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The Importance of International Quality Standards in Negotiating Trade Agreements between the European Union and Third Countries as regards Global Trade in Agricultural Products and Food

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In memoriam

Hans-Peter Pietrzyck

“Food should not be used as an instrument for political and economic pressure.”
– 1996 World Food Summit in Rome/Italy –

“Nothing in life is to be feared, it is only to be understood.
Now is the time to understand more, so that we may fear less.”
– Marie Curie –

SUMMARY

The Importance of International Quality Standards in Negotiating Trade Agreements between the European Union and Third Countries as regards Global Trade in Agricultural Products and Food

The aim of this thesis is to assess the role of international quality standards in context of free trade agreements, taking into account international supply chains and global value chains. An intensive literature review revealed that quality standards imply a close link between trade and resilient supply chains.

Not only traditional governmental trade barriers, but also increasingly trade policy measures by industry influence the extent to which demands from industry standards play a role for trade in agricultural products and food. Comprehensive trade agreements negotiated by the European Union (EU) in recent decades not only eliminate tariffs, but also prescribe a wide range of political measures. They provide a framework for quality management and related international standard setting. Therefore, in the context of free trade agreements, the importance of international quality standards in the agri-food sector is growing.

My own empirical studies refer to three concrete fields of action: **I.** quality management in companies of the agri-food industry, **II.** communication in food supply chains, **III.** reduction of trade barriers in global trade with agricultural products and food. All three fields of action are considered in terms of their mutual influence and under the aspect of sustainability as a quality characteristic. For this purpose, seven empirical sub-studies were conducted between the years 2015 and 2022 and the different methodological approaches as well as the results were published in scientific journals. The publications are framed by an introduction describing the changes in the framework conditions for global trade and a discussion that takes into account the multiple crisis situation since 2020. The results are based on five qualitative surveys and expert interviews with more than 200 participants from the EU and the USA as well as an extensive media analysis.

The four most important results of the expert interviews are: **I.** the sustainability field of action is considered by the experts to be one of the most current and urgent quality features in global trade, **II.** according to the assessment of experts, effective traceability, as aimed at by the EU´s Farm-to-Fork strategy, will only succeed in quality management, if all companies within the value chain recognize the same quality characteristics (for example, animal welfare, GMO-free, CO2 reduction) as a joint effort and pursue them with determination, **III.** experts believe that global trade requires a unified vision and well-organized quality infrastructure in importing and exporting countries, **IV.** for the three fields of action (inter-company quality management, digital communication and reduction of trade barriers), the experts suggest targeted training and further education measures for responsible players as well as the establishment of quality management networks as purposeful actions. The concluding chapter of the thesis addresses several research questions that remain open and which should be answered in follow-up studies.

ZUSAMMENFASSUNG

Die Bedeutung internationaler Qualitätsstandards bei den Verhandlungen über Handelsabkommen zwischen der Europäischen Union und Drittländern bezüglich des globalen Handels mit Agrarprodukten und Lebensmitteln

Ziel der Arbeit war es, die Rolle internationaler Qualitätsstandards im Kontext von Freihandelsabkommen unter Berücksichtigung internationaler Lieferketten und globaler Wertschöpfungsketten zu bewerten. Eine intensive Literaturanalyse ergab, dass Qualitätsstandards eine enge Verbindung zwischen Handel und resilienten Lieferketten implizieren. Nicht nur traditionelle staatliche Handelshemmnisse, sondern zunehmend auch handelspolitische Maßnahmen der Wirtschaft haben Einfluss darauf, in welchem Umfang die Forderungen aus Branchenstandards für den Handel mit Agrar- und Lebensmittelprodukten eine Rolle spielen. Die weitreichenden Handelsabkommen, die in den letzten Jahrzehnten durch die Europäische Union (EU) verhandelt wurden, beseitigen nicht nur Zölle, sondern schreiben auch eine Vielzahl von Politikbereichen fest. Sie bieten einen Rahmen für das Qualitätsmanagement und der damit verbundenen internationalen Standardsetzung. Daher wächst die Bedeutung von internationalen Qualitätsstandards im Agrar- und Ernährungssektor im Kontext von Freihandelsabkommen.

Die eigenen empirischen Studien beziehen sich in diesem Zusammenhang auf drei konkrete Handlungsfelder: **I.** das Qualitätsmanagement in Unternehmen der Agrar- und Ernährungswirtschaft, **II.** die Kommunikation in Food Supply Chains, **III.** der Abbau von Handelshemmnissen beim globalen Handel mit Agrarprodukten und Lebensmitteln. Alle drei Handlungsfelder werden in ihrer gegenseitigen Einflussnahme und unter dem Aspekt der Nachhaltigkeit als Qualitätsmerkmals betrachtet. Hierzu wurden zwischen den Jahren 2015 und 2022 sieben empirische Teilstudien durchgeführt und die unterschiedlichen methodischen Vorgehensweisen sowie die Ergebnisse in Fachjournals publiziert. Eingerahmt werden die Publikationen durch eine Einleitung mit der Beschreibung der Veränderungen von Rahmenbedingungen für den globalen Handel und einer, die multiple Krisensituation seit 2020 berücksichtigende, Diskussion. Das Fundament der Ergebnisse bilden fünf qualitative Umfragen und Experteninterviews mit über 200 Teilnehmern aus der EU und den USA sowie eine aufwendige Medienanalyse.

Die vier wichtigsten Ergebnisse der Experteninterviews sind: **I.** das Handlungsfeld Nachhaltigkeit wird von den Experten als eines der aktuellsten und dringlichsten Qualitätsmerkmale beim globalen Handel eingeschätzt, **II.** eine effektive Rückverfolgbarkeit, wie es die EU-Farm-to-Fork Strategie zum Ziel hat wird, nach Experteneinschätzung, im Qualitätsmanagement nur gelingen, wenn alle Unternehmen innerhalb der Wertschöpfungskette die gleichen Qualitätsmerkmale (zum Beispiel Tierwohl, Gentechnikfreiheit, CO2-Reduktion) als Gemeinschaftsleistung anerkennen und zielstrebig verfolgen, **III.** der globale Handel setzt nach Ansicht der Experten eine einheitliche Vorstellung und gut organisierte Qualitätsinfrastruktur in den Import- und Exportländern voraus, **IV.** für die drei Handlungsfelder (überbetriebliches Qualitätsmanagement, digitale Kommunikation und Abbau von Handelshemmnissen) schlagen die Experten gezielte Aus- und Weiterbildungsmaßnahmen für verantwortliche Akteure sowie die Bildung von Qualitätsmanagementnetzwerken als zielführende Maßnahmen vor. Das abschließende Kapitel der Arbeit geht auf mehrere offen gebliebene Forschungsfragen ein, die in Folgestudien beantwortet werden sollten.

TABLE OF CONTENT

LIST OF ABBREVIATIONS

ACT ..... Action on Climate and Trade
AfCFTA ..... African Continental Free Trade Area
AFSC ..... Agri-Food Supply Chain
AI ..... Artificial Intelligence
AKIS ..... Agricultural Knowledge and Innovation Systems
APD ..... Agricultural Policy Dialogue

BMEL ..... Federal Ministry of Food and Agriculture
BMWK ..... Federal Ministry for Economic Affairs and Climate Action
BRC ..... British Retail Standard
BWE ..... Bullwhip Effect

CAC ..... Codex Alimentarius Commission
CAP ..... Common Agricultural Policy
CEFTA ..... Central European Free Trade Area
CETA ..... EU-Canada Comprehensive Economic and Trade Agreement
COR ..... Canada Organic Regime
Covid-19 ..... Covid-19 pandemic
CPTPP ..... Comprehensive and Progressive Transpacific Partnership

DCFTA ..... Deep and Comprehensive Free Trade Area
DIN ..... German Institute for Standardization

EFTA ..... European Free Trade Association
EIP.Agri ..... European Innovation Partnerships
EU ..... European Union
EUR ..... EURO

FAO ..... UN Food and Agriculture Organization
FSC ..... Food Supply Chain
FTA ..... Free Trade Agreement

GATT ..... General Agreement on Tariffs and Trade
GDP ..... Gross Domestic Product
GFSC ..... Global Food Supply Chain
GFSI ..... Global Food Safety Initiative
GI ..... Geographical Indication
GQII ..... Global Quality Infrastructure Index

HACCP ..... Hygiene Analysis and Critical Control Point
HTSC ..... House of Total Safety Culture

IAF ..... International Accreditation Forum
IAFP ..... International Association for Food Protection
IFS ..... International Featured Standard
IPPC ..... International Plant Protection Convention
IRA ..... Inflation Reduction Act
ISO ..... International Organization for Standardization
ITC ..... International Trade Centre

JEFTA ..... EU-Japan Free Trade Agreement

LkSG ..... Act on Corporate Due Diligence Obligations in Supply Chains

MERCOSUR ..... South American Free Trade Area
MRL ..... Maximum Residue Limit

NAFTA ..... North American Free Trade Agreement
NOP ..... US National Organic Program
NTB ..... Non-Tariff Barriers
NTM ..... Non-Tariff Measures to Trade

PDO ..... Protected designation of origin
PGI ..... Protected geographical indication
PTB ..... Physikalisch-Technische Bundesanstalt

QI ..... Quality Infrastructure

RCEP ..... Regional Comprehensive Economic Partnership

SC ..... Supply Chain
SCL-Standard ..... Safety Culture Ladder Standard
SCM ..... Supply Chain Management
SDGs ..... Sustainable Development Goals of the United Nations
SFSC ..... Short Food Supply Chain
SME ..... small and medium-sized enterprise
SPS-Agreement ..... Agreement on Sanitary and Phytosanitary Measures

TBT-Agreement ..... Agreement on Technical Barriers to Trade
TRIPS ..... Trade-Related Aspects of Intellectual Property Rights
TSG ..... Traditional speciality guaranteed
TTC ..... EU-US Trade and Technology Council
TTIP ..... Transatlantic Trade and Investment Partnership

U.S. ..... United States
UK ..... United Kingdom
UN ..... United Nations
UNIDO ..... United Nations Industrial Development Organization
USA ..... United States of America
USD ..... US Dollar
USDA ..... U.S. Department of Agriculture
USMCA ..... United States Mexico Canada Agreement

WBG ..... World Bank Group
WEF ..... World Economic Forum
WHO ..... World Health Organization
WOAH ..... World Organisation for Animal Health
WTO ..... World Trade Organization

CHAPTER 1: GENERAL INTRODUCTION

1. Preface

The idea for this doctoral thesis was created at a time when the world order was different from what it is today in 2023. The geopolitical and geo-economic structures and trade policies that had evolved over decades had changed fundamentally. The extent of the unforeseeable drastic changes was described by the German Chancellor Olaf Scholz at the beginning of 2022 the term "Zeitenwende" (BPA 2022; DGAP 2023; Hamilton 2023; Lammert 2022) in which we as a society are currently living. For the agri-food trade, this means that leading issues such as quality management and food standards are now being replaced by urgent fields of action such as food availability and sustainability management. (BMEL 2022; DBV 2022; DNR 2022; KAS 2022; Wolf 2023).

The beginning of the current decade was marked by profound events such as: pandemics, energy crisis, inflation, war in Europe and sanctions for trade in goods. Economists once spoke of a globalized world, even hyper-globalization. Today, a slowdown in globalization or de-globalization is looming in the context of trade relations (Felbermayr and Wolff 2023; Hermes 2022; Höppner and Wölfl 2023; Titievskaia et al. 2020).

At the beginning of this research process, the focus was on the negotiations of the Transatlantic Trade and Investment Partnership (TTIP) between the European Union (EU) and the United States of America (USA). The U.S. administration under President Obama and the EU with the EU Commission had a common goal of concluding a free trade agreement (FTA). This raised both supporters and critics. Negotiations were launched in the year 2013 (negotiation mandate: Council 2013). After fifteen rounds of negotiations, no agreement was reached in 2016, which also affected the agri-food sectors. In 2016, the USA ranked as a reliable trade partner of the EU and was the main importer with a trade value of EUR 12 billion, as well as the second most important export partner with a trade value of EUR 19.4 billion. The trade balance was EUR 7.4 billion. The main EU export products were spirits and liqueurs (20%), wine (17%), beer (7.6%), beverages (5%) and cheese (5%). Imports included tropical fruits, nuts and spices (22.5%), soy (14%), spirits and liqueurs (7%), food preparations (4.4%), wine (4.2%), and oilcakes (3.6%) (EPRS 2016).

Negotiations were put on ice in 2016 following the election of U.S. President Donald Trump as he pursued an "America first" strategy, ushering in an era of protectionist trade (Schaller 2019; Greve 2021; BDI 2023; Ligustro 2023). This also changed the perspective of this research.

In addition, Great Britain (UK) was the first country to leave the European Union. The exit process, so-called Brexit, was a novelty in the history of Europe and began in June 2016 with a popular referendum and ended on 31. January 2020 with the entry into force of the EU-UK Withdrawal

Agreement. Since 01. January 2021, the UK has also left the EU single market and the EU customs union. Henceforth the UK is considered a third country.

To ensure continued trading with fair competition, an FTA "EU-UK Trade and Cooperation Agreement" was negotiated in parallel with the withdrawal procedure. The negotiations were concluded swiftly. On 30. December 2020, the FTA was signed and entered into force on 01. May 2021 (see Banse and Freund 2017; Banse and Freund 2018; EC 2021; EC 2023a; Felbermayr et al. 2017; GTAI 2021; Baussand 2022; GTAI 2022; Hajdu 2022). With its exit from the EU, the UK is pursuing an active trade policy and negotiating its own FTAs (Garcia 2023; GTAI 2023).

Another impactful occurrence during the time that the research for this thesis was ongoing was the SARS-CoV-2 virus crisis. The pandemic broke out in China in late 2019 and was declared by the World Health Organization (WHO) to be the Covid-19 pandemic (hereafter Covid-19) on 11. March 2020. Its impact on global supply chain structures has been enormous. Unprecedented supply shortages were the result for both the agri-food sector and other industries. The crisis exposed the vulnerability of global supply chains and the disadvantages of globalization. However, it also revealed how important international food quality standards are and will be in the future (CAC 2023). A large number of research teams have since studied supply chain resilience and evaluating new strategies to stabilize supply chains (e.g., Gray 2020; Toffolutti et al. 2020; Hillen 2021; Engemann and Jafari 2022; Wang 2022). Similarly, strategies for de-globalization are among the new research questions (Titievskaia et al. 2020; Felbermayr and Wolff 2023; Höppner and Wölfl 2023).

Comparing the countries of France, Poland, and the USA, Enz and co-authors (2023) found in their study that there was little difference between the countries in terms of the effects caused by Covid-19. Delivery delays and price increases were the most serious determinants for the companies considered. However, current research on the role of international quality standards in changing global trade is still hardly available.

Another unforeseen event triggered a global shortage situation in March 2021. In Egypt's Suez Canal, a freighter blocked the passage and triggered a traffic jam. The Suez Canal is considered the "bottleneck of global trade". This accident once again caused a disruption in supply chains because other freighters were unable to pass through the canal. A total of 422 cargo ships were unable to travel their trade route for eleven days, causing major economic damage and preventing supply chains from functioning reliably. Consequently, there were significant price increases in warehouse facilities due to a container shortage and thus an increase in consumer prices (Gast et al. 2021; Kiel IfW 2021; Lee and Wong 2021; Notteboom et al. 2022).

Less than a year later, on 24. February 2022, Russia's aggression against Ukraine began. With this offense against international law, Russia has started a war in Europe, which continues to this day and no end to the war is in sight. This war has so far had devastating consequences on the entire European agricultural and food economy. By the beginning of the war, Ukraine was considered an important exporter of grain (especially wheat), sunflower oil and legumes (Wolf 2023; WWF 2022). Warfare destroyed, and continues to destroy, large areas of agricultural land with impacts on soil fertility and food production and trade infrastructure. Moreover, the war, combined with the Covid-19 pandemic, triggered inflation and price increases in agricultural commodities, such as feed and seed, as well as processed and non-processed foods. The EU sanctions imposed on Russia (EC 2023b) have halted exports of natural gas and crude oil to the EU, triggering an energy crisis and leading to further price increases. The OECD (2022, p. 4) summarized in the Economic Outlook Report: "*The war between Russia and Ukraine is a major humanitarian and economic shock*".

2. Problem Statement and Research Objective

Traditional and adaptive quality management and food safety to multiple crisis situations are closely linked to global trade in agricultural commodities and food. The agri-food sector is considered one of the most controversial sectors in negotiations of trade agreements between the European Union (EU) and third countries. The contentious issues are often regulatory coherence and mutual recognition and harmonization of quality standards.

Therefore, this dissertation examines the importance of international quality standards in the negotiations of free trade agreements between the EU and third countries and contributes to the current discussion and to a deeper understanding of this complex subject.

The Transatlantic Trade and Investment Partnership (TTIP), which was negotiated between the EU and the USA from 2011 to 2016, serves as an exemplary fundamental for this research work. The problem definition can be transferred to all other trade agreements and to the EU´s trade policy. Because a counterpoint at TTIP has been different approaches to risk assessment, food safety, and consumer health protection. Unique in the world, the precautionary principle is applied in the EU, where the focus is on the overall process along the entire value chain with the proactive "from farm to fork" approach. This contrasts with the retroactive science principle with aftercare controls and a focus on the end product, as applied in the USA and other third countries.

The rapid change in foreign trade, reinforced by the EU's trade policy and novel free trade agreements (FTAs), is a challenge for all players in the food supply chain. This results in the need to permanently improve knowledge and skills, especially in the area of quality management, and to drive innovative processes.

So far, there is a lack of empirical studies from which it could be deduced how export-oriented companies and their industry associations have dealt with the issue. This dissertation aims to close this gap. The relevance of the research topic is driven by the growing importance of trade and economic relations between the EU and third countries not only for development of bilateral relations, but also for advancement of the global economy as a whole. These transnational partnerships have a significant impact on economic growth, trade and investment flows. Therefore, the benefit of this scientific work derives from the current time reference and the introduced double transformation of the agri-food sector.

It is hypothesized that trade agreement expertise among agri-food companies and industry representatives tends to be rated as very low and that there is little awareness of the importance of quality standards in foreign trade.

The highly qualitative nature of the empirical studies can be seen in the fact that the questions are addressed to a very narrow specific target group. Furthermore, the whole research aims at the systematic search, evaluation and synthesis of political and scientific findings. Within the empirical research, different EU countries and defined EU zones as well as the USA are considered and relevant literature and trade figures are evaluated.

Velthuis and co-authors (2010) recommended in their scientific study on food quality, food safety and certification the preparation of thorough analyses of the impact of different factors on international trade. Thus, both food quality and food safety should always remain in focus, and certification based on different industry standards should not be ignored. As this recommendation has not been fully addressed in research, this paper aims to fill this gap in order to better understand the interactions between the aspects considered.

3. Structure of the Thesis

This empirical research is divided into three specific sub-areas, which are considered with reference to sustainability aspects: quality management, the food supply chain (FSC) and global trade. For these three sub-aspects, the situations in the agri-food industry are always considered.

The Word Cloud in Appendix A of this chapter (Figure A-1) visually represents the most important keywords of this thesis. Forty-two keywords were selected from the chapters of this thesis and ranked and categorized by relevance to the research question (Category A-C). Eighteen words in category A "very high or the highest & very important role" are shown in font color red or orange. The color orange indicates the keywords directly related to the EU in category A.

In category B "high and important significance" were thirteen words classified and marked with the color green. Eleven words marked with the color blue belong to category C "medium importance

or less important role". These words are significant for the whole context and general understanding of the topic. The different fonts were used for visual reasons and are therefore of no concern. Finally, the visual illustration of the keywords by using Word Cloud shows the high complexity and variety of topics of this research project. Quality management is a focus of the investigation.

