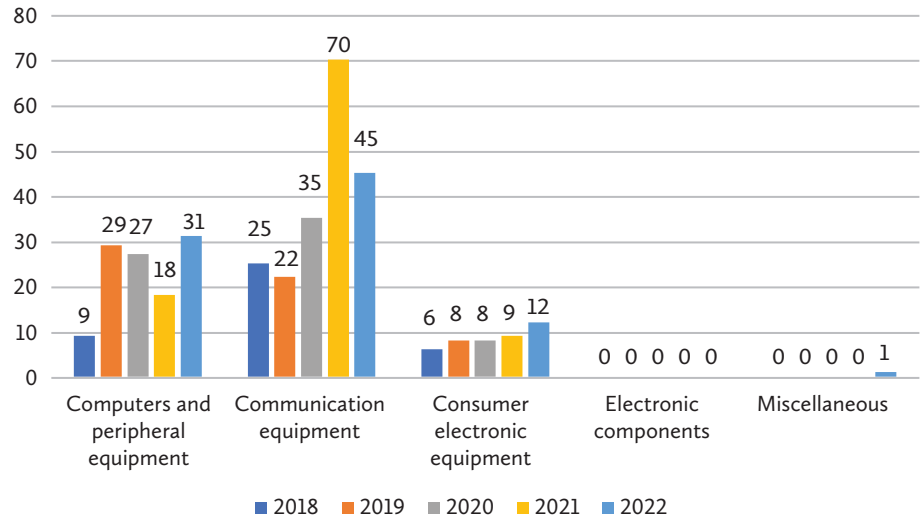
In the exports of ICT goods from Poland to Japan, the "Computers and peripheral equipment" category had the highest value from 2018 to 2022 (see Figure 8.6). In 2022, it reached USD 16 million at current prices, more than three times the amount recorded in 2018. Another category with relatively high figures was "Consumer electronic equipment." In 2020 and 2021, exports of these products amounted to USD 33 million and USD 14 million, respectively, at current prices.

Figure 8.4. Japanese exports to Poland of ICT goods by UNCTAD category in 2018–2022 (in USD million, current prices)



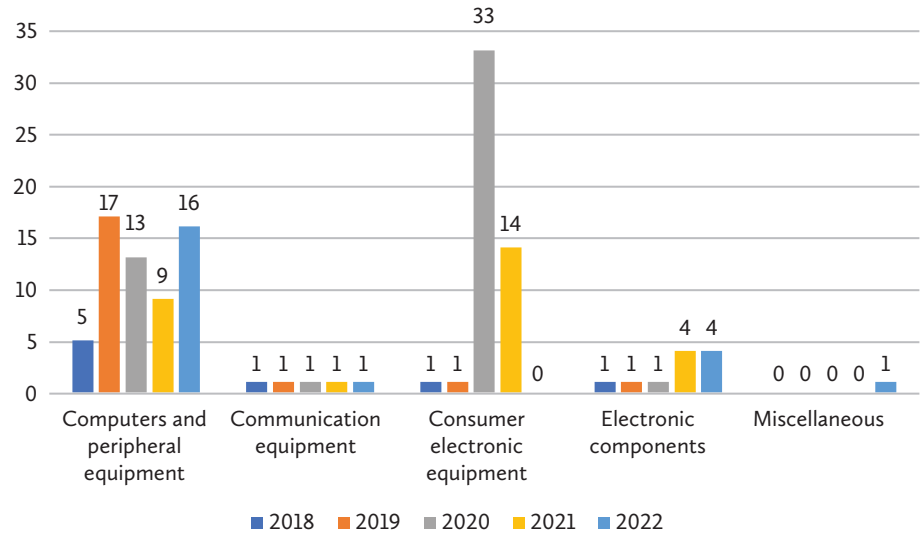
Source: UNCTAD [2024].

Figure 8.5. Polish imports to Japan of ICT goods by UNCTAD category in 2018–2022 (in USD million, current prices)



Source: UNCTAD [2024].

Figure 8.6. Polish exports to Japan of ICT goods by UNCTAD category in 2018–2022 (in USD million, current prices)



Source: UNCTAD [2024].

8.2. Development trends of the ICT industry and the potential for expansion of cooperation between Poland and Japan

The development factors of the ICT industry in the two pertinent countries will be analysed first, followed by the development trends of the industry in Poland and Japan. Two main data sources, the GII report published by the WIPO and the *Digital Competitiveness Ranking* compiled by the IMD World Competitiveness Centre, will be used in the analysis of the factors.

According to the GII 2023, Japan ranks 13th, while Poland ranks 41st in the global ranking of innovative economies. Poland's position places it among the economies with below-expected innovation achievements. Although Japan's position has slipped, the country ranks third among the world's five economies with the highest R&D expenditure and saw an increase in these expenditures in 2022. In terms of the size of the R&D budget, the global situation is as follows: the United States (+5.6%), China (+9.8%), Japan (+3.6%), Germany (+2.7%) and the Republic of Korea (+7.1%). Japan stands out from other countries for its achievements in building a super computer called Fugaku, and is the second largest market for industrial robots. It is also noteworthy that Japan is home to the world's largest science and technology (S&T) cluster, Tokyo-Yokohama [WIPO, 2023].

Although Japan ranks high in the R&D category of the GII 2023, the country faces challenges in higher education, leading to mismatches in the job market and low performance in the business environment, particularly regarding pro-entrepreneurial policies and culture. According to the GII 2023 ranking, what is also Japan's weakness is online creativity included in the creative outputs index.

Poland ranks low in the overall GII 2023 indicator for institutions, including the regulatory and business environment, particularly in terms of policies for doing business. Although Poland's strength lies in its PISA scales in reading, maths, and science, higher education is considered a weakness in its economy according to the GII 2023 ranking. Interestingly, among the strengths of the Polish economy, WIPO highlights intangible asset intensity, industrial designs by origin, creative goods exports, and generic top--level domains in online creativity.

Digital Competitiveness Ranking [IMD, 2023], which examines 64 economies and focuses on indicators related to the digital competitiveness of economies, positions Poland 39th and Japan 32nd (see Table 8.3). The overall digital competitiveness index developed by IMD consists of three factors: knowledge, technology, and future readiness, which are further divided into specific sub-factors.

Similar to the indexes published by WIPO, Poland's strengths according to the IMD also include its high scores in the PISA international comparative study of educational

competencies in mathematics (ranked 9th) and its use of robots in education and R&D (ranked 14th) examined under the knowledge factor. Highly rated are wireless broadband (4th) included in the technology factor and business agility (opportunities and threats) (15th) in future readiness. Weaknesses include starting a business (54th), intellectual property rights (54th), and communications technology (51st), all under the technology factor.

Table 8.3. IMD Digital Competitiveness Ranking 2023 (covering 64 economies), overall digital trends and their individual factors

Country	Total	Knowledge	Technology	Future readiness
Poland	39 (41 in 2021)	37	44	40
Japan	32 (28 in 2021)	28	32	32

Source: IMD [2023].

For Japan, the *Digital Competitiveness Ranking* [IMD, 2023] points to such strengths as wireless broadband (2nd) and world robots distribution (2nd), negligible software piracy (2nd) and e-participation (1st), the last three falling under the future readiness factor. Chief among weaknesses are indicators belonging to the knowledge factor, namely international experience (64th) and digital/technological skills (63rd). Additionally, under future readiness, in the business agility category, weaknesses include responding to business opportunities and threats (62nd), agility of companies (64th), and use of big data and analytics (64th).

