

# Agri-Food Export Competitiveness

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The agricultural sector contributes to the national economy by engaging in export activities within the global market. Conversely, the rapid development of the Internet has greatly impacted output production and has introduced heightened competitiveness among various countries.

Keywords: agri-food ; business analytics ; export competitiveness

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## 1. Introduction

Agriculture is one of the main sectors accelerating economic growth ([Awokuse and Xie 2015](#); [Odetola and Etumnu 2013](#)). This sector also drives regional economic growth after years of declining shares in a country's gross domestic product ([Khan et al. 2020](#)). On the other hand, the agriculture sector strongly links with the rest of the economy due to suppliers for downstream industries ([Raza et al. 2012](#)). The competition for agricultural trade globally is fierce, as seen from the market structure. Based on ([FAO 2023](#)), no country with an export share in the global world reached above 10%. The United States of America (USA), Netherlands, Brazil, Germany, and France are the top five countries with the highest export share of agriculture globally, respectively. Agriculture has already integrated with technology as an implication of digital transformation. [Mentsiev et al. \(2020\)](#) revealed that there are six substantial transformations in the agriculture industry, namely, (1) the integration of the Internet of Things (IoT) into the fields, (2) the integration of IoT with farm equipment, (3) drones for crop monitoring, (4) the use of robotics in farming, (5) RFID tracking in farming, and (6) the use of ML and big data in farming. Currently, supply and demand can be facilitated by the enterprise system through a simultaneous system ([Rachmaniah et al. 2022](#)). This technology can produce higher yields until 60% of output is produced by 2030. Furthermore, the development of software defect prediction also involves reducing the cost of the software testing process, which can be applied in an agriculture system ([Bahaweres et al. 2020](#)). A similar topic was explained by [Balamurugan et al. \(2016\)](#), in which agriculture technology has already improved the IoT for food and farming technology, as shown by many studies on the application of IoT in agriculture. [Suroso et al. \(2022\)](#) found that improving Internet indicators can accelerate agricultural performance through Internet users (%), fixed broadband subscriptions, and secure Internet servers. Thus, the Internet has become an important item in bridging agriculture development and technology usage. It also supports export specialization with an improvement in productivity compared with other competitors, implicating export success in the global market ([Nazarczuk et al. 2018](#)).

Internet indicators show drastic growth in user participation when data between 2010 and 2020 are compared. According to the World Development Indicator ([WDI 2023](#)), there were 29% of users of the Internet, and this grew to 60% in the world context. The growth of Internet users also implicates the high development of Internet infrastructure, which found a statistical increase that was in line with the increase in Internet users. Therefore, the nexus between internet and competitiveness must be explored to find the change in competitiveness in the agri-food global market. Technological developments can be an opportunity or a threat to participants who use them. The Internet's growth can lead to competition between countries in less competitive industrial structures ([Wang and Zhang 2015](#)). Additionally, the impact of the Internet can reduce market competition ([Domenech et al. 2016](#)). This means that the impact could lead to a decline in the competitiveness of countries for global trade. Meanwhile, the Internet is positive and significant to international trade, increasing from 0.2% to 0.4% ([Lin 2015](#)). The Internet could be used as a marketing tool to develop the agricultural industry ([Heang and Khan 2015](#)). The growth of trade also leads to an enhancement in trade competitiveness. Researchers found that the Internet more positively contributes to national and sectoral economies in developing countries ([Bahrini and Qaffas 2019](#); [Suroso et al. 2022](#)). On the other hand, the nexus between the Internet and competitiveness for trade between countries, especially in agriculture, is still questioned. The involvement of digital technology based on the Internet could be used as one of the tools for increasing competitiveness in the agri-food sector ([Kosior 2018](#)).