After this introductory section, Chapter 2 presents the policy framework of this dissertation and brings it into a theoretical context. To understand the dimensions of agricultural trade, Chapter 2 begins with trade statistics, broken down into imports and exports in relation to the EU. Germany is considered separately. Subsequently, the international trade regime of the GATT/WTO and the international standards are explained. Special reference is made to the "Agreement on Technical Barriers to Trade" (TBT-Agreement), the "Agreement on Sanitary and Phytosanitary Measures" (SPS-Agreement) and the Codex Alimentarius Commission (CAC). Furthermore, the topic of trade agreements in general is introduced. In outlining EU trade policy, it dives further into depth and highlights key examples of the EU's free trade agreements.

The basic idea of this thesis was to examine the planned FTA TTIP of the EU with the USA, therefore the current state of recent negotiations of an FTA will be revisited in this context as well. After the theoretical part on international trade relations is comprehensively explained, the theoretical reference to trade follows with reference to quality management and quality standards. Quality standards are studied as non-tariff measures to trade (NTM). At the end of the theoretical introduction, the global supply chains are addressed.

The theoretical fundamentals are applied in greater depth in Chapter 3 by means of various empirical analyses. Seven sub-chapters (Appendices 3.1-3.7) attempt to come close to the goal of this research and to capture the role of quality management in international trade as well as to gain a deeper understanding.

The first empirical study (Appendix 3.1), which is based on a survey of German export-oriented companies and industry associations, presents for the first time the complexity of the interrelationships between the negotiation topics of an FTA (here using the example of TTIP), market knowledge when developing new export markets and quality management. As a result, a wide range of challenging issues and knowledge deficiencies, particularly in the area of regulatory compatibility, are recorded. The study provides initial indications that international standardization needs to be driven forward and should be included in trade agreements as an instrument of innovation policy, which could help strengthen the competitiveness of EU companies. Likewise, necessities for education and training are identified.

Based on this study, further countries, regions and target groups are empirically analyzed using TTIP as an example with a modified study design. Three geographical regions within the EU

(Germany, Poland, Mediterranean countries) have been selected because their level of supply chain development, including infrastructure, economic resources and know-how as well as their quality infrastructure were different. In addition, the situation of the USA is considered.

Poland has a strong position within the EU and therefore a great influence on the EU's trade policy. Thus, the second study (Appendix 3.2) examines Poland's foreign trade position and awareness of FTAs using TTIP as an example in the agri-food sector. Especially for Polish companies, this study is valuable, as the role of FTAs in connection with quality standards has not been discussed in depth at the national level so far. The results point to uncertainties regarding the application and interpretation of international standards in cross-border customer-supplier relationships of FSCs.

The third qualitative-explorative study (Appendix 3.3) highlights the three important components of this research related to sustainability aspects and the Sustainable Development Goals (SDGs) of the United Nations 2030 agenda. It systematically analyzes the high complexity and current relevance of the FSC, quality standards for agricultural products and food, and global trade. The data collected is derived from an online survey of market experts in the USA and the EU. Consistent with the previous study, deep uncertainty, insufficient knowledge, and limited awareness are identified. With regard to the sustainability aspects of global trade, there is a strong willingness among respondents to strengthen the further development of these.

The fourth study (Appendix 3.4) focuses on the Euro-Mediterranean region and additionally discusses the relation to the EU's Common Agricultural Policy (CAP). The question is asked whether the TTIP negotiations and the CAP instruments have an impact on the Euro-Mediterranean regions in terms of food security and whether sustainable development is possible. The study confirms the thesis that in the countries studied, attention to FTAs is not very high. So far, there has been no thought about sustainable effects and the link to quality standards. Based on the results, it is recognized that trade policy needs to be considered to achieve the objectives of the CAP instruments.

Despite much media coverage of FTAs (in this case TTIP), there has been no systematic qualitative and quantitative evaluation regarding quality standards in the agri-food sector. This gap is filled by the following study (Appendix 3.5). Based on an elaborate media analysis of the German mainstream media (print, television, radio), the fifth study analyzes in terms of content the extent to which the industry's quality standards are reflected in the public debate in the light of TTIP.

For this purpose, 1,017 media reports are evaluated by using a guideline. Of these, 532 reports were selected as relevant data for further assessment. These are examined with regard to their scientific character, the use of the term "quality standards" and the reporting on the agri-food industry. Furthermore, the link with quality management regarding the harmonization of the regulatory

framework of the EU and the USA is analyzed. The results reveal gaps in media coverage and a trend toward information asymmetries in recipients' knowledge. Therefore, the study provides indications for future collaboration between media and policymakers. Impulses for further cooperation in mutual recognition and harmonization of quality standards and control procedures in global trade are elaborated.

Based on this media analysis, a further study (Appendix 3.6) adopts the consumer's perspective. The sixth study focuses on the level of information consumers receive from media coverage. A total of 436 reports from radio, television and online media are selected. Of these, 104 reports are relevant to answering the research question. It is found that the German media have failed to provide scientifically based information and the majority have pointed out the negative changes that could be caused by TTIP. Due to the highly complex structure of the globalized FSC, this study highlights the importance of comprehensive consumer information.

The last study (Appendix 3.7) is a comparative study, and deals in depth with the food safety regulations of the EU and Japan. Due to the existing FTA, the current quality standards and labels of the EU and Japan are elaborated. The aim is to identify the equivalence and similarities of the regulatory framework and provide a simple overview to interested groups. The study confirms very high product standards and exemplary consumer protection of both partners.

The last Chapter 4 starts with a presentation of the current developments of the three sub-disciplines of this research in times of multiple crises. Therefore, Chapter 4 specifically discusses sustainability aspects of international trade and related strategies of the EU as well as the potentials of a quality infrastructure. The topic of digitalization and digital communication is particularly highlighted in the context of the double transformation of the agri-food sector. Furthermore, the concern of education and training is discussed. Specific examples are used to explain the extent to which important quality standards and standards in supply chain management have evolved and which new aspects have gained in importance. References are also made to new regulatory measures.

In addition, the situation of Ukraine with regard to quality management in the agri-food sector is presented. The whole value chain, from soil conditions to food production, is considered and the areas of quality infrastructure are discussed and recommendations are made.

The paper concludes with recommendations for further research and a summary of this doctoral dissertation.

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5. Appendix A: Word Cloud

Figure A-1: Word cloud showing the 42 most important keywords of this dissertation thesis.

CHAPTER 2: POLITICAL CONTEXT AND THEORETICAL BACKGROUND

1. Trade Statistics of Agri-Food Products

In terms of global trade, the years in the period 1970-2008 were characterized by globalization or hyper globalization, with world Gross Domestic Product (GDP) increasing from 13% to 31%. (Felbermayr and Wolff 2023). After the recent crisis years, experts believe that "*global trade is growing at the same rate as global production*" (Felbermayr and Wolff 2023, p. 19). This is an indication that although there is no tremendous growth in global trade, the crises have been well overcome and globalization will be transformed. Current economic theories state that global trade is currently in a normal state and a diversification process has begun (Felbermayr and Wolff 2023). This is also reflected in the EU member states' trade in agricultural and food products. The agri-food sector remains a key industry for all EU member states. The industry is a powerful producer, important global exporter and a major importer. In the year 2022, the trade value of all agricultural products and food of the 27 EU member states was EUR 401.5 billion (exports = EUR 229.8 billion; imports = EUR 171.8 billion) with a trade balance of EUR 58 billion. Compared to the year 2021, imports increased by EUR 41.6 billion (+32%) and exports by EUR 31.7 billion (+16%) with a declining trade balance of EUR 10 billion. Reasons for the increase in trade values are mainly related to the prices of raw materials as well as basic agricultural products (e.g., coffee and soy), which recorded an exorbitant price increase (DG AGRI 2023a and 2023b).

Export EU 27

In the year 2022, the main export products from the EU were cereals (EUR 16.9 billion, +41%), cereal and mill products (EUR 23 billion, +22%), and wine (EUR 18.2 billion, +10%). Among these, wheat exports increased by 63% compared to the year 2021 (EUR +11.6 billion), which was also mainly supplied to developing countries (DG AGRI 2023a and 2023b).
In terms of exports of the EU, Figure 2-1 (DG AGRI 2023a) shows that the UK was the most important export destination with EUR 47.8 billion (+14%). The USA was the second most important export partner with EUR 28.9 billion (+18%). At both countries the export value has risen. In contrast, the export value with China (third most important trading partner) decreased by 8% and amounted to EUR 15.8 billion in the year 2022.

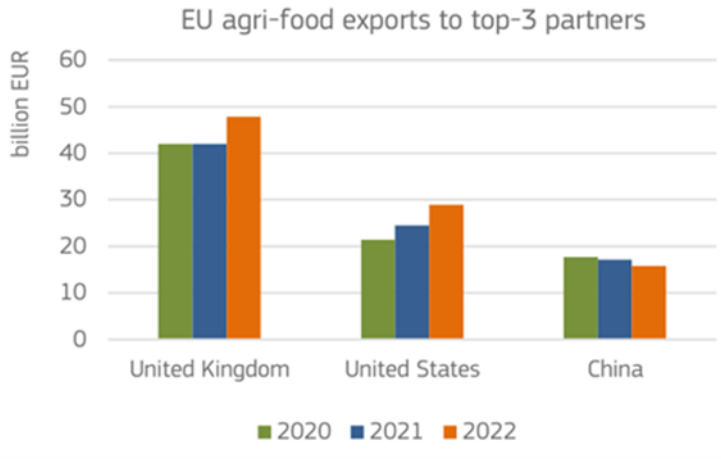

Figure 2-1: Most important export partners of the EU (DG AGRI 2023a).

Import EU 27

The main products imported into the EU in the year 2022 were oilseeds and protein crops (EUR 25.8 billion, +42%), fruits and nuts (EUR 22.2 billion, +7%), coffee, tea, cocoa and spices (EUR 22 billion, +29%), and cereals (EUR 12.7 billion, +106%) (DG AGRI 2023a and 2023b). The main importer of goods to the EU in the year 2022 was Brazil with EUR 20.2 billion (+49%). The most important products from Brazil are coffee, tea, cocoa, spices, cereals and corn (+144%) as well as oilseeds and protein crops. The UK was the second most important import partner with EUR 15.3 billion (+28%).

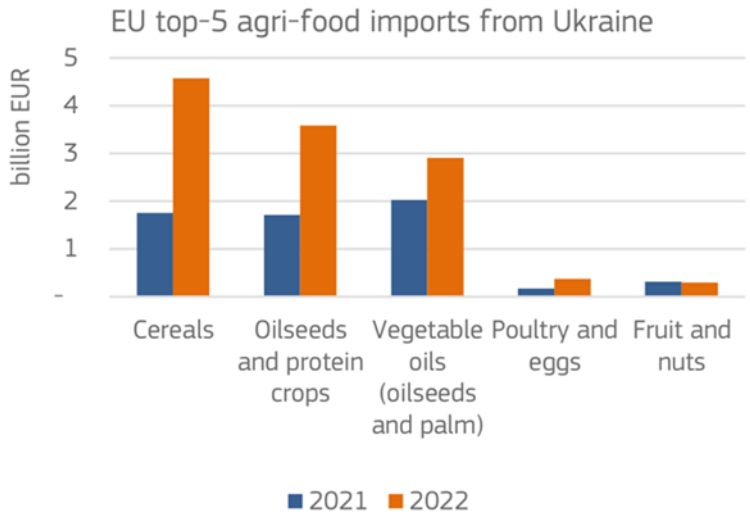

Figure 2-2: Most important import products from Ukraine to the EU in 2022 (DG AGRI 2023a).

Despite the war in Ukraine, goods with a value of EUR 13.2 billion were imported from Ukraine to the EU, making Ukraine the TOP 3 import partner for the EU in the year 2022. The most important products imported into the EU are shown in Figure 2-2. The USA was the 4th import partner with a trade value of EUR 12.3 billion (+32%).

Situation in Germany

In the year 2022, German agricultural companies produced goods with a value of almost EUR 73 billion and employ nearly one million workers, who are employed in 258,700 agricultural enterprises. Agriculture in Germany is one of the four largest producers in the EU and significant economic sector. On the one hand, this produces animal products, based on animal husbandry (pork, beef, poultry and sheep meat), as well as eggs and milk, with a good half of the milk being processed into cheese. On the other hand, there is the cultivation of plant products, mainly cereals (in the year 2022 about 43.5 million tons, +2.7%), field crops, oilseeds (mainly rapeseed), potatoes and sugar beets (both declining), fruits and vegetables, and hops, which is for human consumption. In addition, animal feed and plants used for the production of renewable energy are produced (DVB 2022).

The food industry is considered the fourth largest industrial sector in Germany, with a turnover of about EUR 186 billion in the year 2022. A total of almost 639,000 employees work in 6,150 companies. Of these, 90% are small and medium-sized enterprises (SME) with fewer than 250 employees. The food industry is characterized by heterogeneous production and supply chain structures, including the production, processing, storage and distribution of agricultural products and food. This guarantees a sufficient quantity as well as quality of food for the citizens. The main sub-sectors are confectionery and bakery, milk and dairy products, meat and meat products, oil and fat segment, beverage industry, and fruit and vegetable processing. The export ratio was 35% in the year 2022. In the year 2021, the trade value of the food industry amounted to export EUR 65.8 billion and import EUR 59.4 billion (BVE 2023).

Germany's agri-food sector together exported goods with a value of USD 89 billion in the year 2021, and was thus ranked 4th in world agricultural trade. Imports amounted to USD 109 billion in the year 2021, which placed Germany in 3rd position in world agricultural trade (DBV 2022).

2. Fundamentals of Global Trade

Global trade of goods has a long history (Junguito and Federico 2018). Economists such as Adam Smith, David Ricardo, and Milton Friedman set the cornerstones in developing the theory of international trade and thus free trade. There was consensus among them that international free trade was in the best interest of trading countries and the world (Gray 1985; Friedman and Friedman 1997).

Global agricultural trade is determined by a complex interplay of international regulations and agreements with national laws and requirements. These regulations are aimed to guarantee the safety of processes and products in the agri-food industry, so that the quality and safety of food is provided worldwide.

When researching trade relations, it is important to know and understand the fundamentals of global trade and its interrelationships. The current developments in the global institutions and agreements presented are particularly relevant to today's trade in agricultural commodities and food. Since the 1990s, trade regulations have been continuously developed and adjusted to political advancements. The most important institutions and agreements related to the agri-food sector are outlined in the following overview.

2.1 Historical Outline: GATT/WTO

With regard to the historical fundamentals, the General Agreement on Tariffs and Trade (GATT) of the years 1947/48 - which was signed by 23 nations - should be mentioned first and aimed at the general elimination of tariffs and trade barriers and thus liberal global trade. GATT is still considered the foundation of the multilateral trading system today, in which members are treated equally (most-favored-nation principle) and which has been continuously developed (WTO 2023a; GTAI 2022a; GTAI 2023a).

The first visionary agreement from the feather of the GATT was the "Agreement on Technical Barriers to Trade" (TBT-Agreement), which has been discussed since 1969 within the framework of several world trade rounds and entered into force in the year 1979. The measures covered by the TBT-Agreement apply to all trading partners and are classified as technical measures on non-tariff barriers (FAO and WTO 2017; UN 2019; UN 2022; WTO 2023b), including regulations, standards, testing and certification procedures. Thus, the TBT-Agreement aims to eliminate barriers to trade. More than 200 standards-setting bodies comply with the agreement. TBT-Agreement can, for example, steer the market toward more environmentally friendly products. These include technical specifications for organic production of livestock, algae, aquaculture, and approved processed food

and feed, and the “Regulation concerning the Registration, Evaluation, Authorization and Restriction of Chemicals” (REACH) (McDonald 2005; EU 2006; Maidana-Eletti 2014; Okun-Kozlowicki 2016; FAO and WTO 2017; Grübler and Reiter 2020; WTO 2023b). Figure 2-3 shows an overview of trade disputes that have been conducted under the TBT-Agreement.

Between the years 1986 and 1994, the historic "Uruguay Round" took place with 123 countries and the signing of the “Marrakesh Declaration”. During this period, significant agreements were reached for the agri-food sector (WTO 2023c).

As of the year 1987, the content of the "Agreement on Sanitary and Phytosanitary Measures" (SPS-Agreement) was developed in several negotiating and working groups. The SPS-Agreement entered into force on 01. January 1995, with the establishment of the World Trade Organization (WTO) (FAO and WTO 2017; WTO 2023d). SPS measures aim to protect human, animal, and plant life or health from pests, disease-causing organisms, additives, contaminants, and toxins and can be of various types; for example, food safety measures as well as agricultural quarantine measures. If products or their properties cause a risk to human, animal or plant health, countries can temporarily restrict or ban them, e.g., in the case of suspected African swine fever (ASF) (FAO and WTO 2017; Grübler and Reiter 2020; EC 2023a; WTO 2023d).

Thanks to the SPS-Agreement, the international standards of the so-called "three sisters" are recognized by the WTO: Codex Alimentarius Commission (CAC), World Organisation for Animal Health (WOAH; former OIE), and International Plant Protection Convention (IPPC). For example, the CAC sets food safety standards for contaminants and residues in food, labeling, and sanitary requirements related to food safety (CAC 2023a). The WOAH is the WTO's reference organization for animal health and zoonoses standards and develops guidelines for animal disease control and standards for hygienic animal husbandry, thus contributing to improving the quality of food of animal origin (Thiermann 2011; WOAH 2023). In the area of phytosanitary measures, international standards are set by IPPC. This organization is considered the international benchmark for trade in plant commodities. The standards are intended to control or prevent the spread and introduction of diseases to plants and plant products (IPPC 2023).

If a WTO Member State security measure is more stringent than the international standard, it must be reasoned and justified by a series of scientifically based tests and subjected to a risk assessment. Measures covered by the SPS-Agreement are classified as technical measures on non-tariff barriers (UN 2019, UN 2022). An overview of trade disputes that have been conducted under the SPS-Agreement is shown in Figure 2-3.

The literature reveals that the SPS-Agreement and the standards it integrates have had an enormous impact on international trade in agricultural products and food, as has been widely analyzed (see Roberts and Unnevehr 2005; Disdier et al. 2008; Prévost 2008; Anderson et al. 2012; Thomson et al. 2013; Boqvist et al. 2014; Ferro et al. 2015; Fontagné et al. 2015).

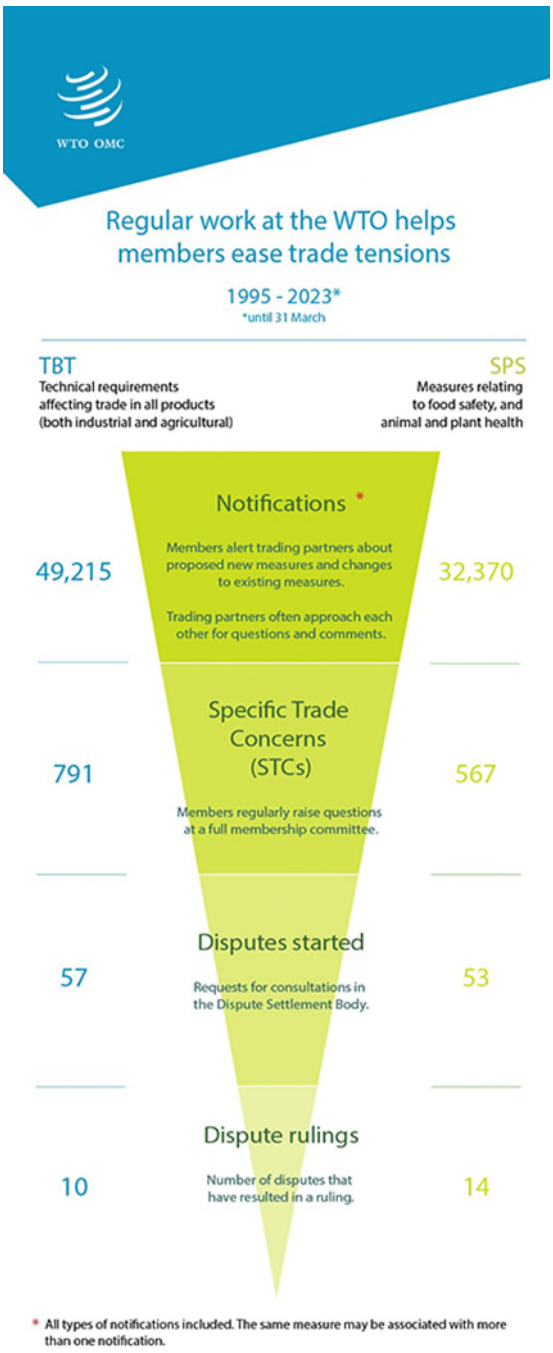

Figure 2-3: Overview of trade disputes at the WTO regarding the TBT Agreement and SPS Agreement from 1995 to 2023 (WTO 2023g).