The PARP report entitled *Perspektywy rozwoju siedemnastu branż polskiej gospodarki* (*Development Prospects of Seventeen Industries of the Polish Economy*) [2023] highlights the IT industry, cybersecurity, and telecommunications as areas of economic activity with the strongest impact on other sectors. The development of these areas is central for the growth of the entire economy [Worek et al., 2023, p. 16]. At the same time, the agency emphasises that it is IT and cybersecurity, rather than the financial system, that now constitute the "bloodstream of the economy" [Worek et al., 2023, p. 16]. The report presents a scenario, developed by a team of experts, for the growth of the IT industry in Poland. Among the cross-industry trends most strongly affecting the sector are digitalisation, client orientation, automation and robotisation, employee orientation, internationalisation of labour markets, conscious and responsible consumption, sustainability, and energy transition. At the same time, critical factors for the industry include the availability and development of digital infrastructure, university-business cooperation, investment in R&D and innovation, increased digital security, availability and quality of human resources, investment in HR development, greater demand

for IT services, and economic changes and crises [Worek et al., 2023, p. 18]. For the next five years, the scenario predicts increased investment in 5G, the development of technical education in cooperation with industry, and stronger specialisation in AI and cybersecurity. The forecast also assumes a growing number of startups, a widespread use of cloud computing and the development of international partnerships [Worek et al., 2023, p. 18].

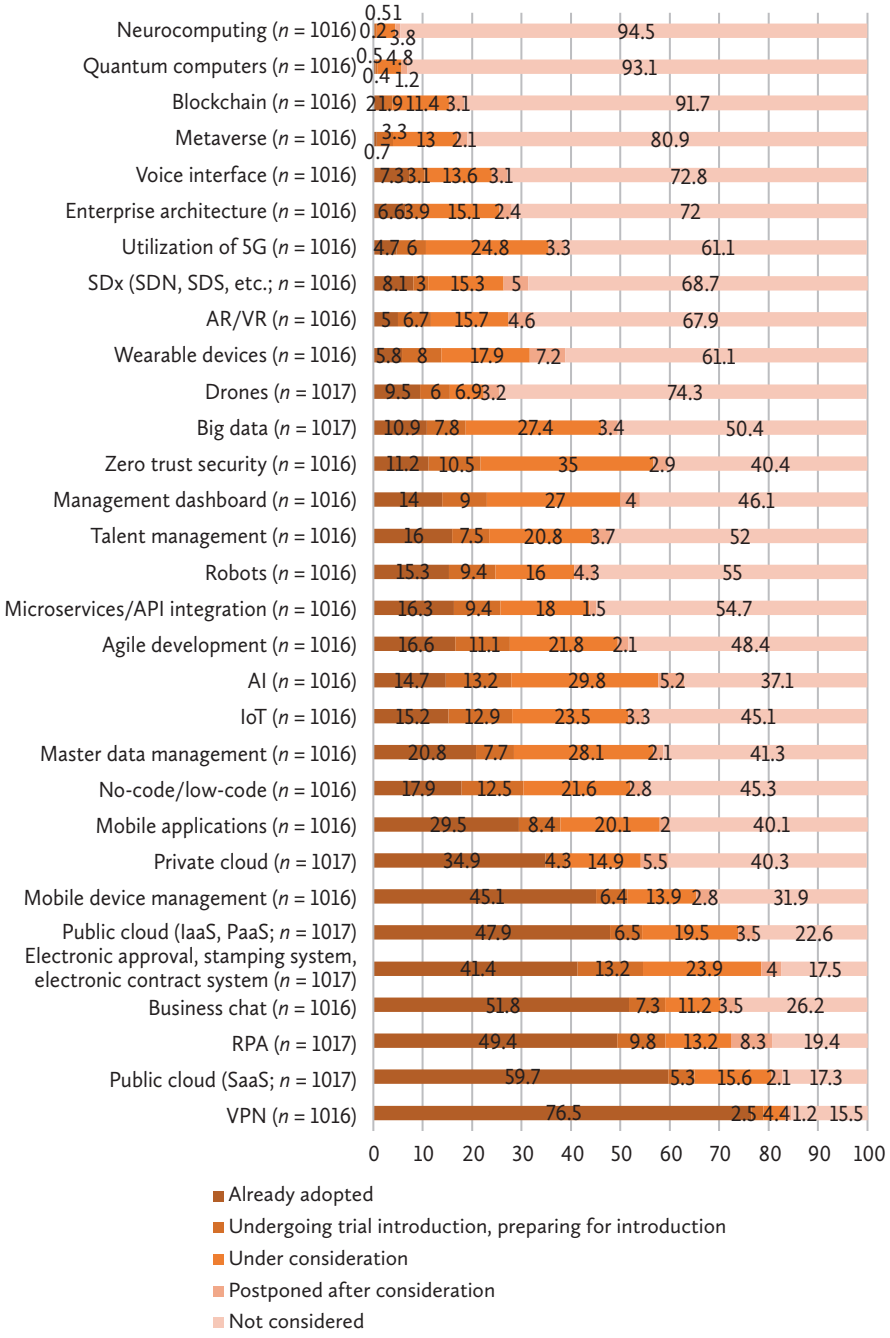
Undeniably, Poland is a key country for investors planning to build a strong presence in the CEE region. In recent years, various institutions have also supported the development of the technology ecosystem in Poland by offering, among other things, programmes to support high-risk ventures, such as Digital Champions. The youngest "unicorn" company in the region, a startup with a capitalisation of more than USD 1 billion, is ElevenLabs, founded in 2022 and originating from Poland [Digital Champions CEE, 2024, p. 33]. Polish companies significantly increased their share in total company capitalisation from 29.81% to 38.03%, making Poland the leader in total capitalisation among CEE countries [Digital Champions CEE, 2024, p. 35].

Interestingly, Poland was ranked 23rd in the global ranking, marking its first appearance there since 2015 and standing as the only Central and Eastern European representative. Additionally, Poland secured 7th place among emerging markets in the FDI Confidence Index 2024 [Trade.gov.pl, 2024]. This achievement reflects not only the recently popular trends of nearshoring and friendshoring but also the country's significant innovative and technological potential [Digital Champions CEE, 2024, p. 34].

In conclusion, Poland is emerging as a leader in the ICT industry within Central and Eastern Europe, with its technological appeal validated by major investors like Google, Amazon, and Microsoft [The Polish Investment & Trade Agency, 2023]. According to PAIH, Poland stands out in Europe for its talent, key location for offshore customer experience (CX) services, dynamic development of the digital economy, and ICT market.

Recently, the Japanese business community has been working hard to effectively implement digitalisation. In response to this challenge, companies must optimise business processes and operations. This drives demand for a range of digital services, including trust services, secure data exchange platforms, and SaaS (Software as a Service) solutions to support back-office functions. Additionally, depending on the specific industry, there is growing demand for solutions in artificial intelligence (AI), the industrial Internet of Things (IoT), sensor networks and technologies, as well as user interface (UI) and user experience (UX). An increasing demand for ICT solutions, coupled with a shortage of talent, is creating opportunities for foreign companies to grow [Broeckaert, 2022, p. 3].

Figure 8.7. Overview of key technologies and their adoption rates among surveyed companies in Japan (%)



Source: own study based on: JUAS [2023, p. 207].