## 2. Agri-Food Export Competitiveness

The meaning of competitiveness varies depending on the context in which it is observed. Competitiveness is commonly defined as productivity, which in turn is a function of factors related to the cost of products, as well as those related to non-price factors ([Verma 2002](#)). In a national context, competitiveness is the ability of an economy to provide its residents with a rising standard of living and high employment on a sustainable basis ([Porter 1990](#)). From a firm context, competitiveness can refer to its economic strength against rivals in the global marketplace where products, services, people, and innovations move freely despite geographical boundaries ([Wang and Hsu 2010](#)). Additionally, this concept refers to the growth and strengthening of the position of a particular enterprise ([Jansik et al. 2014](#)). In a trade context, competitiveness can be defined as the ability of a region to export more in value-added terms than it imports by including terms of trade, which reflect all government discounts and import barriers ([Atkinson 2013](#)). ([Berger 2008](#)) explained the source of competitiveness by distinguishing two basic concepts: the market-based view—which depends on product-related cost or differentiation advantages—and the resource-based view—which depends on the utilization of core competencies or ability to create future products. Researchers focused on export competitiveness in agriculture. The development of the literature related to export competitiveness is now growing, especially for agri-food trade. Commonly, there are three levels of analysis that can be found: the first one deals with countries, the second with regions, and the third one with firms. Furthermore, the competitive position is determined by static advantages, which identify the scale of the differences (in absolute or relative terms) in the productivity of labor and capital ([Umiński and Borowicz 2021](#)). Many scholars have already investigated its export competitiveness to the global market ([Balogh and Jámor 2017](#); [Bojnec and Fertő 2017](#); [Jámor et al. 2018](#); [Mizik et al. 2020](#); [Tandra et al. 2022](#)).

Currently, this topic is still interesting due to the important role of a country or firm in competing with its rivals due to fierce competition in the global agri-food trade. ([Jámor and Babu 2016](#)) stated that countries with net exporters can compete in this trade; however, there is a change in trade patterns in the global market. This means that agri-food trade competition is still unpredictable. Thus, an investigation of factors increasing the export competitiveness of agri-food must be considered, especially the utilization of determinant factors. There are several previous studies that have analyzed the competitiveness of agri-food trade and its determinants. According to ([Mizik 2021](#)), the revealed comparative advantage (RCA), or simply Balassa, index is regularly used by researchers all over the world, which was developed by ([Balassa 1965](#)). ([Torok and Jámor 2016](#)) found that the ham trade competitiveness in Europe is determined by several factors, such as the quality of production, EU accession, and foreign direct investment (FDI). ([Balogh and Jámor 2017](#)) investigated the determinant of competitiveness in the cheese trade in the European Union, showing that GDP/capita, geographical indication, FDI, and EU membership are influential factors. Additionally, the exchange rate and international palm oil processing are essential determinants of the export competitiveness of palm oil for 26 countries' observations ([Lugo Arias et al. 2020](#)). A previous study by ([Török et al. 2020](#)) found that the determinant factors of the beer trade are total beer production, per capita consumption, barley production, the level of foreign direct investments, population, GDP/capita, the high-quality level of the beer export EU membership, and the number of beers with geographical indications. ([Tandra et al. 2022](#)) determined that the determinant factors of the global palm oil trade are the size of the population, import of animal or vegetable fats and oils, GDP per capita, and RSPO certification.

Recently, the Internet has become an important way to lead competitiveness. According to ([Lollar et al. 2010](#)), the operational efficacy and efficiency of businesses, as well as the competitive climate, have altered substantially as a result of the integration of information and communications technology (ICT), namely, Internet and web-based technologies. The development of information technology can be applied to developing a competitive advantage with several activities, such as differentiation, innovation, channel domination, cost reductions, and efficiency improvements ([Bilgihan and Wang 2016](#)). From a micro perspective, there is a positive contribution from the role of information technology toward the competitiveness of micro, small, and medium enterprises (MSMEs) in Cimahi District, Jawa Barat Province, Indonesia ([Setiawan et al. 2015](#)). Adopting technology from developing the platform and web capabilities is positively significant toward export marketing capabilities and performance, which are implicated in the internationalization of small and medium enterprises (SMEs). However, the study of macro perspectives by connecting country competitiveness is still rare. Otherwise, plenty of studies about technology and competitiveness at the micro-scope exist.

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