The “Agreement on Agriculture” is another treaty that came into force in the year 1995 and was a result of the "Uruguay Round". Three main issues were identified: Market access, domestic support and export competition. The main objective of this agreement is to eliminate tariffs and subsidies in the agricultural sector, as they distort markets and restrict trade. Consequently, in the year 2015, agricultural export subsidies were abolished and new agricultural export promotion rules were established. In addition, decisions were made on public storage for food security purposes, a special safeguard mechanism for developing countries, and trade rules for cotton. To further strengthening the focus on food security and environmental issues, a reform of agricultural trade policy is currently underway (Matthews et al. 2017; BMEL 2018; EC 2023b; WTO 2023e).

The greatest milestone in the history of trade is the founding of the World Trade Organization (WTO) in the year 1995 following the "Uruguay Round", through the "Agreement Establishing the WTO". The WTO is still the world's most important trade institution and a global association of 164 states, which has the task of facilitating international trade, removing trade barriers, overcoming bureaucratic hurdles, limiting distorting market interventions, resolving conflicts between states and economic systems (dispute settlement) and thereby creating binding rules for fair, open and interconnected global trade worldwide. The EU and the individual EU countries are members of the WTO and pursue the objectives of the WTO (EC 2023c). Due to the WTO, the objectives and agreements of the GATT are continued and further fundamentals for a multilateral, non-discriminatory, transparent trading system are created (BMEL 2018; FAO and WTO 2017; Felbermayr and Wolff 2023; GTAI 2021; GTAI 2023b; Maier 2015, Schmucker 2023, WTO 2023f). Hence, it is nowadays called the GATT/WTO system and a "Multilateral Trade Order".

Trade experts are forcing a reform process of the WTO. The dispute settlement mechanism and the lengthy resolution of trade disputes are often criticized. Opponents argue for more modern trade rules that require global value chains with global rules and solutions, and perceive a disturbed trust between states that must be restored through confidence-building measures. Furthermore, a work program for agricultural trade with regard to developing and emerging countries seems to be missing. Often, the EU is described as a pioneer for a political reorientation of the WTO with regard to open markets and global rule-making, which should continue the multilateral trading system.

A number of researchers analyzed the WTO reform process and developed recommendations on how it could succeed (see Dhar 2014; Hoekman 2020; Stockman 2020; BDI 2021; Berger and Brandi 2021; Schmucker 2023; Felbermayr and Wolff 2023; GTAI 2022b; Abbas 2023).

2.2 Codex Alimentarius Commission

In the year 1963, the Codex Alimentarius Commission (CAC), whose predecessor institutions were Codex Alimentarius Austriacus and Codex Alimentarius Europaeus, became operational. It is a joint international standardization body of the UN Food and Agriculture Organization (FAO) and the World Health Organization (WHO) with 189 members (188 countries plus the EU) (WHO and FAO, 2018). The main mission of the CAC is to protect consumer health and ensure fair practices in food trade. For this purpose, the CAC has a mandate to develop and implement multilateral standards for "good practices".

The standards are initially voluntary to apply, but can become mandatory if implemented in national laws or regulations. For example, for the past 20 years, the EU has made CAC guidelines for the application of the Hygiene Analysis and Critical Control Point (HACCP) system mandatory in the General Food Law (Regulation (EC) No. 178/2002) in conjunction with Regulation (EC) No. 852/2004, Regulation (EC) No. 853/2004 and Regulation (EC) No. 854/2004. Main topics of the CAC are standards setting and further recommendations on product specification and composition of food, food additives, labeling, food processing techniques and inspection of food. These are considered risk-based and science-based and are recognized by the WTO (Maier 2015). Thus, they contribute enormously to the international harmonization of national standards in the agri-food sector and enable fair practices in terms of transparent and rules-based food trade. Currently, 233 standards (CAC 2023a), 85 guidelines (CAC 2023b), 56 codes of practice (CAC 2023c) have been established. In the year 2021, the CAC revised the Maximum Residue Limits (MRLs) for all food and animal feed (Pesticide residues and Veterinary drug residues) (CAC 2023d). Within the CAC, 21 committees are actively working on the implementation of specific topics (CAC 2023e). The Covid-19 pandemic has also presented challenges to the CAC. All in all, eight Codex texts were adapted to ensure food hygiene and to control viruses in food (CAC 2023f).

2.3 Trade Agreements: Significance and Goals

Trade agreements have a geopolitical significance and can be of various types depending on their objective and content. They are negotiated bilateral (with one country) or multilateral (with several countries or associations of countries) and are secured by a treaty under international law. Not only the EU negotiates trade agreements, but also other countries try to diversify their trade relations.

Globally important trade agreements, which are among the "mega-agreements", are:

- Comprehensive and Progressive Transpacific Partnership (CPTPP): FTA with 11 countries: Canada, Mexico, Peru, Chile, New Zealand, Australia, Brunei, Singapore, Malaysia, Vietnam, and Japan. Initially, the USA was involved and negotiations began in the year 2010 with the goal of establishing a Trans-Pacific Partnership (TPP). The CPTPP entered into force without the USA in the year 2018. Since February 2021, the UK has been negotiating to join CPTPP (IfG 2023).
- Regional Comprehensive Economic Partnership (RCEP): FTA with 16 countries: Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam, Australia, China, India, Japan, South Korea, and New Zealand. Negotiations began in the year 2013 and RCEP entered into force in the year 2022 (ASEAN 2023).
- African Continental Free Trade Area (AfCFTA): largest free trade area in the world with 54 African Union states (excluding Eritrea). In force since the year 2021 (ABG 2023; AfCFTA 2023).
- EU Internal Market: Free trade area with all 27 member states of the European Union: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the four states of the European Free Trade Association (EFTA): Iceland, Liechtenstein, Norway and Switzerland. The EU internal market originated in the year 1958 with the Treaty of Rome and is valid in conjunction with the Treaty on the functioning of the EU (EP 2023a).

In addition, the North American Free Trade Agreement (NAFTA), Central European Free Trade Area (CEFTA) and the South American Free Trade Area (MERCOSUR) exist.
Various types of trade agreements are concluded around the world, such as economic partnership, stabilization, association and FTAs.

EU´s Economic Partnership Agreements with certain developing countries or regions aim to promote and facilitate economic cooperation between the parties and to support the economic development of the partner country (e.g., infrastructure projects). These include countries in West Africa (ECOWAS), countries in East Africa (EAC and SADC), Caribbean countries (CARICOM) and Pacific Island countries (CARIFORUM) (EC 2023d).
Important EU agreements are also stabilization and/or association agreements. These serve to strengthen and deepen political, economic and cultural relations and promote closer cooperation

and integration with the EU. Such agreements exist with European countries that are not EU members: Iceland, Liechtenstein, Norway and Switzerland (EFTA), as well as with Turkey, countries of the Western Balkans, Ukraine, Moldova and Georgia (EC 2023e).

The EU mainly enters into (mostly bilateral) FTAs, also independently of the WTO. Developments in EU FTAs in connection with current EU trade policy are discussed in the following chapter.

The objectives of trade agreements are to secure and promote mutual trade and investment, growth and prosperity, competition and innovation, security and stability, and counter protectionist measures (Schantz 2017). The focus of trade agreements is on the market access for goods, services, investment, and government procurement; protection of intellectual property rights; enforceable regulations for trade and sustainable development; and the removal of barriers to digital trade and trade in energy, processed products and raw materials (GTAI 2020). In addition, other factors such as ethical and cultural values, environmental regulations, animal rights, consumer health, food quality, and traditionally produced foods may also play a role. Trade agreements primarily eliminate trade tariffs, which are also tariff barriers to trade. On the other hand, non-tariff trade measures (NTMs) are also included in negotiations. The international standards for the agri-food sector are the sanitary and phytosanitary measures (SPS) described above, and the technical barriers to trade (TBT) (UN 2019; UN 2022; WTO 2023b, WTO 2023d).

Today, it is called third-generation or new-generation FTAs, because they are very substantial and comprehensive (GTAI 2020). The term preferential trade agreements can also be found in the literature. Trade agreements are defined as preferential if the agreements contain special trade preferences that go beyond the general rules of the WTO. A distinction is made between free trade preference and origin preference (IHK Stuttgart 2023). Preferential trade agreements likewise have the purpose of promoting prosperity, advancing globalization, establishing trade rules, forming alliances, and reducing dependencies (Matthews et al. 2017; Eckhardt and Lee 2018; Lake et al. 2020; GTAI 2022c, GTAI 2022d; García 2023). At the end of the year 2022, according to the WTO, there were 355 preferential trade agreements in force (Schmucker 2023). The WTO reviews the individual agreements at regular intervals (WTO 2023h).

In recent years, a large number of studies have been published by researchers analyzing the effects (economic, political, social, under international law, etc.) of trade agreements. Regarding the agri-food sector, the WTO, TBT- and SPS-Agreements were frequently contextualized and the implications for food safety and food security were examined (see Cremer 2004; Grant and Lambert 2008; Sun and Reed 2010; Martin et al. 2012; Luckstead and Devadoss 2016; Bureau and Swinnen 2018; Moerland and Weinhardt 2020; van Loon 2020; Beghin and O'Donnell 2021; Bown et al. 2021; Hagemejer et al. 2021).

3. European Union's Trade Policy and Developments in Free Trade Agreements regarding the Agri-Food Sector

International trade is one of the most important pillars of the European agri-food sector. Both import and export activities ensure competitiveness, prosperity, jobs and growth at home and abroad. The EU has therefore set itself the task of creating a rules-based international trade environment with third countries within the framework of the WTO. This should be free, stable and predictable and is designed for long-term, sustainable partnerships in a fair environment. Thus, active EU trade policy contributes to sustainable development (EC 2018; Blot and Kettunen 2021; Allenbach-Ammann 2022; Blot 2023). One instrument to successfully implement these goals is the creation of trade agreements. This can maintain and improve competitive and market access conditions and create a level playing field.

The continuous task with constant challenges for the EU is to stabilize food prices, increase the overall availability of food, satisfy consumer behavior by diversifying the basket of goods, and, above all, always maintain high quality standards (EC 2018). Specifically, free trade partners can establish common social and environmental sustainability principles in the treaty texts and put them into practice (Brandi 2017; EC 2018; FES 2018). For the agri-food sector, this primarily concerns the creation of common standards to achieve the 17 UN Sustainable Development Goals (SDGs) under the 2030 Agenda, with particular relevance to health and well-being (SDG 3), economic growth (SDG 8), innovation (SDG 9), climate action (SDG 13), sustainable consumption and production (SDG12), and the protection of biodiversity and healthy ecosystems (SDG 15) (Fruman 2016; UN 2023). Basically, trade agreements always stipulate improved access to third-country markets, simplified security of supply and a willingness to innovate. For the EU, the European Commission (Directorate General for Trade) is the chief trade negotiator with third countries and associated states. To foster public confidence in EU trade policy, all activities and documents have been published transparently since the year 2021 on the basis of the "New Trade Strategy", and public participation and stakeholder conferences have been held and the results made public. With the "New Trade Strategy", the EU primarily wants to take action against unfair trade practices and ensure that trading partners comply with their obligations (Blockmans 2021; Marx and Van der Loo 2021; Hilpert 2022).

3.1 Trade Agreements: Developments

Over the past two decades, the EU has negotiated numerous new bilateral trade agreements with countries around the world and entered into global strategic partnerships (Engage 2022). There are over 40 agreements with 70 countries. The Global Europe Strategy of 2007, based on the Lisbon Strategy, is considered the initiating start (EU 2009; Schmucker 2023). The most recent FTA completed at rapid pace was the "EU-UK Trade and Cooperation Agreement" due to the UK's Brexit withdrawal agreement (see Chapter 1.1).

The trade agreements that have been highly controversial among the public are the EU-USA Trade and Investment Partnership (TTIP), which failed, and the EU-Canada Comprehensive Economic and Trade Agreement (CETA) (De Bièvre and Poletti 2020; Broschek and Goff 2022; Broschek and Freudlsperger 2023; De Ville and Gheyle 2023).

The EU currently has its focus on negotiations with the countries: Australia, Chile, India, Indonesia, Kenya, Mercosur, Mexico, New Zealand and Thailand (EC 2023d, EC 2023e).

The most important trade agreements concluded, which belong to the new generation, are briefly outlined below in relation to the agri-food sector: Canada, Japan and South Korea. The trade statistics provide an indication of the positive effects of the FTAs for the EU and Germany.

Canada

Negotiations on CETA launched in the year 2009 and concluded in the year 2014. CETA entered into force provisionally in September 2017. The ratification process has already been completed on the part of Canada. Not all EU member states have ratified CETA yet. Germany completed the ratification process in January 2023. The agreement eliminates 98% of all tariffs. CETA contains the following set of covenants for the agri-food sector (list not exhaustive):

- elimination of 93.6% of all tariffs by the EU (e.g., maple syrup, apples, cranberries),
- elimination of 91.0% of all tariffs by Canada (e.g., bread, confectionery),
- Cheese: duty-free quotas increased to 32,000 tons,
- Wine and spirits: market access barriers reduced, tariffs eliminated,
- Fish and seafood: gradual elimination of tariffs and regulation of sustainable fisheries,
- Cereals: transition period of seven years with tariff quotas,
- Beef, pork, sweet corn: duty free within the tariff quotas,
- Fruit and vegetables: continue to be subject to the EU import price system,
- Poultry and eggs: no market opening,

- Canada has recognized 143 EU 'geographical indication' (GI) protected products,
- recognition of the EU precautionary principle by Canada,
- "Right to regulate" by EU governments regarding higher standards and levels of protection for product and food safety,

(see Leblond 2016; Rudloff 2016; Devadoss and Luckstead 2018; Luckstead and Devadoss 2019; BMEL 2023a; BMWK 2023a; EC 2023f).

Trade data indicate that trade relations with Canada were well underway in the year 2022 and growing steadily. Canada was the EU's 9th ranked export partner for agricultural products and food with an export value of EUR 4.74 billion (+16.9%). Canada is also important to the EU as an import partner (17th place). In the year 2022, imports amounted to EUR 3 billion (+4.8%) with a trade balance of EUR 1.8 billion. In general, the most successful export sector was the beverage industry: wine (EUR 1.2 billion, +9.4%), beer and other beverages (EUR 0.34 billion, +8%), and spirits and liquors (EUR 0.3 billion, +19.2%). Confectionery exports increased significantly (EUR 0.39 billion, +22.6%). Exports of cereals and mill products increased by 23.9% (EUR 0.363 billion). The main imports into the EU from Canada were cereals (EUR 0.97 billion, +38.2%), oilseeds and protein crops (EUR 0.82 billion, -24.8%) and vegetables (EUR 0.217 billion, +15.4%). A strong increase in imports was recorded for fruits and nuts (+32.4%). Imports of margarine and vegetable oils and fats declined significantly (-52.5%) (DG AGRI 2023b).

Germany exported agricultural products and food valued at EUR 0.479 billion (+15%) to Canada in the year 2022, with meat and meat products, confectionery and bakery products, and cereal products as the main products supplied. Canadian imports amounted to EUR 0.224 billion in the year 2022 (-30%). Fruit preparations and canned fruit, oil fruits, legumes, fish and fish products were the main imported products (BMEL 2023b).

Japan

Talks for an EU-Japan Free Trade Agreement (JEFTA) opened in the year 2013 and were finalized in July 2018 after 18 rounds of negotiations. The agreement entered into force in February 2019 and is an economic partnership agreement. JFTA contains the following agreements for the agri-food sectors (list not exhaustive):

- Japan has recognized 205 GI-protected products of the EU,
- the EU has recognized 56 GI-protected Japanese products,
- Wine: immediate elimination of customs duty (15%),

- Pork meat: elimination of duty (4.3%) and reduction of specific duty from 482 yen/kg reduced to 50 yen/kg over 10 years,
- Beef: reduction of duty from 38.5% to 9% over 15 years,
- Dairy products: elimination of tariffs (29.8%) on hard cheese over 15 years and duty-free tariff-rate quotas for soft and fresh cheeses, which will be expanded over time,
- Processed food (e.g., pasta, chocolate): Tariffs (30%) will be eliminated over a 10-year period,

(see Cimino-Isaacs 2020; Grübler et al. 2021; Yoshii and Yi 2021; Yi 2022; BMEL 2023c; BMWK 2023b; EC 2023g; EU-Japan Centre 2023; Frennhoff Larsén 2023).

Trade statistics demonstrate that Japan was the EU's top 5 export partner for agricultural products and food in the year 2022, with an export value of EUR 8.3 billion (+12.8%). In the year 2022, imports amounted to EUR 0.492 billion (+10.1%; ranked 48th) with a trade balance of EUR 7.8 billion. Trade can be assessed as steadily growing. The main export products were pork meat (EUR 1.5 billion, +19%), tobacco, cigars and cigarettes (EUR 1.4 billion, -14.1%), wine (EUR 1.1 billion, +21%) and dairy products (EUR 0.47 billion, +32%). Poultry and eggs exports increased by +59% (EUR 0.140 billion). From Japan, mainly mixed food preparations and ingredients (EUR 0.124 billion, +3.3%) were imported into the EU. A strong increase in imports was recorded for grain and mill Products (+22%), beverages (+40%) and beef (+31%) (DG AGRI 2023b).

Agricultural products and food valued at EUR 0.553 billion (+26.3%) were exported from Germany to Japan in the year 2022. These were mainly milk and dairy products, cheese, sugar, hops and wine. Imports amounted to EUR 0.094 billion (-10.5%) in the year 2022. Japanese imported products were mainly seasoning sauces, tea, fish and fish preparations, spirits, and meat and meat products (BMEL 2023d).

South Korea

Negotiations for an EU-South Korea FTA started in the year 2007 and were concluded after seven rounds of consultations with signature in the year 2009. The agreement has been provisionally applied since the year 2011 and entered into force in the year 2015. The EU-South Korea FTA contains the following agreements for the agri-food sector (list not exhaustive):

- elimination of 98.7% of all tariffs (e.g., pork meat, wine and whiskey),
- Cheese: duty-free quota,

- Rice and beef: no market opening,
- South Korea has recognized 165 GI-protected products from the EU,
- the EU has recognized 63 GI-protected South Korean products,
- cooperation for developing a common understanding of international standards,

(see Hilpert 2009; Jarzębowski and Bezat 2018; Yoshii and Yi 2021; Jung 2022; BMEL 2023e; EC 2023h).