Table 8.4. Percentage of new technologies implemented by industry

New technology adoption status	1	2	3	4	5	6	7	8	9	10
VPN (virtual private network)	82.5	72.5	68.4	77.8	73.7	64.1	69.6	78.8	73.1	69.9
Public cloud (SaaS)	64.9	63.5	59.2	62.1	57.9	48.7	67.4	81.8	62.8	59.6
Robotic process automation	57.9	58.4	50	60.8	62.1	35.9	69.6	63.6	53.8	33.7
Electronic approval, stamping system, electronic contract system	56.1	46.1	34.2	45.1	53.7	37.2	60.9	63.6	55.1	56
Business chat	68.4	51.7	42.1	49	42.1	38.5	69.6	72.7	50	56
Public cloud (IaaS, PaaS)	54.4	47.8	48.7	50.3	49.5	46.2	54.3	72.7	50	48.8
Mobile device management	70.2	48.3	42.1	48.4	47.4	30.8	56.5	60.6	44.9	39.2
No-code/low-code	38.6	23.6	21.1	34	30.5	14.1	30.4	33.3	28.2	22.3
Mobile applications	40.4	29.8	23.7	33.3	20	28.2	63	51.3	33.3	25.3
Private cloud	49.1	32.6	43.4	31.4	27.4	16.7	52.2	51.5	35.9	22.3
Agile development	24.6	15.2	13.2	26.1	17.9	11.5	32.6	45.5	17.9	27.1
IoT	29.8	17.4	21.1	35.3	6.3	3.8	2.2	24.2	11.5	10.8
Microservices/API integration	22.8	17.4	7.9	19	17.9	20.5	56.5	33.3	26.9	23.5
Talent management	28.1	29.2	13.2	24.8	18.9	19.2	26.1	27.3	23.1	16.9
Management dashboard	21.1	15.2	11.8	17.6	16.8	10.3	21.7	42.4	6.4	11.4
Zero trust security	28.1	18	7.9	19	12.6	10.3	17.4	30.3	11.5	12
Language-generating AI	12.3	10.1	3.9	10.5	10.5	1.3	13	12.1	7.7	6
Robots	21.1	21.3	15.8	30.7	12.6	10.3	15.2	12.1	16.7	8.4
Master data management	22.8	16.9	17.1	18.3	21.1	23.1	28.3	36.4	5.1	9.6
AI (other than generative AI)	12.3	15.2	10.5	15.7	11.6	6.4	23.9	24.2	9	8.4
Big data	12.3	9	13.2	13.1	7.4	9	15.2	27.3	5.1	9.6
Drones	36.8	7.3	10.5	8.5	3.2	0	8.7	18.2	6.4	10.8
Wearable devices	19.3	6.2	9.2	11.1	3.2	1.3	6.5	12.1	9	2.4
Utilisation of 5G	14	3.4	6.6	5.2	6.3	6.4	8.7	15.2	14.1	9
AR (augmented reality) / VR (virtual reality)	17.5	6.7	7.9	10.5	3.2	0	4.3	9.1	7.7	4.2
Other generative AI	7	1.7	2.6	4.6	3.2	0	6.5	6.1	2.6	0.6
SDx (SDN, SDS, etc.)	8.8	10.1	3.9	15.7	3.2	2.6	17.4	9.1	11.5	4.8
Voice interface	14	2.8	7.9	9.2	5.3	6.4	21.7	15.2	11.5	4.2
Enterprise architecture (EA)	7	7.3	3.9	11.1	7.4	5.1	19.6	21.2	3.8	4.8
Metaverse	3.5	1.1	0	2	0	0	0	0	3.8	0.6
Blockchain	3.5	3.4	0	2	3.2	0	6.5	3	2.6	3
Quantum computing	0	0	0	0.7	1.1	0	0	0	0	0
Neurocomputing	0	0	0	0.7	0	0	0	0	0	0

Note: for each new technology listed, the highest value is marked in red and the second highest value is marked in yellow. Explanation: 1. Architecture and civil engineering; 2. Lifestyle-related and other production; 3. Production of basic materials; 4. Processing and assembly production; 5. Wholesale; 6. Retail and catering; 7. Finance and insurance; 8. Social infrastructure; 9. Transportation, storage and real estate; 10. Services.

Source: own study based on: JUAS [2024, p. 212].

A valuable resource for understanding technology development trends in Japanese companies is an annual survey conducted by the JUAS. The JUAS surveys for 2022 and 2023 were conducted from 9 September to 27 October, targeting 4500 companies, including those listed on the Tokyo Stock Exchange. A report based on respondents' answers summarises various survey results, including the current status of new technology implementation in Japanese companies (see Figure 8.7).

According to JUAS [2023], the most technologically advanced industries in Japan were finance and insurance, as well as social infrastructure (ICT, energy, distribution, and communications). In 2023, the latter emerged as the clear leader in adopting new technologies compared to other industries in Japan [JUAS, 2024]. The social infrastructure, and finance and insurance industries are dictating the pace of adopting new technologies across the economy. It should also be noted that large companies show a significantly higher level of technology adoption compared to smaller enterprises. In 2022, the social infrastructure industry saw predominant implementation of AI, big data, robotic process automation, enterprise architecture (EA), and agile development [JUAS, 2023]. In 2023, the social infrastructure industry led in implementing such technologies as public cloud (IaaS, PaaS and SaaS), management panels, master data management (MDM), big data, electronic workflows, enterprise architecture, the zero trust security model, and agile development [JUAS, 2024, p. 211].

The 2023 JUAS survey highlighted heavy drone use in the construction and engineering sectors. However, in 2024 (see Table 8.4), these industries saw the highest deployment of, among others, augmented reality (AR), virtual reality (VR), wearable devices, and mobile device management (MDM) [JUAS, 2024, p. 212]. In addition, an increased uptake of generative AI among companies in general was noted as of mid-2022 [JUAS, 2024, p. 228].

The 2022 survey results imply a significant focus among Japanese companies on implementing or considering the implementation of the Zero Trust security model. This trend is driven by a rise in remote work and other flexible work arrangements, and willingness to enhance security while boosting convenience and productivity [JUAS, 2023]. Additionally, over half of the companies, particularly those with high revenues, are adopting "no-code/low-code" solutions to foster business efficiency and advance digital transition [JUAS, 2023, p. 222].

The finance and insurance as well as the social infrastructure industries face significant challenges in transforming their existing product and service delivery methods and also in creating new, next-generation business models. In the other industries, the review of decision-making and business processes in accounting and HR remains a common problem [JUAS, 2024, p. 222]. The authors of the JUAS report

[2024, p. 222] conclude that the finance and insurance as well as the social infrastructure industries, leaders in adopting new technologies, not only address current issues by adopting technologies, but also tackle future challenges.

Summary and conclusions

Information services, research, and ICT-related services and production account for the largest share of GDP generated by Japan's information and communications industry. The industry employs 3.5% of the country's total company workforce, and Japan's ICT market is well established globally. In contrast, the ICT industry in Poland is primarily developing in IT services. Most companies in this industry are SMEs, and there are nominally far more of them than ICT companies in Japan. However, Japanese ICT companies generate a much higher headcount. In recent years, R&D expenditure among companies in Poland's ICT industry has increased significantly (by 40.5% in 2022 compared to the preceding year), while in Japan, research expenditure in the industry has either declined or remained steady.

The main partners of Japan's international trade in ICT goods are Asian countries. Poland exports ICT goods predominantly to European countries, and imports them mainly from Asian countries. Poland's ICT services exports have a higher value than those of Japan. Domestically, the share of ICT services exports in Poland's total services exports is more than twice that of Japan. The opposite is observed for imports. Interestingly, Japan ranks 8th by value in Polish imports of ICT goods with a 2.5% share. Moreover, Poland's trade in digitally deliverable services is marked by significantly higher growth dynamics than that of Japan.

In recent years, Poland has been emerging as a leader in the ICT industry among Central and Eastern European countries. Its technological appeal is underscored by investment from international giants in the industry. In Japan, the pace at which new technology is adopted across the economy is driven by social infrastructure, as well as the finance and insurance industries. Transforming an existing product and service delivery methods and creating new, next-generation business models are the most significant challenges in those industries. In other industries, the review of decision--making and business processes in accounting and HR remains a common problem.

Cooperation of Polish and Japanese companies in the ICT industry is currently limited, but holds potential for development. Information obtained from entrepreneurs regarding business, research, and investment cooperation between companies from Poland and Japan, as well as the presence of Polish companies in the Japanese market, indicates that a crucial element from the perspective of Polish investors is finding

a strategic Japanese partner. This is particularly important given significant barriers and cultural differences, such as English proficiency and the length of negotiation and sales processes, between European countries and Japan. Entering the Japanese market on one's own is challenging, although success can depend on such factors as the type of the product offered, the sales model, and the target customer's main industry (in the case of B2B). What is noteworthy is that valuable contacts between Polish and Japanese companies are sometimes established in third countries, such as Western European countries or the United States, where some large Japanese companies actively seek open innovation partners.

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Chapter 9

Cooperation between Poland and Japan in the video game industry

Kamil Flig, Jakub Marszałkowski, Artur Franciszek Tomeczek

Introduction

The purpose of the chapter is to provide an overview of cooperation between Poland and Japan in the gaming industry. Polish game developers play an important role in this extremely globalised sector. The strength of the industry, due to ease of exporting digital products, such as games, and the possibility to reach customers quickly through global distribution platforms via the Internet, is evidenced by the presence of not only large companies such as CD Projekt and Techland, but also dozens, if not hundreds, of smaller studios successfully competing on the international market. Furthermore, Poland has made a unique contribution to the global digital distribution system, oligopolistically dominated by four American (Steam, Microsoft, Google, Apple) and two Japanese (Sony, Nintendo) multinational corporations. The GOG.com platform, owned by CD Projekt, is the only one of substantial importance that can be found outside of these two countries.

Japan, as an economy, has based its post-war economic miracle on exports and rapid economic growth [Tomeczek, 2022]. The position of Japanese companies in the electronics industry and their pioneering role in the early development of the games console market has made Japan one of the most important players in the gaming industry to this day. Companies such as Nintendo and Sony are known to almost every person interested in digital entertainment.

The chapter is formed of two parts. Part one looks at the development of the gaming industry in Poland and Japan (history of the gaming industry as a whole, its size and characteristic features in Poland and Japan). Part two presents development trends and the potential for further cooperation in the gaming industry.

9.1. Development of the gaming industry in Poland and Japan

9.1.1. History of the gaming industry

Over several decades, the global gaming industry[1] has evolved from a niche sector into a powerful business and a vital part of mass culture. The ubiquity and availability of this form of digital entertainment that we are experiencing today was made possible thanks to the Cathode-Ray Tube Amusement Device[2] – an analogue missile simulator that was the prototype of present-day computer games. The game mechanics did not require a monitor: an oscilloscope[3] served as the screen. The first game with a more sophisticated graphics layer, taking advantage of the power of an analogue EDSAC computer (a machine developed by Cambridge University in England), was OXO[4] – a digital version of the popular tic-tac-toe game. Another milestone in games development was the launch of first consoles, with the Magnavox Odyssey at the forefront [Schreier, 2016]. In the 1970s, more and more platforms of this kind were created, and Atari emerged as the leader of the console segment. After a while, home versions of consoles began to oust expensive gaming machines present in bars and other public areas. This revolution triggered a shift in thinking about what a computer game could be and a departure from strictly arcade video games. Thanks to such inventions as the Commodore C64 computer,[5] created in the USA by Jacek Trzmiel (known as Jack Tramiel), a Polish immigrant from Łódź, it became possible for computer games to find their way into gamers' homes on a widespread basis. By harnessing the power of processors designed for entertainment, computer games became more and more advanced in the technology, graphics and story department. Also the next generations of 8-bit and 16-bit consoles took advantage of greater computing capabilities, which allowed for more complex mechanics and opened up the next stage of games development. The rivalry between the two leading console manufacturers of the time: SEGA and Nintendo, showed how huge and lucrative the games market can be. The Nintendo NES console sold more than 50 million units. The spread of three-dimensional graphics and the development of the Internet were the next steps in the gaming revolution. They

1 The term 'games industry' as used in this chapter covers – aside from PC games – also console, mobile and browser games.

2 An early form of an electronic interactive game. Developed in 1947 by two engineers, Thomas T. Goldsmith Jr. and Estle Ray Mann.

3 An electronic instrument for observing, imaging and studying the relationship between two electrical quantities or other physical quantities represented in electrical form.

4 A computer version of the tic-tac-toe game created for the EDSAC computer in 1952.

5 The 1980s home computer, manufactured by Commodore Business Machines (CBM). The C64 had been the best-selling computer in the history of computing until that point, with 17 million units sold.

have led to a dynamic increase in the number of released titles and their complexity. The advent of the *Doom* series, with its 3D graphics and online capabilities, marks the opening of a new spectrum of possibilities for co-operative entertainment. Many more genres and ways of playing became possible. With the development of new platforms and wider access to personal computers and mobile devices, game production became specialised and split into several segments.

The turn of the century saw Sony and Microsoft join the ranks of the leading manufacturers of gaming platforms. Since then, the console market has been an arena of an ongoing war between three giants: Sony (Japan), Microsoft (USA) and Nintendo (Japan). Over the past two decades, Sony and Microsoft have been constantly competing for market dominance, launching successive generations of their consoles: PlayStation 2, 3, 4 and 5, as well as Xbox, Xbox 360, Xbox One and Xbox Series X/S. Nintendo holds the third place, with its 64, GameCube, Wii, Wii U, and Switch consoles. Sony currently occupies the leading position on the global market, with a share of approx. 50%, followed by Microsoft, the manufacturer of the Xbox consoles, with around 30% of the market. Nintendo, with its Switch console, has a share of around 20% [Newzoo, 2023].

Dynamic growth is also taking place in the mobile device segment, which has become an important part of the market. Contemporary smartphones and tablets, which offer the computing power equivalent to that of computers, are perfectly suited to serve as portable entertainment centres. In 2008, Apple introduced the App Store, which turned out to be a ground-breaking solution for mobile gaming. The model of wide accessibility of mobile games emerged, and the market began to grow at a dizzying pace. Currently, the most popular mobile operating systems, iOS and Android, with their app stores, play the leading role in mobile games distribution. The development of augmented reality (AR)[6] and virtual reality (VR),[7] considering that almost everyone has an advanced mobile device in their pockets, has led to the astounding success of such titles as *Pokémon GO* – a game using AR, where the real environment becomes the arena.

Personal computers (PCs) are also continuing to evolve. Today, laptops and gaming desktops boast powerful specifications, taking advantage of ever newer processors, graphics cards and cooling systems. Through growth of streaming and online gaming, dedicated accessories and an entire market of PCs tailored to the needs of gamers have been emerging. The gaming market is capitalising on these advances in technology, reaching more and more customers.

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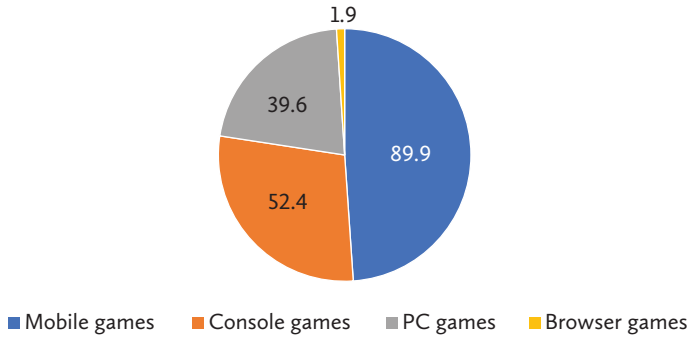
6 A system that combines the real and the computer-generated world. It typically uses a camera image overlaid with real-time, generated 3D graphics.

7 An image of artificial reality created through the use of information technology. It involves multiple media to create a computer vision of objects, spaces and events.

9.1.2. Size and significance of the gaming market

The games industry may be broken down by entities operating in it (manufacturers: development studios, publishers, distributors, platform producers and specialised service providers), the products it creates (consoles and console video games, PC games, mobile games and browser games) and the geographical markets in which games are sold. These divisions notwithstanding, a recent report by Newzoo [2023] forecasts that the value of the gaming market will exceed the USD 200 billion mark in 2026. In comparison, the entire traditional entertainment industry (cinema, music and video) generated revenues of around USD 100 billion in 2024 [Grand View Research, 2024]. Video games are the most rapidly growing industry and are included among the so-called creative industries. Digital distribution allows even small, independent developers and publishers to compete in a global market that is evolving at a dizzying pace.