Trade with South Korea has been growing steadily in recent years. In the year 2022, South Korea was among the top ten export partners of the EU in agricultural products and food with an export value of EUR 4.6 billion (+17%). In the year 2022, imports amounted to EUR 0.377 billion (+24.8%; ranked 56th) with a trade balance of EUR 4.2 billion. The main export products were pork meat (EUR 1 billion, +5.6%), dairy products (EUR 0.84 billion, +49.7%), mixed food preparations and ingredients (EUR 0.4 billion, +36%) and wine (EUR 0.34 billion +17%). Exports of spirits and liquors increased by 105% (EUR 0.076 billion). The main imports into the EU from South Korea were grain and mill products (EUR 0.128 billion, +40.7%) and beverages (EUR 0.06 billion, +20%). A strong increase in imports was recorded for the confectionary industry (+200%). There was a slump in imports of pork meat (-67%) because of an import stop due to African Swine Fiver (DG AGRI 2023b).

3.2 EU Geographical Indications and Quality Schemes

In the international trade of agricultural products and foods, and thus in trade agreements, the quality schemes play a major role, which are defined with the EU quality policy. The aim is to protect certain products manufactured in the EU with characteristic properties and product specifications. About 2,000 products have been protected so far by registration of the eAmbrosia database (EC 2023i). Four quality labels have been established by the EU. These are the: “Protected designation of origin” (PDO), "Protected geographical indication” (PGI) and "Geographical indication (spirit drinks)” (GI) and “Traditional speciality guaranteed” (TSG). Products awarded with one of these labels are subject to intellectual property protection in the EU (EC 2023j, EU 2012). These governmental quality schemes for agricultural products differentiate in terms of the basic requirements of private standard labels (Theuvsen et al. 2014). The recognition of these intellectual property rights plays a major role in FTAs and are enforced by the EU with great determination. Intellectual property rights and Rules of Origin are classified as non-tariff trade barriers (UN 2019; UN 2022). In addition, they are considered a tool for sustainable food systems (Vandecandelaere et al. 2021) and interact with innovations (Stranieri et al. 2023).

A corresponding EU strategy has been in place since the year 2014 (EC 2023k). In this respect, the EU supports the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS-Agreement) of the WTO (WTO 2023i).

4. Negotiations underway between the EU and the USA on a Free Trade Agreement

Trade relations between the EU and the USA have a long tradition. Since the end of the Second World War and the membership in the GATT/WTO of both powerful trading partners, talks and negotiations on an intensive bilateral partnership have been conducted repeatedly (Donnelly 2023). The most prominent example in recent years, was the negotiations of an FTA, the Transatlantic Trade and Investment Partnership (TTIP), which was initiated in 2013 by President Obama. U.S. President Donald Trump's "America First" policy put the dialog on hold after 15 rounds of negotiations in the year 2016. Formally, TTIP was terminated in the year 2019 (EC 2023l).

There have been repeated trade disputes between the EU and the USA over the years due to protectionist measures, which were also pending in the WTO dispute settlement procedure. These include, for example, the imposition of Steel and Aluminum Tariffs by the USA in the year 2018, retaliatory tariffs on Airbus and import duties on EU cars by the USA in the year 2019, and the EU trade ban on hormone-treated meat and meat products (EC 2002a; EC 2002b; Johnson 2015; Bromund and Beaumont-Smith 2020). The most recent example is the dispute arising from the USA countervailing duties imposed in the year 2018 on imports of ripe olives from the EU (Spain) (EC 2023m). In general, the agri-food sector is considered a contentious issue in transatlantic trade relations mainly due to tariffs on "composite agrigoods", fish and seafood, as well as origin labeling, SPS measures e.g., live animals, certification and health certificates, EU risk assessment through the precautionary principle, recognition of GIs, digital trade, and conformity assessments of standards (Bromund and Beaumont-Smith 2020). Given these differences in trade in agricultural products and food, an EU-USA FTA would be an economic win and a success story for both economies (Pawlak 2022).

On a positive note, the EU and the USA were able to renew a trade agreement in the area of high-value beef that had been in place since the year 2009, thus resolving a WTO trade dispute that has existed since the year 1989. In August 2019, the two trading partners agreed that the USA will be allocated a tariff rate quota of 35,000 tons of hormone-free beef by the EU, gradually over seven years. This means that through this agreement, the USA could nearly triple the value of duty-free beef exports to the EU, from an annual commodity value of USD 150 million to USD 420 million (Council 2019; USTR 2019; Bromund and Beaumont-Smith 2020).

The election of the 46th President of the USA Joe Biden in January 2021 has further opened up US trade policy. This holds new opportunities for the transatlantic relationship, as Biden is considered a multilaterist (Felbermayr and Stamern 2021; Greve 2021; BDI 2023; Ligustro 2023; Schmucker 2023; Schoenbaum 2023).

Since then, the U.S. administration, represented by U.S. Trade Representative Katherine Tai, has again shown a willingness to enter into intensive talks with the EU, to create a trade agreement and to strengthen transatlantic relations in many areas. Thus, the EU-US Trade and Technology Council (TTC) was founded as early as June 2021. This offers the possibility to work out new transatlantic cooperations and bilateral trade. It will work on important global trade, economic and technology issues related to sustainable supply chains, green transformation and digital rules. The Council consists of ten working groups (WG) (Bel 2021; USDC 2022; EC 2023n). Of particular relevance to the agri-food sector and this research thesis are the following five working groups:

- Working Group 1 - Technology Standards: Recognizing the importance of international standardization activities (including WTO), international standardization activities are coordinated and formal and informal cooperation mechanisms are developed. This relates primarily to critical and emerging technology standards (including artificial intelligence and other new technologies, e.g., in the agricultural sector) (EC 2023n).
- Working Group 2 - Climate and Clean Tech: Addresses the Green Transformation. Identifies opportunities, policies, and incentives to support technology development, transatlantic trade, and investment in climate-neutral technologies, products, and services. Cooperation is promoted with and within third countries, research and innovation. WG 2 explores how to calculate embedded greenhouse gas emissions in global trade (EC 2023n).
- Working Group 3 - Secure Supply Chains: The aim is to improve the resilience of supply chains in the EU and the USA. This will involve improving transparency of supply and demand, security of supply in the green and digital transformation, and protection of citizens. The focus is on clean energy, pharmaceuticals, and critical materials. Promoting sustainability, resilience and supply chain diversification in agriculture and food safety is the topic of WG 3 (EC 2023n).
- Working Group 7 - Export Controls: conducts technical consultations on legislative and regulatory developments. WG 7 provides information on risk assessments and best practices in licensing and export controls (EC 2023n).

- Working Group 10 - Global Trade Challenges: Addresses the prevention of new and unnecessary technical barriers to new technology products and services in six work areas. Focuses on trade and environmental issues, particularly trade challenges in agriculture and food safety. The aim is to avoid and overcome bilateral and global trade barriers (EC 2023n).

The special aspect of TTC is, that a dialogue platform is available in the period from May 2022 to May 2025, in which all interested citizens and civil groups in the EU and the USA can participate and provide their input in the working groups and stimulate discussion (EC 2023o).

Looking at the foreign trade statistics, it quickly becomes clear why an FTA between the EU and the USA has economic advantages for the agri-food sector. For the EU, the USA was the second most important export partner for agricultural products and food in the year 2022, with an export value of EUR 29 billion (+18%), and the fourth most important import partner with a trade value of EUR 12.3 billion (+31%). The trade balance was EUR 16.8 billion. The annual growth rate of the last ten years was 8.4% for exports and 5.7% for imports. The main export products were wine (EUR 5 billion, +10.7%), spirits and liquors (EUR 3.8 billion, +15.7%) and cereals and mill products (EUR 2.7 billion, +38.4%). Exports of beer and other beverages were among the main export products at EUR 2.4 billion, down -8.5%. Oilseeds and protein crops (EUR 3.1 billion, +44%), fruits and nuts (EUR 2.7 billion, +22%), spirits and liquors (EUR 0.83 billion, +48%), and cereals (EUR 0.53 billion, +260%) were imported to the EU from the USA with a strong increase (DG AGRI 2023b). Agricultural products and food valued at EUR 2.5 billion (+20%) were exported from Germany to the USA in the year 2022. With a strong increase, these were mainly coffee (+42%), sugar (+14%), grain and mill products, and horses. Imports amounted to EUR 3.1 billion (+26%) in the year 2022. Import products were oilseeds (especially soy +70%), nuts and dried fruits, fish and fish preparations, spirits, and wine (BMEL 2023f).

Finally, it should be noted that the USA, as well as the EU, does not only conduct trade policy internally. As the current "2023 Trade Policy Agenda and 2022 Annual Report" (USTR 2023) shows, the USA has taken and implemented important measures in a very short time due to the vital trade policy under Biden. 14 FTAs are in place, six new trade initiatives were launched, for example Indo-Pacific Economic Framework in Asia, and efforts are in progress on twelve other trade initiatives and preference programs. The most important and well-known FTA is the “United States Mexico Canada Agreement” (USMCA), which is the successor agreement to “North American Free Trade Agreement” (NAFTA) (ITA 2023; Schmucker 2023; Schoenbaum 2023).

5. Quality Management and Quality Standards regarding Global Trade

In this thesis, quality management and quality standards in the agri-food sector are the focus of the research. Therefore, in this chapter, the most important terminology is introduced and the relationship to global trade is established.

The agri-food industry is characterized by a complex system of different economic actors. It comprises all stages of the food chain, from commodity producers and suppliers, through processing, logistics and distribution stages, to the end consumer. In addition, actors such as producers of machinery and packaging are involved in the processes of the agri-food industry. In the area of food production, traceability across all stages is mandatory to create high-quality and safe products, so the individual stakeholders must be in close contact with the respective upstream and downstream stages. Food safety includes not only hygienic safety, but also aspects such as GMO-free production, safe manufacturing processes and product labeling. The fundamentals of these principles are anchored in the General Food Law (Regulation (EC) No. 178/2002) in the EU, with compliance with the Hazard Analysis and Critical Control Points (HACCP) principles (EU 2002; van der Meulen and Wernaart 2022).

5.1 Quality and Quality Management

The term "quality" is present in many areas of life and is derived from the Latin word "qualitas", which translates as "condition" or "property". In general, it is used to describe the inherent characteristics or properties of things. The DIN EN ISO 9000:2015 defines "quality" as *"the degree to which a set of inherent characteristics meets requirements"*. A distinction is widely made between product, process and system quality.

Nowadays, "quality" is associated with aspects of value such as safety, reliability, performance, aesthetics and customer expectations. In the agri-food sector, "quality" refers to the condition of agricultural commodities and (processed) foods in terms of characteristics related to their safety, nutritional value, sensory properties, sustainability, religious requirements, and conformity with applicable regulations and standards, with the aim of protecting consumer health. This is assured by various quality control and certification systems. Quality can also be understood as any form of compliance with the customers' preferences, which directly define the desired product characteristics.

Quality in all its forms must be ensured in the company. Quality management is used for this purpose. DIN EN ISO 9000:2015 defines quality management as *"coordinated activities for managing and directing an organization with regard to quality"*.

Thus, the responsibility for quality management and the systematic implementation, including risk management and effective quality assurance, of agricultural products and foodstuffs is with the entrepreneur, namely the private sector. It should be emphasized at this point, that strategic quality management depends strongly on customer-supplier relationships and the criteria of private standards of trade (Schütz et al. 2014). Quality management is an interdisciplinary task in which a number of methods, strategies and models have been developed in recent years. Further developments of quality attributes, innovative approaches, and industry-specific definitions can be found in the literature (see Giovannucci and Satin 2000; Schütz 2009; Velthuis et al. 2010; O'Hagan 2014; Petersen and O'Hagan 2014; Schütz et al. 2014; Fritzen 2016; Petersen and Lehnert 2017; Brüggemann and Bremer 2020; IFC 2020; Luning and Marcelis 2020; VDOE 2020; Herrmann and Fritz 2021a; Herrmann and Fritz 2021b; Sommerhoff 2021).

A company's success in the global marketplace depends on the quality of its end products, the raw materials and ingredients it uses, its manufacturing processes, and its effective quality management system, which help it differentiate from competing products. The relationship between quality and global trade has been empirically investigated by some studies (cf. Velthuis et al. 2010; Baltzer 2011; Melo et al. 2014; Olper et al. 2014; Gervais 2015; Curzi and Pacca 2015). Hallak (2006) proved in his empirical study that quality is a significant factor explaining global patterns of bilateral trade. Fiankor et al. (2020) empirically found that regulatory heterogeneity in product standards reduces trade flows by examining the quality and quality-adjusted price effects of regulatory heterogeneity in agricultural markets. He suggested that the effects might be due to the reduced competition that would result from stricter standards in the importing country.

5.2 Quality Standards in General

Standards are sets of rules that are adopted in defined standardization procedures and by consensus of all stakeholders. They serve sustainable production and take into account consumer concerns as well as requirements for health protection, industrial safety and environmental protection (DIN 2023a). The aim is to define requirements for products, services and processes through standards to ensure the safety of people, animals, the environment and products as well as quality improvement at all levels of the economy and daily life. This is intended to promote a free movement of goods and exports (DIN 2023b). A distinction is made between product and process standards, with the respective standard primarily regulating safety, quality, social and environmental impact. Standards represent the current state of science and technology and are intended to serve the benefit of the general public without providing an advantage to individual players.

They are defined as "catalysts for innovation" by promoting the transfer of knowledge and technology from research to practice and to the markets, thereby spreading and harnessing innovative expertise (Hallscheid et al. 2019).

European standards are opening up the domestic market, international standards are creating a harmonized world market (Hallscheid et al. 2019). In Germany, the German Institute for Standardization (DIN) has been contractually established as the national standardization organization representing German interests at European and international level (DIN 2023c).

The International Organization for Standardization (ISO) was founded in the year 1947 and is headquartered in Geneva, Switzerland. It consists of national standards bodies from different countries that work together to develop and promote international standards. ISO standards are standards adopted by consensus, but which are not binding under international law. In addition to standards for quality management systems such as the DIN EN ISO 9000ff. series of standards and the DIN EN ISO 22000 standard, ISO has developed product- and process-specific standards that define requirements for processes, facilities, employees and objects in the production of agricultural and food products (Bruckner et al. 2014). DIN EN ISO 31000 defines measures for risk management. Quality standards act along the entire process chain and represent an essential tool for ensuring safe, uniform and comparable processes and products in international trade (DIN 2023d).

Along with the international standards and legal standards described above, private sector standards (industry and consumer standards) play a special role in trade in agricultural products and food (Hobbs 2010; Velthuis et al. 2010; van der Meulen 2011; Havinga 2018). These serve to ensure product and process quality among actors in trade relationships. Initially, private standards are generally non-binding, meaning they do not have the character of law. However, they can become binding if they apply to a large majority of traded goods (Hobbs 2010; Heckelei and Swinnen 2012; Havinga 2018).

Through the efforts of food retailers and trade organizations, respectively, a particularly large number of voluntary private sector standards have developed in recent decades. Among the most important standards, which are examined in this dissertation, are GLOBAL G.A.P in the field of agriculture, GMP+ in the feed industry, International Featured Standard (IFS), QS standard, British Retail Standard (BRC) for quality assurance in the food industry. Furthermore, important international sustainability standards are: MSC (fisheries) and ASC (aquaculture) and REDcert (biomass) (van der Meulen 2011; Bruckner et al. 2014; Havinga 2018; IFC 2020).

GLOBAL G.A.P, IFS and BRC are benchmarked by the Global Food Safety Initiative (GFSI). GFSI, founded in the year 2000, is an international not-for-profit association dedicated to enhancing food safety throughout the supply chain and promoting the harmonization of food safety standards

on a global scale. GFSI's three strategic objectives are: Benchmarking and Harmonization, Capability Building, Public-private collaboration. Benchmarking compares existing standards against defined characteristics. This establishes equivalence, which creates confidence among retailers, manufacturers and consumers that the certified products meet high safety standards. It also avoids duplicate audits in certification processes and reduces trade barriers. GFSI is also accepted in the USA and Japan. GFSI partners include the CAC, ISO, the International Accreditation Forum (IAF), the International Association for Food Protection (IAFP), the World Bank Group, and the World Organization for Animal Health (WOAH) (Hobbs 2010; IFC 2020; GFSI 2023).

Generally, a proof of conformity with specified requirements of a standard, is called certification and is made by an independent certification body (Herrmann and Fritz 2021c). Certification aims to ensure that a certain level, as defined by legal requirements or standards and guidelines, is maintained. Furthermore, it can also highlight the special features or uniqueness of a product so that products stand out from the competition. Thus, in addition to meeting the requirements, often set by customers, a competitive advantage is created. Hence, standards, which serve to specify the requirements, as well as certification, which confirms compliance with them, are important within the framework of quality management and for quality assurance (Velthuis et al. 2010; Bruckner et al. 2014; Theuvsen et al. 2014; Havinga 2018).

5.3 Quality Standards as Non-Tariff Barriers to Trade

Standardization is above all an international task to reduce technical barriers to trade worldwide, to disseminate innovations and to concretize technical legislation. Standardization policy - especially that of Germany - is an essential part of economic and innovation policy and strengthens its competitiveness as an economic nation and exporting country (BMWK 2023c).

The benefits of standards are of great importance in the globalized trade market and serve to facilitate market access, as they promote international cooperation between all relevant market participants and manufacturers (DIN 2023e). Barrier-free international trade is based on the application of common standards. In FTAs, the mutual recognition of standards - also in the agri-food sector - plays a far more important role than the full harmonization of these. Since full harmonization of requirements for certain products and production processes cannot be achieved by European standards in many areas, national standards are often mutually recognized by the negotiating partners of a trade agreement in order to assign an equal level of safety to the corresponding products. In this way, products that are classified as marketable in one EU member state can also be placed on the market in other partner countries and vice versa (EP 2023a; EP 2023b; Maier 2015).

Although, as described above, standards are generally considered as "catalysts for innovation and trade", quality standards of the agri-food sector are often judged as non-tariff barriers (NTBs) or non-tariff measures (NTMs), especially in the context of the SPS and TBT agreements, which apply only to public standards but not to private standards. Private standards have not been considered in the GATT/WTO system so far, but this could or should change in the future (Hobbs 2010; Heckelei and Swinnen 2012; Wouters and Geraets 2012; Maier 2015). In many cases, there is a perception that quality standards would restrict market access and be used as a protectionist instrument. In principle, NTMs have an impact on international trade flows, but are not associated with tariffs. Therefore, there are a high number of NTMs, which are distinguished according to their purpose. On the one hand, NTMs can curb trade activities between states, for example if they are state-imposed price, quantity or regulatory measures (so-called import quotas, licenses or formalities, etc.). On the other hand, NTMs can be used to achieve political goals, for example sanctions against states that violate international law.

A famous example of an NTM is the EU hormone ban, which prohibits the marketing of meat and meat products treated with growth-promoting hormones (EC 2002a; EC 2002b; Johnson 2015; Bromund and Beaumont-Smith 2020). To better identify and distinguish between the different forms of NTMs, they have been classified in detail by the United Nations (UN) (UN 2019; UN 2022).

Some studies examined the evolution of different types of NTMs, including in terms of standards (see Beghin and Bureau 2001a; Beghin and Bureau 2001b; Cadot and Malouche 2012; Heckelei and Swinnen 2012; Swinnen and Vandemoortele 2012; Wouters and Geraets 2012; Ederington and Ruta 2016; Matthews et al. 2017; Santeramo and Lamonaca 2019; Grübler and Reiter 2020; Rabadán and Triguero 2021; Raimondi et al. 2023). In turn, other studies attempt to empirically disprove that quality standards are part of NTBs. For example, Ehrich and Hess (2015, p. 2) used a model to introduce a conceptual framework approach to the economic role of institutions in the adoption of standards and trade. The results show that "*exports to markets with relatively high quality standards are more relevant than for overall exports*". Thus, the empirical results confirm that the positive effects of quality indicators on exports are particularly relevant for exports to markets with high standards. The study by Aisbett and Silberberger (2021) examines the role of standards on trade liberalization measures with the result that they promote divergence in standards across countries.

6. Global Supply Chains of Agri-Food Products

Each organization acts in a network, and each act as a customer when it buys materials from its own suppliers, and then it acts as a supplier when it delivers materials to its own customers. Products move through a series of organizations as they travel from the original suppliers of raw materials, through intermediate organizations, and on to the final customers. "*This network of organizations that are linked through upstream and downstream relationships in the different processes and activities that produce value in the form of products and services in the hand of ultimate customer*" is defined as supply chain (SC) (Christopher 2005, p.17).

Already two decades ago Verwijmeren (2004, p.166) made the observation that "*In business we face the trend of increased global competition, which forces companies to improve their efficiency. One of the measures for efficiency improvement is supply chain management*". In summary, supply chain management (SCM) is an *"integrative approach"* to planning, control and monitoring of product flows, from suppliers to end users, aiming at *"improved customer service at reduced overall costs"* (Jones and Riley 1985; Ellram 1991, pp. 16-17). One of the significant difficulties of supply chain quality management is in information management.

Supply chain quality management has experienced difficulties in predicting and controlling quality factors due to a lack of correct information (Li 1997; Li and Collier 2000; Wang et al. 2007; Coyle et al. 2016). These difficulties are predicted to be significantly compounded as the scope of SCs are increasing in which the complexity is even greater.

The supply chain of agri-food products (AFSC) has a prominent role in making food available to consumers. The functioning or non-functioning of the steps within the supply chain affects the availability, prices, accessibility and variety of food. Within a complex food value chain (FVC), the AFSC is the sub-branch that describes the transportation and distribution of food from producer to consumer with different actors (suppliers, manufacturers, wholesalers, retailers, consumers). The whole FVC includes all stages and processes starting with agricultural production, technological processing, packaging, storage, distribution and ending with the point of sale of food and agricultural products (O'Hagan 2014; DG AGRI 2015; EC 2019). Along the entire FVC, efficient quality management methods must be sustainable. AFSCs can be distinguished in terms of distance into: Short Food Supply Chain (SFSC) and Global Food Supply Chain (GFSC). SFSCs are characterized by food being produced, processed, and sold locally or regionally (Giampietri et al. 2018; Jarzębowski et al. 2020). Through SFSCs, opportunities exist to promote sustainable agricultural systems and local economic development, increase agricultural value added, and diversify production (Jarzębowski and Pietrzyck 2018).

When considering international trade, this research focuses on the GFSC. Srinivasan et al. (2014, p. 1) defined the GFSC as *"a worldwide network of suppliers, manufacturers, warehouses, distribution centers, and retailers through which raw materials are acquired, transformed, and delivered to customers".* GFSCs therefore enable the import and export of food across borders and need to function in a stable manner. Many countries rely on a stable supply of agricultural commodities to produce high-quality food. The demand arises because, on the one hand, a country cannot grow the raw materials it needs in sufficient quantities or at all. On the other hand, there is a growing demand for food in countries with growing populations or increasing purchasing power. Therefore, taking into account sustainability criteria and the ongoing trade liberalization, the crucial tasks are:

- ensuring efficient transport and logistics systems,
- guarantee of complete traceability,
- compliance with customs and regulatory requirements, such as conformity of standards and certification procedures, and avoidance of duplicate certifications,
- preventive risk management,
- ensuring transparency along the entire food chain to the consumer,
- guarantee of dietary diversity,
- protection of finite resources within planetary boundaries,
- preservation and creation of jobs and
- establishment of fair trade practices,

(Wognum et al. 2011; Baldwin 2013; Schiefer and Deiters 2013; Dabbene et al. 2014; O'Hagan 2014; EC 2019; Christen 2023; DG AGRI 2023c).

GFSCs have been strongly burdened in recent years (Caraher et al. 2023). It is noticeable that supply chains are becoming increasingly complex, longer and thus less transparent. In addition, cost pressure has risen, raw materials are becoming scarcer, risks are growing, and verification requirements have increased (Strecker et al. 2020). However, the significant reasons for the threat to stable supply chains were Covid-19, global supply disruptions, shifting of supply flows in a very short period of time, and the war in Ukraine. The Covid-19 pandemic caused unprecedented uncertainties, with international supply disruption and high demand volatility (van Hoek 2021). During the Covid-19 pandemic, in the year 2021 was an economic recovery for which some companies were not prepared. This was due to pent-up consumption and catch-up effects from deferred projects. Consequently, supply shortages and the so-called bullwhip effect (BWE)

occurred at the end of the year 2021. The BWE occurs when minimal changes in demand at the end of the supply chain result in exponential fluctuations in demand for raw materials. This effect is amplified in the case of long supply chains - i.e., GFSCs - (unexpected) changes in demand, and insufficient information flow or distortions between actors in the supply chain (see Rahman et al. 2020; Otero-Diaz et al. 2021; van Hoek 2021; Bunde 2023; Wolf 2023; Mukucha and Chari 2023). In addition, safety stocks were built up during the crisis periods to avoid bottlenecks. Consequently, warehousing was intensified and a shortage of storage facilities occurred. Moreover, resources were deployed to improve monitoring of existing supply chains. The BWE described has had a negative impact on GFSC efficiency and profitability (Rahman et al. 2020; Mukucha and Chari 2023).

All these crisis situations show that the agri-food sector must find solutions to make supply chains even more resilient to disruptions in the future. First solutions are proposed with regard to the diversification of supply chains. Sourcing a product from a single supplier (so-called single sourcing) does not seem to be promising for the future. Instead, a supplier network for multi-sourcing should be established. For this, closer cooperation between the various players in the supply chain is of great importance. Other approaches include digitization of supply chains for more rigorous information sharing (EC 2019; Rahman et al. 2020; Otero-Diaz et al. 2021; West 2022; Bunde 2023; Wolf 2023). In the area of digitalization, there are already well-developed solutions, such as the "digital delivery bill", which is applied along the entire supply chain and contributes to sustainability by reducing greenhouse gas emissions. The "digital supply chain twin" shows supply chain processes in real time, contributing to transparency and automation of trouble-free processes. By using real-time demand monitoring technologies, demand forecasts could be made more accurate (Otero-Diaz et al. 2021; Höppner and Wölfl 2023). In addition, blockchain technology related to the GS1 standard is important for GFSCs in improving transparency and traceability of products along the supply chain (Jabbar et al. 2021; GS1 2023).

The described characteristic properties and challenges of a GFSC indicate that it needs a great focus on sustainability, transparency and visibility in global trade relations and in the negotiation of FTAs, as they face more dependence and vulnerability.

7. References Chapter 2

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CHAPTER 3: IN-DEPTH ANALYSES OF SEVERAL COUNTRIES

A trend analysis on the development of export activities in the agri-food sector in Europe as of the year 2015 was the starting point for my own work. Until then, there was a lack of information on the extent to which the introduction of standard-compliant quality management systems influenced companies' willingness to export. Based on interviews with experts in the run-up to the own study, the hypothesis was pursued that industry standards and the globally recognized DIN EN ISO 9001ff standard increasingly influence global trade relations in terms of agricultural products.
The knowledge of various experts along with ten methodological approaches were used to investigate this hypothesis. The methods, which have already been published in seven publications, were:

- Media analysis of the German public press and mainstream media (print media, TV broadcasts, radio reports, online media of non-governmental organizations),
- Online surveys with structured questionnaires with export-oriented companies, industry associations and foreign chambers of commerce in the domestic market and abroad,
- Expert interviews with standard providers by using an interview guide,
- Expert interviews with export-oriented companies, industry associations, foreign chambers of commerce, business representatives, consultants and policy advisors,
- continuous literature analyses,
- monitoring and evaluations of trade statistics,
- live surveys with students enrolled in Quality Management of the Agri-Food Industry at the University of Bonn,
- continuous monitoring at trade fairs, conferences and symposia,
- statistical evaluations,
- Ad hoc dialogues with politicians at EU, federal and state level as well as representatives of ministries and non-governmental organizations (NGOs).

Countries or geographical regions covered by the empirical studies were:

- Germany,
- Poland,
- The United States of America (US),
- EU-Mediterranean countries: Croatia, France, Greece, Italy, Portugal, Slovenia, Spain and
- Japan.

The respective methodological approaches and results were published and are presented in detail in the following seven chapters.

Further online surveys with structured questionnaires were conducted among export-oriented companies and associations in the BeNeLux countries (Belgium, Netherlands, Luxembourg) and the USA. These findings did not generate any additional aspects to the published surveys, but they allowed further interpretations of all the results. The results of the elaborately conducted expert interviews brought new insights, which were incorporated into each individual evaluation and could be reflected in the overall context of the research work. The studies also enabled an active international network to be established and strengthened with representatives of associations, business stakeholders, export-oriented companies, quality managers, standard providers, food supply chain experts and policymakers, which can also be used for further research activities.

Appendix 3.1

Pietrzyck K., Steinhoff-Wagner, J., Jarzębowski S., Petersen B. (2017): **Building Bridges – Internationales Qualitätsmanagement der Agrar- und Ernährungswirtschaft auf globalen Märkten unter Einbeziehung von Freihandelsabkommen am Beispiel TTIP**. In: Otten, Götz, Pollak (Hrsg.): Heutige und zukünftige Herausforderungen an die Qualitätswissenschaft in Forschung und Praxis – Bericht zur GQW-Jahrestagung 2017 in Erlangen. FAU University Press, S. 185-208. ISBN 978-3-96147-021-1.

Appendix 3.2

Pietrzyck K., Petersen B., Jarzębowski S. (2018): **The Role of Quality Management in the Context of the Transatlantic Trade and Investment Partnership (TTIP): The Case of the Polish Agri-Food Sector.** International Journal "*Problems of Agricultural Economics*". 3 (356) 2018. pp. 94-110. https://doi.org/10.30858/zer/94479

Appendix 3.3

Pietrzyck K., Jarzębowski S., Petersen B. (2021): **Exploring Sustainable Aspects Regarding the Food Supply Chain, Agri-Food Quality Standards, and Global Trade: An Empirical Study among Experts from the European Union and the United States.** *Energies.* 14(18):5987. https://doi.org/10.3390/en14185987

Appendix 3.4

Pietrzyck K., Driouech N., Petersen B. (2018): **The Transatlantic Trade and Investment Partnership (TTIP): threat or an opportunity for EU-Mediterranean agriculture and agri-food sector? An exploratory survey**. In: Wigier M., Kowalski A. (eds.): Proceedings of the International Scientific Conference "The Common Agricultural Policy for the European Union – the present and the future". 5-7 December 2017. Stare Jabłonki, Poland. Multi-Annual Programme 2015-2019, no 73.1. Institute of Agricultural and Food Economics, National Research Institute, Warsaw. pp. 177-195. https://doi.org/10.30858/pw/9788376587431.14

Appendix 3.5

Pietrzyck K., Berke, N., Wendel V., Steinhoff-Wagner J., Jarzębowski S., Petersen B. (2021): **Understanding the Importance of International Quality Standards Regarding Global Trade in Food and Agricultural Products: Analysis of the German Media.** *Agriculture.* 11(4):328. https://doi.org/10.3390/agriculture11040328

Appendix 3.6

Pietrzyck K., Berke N., Steinhoff-Wagner-J., Petersen B. (2017): **A view on the uninformed consumers towards quality standards in the context of the TTIP negotiations.** *AGROFOR International Journal*, Volume 2. Issue No. 3. pp. 44-52. https://doi.org/10.7251/AGRENG1703044P

Appendix 3.7

Pietrzyck K., Rexroth A., Petersen B. (2018): **The Economic Partnership Agreement between the European Union and Japan: A Comparative Analysis with Focus on the Quality Standards in the Agri-Food Sector**. Book of Proceedings. IX. International Scientific Agriculture Symposium „AGROSYM 2018". October 04 - 07 2018. Jahorina. Bosnia and Herzegovina. pp. 881-888. ISBN 978-99976-718-8-2.

CHAPTER 4: GENERAL DISCUSSION AND CONCLUSION

1. Current Developments and Outlook

The criteria of safety and quality remain central to international trade in food and agricultural products. The crises of recent years have shown how vulnerable the agri-food sector and markets for feed and food are. Companies that engage in intensive international trade are at the mercy of global competitive pressures and therefore strive to establish, maintain, and sustain stable supply chains along the entire value chain (Hobbs 2021; Thilmany et al. 2021; Engemann and Jafari 2022; Bunde 2023). However, international value chains are characterized by geographically and organizationally separate process steps and different legal frameworks. Even today, this means incalculable risks for companies due to the multi-layered asymmetries of information and responsibility. Nevertheless, there are examples of how stable, international value creation partnerships have been established on the industry's own initiative (ChainPoint 2023a).

Stability and transparency of supply and value chains are achieved in particular through coordinated transnational traceability of products in companies throughout the value chain across different countries (ChainPoint 2023b; Ellebrecht 2019). This is because only through digital communication (Petersen and Lehnert 2017, Chapter 6.3) via a common cloud portal solution is it possible in terms of information technology to view requirements from different industry standards as well as legal requirements in global supply chains as a joint effort, to ensure quality and safety, and to prevent food fraud. Transparency and sustainability are typical quality characteristics that always represent a joint effort of all market partners (Kenntner et al. 2021; Petersen and Lehnert 2017, Chapter 5.1). In this context, the double transformation - the digital and the ecological transformation - of agri-food systems need to be understood. This challenge will be exacerbated by climate change in the coming years. The current challenge is to find new approaches to international trade under rapidly changing conditions, both at the political and decision-making levels of the economy. This is taking place in an increasingly clear area of tension because, on the one hand, the world's population will continue to increase and, on the other hand, more and more people will have access to high-quality food as a result of income increases in emerging and developing countries. In both cases, a number of international players, starting with manufacturers of agricultural inputs (pesticides and fertilizers, seeds, etc.), farmers, suppliers, producers, logisticians, traders, but also public institutions and governments, must be involved in the processes of change. Towards a double transformation of the agri-food sector in the sense of the Green Deal (DIHK 2023; EC 2023a) and the EU's Farm to Fork approach (EC 2023b) is inconceivable without strengthening the role of farms (ChainPoint 2023a).

This is to be achieved through the EU program Agricultural Knowledge and Innovation Systems (AKIS), in which farms are to be actively involved in the development work for sustainable solutions through European Innovation Partnerships (EIP.Agri) (EU CAP Network 2023). One result of this new form of support is the hybrid service Q-Farm HUB, offered through EQAsce as the first farm-centered platform cooperative in Europe. The cloud portal solution currently supports livestock farms and their market partners in converting livestock systems while taking into account socio-political demands for more animal welfare and reduction of CO2 and methane pollution (Heide 2023). In order to meet the sustainability goal SDG 4 "Quality education and lifelong learning" as well as for a future-oriented approach of agriculture, the topic of education and training is of high relevance (EQA 2023a; Petersen and Lehnert 2017, Chapter 6.2). In this context, there is a growing demand for individual e-learning formats in combination with digital certificates of education (Diekmann et al. 2022).

The theory on quality and quality management has a strong reference to the entrepreneurial level and focuses primarily on individual companies. However, this must be considered in a more differentiated way in the agri-food sector, because especially in this sector there are many small companies in family structures (small farmers) along the value chain. Exactly for these companies, the assessment of quality is a key differentiator in global markets and provides access to retail chains. Therefore, looking at the whole chain is of particular importance here as well. Traceability as a quality characteristic has already been a requirement in the general food law (Regulation (EC) No. 178/2002) of the EU since the year 2002. The international, chain-wide traceability as it is possible today via the technical-organizational cloud portal solutions goes beyond the regulations in the food law and is based on business-to-business (B2B) agreements between the market partners and trade partners. A distinction is made between traceability directed upstream (toward the origin) and traceability directed downstream (toward the end consumer). In addition, Regulation (EC) No 1935/2004, which governs the traceability of materials and items that come into contact with food, came into force in the year 2004. Despite digital capabilities, to date no EU-wide regulations have been made to require chain-wide (including global) traceability. Due to the volatilities along the value chains, this should be an important task for the responsible groups to implement globally in the course of the digital transformation.

In the same context, another indispensable task for producers and consumers alike is dealing with food fraud. In international trade and in times of crisis (Tentamus 2022; ENFIT 2023), it is significant to conduct intensive risk management to ensure standardized qualities as well as food safety and to counteract fraud, especially in proofs of origin (Petersen and Lehnert 2017, Chapter 5.3).

According to a study, the risk issues in the year 2022 were: rising raw material prices, uncertain raw material availability, supply capability (outages), difficult supplier default, climate damage and emissions, and compliance with limits and maximum quantities (BVE and AFC 2022).

The recent food safety crisis in the USA shows that there are situations where the USA has to rely on other countries. In February 2022, one of the largest U.S. manufacturers of infant milk formula was forced to close the factory because products were contaminated with bacteria and consumption was causing infant deaths and illness. The recall of the products and the closure of the factory resulted in a loss of confidence among consumers. In addition, there was a shortage of infant formula, resulting in supply shortages. To ensure the supply of infants, U.S. President Biden ordered emergency measures and had infant formula imported from the EU via "air bridges". Consequently, European manufacturers in turn increased production to prevent a supply shortage from occurring in the European region (FDA 2022; BVL 2022; ZDF 2022). This crisis case clearly shows that the USA trusts and thus recognizes the EU food safety system.

During my studies, I repeatedly heard the statement that there is not a knowledge problem in the agri-food sector regarding the role of quality standards and supply chains in global trade, but an implementation problem. In recent years, they said, many innovative ideas have been developed and important areas for action have emerged. However, these would be parked in the bottom desk drawer by both companies and politicians and would not be realized. Some digitization projects related to blockchain technology that control and document cross-border pathways (see Barge et al. 2023; Bosona and Gebresenbet 2023; Diekmann et al. 2023; ENFIT 2023; Kafetzopoulos et al. 2023) have become known, but there is much more potential. The agri-food sector could now seize the opportunity and mark the beginning of a new era with the so-called "Zeitenwende". With this shift from old ways of thinking to an agile approach and the implementation of the many valuable insights, now seems to be the time to act. A paradigm shift seems inevitable and, in fact, it has already begun. For public administration, there were many challenges posed by the Covid-19 pandemic, from which was born the opportunity to reprioritize areas of action and build a risk-based and flexible regulatory system (OECD 2021).

The following current examples already show the implementation of the lessons learned in actual measures - also in light of the fulfillment of the SDGs - and illustrate the realization of innovative ideas in quality management and the advancement of new standards as well as political initiatives. Both private sector and government measures are presented and considered in the context of sustainability.

1.1 Sustainability in the Overall Perspective

All topics considered in this thesis are always related to sustainability as well as to the 17 Sustainable Development Goals (SDGs) of the United Nations, whether it is international trade, quality management, standardization as well as food supply chain management. Therefore, it is impossible to consider the topic separately, as all chapters are closely linked to sustainability aspects. The topic of sustainability has occupied the agri-food sector for many years along the entire value chain.

In international trade, the issue is becoming increasingly important, with sustainability measures counting as non-tariff trade barriers (WEF 2022). For this reason, chapters on sustainability and sustainability criteria are always anchored in the new generation of trade agreements (Brandi 2017; FES 2018).

As part of a scientific study, the requirements for sustainability aspects in the international food trade were analyzed in the year 2022. Sustainable business management strategies and their dimensions (environmental, economic, social) were examined. As a result, opportunities for export were identified in terms of environmentally friendly packaging, climate-neutral production, organic products, CO2 neutrality in transport and logistics, and innovations. Despite the willingness of food companies to create a transformation toward more sustainability, there are a number of obstacles standing in the way of this endeavor. These include the high cost coupled with low return on investment and appreciation for implementing sustainable measures, unclear measurement of effectiveness, low consumer price acceptance, lack of marketable packaging, onerous implementation of regulatory requirements, and high investment in transforming more sustainable supply chains. Ultimately, it was determined that food retailing is the key driver of sustainability issues (MGN 2022).