Figure 9.1. Value of the global gaming market in 2023 (in USD billion)



Source: own study based on: Newzoo [2023].

Mobile games boast the largest share in the global gaming market. In 2023, they accounted for 49% of the market [Newzoo, 2023]. The year-on-year growth dynamics, however, have slightly slowed, largely due to there being no new markets to be conquered, but also because of the changes in the mobile games' distribution model as well as monetisation problems. The second place is occupied by console games, with a 28% share. The console market is growing rapidly, both in terms of the number of players and the market value. It is estimated that the console market will grow from the expected USD 57.20 billion in 2024 to USD 80.98 billion in 2029, which translates into a CAGR of 7.2% [Research Markets, 2024]. The main driver of growth in this category are the successive launches of the most anticipated titles (the highest-grossing, AAA games). PC games accounted for 22% of the market and browser games for just under 2%. The

largest year-on-year share increase occurred in PC gaming. The boundaries between particular platforms are being blurred by the growing trend towards multi-platform and cross-platform gaming, i.e. the ability to run games on all major platforms and play together regardless of the platform one has.

The value of the gaming market, in terms of revenue from selling games to end users or monetisation, varies by latitude. Statistics cite Asia and the Pacific as the largest market, with a 46% share [Newzoo, 2023]. In second place is North America (27%), followed by Europe (18%) and South America (5%). Such an interpretation, however, blurs the picture, since Western markets are globalised, abound with equally global games, while Asia has an incomparably larger share of local production and correspondingly smaller potential for our exports.

As far as countries are concerned, China and the United States are the largest gaming markets, both of comparable size. The top three also include Japan, estimated at roughly half of them. The combined market share of China, the US and Japan accounts for more than three quarters of the profits generated throughout the entire games industry [Newzoo, 2024]. Further down the rankings are South Korea, Germany, the UK, France and Canada. The superiority of the top three is the result of the demographics of these markets and the strong gaming culture. For example, in Japan, out of a population of 125 million, more than 100 million are counted as potential gamers. The Middle East and Africa region is the smallest market for game developers (with a share equal to 4%); however, these markets have the highest growth rate. According to the results for 2023, the Middle East and Africa market recorded 4.6% year-on-year growth. This trend can also be explained by demographics. The population of gamers in the region (who in most cases have access to a smartphone, less often a PC or another platform) is currently 377 million against a population of almost 600 million. For this reason, the potential for growth by attracting new audiences is enormous.

The European games industry is rapidly increasing in size, becoming an increasingly important employer and generator of value and innovation. According to *The Game Industry of Poland* report, the United Kingdom, with more than 20 000 people employed in the industry [Marszałkowski, 2023b], has the first place in Europe. Poland – as per this most favourable for us employment ranking – is in second place, slightly ahead of France and, for several years, significantly ahead of Germany. However, financial indicators still remain a challenge for our industry: when it comes to revenue, profitability and availability of capital, Poland is significantly outperformed by Germany (which is smaller than Poland in terms of employment), and particularly by Sweden and Finland.

Table 9.1. Europe's largest games industries (in terms of employment and number of developers)

No.	Country	Employment	Date of data	Number of developers and publishers	Date of data
1	United Kingdom	20 975	(2021)	1528	(2021)
2	Poland	15 290	(2023)	494	(2022)
3	France	15 000	(2023)	577	(2022)
4	Germany	11 242	(2022)	750	(2022)
5	Spain	9621	(2022)	447	(2022)
6	Sweden	8445	(2022)	939	(2022)
7	Romania	6800	(2022)	222	(2022)
8	Netherlands	4560	(2022)	501	(2021)
9	Finland	3700	(2022)	232	(2022)

Source: own study based on: European Game Developers Federation [2024]; Game Industry Conference [2024].

The most important part of the industry's value chain are the game developers and producers or creators. According to the State of the Game Industry survey of 3000 industry employees, the majority of developers are young and emerging companies. 56% of game development companies have been operating on the market for less than 10 years [State of the Game Industry, 2024]. A large proportion of these are small independent studios dedicated exclusively to game development. Many create independent games (indie games), which are small productions aimed at a niche audience.

The industry is experiencing consolidation, whereby small producers are being absorbed by larger actors. Although game publishers and distributors constitute a separate category of the industry's actors, huge conglomerates covering the entire value chain are often created as a result of consolidation processes in the sector. It is the norm for the largest companies engaged in game development to serve as both publishers and distributors of their titles via digital sales platforms. Game console manufacturers (Microsoft and Sony in particular) also acquire game publishers and distributors, thereby gaining control of the value chain from developers to distributors to hardware platforms. Game sales platforms (e.g. Apple's iOS, Google's Google Play Store) hold most of the highest positions among the top 10 in terms of revenue in the games industry in 2023. The list of the largest companies in the industry in terms of games revenue generated in the first half (H1) of 2023 is shown in Table 9.2.

Table 9.2. Largest public companies in the industry and their H1 2023 revenues from gaming

No.	Company, country of origin	Gaming revenues in H1 2023, y/y change	Main reasons for the revenues generated
1	Tencent (China)	USD 15.4 billion, despite a 3.6% decrease from the previous year	it remains the market leader thanks to popular titles such as *Honor of Kings*, *PUBG Mobile* and *Valorant*
2	Sony (Japan)	USD 8 billion, up 8.7%	growth is being driven by the success of titles released on PlayStation
3	Apple (USA)	USD 6.9 billion, up 3.2%	revenue comes mainly from mobile games available on iOS
4	Microsoft (USA)	USD 6 billion, up 3.5%	Microsoft further reinforced its position in the market with the acquisition of Activision Blizzard
5	NetEase (China)	USD 5 billion, down 3.8%	despite the decline, NetEase maintains a strong position in the Chinese market
6	Google (USA)	USD 5 billion, up 2%	it draws revenue mainly from games available in Google Play Store
7	Activision Blizzard (USA)	USD 4.4 billion, up 35.5%	the company has profited from popular titles such as *Call of Duty* and *World of Warcraft*
8	Electronic Arts (USA)	USD 3.8 billion, up 5.5%	it draws revenue mainly from sports games and titles such as *FIFA* and *Madden NFL*
9	Nintendo (Japan)	USD 3.1 billion, up 3.3%	Nintendo has seen steady growth thanks to the success of games such as *The Legend of Zelda: Tears of the Kingdom*
10	Take Two Interactive (USA)	USD 2.4 billion, up 26%	successes such as *Grand Theft Auto* and *Red Dead Redemption* are the driving force behind the company's revenues
11	CD Projekt	USD 80 million, down 14%	for comparison, the results of the largest publicly listed Polish gaming company

Source: own study based on: Newzoo [2023].

9.1.3. Polish gaming industry

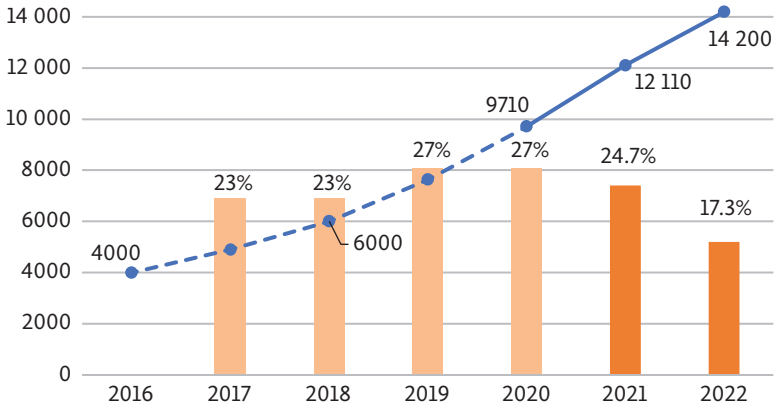
Poland, due to having been in the clutches of communism, missed the initial stages of the computer revolution. It was impossible to legally import a computer into the country, and the prevailing centrally planned economy was unable to handle the latest technological advances. Over the past dozen years or so, Poland has transformed