Without a doubt, the industrialized nations need to advance their efforts their efforts towards more sustainability, taking into account the principles of social and environmental sustainability (BMUV 2017). Therefore, the EU is also striving to live up to its responsibility and global influence. In this context, the EU Commission presented a proposal for an EU legal framework on sustainable corporate governance in February 2022, which also includes binding due diligence requirements in global value chains (EC 2022a). The required standards are stricter than the German Act on Corporate Due Diligence Obligations in Supply Chains (LkSG) (see Chapter 4-1.2.3).

In addition, the EU is discussing the issue of due diligence with other countries. Within the framework of the EU-U.S. Trade and Technology Council (TTC), the promotion of workers' rights in supply chains, the elimination of forced labor, and the importance of engagement in trade policy

were placed on the agenda and brought up for discussion in a roundtable entitled "Global Trade Challenges" in March 2023 (EC 2023c). The most recent development is the measures on deforestation-free supply chains, which were initiated within the framework of the European Green Deal (see Appendix 3.3) (EC 2021; EC 2022b). With the entry into force of Regulation (EU) 2023/1115 (EU Deforestation Regulation) on June 30, 2023, the EU has taken a major step in the fight against deforestation and is thus clearly committed to deforestation-free supply chains. Accordingly, certain raw materials and products may only be imported, exported or provided to the EU market if they are not linked to deforestation and forest degradation. From 30. December 2024, the regulations and corporate due diligence requirements will be mandatory for trade in, for example, timber, soy, oil palm, cattle, coffee, cocoa, and other raw materials (BMEL 2023a; Bundesregierung 2023; BAFA 2023; ChainPoint 2023c). For the implementation, there are still some gaps and legal guidelines regarding the concrete implementation of the EU regulation on a national level.

In Germany, the government also supports a number of resource-based initiatives to promote sustainability, such as the Forum for Sustainable Cocoa (FNK 2023), the Forum for Sustainable Palm Oil (FONAP 2023), and the Forum for Sustainable Protein Feed (FONEI 2023).

Other strategies and programs that have emerged within the framework of the Green Deal and include sustainability issues are the EU Biodiversity Strategy 2023 (EU 2023a), which aims to improve biodiversity in Europe by 2030. In the context of this strategy, numerous research projects (for example, CLEVER (2023) and RAINFOREST (2023)) have been initiated to explore new approaches to achieving the goals and to accelerate transformative processes. The CLEVER project (2023) examines the impacts of international trade in non-food agricultural and forest products (particularly feed, energy crops, tropical timber, and aquaculture) on biodiversity. Whereas the RAINFOREST project (2023) will use case studies and models to seek feasible solutions and conditions for a more sustainable food and biomass value chain, which will be technology-based. Both projects have a duration of three years, until the end of the year 2025.

To counter the energy crisis and secure the EU's energy supply, the “RePower program” (DIHK 2023; EC 2023d) was launched in May 2022 as part of the Green Deal.

In addition to the Green Deal, the EU has set another very important priority to address global challenges (climate change, global health security, sustainable development, stronger supply chains) and crises in development terms, the Global Gateway Strategy. For geopolitical development projects, EUR 300 billion has been allocated by the EU for the years 2021-2027, which will provide the framework for foreign investment to create jobs, capabilities and better living conditions for the world's population. Five investment areas have been identified for this purpose:

digital, climate and energy, transport, health, education and research. These are subject to the six core principles of investment and partnerships: democratic values and high standards, good governance and transparency, equitable partnerships, green and clean infrastructure, safety oriented, and is a catalyst for private sector investment. There are now 87 lighthouse projects worldwide (EC 2022c, EC 2023e; GTAI 2023). Global Gateway is also highly relevant to the agriculture and food sector, especially for developing countries in Africa, the Caribbean, and the Pacific region (ACP). Investments are to be made for resilient food systems, for example, to build sustainable production as well as to establish a stable quality infrastructure. Production facilities for green hydrogen and sustainable agricultural practices with a focus on soil fertility, fertilizer use, water management, nutrient availability, biogas plants, and access to farm operating resources will be promoted (IFAD 2023).

Other countries and world organizations have also launched programs to counter the crises of this time with sustainability programs for climate and trade, and to strengthen global food security.
For example, the USA aims to bring together climate, trade and industrial policies through its 2022 "Inflation Reduction Act" (IRA) climate investment program. Industrial and climate policies are intended to link industrial value chains with climate transformation. IRA's climate change package has a total volume of USD 370 billion over ten years. Of this, USD 9.7 billion is earmarked for the U.S. Department of Agriculture (USDA) to invest in rural electricity infrastructure to reduce greenhouse gas emissions and improve energy efficiency in the agricultural sector. Further, more than USD 2 billion will be provided to agricultural producers to use renewable energy. Another USD 500 million will support the sale and use of ethanol and biodiesel blends (Biofuel Infrastructure). Approximately USD 25 billion will be invested in climate-friendly agricultural measures (White House 2023).
In addition, the USA has provided USD 178 million for development projects under the "Food for Progress program". The objectives of these measures are to improve agricultural productivity and expand trade in agricultural products (USDA 2023).
The cornerstone for another international initiative was laid on 20. April 2023. The WTO has joint forces with the World Economic Forum (WEF) and the World Bank Group (WBG) to launch the "Action on Climate and Trade" (ACT) initiative. This aims to help participating developing countries use trade to achieve their mitigation and adaptation goals (Brenton and Chemutai 2021; WEF 2022; World Bank 2023; WTO 2022).
All the initiatives presented show that an awareness has arisen among the world's population and policymakers to protect the environment and climate and to always combine projects with

sustainability aspects as well as to stop the overexploitation of natural resources. Therefore, the issue of sustainability is a task for society as a whole. Achieving real change requires that initiatives be monitored over long periods of time and, if necessary, readjusted. Establishing and persistently deepening international networks and consortia is essential to exploit synergies and to make the best possible utilization of innovations and scientific findings, as well as to carry them forward and stabilize them over generations. The framework conditions for this can be created by efficient quality management and international standardization.

1.2 Quality Safety and Sustainability Standards

In addition to the established international public trade standards of the WTO, the CAC and the private standards of the retail sector (IFS, BRC, etc.), quality management also focuses on private industry standards, sustainability standards and standards in the supply chain. Due to rapid changes in the industry and crises-driven risk management, it is always necessary to develop new standards or modify existing standards and generally improve the food safety culture (OECD 2021).
Sustainability standards, which are mostly voluntary, are enormously important for companies' sustainability strategies and also for their trade policies. For a comprehensive, verified and transparent overview of existing standards, the International Trade Centre (ITC) provides a sustainability standards database. Currently, over 300 standards can be accessed and compared. Areas are: environmental protection, labor rights, quality and food safety, economic development and business ethics (ITC 2023). Due to sustainability activities in the private sector, a shift in the responsibility of managing sustainability in the food system away from the public sector is evident (Bemelmans et al. 2023). On the government side, for these reasons, the "German Strategy Forum for Standardization" was founded in February 2023 under the leadership of the German Federal Ministry for Economic Affairs and Climate Action (BMWK), where 42 experts are to strengthen the German role in global standardization as well as contribute identified topics to the "High-Level Forum on European Standardisation" of the European Commission (BMWK 2023).

In addition, the following section shows a selection of new or further developed standards and regulations.

1.2.1 Standards for Forms of Animal Husbandry

In the public debate in Germany, the animal welfare of farm animals has been discussed controversially for many years. As a result, the German industry standard "Initiative Tierwohl" (Animal Welfare Initiative) has developed since the year 2015, which aims to improve conventional farming and animal welfare and thus set a clear signal for the social responsibility of animal husbandry companies. In addition, the initiative promotes scientific projects that research innovative measures for better animal welfare. With the product label for meat from an audited and certified animal welfare farm, consumers are informed and have more guidance in their purchasing decisions (ITW 2023).
In addition, there are other standards and product labels in Germany that provide information about the farming methods and meat qualities (list not exhaustive):

- Haltungsform-Label of the Gesellschaft zur Förderung des Tierwohls in der Nutztierhaltung mbH (Haltungsform 2023),
- Animal Welfare Label "Für Mehr Tierschutz" by Deutscher Tierschutzbund e.V. (DTB 2023),
- Organic labeling for meat products: Naturland (Naturland 2023), Bioland (Bioland 2023), Demeter (Demeter 2023),
- Neuland branded meat program (Neuland 2023),
- DLG Dairy Farming Program (DLG 2023).

But so far, there is no binding state label that supports forward-looking animal husbandry and informs consumers about the type of husbandry. But Germany is on a good way to introducing just such a label on a mandatory basis. In July 2023, the German Minister of Agriculture, Cem Özdemir, announced the introduction of a mandatory state animal husbandry label. The Animal Husbandry Labeling Act is to come into force in the fall of the year 2023. Starting with pig fattening, the labeling is to be applied to all other animal species and the entire value chain. Food of animal origin from other EU member states and third countries can also be voluntarily labeled in accordance with the Animal Husbandry Labeling Act. However, the state label does not guarantee animal welfare (BMEL 2023b). Here, just as presented under the sustainability chapter (see Chapter 4-1.1), it is to be expected that export-oriented value chains for meat products and dairy products will continue the double transformation they have begun via regional and global partnerships and B2B initiatives in order to hedge markets.

1.2.2 Guide for Occupational Safety and Health Protection

In addition to the classic tasks of quality management (see Chapter 2-5.1), occupational safety and health protection at all levels of companies has been focused on by the responsible persons in recent years. Due to the Covid-19 pandemic, human behavior has become more important (OECD 2021). On the one hand, to ensure compliance with the international standards DIN ISO 45001:2018 (occupational health and safety management) and DIN EN ISO 26000:2021 (sustainability management and corporate social responsibility (CSR)) and, on the other hand, to integrate the human factor into the safety culture. In this way, an awareness of occupational safety is to be created among the employees in the company and consciously safe actions are to be promoted. To ensure better application of the rules from theory to practice, it is important that employees better understand why they do what they do. To make the efforts measurable and thus certifiable, a new standard was developed in the Netherlands in the year 2012, namely the Safety Culture Ladder Standard (SCL-Standard). This was initially applied in the rail vehicle industry and extended to other industries. The goal of the five-step SCL-Standard is generally "*to reduce unsafe situations, harm and omissions*" (NEN 2023). An SCL audit consists of interviews and observations of employees at work, as well as a digitized self-assessment of the company. SCL certification increases occupational safety awareness and lowers accident rates, so the safety aspect of the SCL-Standard is a clear competitive advantage (Becker 2020). In the year 2020, a panel of experts has been formed to study the criteria of the SCL-Standard and to explore possibilities of applying the SCL-Standard to companies in the agri-food industry and their entire value chain. For establishing a new understanding of safety culture, the experts agreed at the end of the year 2021 that the "House of Total Safety Culture"-Standard (HTSC-Standard) should be established for the agri-food sector based on the SCL-Standard. The criteria, approach and stages of the standard have already been described. The developed certification levels have since been evaluated at pilot farms (EQA 2020; Bonse et al. 2022).

1.2.3 Guide for Supply Chain Management

Due to the complexity of global value chains and international interdependencies of supply chains, an integrated management system that takes into account a number of different standards and is to be continuously developed further, has profound significance. When setting up organizational structures, control mechanisms and handling rapid changes, digital processes are often used. The employees of a company must be continuously trained and qualified for these developments. Future-oriented consulting systems (e.g., "Qualint") can increase effectiveness in these processes

(Krieger-Güss et al. 2023). Supply chain management must follow a number of international ISO standards. These are primarily the: DIN ISO 28000:2015 (Specification for security management systems for the supply chain), DIN EN ISO 22301:2020 (Business Continuity Management Systems (BCMS)), DIN EN ISO/IEC 27001:2017 (Information security management systems (ISMS)), and with regard to sustainability, DIN EN ISO 14001:2015 (Environmental management systems). These standards are cross-sectoral. Other important standards have been established in the agri-food sector and are constantly being developed further.

ENFIT Standard

With regard to a transnational traceable supply chain, the ENFIT standard was redeveloped by a group of experts in the years from 2018 to 2020. Until now, there was no uniform and auditable standard that ensured hygiene requirements and the safety of transport routes along the entire value chain. This gap will be closed with the ENFIT standard, which ensures food safety during the transport of unpacked raw materials and foodstuffs in food transport containers. To identify and prevent sources of hazards, the guidelines regulate the handling of food transport vessels (e.g., containers, silos, tanks, boxes, pallets, etc.), loading and offloading, and cleaning them. In addition, the digital tool "ENFIT-GID" (Global Identification Number) is implemented by the standard. The certification of cleaning facilities is carried out systematically in three stages (audit, technical equipment inspection and personnel training inspection) by independent certification companies and is authenticated by means of the international ENFIT-High Quality Food certificate and label of approval. The ENFIT standard is also applied in the field of Kosher cleaning. Therefore, the certification is recognized in Israel and in the USA. The ENFIT standard is also applied in Halal cleaning, as this prevents the contamination of undesirable ingredients and complies with the strict Muslim requirements. In the future, the ENFIT standard is to be extended to include a uniform and synchronized ENFIT FOOD DEFENSE standard (ENFIT 2023).

GS1: Product and Process Standard

Another important global standard in supply chain management is the GS1-Standard. This is a standard along the value chain and is used for product and location identification as well as securing product master data, which leads to better and more efficient supply chains. GS1, as the standard provider, has developed 24 standards to date over 45 years, with the EAN barcode being the best known and accepted worldwide. GS1 operates globally and comprises a network of around 115 organizations. In the agri-food sector, the GS1-Standard is used primarily for fruit and vegetables,

meat and foodservice. The identification, communication and process standards are constantly being developed to optimize the value chain. Furthermore, GS1 is involved in a large number of research projects. In the field of agriculture and food, the project "SiLKe" started in the year 2019. Here, a digital platform is to be developed on the fundamental of blockchain technology, with which "*the transparency and security of the processes and structures of food production and logistics are to be increased*." The goal is high-resolution traceability in risk situations with simultaneous counterfeit protection (GS1 2023; SiLKe 2023).

Act on Corporate Due Diligence Obligations in Supply Chains

Due to the described sustainability principles in international trade, Germany launched its own national law on corporate due diligence in supply chains (so-called Act on Corporate Due Diligence Obligations in Supply Chains, LkSG) in June 2021, which came into force on 01. January 2023. The LkSG applies not only to the agri-food sector, but also to all other industrial sectors and companies with 3,000 or more employees, and from 01. January 2024 with 1,000 or more employees (BAFA 2023). In the food industry, approximately 925 companies will be required to implement the LkSG from the year 2023 and approximately 4,800 companies from the year 2024 (BVE 2021). Smaller medium-sized companies are not affected. The guiding principle of this law is the improvement of global human rights (e.g., prohibition of child labor, protection against slavery/forced labor/torture, occupational health and safety, appropriate wage payments) as well as the social organization of human life with one another (e.g., prohibition of discrimination) and the fulfillment of the objective of the global 17 SDGs. In this context, companies are to be held accountable in a binding manner to comply with environmental and social due diligence obligations along the entire supply and value chain and to respect human rights along the entire chain. Companies use quality management methods for implementation. In their risk management, they are required to prepare a risk analysis for each supplier, documenting compliance with the legal criteria in a transparent manner. Due to the LkSG, corresponding human rights clauses and prevention as well as remedial measures are often included in contracts with trading partners (Strecker et al. 2020; BVE and AFC 2022; Wolf 2023). The LkSG integrates the principle of appropriateness with a necessary scope of discretion and action for the implementation of due diligence. This includes the selection and design of measures as well as the necessary expenditure of resources (BAFA 2022). However, it is not clear from the LkSG how the reporting should be done and which measurable criteria should be used for a risk analysis. There is the difficulty for the companies themselves to make a risk classification and to clarify the possibilities of influence.

In order to comply with the seven-year obligation to provide evidence, companies are making efforts on their own initiative to meet the due diligence requirements of the LkSG. Digital tools are often used for this purpose. There are now many global products and fully-featured digitization projects on the market (e.g., TraceMap by Chainpoint), which support companies in their implementation. In addition to documentation and reporting, these digital tools can be used to map the entire supply chain, analyze all suppliers via automatic risk assessments, perform risk assessments, connect directly with the supplier and trigger corrective intervention actions, and ultimately make better decisions through the big picture (O'Hagan 2023).

1.3 Quality Infrastructure (QI)

The concept of Quality Infrastructure (QI) is located in the field of quality management and pursues a coherent and strategic public quality policy at the national level to achieve the Sustainable Development Goals (SDGs).

The United Nations Industrial Development Organization (UNIDO) defines QI as a *"system comprising the organizations (public and private) together with the policies, relevant legal and regulatory framework, and practices needed to support and enhance the quality, safety and environmental soundness of goods, services and processes"* (UNIDO 2018, p. 9). The five pillars of a QI are: Metrology, Standardization, Accreditation, Conformity Assessment and Market Surveillance (UNIDO 2018; Mesopartner 2023).

By sustainably building a functioning QI, it can be effective within a country and drive technological progress. In the agri-food sector, it is possible to transfer specific expertise within the QI through capacity building, which can increase quality and food safety, food security and agricultural development. Moreover, the parameters of a QI are important factors in international trade of food and agricultural products and enables access to foreign markets. Although the pillars of QI are NTBs, a functioning QI can build trust between trading partners and support fair trade (Harmes-Liedtke 2020). With regard to the creation of trade agreements, QI must be taken into account because standards and conformity assessments are covered by the WTO´s TBT-Agreement and are therefore taken into account in WTO-compliant trade agreements (Harmes-Liedtke 2023).

When QI is fully in place, it is considered "*a critical element in promoting and sustaining economic development, as well as environmental and social wellbeing*" (UNIDO 2018, p. 9). Malaysia is the most recent example country where a robust QI has been established (DSM 2022; ITC 2022).

In order to establish a functioning QI, a method was developed by the Physikalisch-Technische Bundesanstalt (PTB) on how to find and close gaps in quality along the value chain. This method is called CALIDENA and has been successfully applied since the year 2007, especially in the

agricultural sector of developing and emerging countries. Quality issues are addressed systematically and sustainably. A concrete coordinated action plan aims to strengthen not only the QI but the entire value chain as well as to enable access to promising markets (PTB 2023).

To make the success of QI methods such as CALIDENA measurable and comparable, the Global Quality Infrastructure Index (GQII) was developed in the year 2010. Until then, there was no benchmark to measure the level of QI development and no systematic process to share and compare data. GQII filled this gap and created an Open Data database, which is continuously expanded and validated. In the year 2019, the database's calculation formula was revised and has since included 13 components and 110 weighting factors. The benefits of GQII are primarily in knowledge transfer and decision-making processes, as it can be used to quantify the development status of a country's QI and compare it with other countries. In addition, there is the possibility of obtaining information about trading partners and making political decisions for action (GQII 2023).

In the area of conformity assessment and accreditation, the successful digitization study "QI-FoKuS", was carried out by public entities in the year 2022. This initiative used a comparative analysis across countries that assessed the influencing factors, effects, and impact mechanisms in the field, thus creating a database and identifying trends in QI. During this international project, 16 countries from all continents were surveyed. Using a seven-stage maturity model, it was possible to record the digital maturity of the conformity assessment agencies in the digital transformation as well as trends in digitalization (BAM 2022).

From these developments, it can be concluded that QI is an important system for the quality management of a country and for global trade in agricultural products and food. Policymakers can use this system for trade policy. Therefore, the existing system of QI should be further developed and scientifically accompanied in the future. Eventually, there is a lot of potential in the area of digitalization, education and training, and international networking (Petersen and Lehnert 2017, Chapter 4-6).

1.4 Ukraine with respect to the Agri-Food Sector and Quality Management

More than a year has passed since the beginning of the Russian aggression against Ukraine, which violated international law. A war that shook the whole democratic Europe and had geopolitical repercussions all over the world. European governments have responded with sanctions against Russia and other areas as part of the backlash. Sanctions are protectionist measures and are generally used to take advantage of the resulting economic downturn to bring about a change in policy on the part of the other side and are a negotiating tool.

The EU has developed a sanctions concept, which has been implemented in eleven packages. Import or export bans apply to wood, spirits, liquor, high-end seafood. The EU stresses that none of the measures adopted by the EU in any way targets trade in agricultural products and food, including wheat and fertilizers, between third countries and Russia. In addition, Russia was stripped of its most-favored-nation status in the WTO in March 2022, thus losing important trade benefits as a WTO member (EU 2023b). Furthermore, companies such as McDonalds and Starbucks have withdrawn from the Russian market. Germany reacted quickly to escape its dependence on Russian gas supplies.

Ukraine's neighboring countries (Poland, Romania, Republic of Moldova) are under particular strain due to the war.

1.4.1 Trade Statistics 2022

Ukraine is trying to withstand the war. Trade statistics showed that in the year 2022 Ukraine was the EU's 17th-ranked export partner in agricultural products and food, with an export value of EUR 2.9 billion (-5.9% compared to the year 2021). In the year 2022, imports to the EU amounted to EUR 13.2 billion (+90.6% compared to the year 2021; 3rd place) with a trade balance of EUR -10.3 billion. The main export products from the EU were coffee, tea, cocoa and spices (EUR 0.38 billion; +14.1%), pet food and forage crops (€EUR 0.27 billion; +21%), cereal preparations and mill products (EUR 0.22 billion; -1.8%) and dairy products (EUR 0.21 billion; -26.2%). Pork meat exports increased by +51.7% (EUR 0.176 billion). There was another significant increase in vegetables (+45.4%; EUR 0.173 billion) and beer, cider and other beverages (+33.7%; EUR 0.119 billion). Exports declined in particular for confectionery and chocolate (-31.9%; EUR 0.147 billion) as well as for wine and wine-based products (-41.3%; EUR 0.084 billion).

The main imports from Ukraine to the EU were cereals (EUR 4.58 billion; +161.8%), oilseeds and protein crops (EUR 3.6 billion; +113.4%), vegetable oils (here oilseeds and palm) (EUR 2.93 billion; +44.6%). A sharp increase in imports was recorded for poultry and eggs (EUR 0.373 billion; +115.6%), sugar and isoglucose (EUR 0.213 billion; +3,450%) and dairy products (EUR 0.164 billion, +300%) (DG AGRI 2023a). The trade data clearly indicate that these were not regular trade movements in the year 2022.

1.4.2 Impact on the Food Supply Chain

With regard to the Food Supply Chain (FSC), the war has had an enormous impact. Global supply chains were disrupted, transportation infrastructure (ports, railways, etc.) were destroyed, capacity shortages were created, cold chains were disrupted, and transport of goods and fuels became more expensive. Customs inspections, however, took place undisturbed. Due to the disrupted FSC and increased producer prices, the agri-food sector is under enormous cost pressure (Pfaffl 2022).

At the beginning of the war, Russia prevented the delivery of important agricultural products abroad by means of a naval blockade. Alternative export routes by train or truck via Poland or Romania were hardly possible due to the lack of infrastructure. Thus, there was a disruption and interruption of the important trade routes between Europe and Asia (Höppner 2022). Due to the grain agreement, which was concluded in July 2022 between Ukraine and Russia - with the participation of the United Nations and Turkey - grain and other agriculturally important products (e.g., soybeans, sunflowers, rapeseed, turnips) could be shipped out of Ukraine and exported. The grain agreement created secure corridors at three Black Sea ports for export by ship to Istanbul, Turkey. These corridors were not allowed to be attacked (GTAI 2022). From Istanbul, most of the agricultural products were shipped to Africa and the Middle East, where they are of the highest importance in ensuring food security. If this agreement had not succeeded, a humanitarian famine would have occurred. After one year and after three extensions, the grain agreement expired on 17. July 2023 and Russia is not willing for an extension. The war was thus raised to a new level of escalation. The end of the grain agreement is dramatically especially at this target date, because in July the Ukrainian grain harvest of 1.24 million tons began (APD 2023a). Economic losses, logistical bottlenecks, price increases, and famine are to be expected. A short-term solution does not seem to be in prospect.

In post-war reconstruction, Ukraine has the opportunity to consider sustainability aspects and to implement innovative infrastructures, using the newest energy technologies with the most advanced environmental standards.

1.4.3 Quality Management: Impact and Outlook

Ukraine is a member of WHO, CAC, WOAH (former OIE) and WTO (BMEL 2018) and has the status as a candidate country for accession to the EU (AA 2022). For Ukraine, this means that it is moving closer to EU values and standards, and existing EU regulations are to be applied upon accession. The fundamental is the EU-Ukraine Association Agreement, which entered into force in September 2017.

Under the Association Agreement, the EU established a Deep and Comprehensive Free Trade Area (DCFTA). Three countries are members of DCFTA: Georgia and Moldova (since the year 2014) and Ukraine (since the year 2016) (DG AGRI 2023b).
So, what does this mean for quality management along the entire value chain?

Soil Condition

Ukraine consists of 70% agricultural land and is considered as "Europe's breadbasket". The Ukrainian topsoil has about a quarter of the world's extremely fertile "Chernozem" or "black soil" (AC 2021). In March 2020, an agricultural reform began in Ukraine, which included agricultural land reform. The reform was aimed at state deregulation, de-shading, and digitalization (AC 2021; BMEL 2021). The Ukrainian "Economic Strategy to 2030" of March 2021 also included many measures in the agricultural sector (BMEL 2021). Now, agricultural land is not only contaminated by acts of war and munitions, but the destruction of the Kakhovka Dam (Kherson Oblast, Ukraine) in June 2023 also leaves unprecedented contamination of soils, e.g., by fecal pathogens, chemicals, and heavy metals, and leads to a shortage of drinking water as well as fish mortality. The cultivation of agricultural commodities is partly impossible.
The EU should make efforts to rebuild Ukraine and especially the agricultural areas. This can be achieved mainly through European networks and private partnership projects that already have experience in post-disaster reconstruction and effective crisis management, such as the Model Region-WiR Initiative (EQA 2023b, EQA 2023c; Petersen and Lehnert 2017, Chapter 5.4). In addition, the German-Ukrainian Agricultural Policy Dialogue (APD) in the area of "Soil Component" should be continued by the German Federal Ministry of Food and Agriculture (BMEL) beyond the project lifetime (end of the year 2024) (APD 2023b).

Quality Infrastructure

Recent expert surveys have shown that a QI (see Chapter 4-1.3) has not yet been established in Ukraine. In the areas of standardization, accreditation, conformity assessment and market surveillance, there is also an enormous backlog demand on the state side, especially with regard to EU accession. In this regard, the state accreditation service should be set up more broadly, knowledge should be built up and a concrete strategy for QI should be developed. Quality certificates exist on a voluntary basis and certificates of conformity for food products are mostly not required (BMEL 2018). It was recommended by the experts to start with a flagship at the regional level (oblast) and then expand to other oblasts, thus making a major contribution to

development cooperation. The experts explained that the statistical system and the Economic Accounts for Agriculture do not provide reliable data either. Although a register should have been established since the year 2020 with the agricultural reform (BMEL 2021), market monitoring on the part of the state has so far been incomplete. Therefore, there is still a need to establish a comprehensive farm register, for example, to reliably record harvest volumes and to identify the actual number of farms. This is especially mandatory for the planned EU accession. Modern digitization projects with Artificial Intelligence (AI) could be initiated for the implementation of such a register.

In addition, the experts reported that there are major knowledge deficits in the area of standardization and in quality assurance among small and medium-sized enterprises (SMEs) in the food industry. Although since September 2019 the implementation of the HACCP system has become mandatory (Miller 2022), many companies cannot meet the requirements because they do not know the criteria of public and private standards. Unlike in other world regions, Ukrainian retail chains do not have a voluntary commitment to quality assurance.

In this regard, Germany could expand the APD to include a food quality support component and involve Ukraine in European networks and private partnership projects. With respect to international trade, a QI should also be established with the aim of facilitating access to foreign markets. Furthermore, Germany should revive the expired AGRITRADE project with Ukraine, implement the experience gained and promote projects regarding advice on agricultural trade issues (BMEL 2019).

In terms of certification of organic products, Ukraine is already quite well positioned. Some organic farms in Ukraine are certified according to the EU organic standard. Other organic standards such as the US National Organic Program (NOP), Canada Organic Regime (COR), Bio Suisse (Switzerland), Naturland and Bioland (Germany), JAS (Japan) and KRAV (Sweden) are known and used in Ukraine. The first Ukrainian organic certification body (Organic Standard LLC) was accredited according to the national organic standards of Ukraine at the end of May 2023 (Shor 2023). Therefore, in the field of organic products, Ukraine could establish a prominent position in the world in the future. Ukraine has already aligned legislation in the organic sector as closely as possible with the current EU regulation (Shor 2023). Even before the war, Ukraine was among the largest exporters of organic products to the EU (EC 2023f, Graph 4.2; BMEL 2021). Organic agriculture was practiced on 422,299 hectares by 528 certified farms (Shor 2023). It is recommended that Germany should continue and intensify the initiated projects "German-Ukrainian Cooperation on Organic Agriculture" (COA 2023) and "Promotion of Agricultural Education in Ukraine" (FABU 2022) which are funded by the BMEL.

2. Recommendations for Further Research

The previous publications point out some policy recommendations for developing trade relationships that take into account international quality and industry standards. In addition, there is much potential for further research that should address the issues at the nexus of global value and supply chains, quality management, trade of agri-food products, and sustainability. Due to past and ongoing crisis situations, the literature on both international supply chains, global value chains, and trade agreements has gained momentum.

Work on resilient supply chains and standard setting in international trade flows with respect to each value chain component should be the fundamental for further demanding empirical analysis. The focus should be on holistic, integrated solutions that address the global challenges of food safety and challenges of resilient supply chain relationships.

There is still a lack of a suitable evaluation model for the private economic and macroeconomic benefits in the free trade of agricultural products and food, taking into account international quality standards. For the first time, this paper classifies the degree of internationalization of private quality standards with reference to FTAs. This should be followed by empirical studies that provide guidance to standard providers on how they can increasingly achieve international recognition and dissemination.

New innovation impulses are currently being set in the area of digitization and digital communication. These should also be increasingly used to demonstrate the knowledge transfer of the insights gained to stabilize trade relations at company level.

As part of the farm-to-fork strategy, the EU plans to introduce sustainability labeling for food. Standard providers should make it their task to cooperate in the development of this new labeling and its criteria. In turn, political decision-making bodies should incorporate the knowledge of private-sector standardization panels into conflict and problem-solving processes to a greater extent than has been the case to date. Within this framework, a database could be set up that map important sustainability parameters such as the CO2 footprint of a product manufactured under different process conditions. This could provide further guidance for certification and conformity assessment.

Long-term studies of foreign trade transactions could open up opportunities to shed light on cross-cultural trust building and develop training opportunities. After all, it is precisely the personal partnerships and trust-building business relationships that open up avenues into foreign markets.

Further research opportunities exist in quality infrastructure methods and analysis.

Thus, based on the information from the present thesis, future research should analyze additional quality standards in trade agreements, communication structures of global value chains, and international supply chains and their mutual influence. In this way, important insights into the design of contracts at national and EU level can be gained in the run-up to new trade agreements.

3. Concluding Summary

The aim of seven sub-studies was to analyze the importance of international quality standards in the negotiations on FTAs between the EU and third countries and have them evaluated by an international panel of experts.

The question was investigated to what extent the various industry standards in the agri-food sector have an influence on trade relations between companies in the EU and third countries. In addition, the aim was to clarify how export-oriented companies in different EU countries differ from each other in their strategies. It was hypothesized that the importance of industry and quality standards is not yet sufficiently perceived by those responsible for foreign trade issues. Furthermore, the research examined the extent to which trade agreement expertise is present in agri-food companies and among industry representatives.

Due to the strong presence of the planned FTA TTIP between the EU and the USA in the public debate in the years from 2013 to 2016, an extensive media analysis was carried out in German-speaking region. The results of the analysis showed that there was hardly any coverage of international quality standards in the agri-food sector in the context of TTIP. The analysis of the reporting focused on the topics of insufficient consumer information, differences in principles and legal frameworks in relation to the fields of action and responsibilities for food safety and preventive health protection.

The focus of the sub-studies was on collecting the opinions and assessments of experts about how they evaluate the importance of quality standards in relation to two fields of activity:

I. as a measure to achieve more rapid resilient supply chains and
II. to achieve the global sustainability goals by 2030.

It became clear that the interviewed experts classify multilateral trade regimes as an interplay of international regulatory measures and economy-based quality management systems. However, some experts refer to industry and quality standards as non-tariff barriers to trade. Fact is that only stable and resilient supply chains can guarantee a smooth-running import and export of agricultural products and food.

The results of five qualitative surveys and multifarious expert interviews reflected the opinions of more than 200 panelists over a period of almost 10 years.

The empirical research on foreign trade is divided into four separate sub-studies, each with results published in peer reviewed journals (Appendices 3.1-3.4). While the results cannot be generalized, it was possible to confirm the hypothesis that knowledge of trade agreements and trade policy among representatives from the agricultural industry and associations was surprisingly limited at the time of the survey. Especially in the field of regulatory compatibility, considerable gaps in knowledge could be identified. Consequences and effects could therefore not be correctly assessed by most respondents. An overall lack of attention to this topic was identified as the reason. Besides, considerable uncertainty was evident with regard to the application and interpretation of international standards. With regard to cross-border customer-supplier relationships within supply chains, the respondents criticized the difficile asymmetries of responsibility. From all four sub-studies, the experts' assessment could be summarized as follows: recommended measures to guarantee transparency in global supply chains and food safety are, on the one hand, targeted education and training measures and, on the other hand, the formation of quality management networks. The results of the empirical surveys thus clearly confirmed the importance of international quality standards for the future. According to the experts, industry standards supported by the economy play a greater role than the industry-neutral DIN ISO standards.

Another methodological approach to obtain a comprehensive picture of opinion was to conduct media analyses in German-speaking regions (Appendices 3.5 and 3.6). For this purpose, 1,140 media reports from print media, TV programs, radio broadcasts and online media were evaluated. Of these, 551 reports (48.33%) were selected as relevant data for further review. The media content was evaluated by means of a quantitative content analysis using a category scheme as a measurement tool as well as a guideline-based qualitative evaluation. The reports were examined with regard to scientific character, the use of the term "quality standards" and the reporting on the agri-food industry in connection with global trade. In addition, the link with quality management regarding harmonization of the regulatory framework was analyzed. Furthermore, an assessment of published consumer information was carried out.

It was found that there was increased media coverage of issues related to TTIP between 1. June 2013 and 31. December 2016. This raised interest among the public in unresolved issues in the negotiation of FTAs. The results of the analysis revealed evident gaps in the correct use of technical terms in media reporting. An information asymmetry in the knowledge of the recipients could be identified. Most of the mainstream media shared limited scientifically based information about the thematic field. Although reporting was done from a neutral position, the negative consequences of a trade agreement were often emphasized more than the benefits for consumers.

In most cases, the media's use of the term "standards" did not match the scientific definition and was therefore often misleading to readers or listeners. The conclusion from this finding of the analysis was to improve the formats of knowledge transfer between science, policymakers, and the mainstream media. Moreover, the highly complex topic of FTAs requires much more detailed consumer information than was the case during the TTIP debates.

The integration of quality standards in the context of FTAs could be presented in detail using the example of the concluded agreement (entered into force in 2019) between the EU and Japan. Preparations for this agreement were facilitated in that both negotiating parties could rely on the existence of similar quality assurance manager systems. Both food law enforcement and controls, as well as compliance audits, are based on the same set of standards (Appendix 3.7).

Summarizing all partial results of the thesis, they represent a compilation of experience of experts from business and trade policy of the last decade. During this time, the understanding of the complex relationships between demands from international industry standards and facilitations in the trade of agricultural products and food grew if the quality infrastructure between importing and exporting countries is comparable. For export-oriented companies, this development is crucial. After all, in order to remain competitive, they need to increase their knowledge of quality requirements in foreign trade more than ever before. In the future - according to the experts - international quality networks will play a role in determining secure trade relations. The forecast for the next few years is that new integrated, inter-company quality management and traceability systems will emerge on foreign markets as a result of the digital transformation. How quickly the quality attribute of sustainability will be taken into account in global trade in agricultural commodities and foodstuffs alongside the quality attribute of food safety depends above all on who becomes the driver for a corresponding industry standard.

The respondents see the harmonization of international quality standards not only as an important field of political action, but also as a joint effort by various standard providers. The interviewed experts also request for helping companies to acquire the skills needed to implement integrated quality management systems. Capacity building within companies is recommended for this purpose.

Without any doubt in the opinion of the experts interviewed, industry standards and quality management systems represent a warrantor for resilient supply chains in the context of global trade. The contents of the different published sub-studies never lose their topicality, despite the global crisis situations and the changes in international trade.

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APPENDIX 3.1

BUILDING BRIDGES - INTERNATIONAL QUALITY MANAGEMENT OF THE AGRI-FOOD INDUSTRY ON GLOBAL MARKETS - REFLECTING FREE TRADE AGREEMENTS: TTIP AS AN EXAMPLE [1]

Abstract

Free trade agreements aim to open markets and reduce non-tariff barriers to trade. These are, among others, the intentions of the planned free trade agreement between the European Union (EU) and the United States of America (US) - the Transatlantic Trade and Investment Partnership (TTIP).

This paper presents the results of empirical studies conducted among representatives of trade associations and export-oriented companies in the German agri-food industry in summer of 2016. The aim of the studies was to obtain an opinion on the state of knowledge about TTIP and trade relations with the US in connection with quality management.

The results reveal great uncertainty surrounding the US market and TTIP. For want of specific information about system, product and process standards in quality management and large gaps in knowledge about the possible effects on regulations, greater transparency and simpler regulations are required. Conscious that international quality standards play a major role in this, the respondents see the need for the close coordination of processes. One task of quality science can therefore be to identify national differences in the application and interpretation of international standards in cross-border customer-supplier relationships of value chains for food products and to develop proposals for the harmonization and use of synergies. The ambition should be to give greater consideration to the coordination processes in the European standards system.

Keywords: Free Trade Agreement (FTA), Transatlantic Trade and Investment Partnership (TTIP), non-tariff trade barriers, agri-food industry, quality management, quality standards, food safety

[1] This chapter has been published in German:
Pietrzyck K., Steinhoff-Wagner, J., Jarzębowski S., Petersen B. (2017): Building Bridges – Internationales Qualitätsmanagement der Agrar- und Ernährungswirtschaft auf globalen Märkten unter Einbeziehung von Freihandelsabkommen am Beispiel TTIP. In: Otten, Götz, Pollak (Hrsg.): Heutige und zukünftige Herausforderungen an die Qualitätswissenschaft in Forschung und Praxis – Bericht zur GQW-Jahrestagung 2017 in Erlangen. FAU University Press, S. 185-208. ISBN 978-3-96147-021-1.

1. Introduction and Background

The development of closer bilateral trade relations with individual countries and regions is one of the main objectives of the EU's active trade policy (EC, 2014). Since June 2013, the US and the EU have been negotiating a joint Free Trade Agreement (FTA), the Transatlantic Trade and Investment Partnership (TTIP) (EC, 2015). Since then, TTIP has been the subject of contentious public debate. One focus is on the various consumer protection standards, with fears that the existing EU legislation would be undermined (Kolev and Matthes, 2016).

The European standards system is underpinned by EU legislation and follows the tenet of the precautionary principle, which represents the preventive character of consumer protection and consequently of quality management (Kolev and Matthes, 2016; Theuvsen et al., 2013).