itself from a country where the computer revolution was lagging behind into a game developer boasting a multitude of global successes. The country's games industry is now 30 years old. The first Polish game is considered to be *Pandora's Box* (*Puszka Pandory*) from 1986. The dynamic development of the gaming industry coincides with the beginning of the systemic changes after the fall of communism in Poland. A group of enthusiasts gathered around companies such as LK Avalon, Detalion and later Metropolis Software capitalised on this period [Kosman, 2015]. However, computer hardware was expensive and beyond the reach of the Polish consumer's pocket. For this reason, it was not until the turn of the century that serious and mass-released productions produced by professional studios began. Nonetheless, thanks to previous experience obtained in a different economic reality, people formerly associated with Metropolis were able to establish 11 bit studios, which today has a proven track record with several titles of worldwide significance. The turn of the century saw the rather spectacular growth of Techland and the success of the *Chrome* title in 2003. It was around this time that the management of CD Projekt (a company involved at that point in the distribution of video games and the development of their Polish language versions) made the decision to separate from its structure a studio with the intention of producing its own games. This allowed work to begin on *The Witcher* (*Wiedźmin*) project, whose successive parts are a symbol of Polish success in the gaming industry.

The period of the most dynamic growth in the gaming industry in Poland occurred from 2014 to 2020. Although we lack precise data from before the release of *The Game Industry of Poland – Report 2020*, by analysing previous publications and consulting with experts from the industry it is possible to more precisely describe the shape of this growth. In 2016, the industry estimated itself to count around 200 companies and 4000 individuals working in game development. Increasing these levels and reaching the 2021 thresholds –a year we have data from – implies that employment must have grown consistently by approx. 25% year to year for the next 5 years (the changes in employment and the number of companies in the Polish games industry are shown in Figures 9.2 and 9.3). This means growth at an exponential rate, which clearly cannot continue indefinitely, and thus in the following years it does indeed slow down, but is still above the European average [Marszałkowski, 2023b]. The gaming industry in Poland has become such a complex system that there are a number of specialised companies that are involved in the production and distribution process. There are more companies associated with the video game industry listed on the Polish stock exchange than in other countries [Gemra, 2024]. In 2023, nearly 500 game developers and publishers, collectively employing more than 15 000 people, were operating in Poland [Game Industry Conference, 2024]. The Polish games industry has thus gained relevance in the European context, and is today in the top three largest employers as compared to its

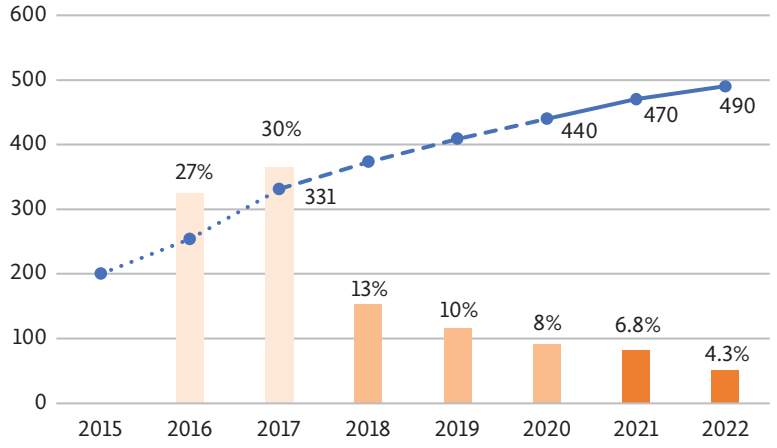
European counterparts. At present, it seems that the upper limit is 500 publishers and developers nationally and it will not continue to rise, and may even start to fall due to consolidation processes. Warsaw, Kraków and Wrocław are important video game development centres, accumulating the vast majority of representatives of the Polish gaming industry [Agencja Rozwoju Aglomeracji Wrocławskiej, 2022].

Figure 9.2. Employment in video game development in Poland with year-on-year increases in 2016–2022



Note: dashed lines indicate roughly estimated values from before the publication of accurate reports.
Source: Marszałkowski [2023a, s. 140].

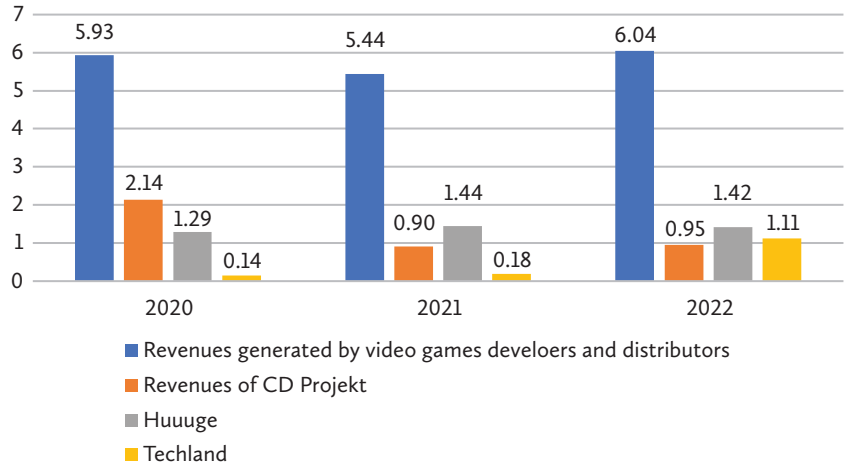
Figure 9.3. Number of companies in the Polish video game industry (developers and publishers) with year-on-year increases in 2016–2022



Note: dashed lines indicate roughly estimated values from before the publication of accurate reports.
Source: Marszałkowski [2023a, s. 140].

Currently, the profits generated by Polish game developers and creators are growing in a dynamic fashion. Although, at first glance, some stagnation is apparent in recent years, this is due to changes in the results obtained by the biggest game producers and distributors, and above all the launches by the largest Polish developer and publisher, CD Projekt. Putting aside stock market fluctuations of the creators behind *The Witcher* and *Cyberpunk 2077*, the rest of the video game developers' and publishers' industry has experienced significant year-on-year sales increases. Polish video game developers are growing dynamically in almost every segment, creating both big-budget games and small independent productions. For the vast majority of Polish developers, the priority area is the production of PC games, primarily for the Steam platform. Only after these successes are the titles often brought to consoles. Generally, strictly the largest developers can afford to publish games on consoles. Polish games have also demonstrated great publishing results on the Nintendo Switch handheld console and have been involved in the emerging segment from the very start. In contrast, the production of mobile games is the domain of only a few studios, but most of them are quite large and have a hundred or even several hundred employees. When analysing the revenues of game developers, it is important to pay attention to the cyclical nature thereof; revenues are high in the year of a game's release and then dive until the next release. If a producer develops several titles in parallel or makes money from games published in another model than the release-dependent premium model, this phenomenon may be less pronounced.

Figure 9.4. Revenue generated by Polish video game developers in 2020–2022 (in PLN billion)



Source: own study based on the Game Industry Conference, reports by CD Projekt, Huuuge and Techland.

Table 9.3. Valuations of the largest Polish game developers and publishers (in PLN billion)

Place	Name	Value
1	CD Projekt	13.32
2	Techland	9.40*
3	PlayWay	2.20
4	11 bit studios	1.68
5	Huuuge	1.40
6	Ten Square Games	0.63
7	PCF Group	0.62
8	Bloober Team	0.45
9	Creepy Jar	0.37
10	CI Games	0.31
11	Artifex Mundi	0.30

* Valuation for the purpose of the purchase of Techland shares by Tencent.

Source: own study based on Warsaw Stock Exchange company reports (data as of 6 June 2024).

Virtually all revenues of Polish games developers come from exports, with the local domestic market usually accounting for approx. 2–4% of sales. In 2020, for the first time, the value of Polish game exports to global markets exceeded the value of imports of global games played by Poles. This state of affairs has continued in subsequent years, making Poland one of the few net global game exporters [Biedermann, Marszałkowski, 2021]. In 2023, the value of Poland's games exports exceeded one billion dollars, making Poland one of the leading exporters of video games in Europe. The key markets where Polish games are sold are the US, China, the UK, Germany, France and Japan [Video Games Europe, 2022].

9.1.4. Japanese gaming industry

Japan is one of the most important, if not the most important, country for the video game industry. Historically, this market has been completely dominated by Japanese consoles. Currently, two of the three major gaming consoles on the market, Sony PlayStation 5 and Nintendo Switch, are manufactured by Japanese companies (the third one is the US-based Xbox Series X/S console). Due to the oligopolistic nature of the games console market, virtually every major video game developer and distributor has to partner with Sony or Nintendo. The brands created by Japanese gaming companies have gained worldwide recognition. Over the years, Japan has created many of the

most iconic characters in gaming history, representing valuable intellectual property of such companies as Nintendo (Mario, Luigi, Peach, Bowser, Donkey Kong, Zelda, Link), The Pokémon Company (Pikachu, Ash, Misty), Square Enix (Cloud, Sephiroth, Aerith, Tifa) and Konami (Solid Snake, Big Boss).

The influence of Japanese companies as far as controlling distribution platforms in the PC games market is much weaker, with US companies such as Valve (Steam), Microsoft (Xbox App) and Epic Games (Epic Games Store) at the forefront. The Polish CD Projekt (GOG.com) also has a relatively strong position in this industry. In recent years, Sony has begun to bring its games, which previously used to be released exclusively on PlayStation, to PC platforms (including *God of War*, *The Last of Us Part I*, *Marvel's Spider-Man Remastered*, *Horizon Forbidden West* and *Ratchet & Clank: Rift Apart*). Also the *Final Fantasy* series, traditionally associated with Sony's consoles, has arrived on PC where it is represented by such games as *Final Fantasy XV* and *Final Fantasy VII Remake*. In the recent months, Sony has significantly strengthened its position in the PC gaming market with the success of *Helldivers 2*.

Many of the entries on lists of the best games of all time are games developed by Japanese studios. On the popular website Metacritic, which maintains a ranking based on aggregating the ratings of available reviews, the number one game for many years has been *The Legend of Zelda: Ocarina of Time* which was released in 1998 for the Nintendo 64 console [Metacritic, 2024].

Table 9.4. Gaming patents filed in Japan in the 1994–2023 period

No.	Name of the company applying for patents	Number of patents
1	KONAMI DIGITAL ENTERTAINMENT CO LTD	2427
2	NINTENDO CO LTD	1855
3	GREE INC	1477
4	ARUZE CO	1300
5	NAMCO LTD	1169
6	COLOPL INC	1110
7	COPCOM CO LTD	1007
8	SEGA CO	993
9	BANDAI NAMCO ENTERTAINMENT INC	927
10	NAMCO BANDAI GAMES INC	901
11	SQUARE ENIX CO LTD	801
12	KONAMI CO LTD	790
13	TAITO CO	790
14	DNA:KK	668

No.	Name of the company applying for patents	Number of patents
15	SONY COMPUTER ENTERTAINMENT INC	599
16	BANDAI CO LTD	496
17	SEGA GAMES CO LTD	481
18	MIXI INC	436
19	KONAMI DIGITAL ENTERTAINMENT:KK	386
20	CYGAMES CO LTD	352

Source: WIPO [2024].

Table 9.4 presents the top 20 companies that applied for the highest number of patents related to the gaming industry (category: 'Video games, i.e. games using an electronically generated display having two or more dimensions') with the Japan Patent Office from 1994 to 2023. In total, the number of patents filed during this period is 31 345. The data in the table are not aggregated and show the name of individual companies at the time of patent filing. The table incorporates, of course, the gaming console oligopolists: Nintendo and Sony. Other major players include well-known companies in the West such as Konami, Bandai Namco, Capcom (listed as COPCOM in the database), Sega and Square Enix. Japanese video game companies file patents very frequently. Many of these are related to gaming consoles (including technology and accessories) and pachinko machines. By way of comparison, in the same period the European Patent Office received 7015 such patent applications (with Japanese companies being responsible for many of them), while 55 patents were filed in Poland, 56 in the Czech Republic and 15 in Slovakia.

9.2. Development trends of the video game industry and the potential for expansion of cooperation between Poland and Japan

9.2.1. Development trends of the video game industry

The video game industry creates innovations on a technological and business level, but also, first and foremost, by developing the content of the games themselves (i.e. content innovations). The evolution of games is strongly correlated with development of computer, mobile and data processing technologies. The industry is taking advantage of advances in technology, while driving innovation through new software solutions. Games are becoming a force for pushing the limits of 2D and 3D imaging capabilities and innovations in the area of data use and processing. Developers are constantly

extending the boundaries of immersion through the use of AR and VR technologies, plunging players completely into the depths of a virtual world. The video game market owes its continuous and dynamic growth, among other things, to the implementation of digital distribution models. Games are sold in increasingly more complex business models that allow companies in the industry to reap enormous profits. The stories being told in gaming are becoming more and more mature, now fully competing with other forms of digital entertainment. New forms of engagement and scenario writing are being created through video games. Games have also become an area of rivalry in sport, taking the form of e-sports. All of these changes are in the background of this extraordinarily dynamic development of the video game industry and the reason for its huge potential for further growth.

Trend 1. Longer life cycle of games and changing business models

The demanding macroeconomic environment and an increasingly slower rate of global player base growth are driving game developers or distributors to experiment with different monetisation strategies for PC and console games. This includes more and more often the introduction of different subscription models and micropayments (e.g. battle passes, loot boxes). The fierce competition at the market dominated by several platforms reinforces the shift towards greater use of subscriptions as a payment model. Another trend is also to extend the life cycle of games. Video games are being supported by developers for longer periods of time, encouraging player engagement by offering additional content, thus shifting to a Game as a Service model. The distribution model of games is also changing. Digital publishers are gaining more power in the market, creating an ecosystem for video game sales and use (e.g. Steam (Valve), Microsoft Store and Game Pass, PS Store (Sony), Nintendo eShop, Google Play, App Store (Apple) and finally GOG (CD Projekt)). Attachment to particular consoles and other platforms as well as integration into the entire digital distribution ecosystem is also an element of creating long-term customer loyalty.

Trend 2. Increased importance of mobile games

Over the years, the mobile games segment has been growing at the fastest pace among all the platforms. The increasing number of smartphones and the development of telecommunication networks are the main reasons for this growth, with the segment gaining new audiences and evolving strongly in new geographical areas. Mobile games, through innovative ways of creating engagement and – above all – monetisation, still account for the largest share of the overall gaming market. In developed markets,

mobile games face challenges related to the scope of access to users' data and increasing privacy restrictions which make it more difficult to design advertising campaigns being an important source of revenue for predominantly free-to-play mobile games. Another challenge is how to change and adapt mobile games' business models to these realities to ensure a balance between advertising and payment in games. The market is also heavily dominated by the major players even at the level of game development.

Trend 3. Hybrid platforms and cloud gaming

The pioneer of this new thinking about platforms is Nintendo which launched the Switch console in 2017. This console allows you to play at home on your TV, but can also work as a portable handheld console. Now, there are several solutions that make it possible to play the most advanced titles regardless of the platform used. An important breakthrough in this regard is also the advances made in the cloud technology area. Thanks to cloud solutions, it has become possible to connect to a game from any device, also from a mobile phone or tablet. Normally, such devices do not meet the same technical requirements as desktop computers or consoles, but by using live streaming, it is possible to enjoy even the most demanding titles on various devices.

Trend 4. Metaverse – virtual worlds

Although AR and VR are entering the world of digital entertainment in an increasingly bold manner, the gaming industry is not yet experiencing a huge revolution caused by the possibilities offered by creating a virtual environment. Platforms supporting AR technology are not among the best-selling gaming mediums, and titles using the technology are still quite niche. However, this does not mean that the future of games cannot belong to the so-called metaverse. Augmented reality and immersive virtual worlds are natural candidates to become the next revolution in the gaming industry, on a par with 3D graphics and online gaming.

Trend 5. Independent (indie) games

Thanks to the development of digital distribution platforms such as Steam, itch.io, Epic Games Store and dedicated marketplaces for consoles (PlayStation Store, Xbox Live, Nintendo eShop), reaching the global audience with niche titles has become a possibility. With easier access to development tools (tools such as Unity, Unreal Engine, GameMaker Studio have become more affordable), the barriers to entry have been lowered significantly and there are now more ample opportunities to create quality

projects. The rise of crowdfunding platforms which allow developers to obtain funding without having to seek institutional investors has also been a factor that contributed to better chances of fulfilling such projects. Gamers are also changing, and the popularity of games that offer unique experiences is growing. Interest in indie games is on the rise as well due to how popular gaming is on social media platforms. Communities of gamers on YouTube and Twitch actively promote and support indie games.

Trend 6. Generative AI tools

Generative artificial intelligence (AI) technology has grown enormously in popularity over the past year, with such platforms as ChatGPT, GitHub Copilot and Midjourney increasing the accessibility of those tools to ever-wider audiences. The video game industry also benefits from much more common use of artificial intelligence. New AI tools are intended to enhance creativity, improve productivity and lower barriers to entry of work in the industry. At the present time, key AI applications already occurring in games development process include: generating game content and creating worlds, creating NPCs, generating dialogue and storylines, optimising gameplay, testing assumptions and creating textures, graphics and soundtracks.

9.2.2. Potential for the cooperation between Poland and Japan in the video game industry to evolve

Few industries can attest to the huge potential for cooperation between Poland and Japan as well as the games industry. The potential for Polish-Japanese cooperation in games is considerable, given the dynamic growth of the industry in both countries. Poland is one of the of the leaders in video game development in Europe, while Japan is the third largest domestic market for games, which is continuing to grow despite its enormous gaming population. Japan is home to many global giants in the gaming industry, such as Nintendo and Sony. The companies originating from that country are known for producing games of the highest technological and artistic quality. Once a bastion of consoles, in light of the hegemony of such domestic giants as Sony and Nintendo, presently the Japanese market is booming once again thanks to the growing popularity of mobile games and, above all, PC games. The PC games market in Japan has doubled between 2019 and 2024, and the Japanese are demonstrating an increasing interest in foreign titles and indie productions. Polish developers, considering a large number of published titles, are becoming a natural target for the growing interest of Japanese gamers. Already at this point in Japan, the Polish games industry has had some success on Steam, Nintendo consoles and PlayStation. Japanese gamers particularly

appreciate Polish games from the horror genre. Polish developers, taking advantage of this interest, are successfully creating titles dedicated for the Japanese audience.

It is worth mentioning two **high quality international events held in Poland, which make it possible to reach companies in the Polish video game industry.** The first one is the Game Industry Conference and Poznań Game Arena are a unique combination of a B2C games fair and a conference for professionals with its own B2B expo zone; in Europe, it is the largest industry event east of Cologne. The Game Industry Conference is one vying for the title of Europe's largest conference. It is a meeting place and an event full of valuable lectures and exchanges of experiences, enjoyed each year by more than 3500 participants. But the GIC also offers rich opportunities for business, boasting a B2B expo zone with 45 stands and an extremely efficient business meeting system and area. Poznań Game Arena – which takes place simultaneously – is one of the most prominent and largest games fairs in Europe, organised for actors within the industry as well as for individual visitors. PGA has a nearly 20-year long history and each year is attended by more than 79 300 visitors who check out games and hardware from more than 220 exhibitors. The main objective is to provide a friendly environment for making business contacts, discussing current trends and sharing valuable experiences. Both events take place simultaneously **every year in October** on the grounds of the **Poznań International Fair**, Głogowska 14, 60-734 Poznań.

DigitalDragons is a leading B2B event that has been attracting video game industry representatives from across Europe for over 10 years. Developers, artists, publishers, investors and leading games journalists from around the world are invited to join the three-day conference held in Kraków. The event continues to grow, attracting more than 2500 people associated with the video game industry to the capital of Małopolska. The main focus of the conference is specialised lectures that take place in the ICE Kraków Congress Centre. The Kraków Technology Park, which is the organiser of the event, attaches particular importance to the networking aspect – meetings in the Business Network Zone allow for sharing experiences and establishing key business relationships. The conference is held **each year in May** at the **ICE Kraków Congress Centre**, Marii Konopnickiej 17, 30-302 Kraków.

Summary and conclusions

Cooperation between Poland and Japan in the gaming industry is multi-faceted and its potential for further progress is high. The industry is globalised, digitised and rapidly changing. Major game developers and distributors have become international companies with huge financial resources at their disposal. It is certainly worth pointing

out that virtually every company in the world that wants to release its games on Japanese gaming consoles (which make up the majority of this market) needs to enter into some kind of partnership with Japanese companies, namely Sony or Nintendo. Similarly, Japanese companies that wish to distribute their PC games on the GOG.com platform have to cooperate with CD Projekt in this respect.

While it is easy to see the potential for further development, its exact direction in such a fast moving industry is difficult to predict. Many of the general trends identified in the chapter can already be observed today, but only in the future will it be possible to asses the ultimate impact of technologies such as generative artificial intelligence. Despite the significance of both countries in the global context, the gaming industry in Japan is still far more advanced than the Polish one.

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The aim of the monograph is to comprehensively present the conditions, determinants, and prospects of economic cooperation between Poland and Japan, with a particular focus on selected sectors of the economy: cosmetics, medicine and pharmaceuticals, agri-food, green technology, information technology (IT) and gaming. The first part of the book focuses on the analysis of international competitiveness and innovation of both countries, bilateral trade relations and investments, as well as cultural conditions of Polish-Japanese cooperation. The second part provides a detailed analysis of selected industries, identifying development trends and cooperation potential. This monograph may contribute to a better understanding of the dynamics of cooperation between Poland and Japan and help both entrepreneurs and decision-makers to make informed business and strategic decisions.

Celem monografii jest kompleksowe przedstawienie uwarunkowań, determinant oraz perspektyw współpracy gospodarczej między Polską a Japonią, ze szczególnym uwzględnieniem wybranych branż gospodarki: kosmetycznej, medycznej i farmaceutycznej, rolno-spożywczej, zielonych technologii, technologii informacyjnych (IT) i gamingowej. W pierwszej części książki skupiono się na analizie konkurencyjności międzynarodowej i innowacyjności obu krajów, obustronnych relacji handlowych oraz inwestycji, a także kulturowych uwarunkowań współpracy polsko-japońskiej. W drugiej części dokonano szczegółowej analizy wybranych branż, identyfikując trendy rozwojowe i potencjał współpracy. Niniejsza monografia może przyczynić się do lepszego zrozumienia dynamiki współpracy między Polską a Japonią oraz pomóc zarówno przedsiębiorcom, jak i decydentom w podejmowaniu świadomych decyzji biznesowych i strategicznych.

本書の目的は、ポーランドと日本の経済協力の条件、決定要因、展望を包括的に紹介することであり、特に化粧品、医薬品、農業食品、グリーン・テクノロジー、情報技術（IT）、ゲームといった特定の経済分野に焦点を当てている。本書の第1部では、両国の国際競争力とイノベーション、二国間の貿易関係と投資、日ポーランド協力の文化的条件の分析に焦点を当てている。第2部では、特定の産業について詳細な分析を行い、発展の傾向や協力の可能性を明らかにしている。本書は、ポーランドと日本の協力関係のダイナミクスをよりよく理解し、起業家や意思決定者が十分な情報を得た上でビジネスや戦略上の意思決定を行うのに役立つであろう。

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