Parallel to this system, there are a number of private-sector standards that ensure compliance with minimum product requirements. These two approaches have an enormous impact on competition and determine the competitiveness of European companies in the US market (Theuvsen et al., 2013). Conscious that international quality standards play a major role in trade with the US, there is a need for rigorous coordination of processes. Both product and process standards as well as quality standards must be increasingly brought into the TTIP discussion to protect the proven and internationally recognized European DIN-ISO standard system (DIN, 2014).

When analyzing the advantages and disadvantages of TTIP, the economic, social and environmental consequences are generally taken into account. In the past, the European Commission (EC) commissioned numerous studies to forecast the impact of TTIP (Team Stronach, 2015). The most important are the ECORYS (2009), CEPR (2013), CEPII (2013) and Bertelsmann/ifo (2013) studies. These studies are based on economic model calculations. Studies on the TTIP-FTA were also carried out in the field of agri-food sciences. The risks and opportunities for the EU agri-food sector were analyzed by Bureau et al. (2014) on behalf of the European Parliament. The study by Wilhelms (2014) compared the system of food law in the EU and the US in the context of the TTIP-FTA and identified the differences between the European precautionary principle and the US aftercare principle which were illustrated and documented by using examples. Based on this study, the current research work examines the role of international quality standards in the preparation phase of the TTIP-FTA. To date, there has been a lack of empirical studies indicating how export-oriented companies in the agri-food industry and their trade associations have dealt with this issue. The aim of this study was therefore to obtain an industry-specific assessment by sector experts on the state of knowledge regarding TTIP and the US export market in connection with quality management (Mayring, 2015). On the basis of the survey results, further research questions also need to be formulated.

2. Data Basis and Methodology

Two target groups were defined as test subjects for the online survey: firstly, "export-oriented companies" from all over Germany and secondly their "trade associations". Only representatives of the agri-food industry were interviewed. The survey software "EFS Survey[2]" of Questback GmbH via the academic program "Unipark" was used to implement the survey. The data export and the descriptive analysis of the survey were carried out using Microsoft Excel. The survey was divided into three technical sections and a general/statistical question section:

- four questions on TTIP
- four questions on trade with the US
- three questions on quality management
- four general closing questions.

An adapted questionnaire (Appendix I) was created for both target groups, which could be selected via a filter question at the beginning of the survey. The aim of the questionnaire wording was to interview and compare the target group "export-oriented companies" and the target group "trade associations" individually (Kallus, 2016). The survey contained two filters and 92 variables.
Most of the questions had to be answered with the help of a Likert scale with obligatory box-checking and it was also often possible to enter optional comments and supplementary information (e.g. literature/source references to statistics or similar) on the respective question in a free text block. In addition, a few open questions were asked which were not multiple-choice. Participation was voluntary and anonymous.
Before launching, the online survey was pre-tested by master students from the Department of Quality Management at the University of Bonn and other experts. The survey was also validated by means of a consistency check and time expenditure analysis. The online survey was active from 13. June 2016 to 13. October 2016, meaning it was accessible for four months. To acquire participants in the different target groups from all over Germany, different approaches were taken. First of all, the managing directors of the trade associations were personally contacted by email and invited and in some cases informed by phone. The associations were also asked to spread the survey to their member companies. Moreover, various multipliers, such as freelance agricultural journalists, journalists at trade journals, trade promotion offices as well as regional agri-food networks in the federal states and political players in agricultural trade affairs in the federal and state ministries were contacted by email. They were asked to share the survey through their usual communication

[2] Version Summer 2016/1.2

channels. In addition, personal discussions were held and leaflets were distributed at various trade events (Table 1).

The leaflets (Appendix II) used to advertise the survey was well structured and contained a precise definition of the specific target group and an accurate description of the aim of the research work. A logo was also developed for memorability purposes. To enable participants to access the survey, a web link and a QR code were disclosed. Furthermore, the survey was also shared in social networks. Finally, the survey was distributed on 17. August 2016 via the mailing list of the export promotion program of the Federal Ministry of Food and Agriculture (BMEL).

Table 1: Involvement in conferences and advertising for the survey at various issue-specific events between June and October 2016

Date	Venue	Organizers	Topic	Target group
15. June 2016	Berlin	Association "Food-Made in Germany e. V. "	General Assembly and 6th Export Forum	Export association with 65 members of German food and specialty manufacturers
15.-16. June 2016	Berlin	Association "Deutscher Raiffeisen-verband e. V." (DRV)	Deutscher Raiffeisentag 2016 "Europa und Märkte in Turbulenzen – Jetzt die richtigen Weichen stellen!" and General Assembly	2,250 member companies in agricultural trade and processing of animal and plant products, association itself
16. June 2016	Berlin	Federal Ministry of Food and Agriculture (BMEL); Federation of German Food and Drink Industries (BVE); Federal Foreign Office (AA)	7. Foreign trade day of the agri-food industry hosted by BMEL / BVE / AA	approx. 500 participants from associations and companies of the agri-food industry
31. August 2016	Düssel-dorf	Federation of German Food and Drink Industries (BVE) and Ministry for Environment, Agriculture, Conservation and Consumer Protection of the State of North Rhine-Westphalia	Kick-off Event „BVE-Regionalinitiative Nachhaltigkeitsförderung“ Motto: "Improve competitiveness and the world? Sustainability strategies for the North Rhine-Westphalian food industry"	approx 50 participating companies of the food industry
06. October 2016	Neuwied	Chamber of Industry and Commerce Koblenz	"Food Forum USA and Australia"	approx 80 participating companies of the food industry

3. Survey Respondents

According to the field report of the online survey, 497 interested parties (gross participation) accessed the survey. Net participation was 52.11% with 259 data sets. In fact, 113 participants completed the survey, amounting to a gross completion rate of 22.74% and a net participation rate of 43.63%. The analysis of the MS-Excel spreadsheets found that some panel participants did not complete the questionnaire, but that the actual answers given were significant. After adjusting the values, it was found that 141 data sets could be evaluated, corresponding to a rate of 28.37%. Of the 141 survey data sets, 121 are attributable to the target group export-oriented companies and 20 to the target group trade associations. A time expenditure analysis conducted when the survey was prepared gave a conjectured processing time of 10 to 15 minutes (min). The mean and median average of the actual processing time were 28:55 min and 9:25 min respectively. This difference was down to nine participants needing more than half an hour but less than one hour to complete the questionnaire. The time taken suggests that the persons were interrupted by other activities, such as phone calls. Furthermore, there is a statistical outlier who, according to figures, took 31 hours to complete the questionnaire. A technical error is the only possible cause for this case.

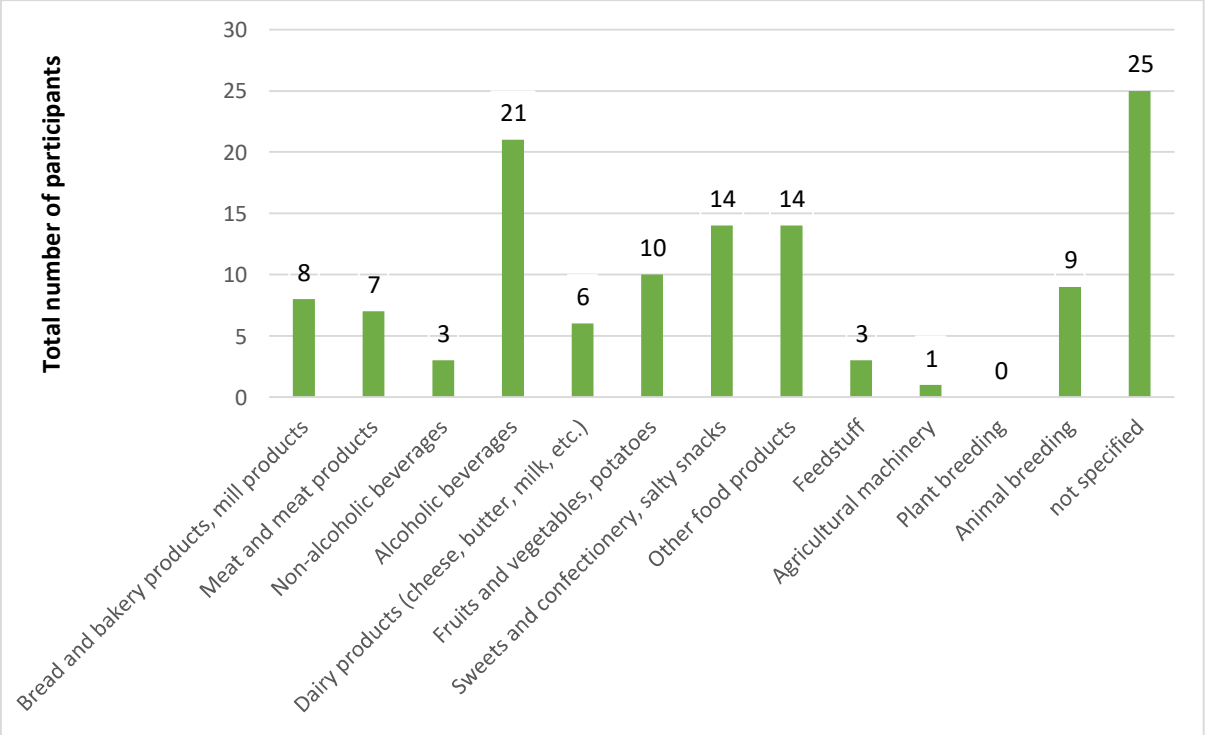

Figure 1: Overview of the diversification of the involved branches (n = 121)

Figure 1 shows the share of companies in different branches. From this it can be seen that 25 respondents did not provide any information, while the alcoholic beverages sector accounts for the largest share. There were no participants from the plant breeding sector.

Moreover, 38 invited companies stated that they were unable to participate in the research survey due to their internal company policy or for capacity reasons.
Companies in the agri-food sector can be divided into four different classes of company according to size. The number of employees and financial thresholds are used for this purpose (EC 2003, 2016a).

- Micro companies (< 10 employees, ≤ 2 Mio. € turnover/year)
- Small companies (< 50 employees, ≤ 10 Mio. € turnover/year)
- Medium-sized companies (< 250 employees, ≤ 50 Mio. € turnover/year)
- Large companies (> 250 employees, > 50 Mio. € turnover/year)

A significant number of all classes of company participated. The mid tier participated the most. Twenty-seven respondents (22.3%) did not provide any information on the size of the company. Figure 2 shows the distribution of participants in the survey. For the target group "trade associations", the survey of industry affiliation was omitted in the interests of anonymity.
Of 20 participants, 17 association representatives reported the number of their member companies. Eight small associations (< 100 members), six medium-sized associations (101-1,000 members), one large association (> 1,000 members) and two very large associations (125,000-150,000 members) took part.

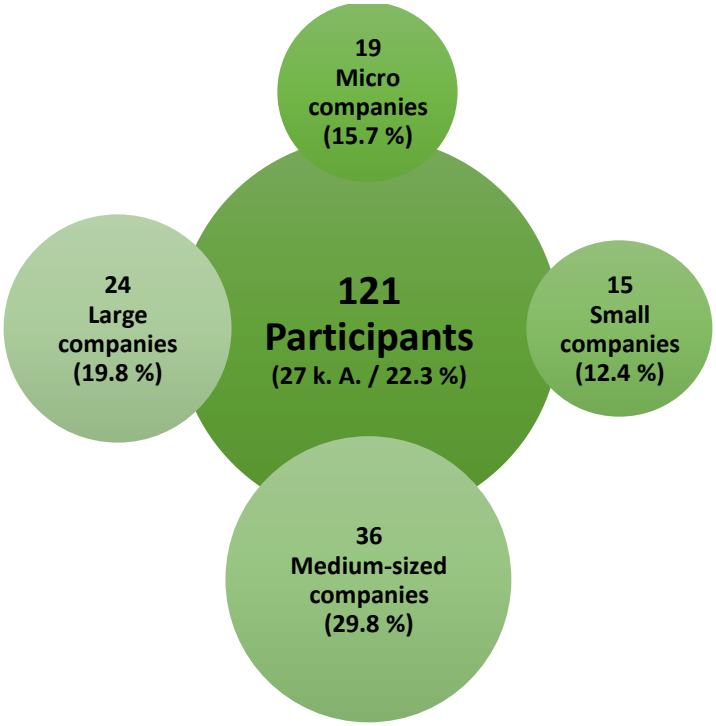

Figure 2: Overview of the participating company classes with percentage distribution

4. Results and Discussion

The analysis was conducted in line with the structure of the survey, with only the technical sections of questions 1-3 of relevance. Where possible, the results of both target groups are compared and discussed.

4.1 Knowledge regarding TTIP

At the start of the survey, the panel participants were asked to give up to three statements as open answers as to which sources are used to obtain information on TTIP. They had to determine the first to third choice. Multiple answers were possible. To present the results, the open answers were assigned to six categories, as shown in Figure 3. The categories were ranked according to importance.

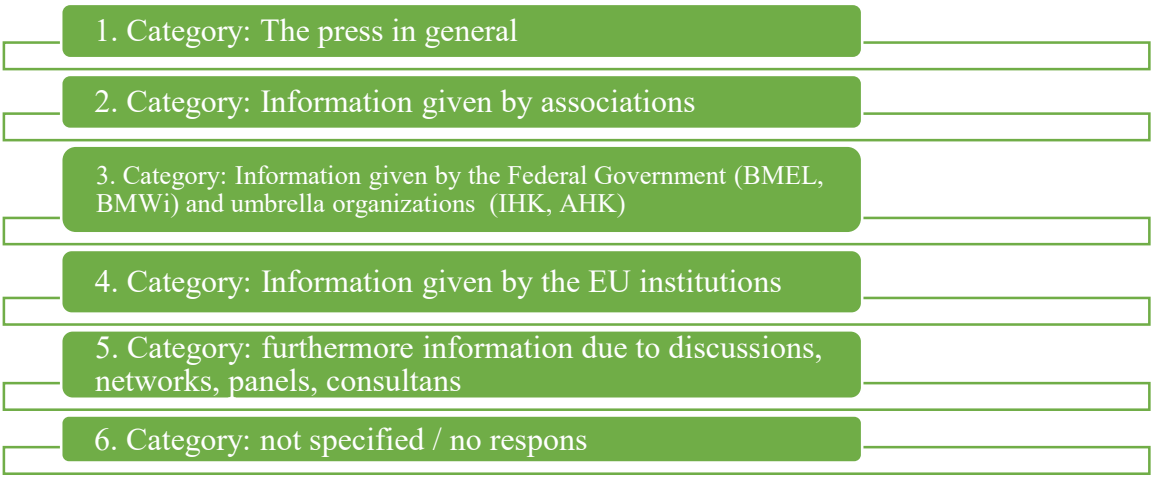

Figure 3: Categorization of the information sources

The results (Table 2) show that the companies and associations both use secondary sources of information. The press, including online media, specialist media and business magazines, plays the largest role. Distributed over all three options, various press products were named 151 times by the companies. The association representatives mentioned the press 19 times. Both groups obtain information from associations (56 companies and 12 associations), i.e. trade associations from umbrella organizations, and from representatives of the Federal Government (18 companies and 8 associations). It is striking that the associations (25 mentions) virtually exclusively obtain information from the EU institutions, while only one company mentioned the EU. Discussions and information gained through networks are also important for the companies (14 mentions). In the open text field, respondents criticized the lack of official information from the Federal Government available for inspection and thus the exclusive provision of second-hand information, which makes it difficult to form independent opinions.

Table 2: Total and percentage share of information sources according to importance in a comparison of the companies (Comp.) and associations (Assoc.)

Category	1. Choice				2. Choice				3. Choice			
	Comp.		Assoc.		Comp.		Assoc.		Comp.		Assoc.	
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%
1. The press in general	**75**	**61.98**	**8**	**40**	**54**	**44.63**	**5**	**25**	**22**	**18.18**	**6**	**30**
2. Information given by associations	28	23.14	5	25	17	14.05	5	25	11	9.09	2	10
3. Information given by the Federal Government and umbrella organizations	8	6.61	2	10	8	6.61	4	20	2	1.65	2	10
4. Information given by the EU institutions	1	0.83	5	**25**	0	0	0	0	0	0	0	0
5. further sources	1	0.83	0	0	3	2.48	2	10	10	8.26	0	0
6. not specified / no response	8	6.61	0	0	39	32.23	4	20	76	62.81	10	50
n =	121		20		121		20		121		20	

To classify the further results of the survey in a qualitative way, it was important to ask the extent to which companies are truly aware of TTIP. The association representatives were asked to assess their member companies. As shown in Figure 4, the assessments are largely identical. Over 42% of the companies and 60% of the association representatives give their awareness of TTIP as high to very high. However, 32% of the companies are also neutral towards the topic, this was estimated by the associations with 20%. In comparison, it can be seen that the association representatives believed member companies' awareness of TTIP to be higher.

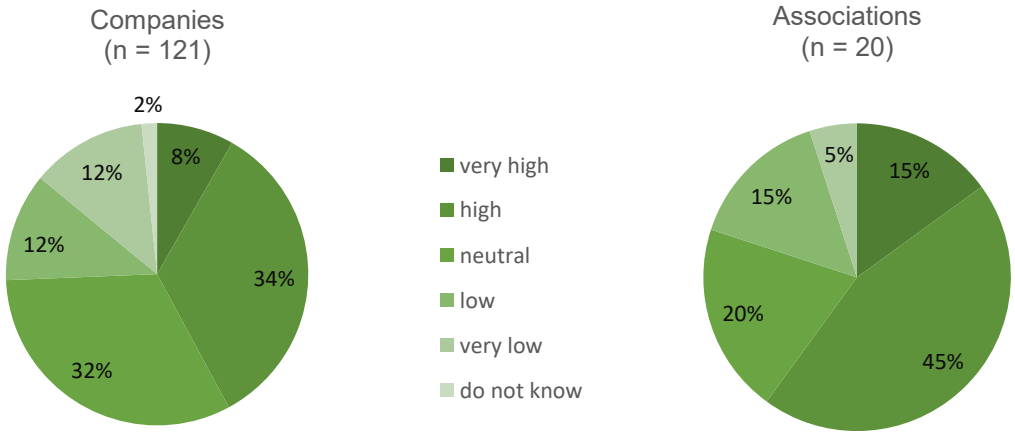

Figure 4: Comparative assessments of "Awareness of TTIP" between the companies and association representatives

In this context, criticism was levelled at the lack of transparency, which creates mistrust. The companies believed it was important to know facts about TTIP and to understand the agreement, with priority not currently given to the issue.

In the further analysis, the participants were asked to give their opinion on the particularities of TTIP as opposed to other free trade agreements. The question was designed to be open to allow the test persons to express their concerns in detail. Both the companies and the associations identified positive and negative aspects of the free trade agreement. Table 3 summarizes and evaluates useful statements. The companies were primarily concerned about the undermining of existing EU legislation, especially with regard to consumer protection (14 mentions). For example, conflicting interests and disregard for the precautionary principle were mentioned. In addition, respondents said preponderantly that the free trade agreement was unfavorable to the mid-tier and would only benefit large multinational corporations. The companies pointed out that the effects of TTIP could not be assessed, which was also due to the lack of transparency in the negotiations and the positions of the EU. The associations focused on public perception as a particularity (8 mentions). Polemicization and spreading of bias by NGOs and the media was reportedly new and had reached a new dimension.

Both target groups believed the free trade agreement has special strategic significance (15 mentions), with particular referenced to the market size and interconnectedness of important economic areas. In summary, the agreement will have a considerable impact on world trade standards and globalization as a whole owing to its scope and complexity.

Table 3: Presentation of the above particularities and their assessment in a comparison of the companies and association representatives and as a whole

Particularity	**Companies**		**Associations**		**Total**
	Mention	Assessment	Mention	Assessment	Mention
Particular strategic and economic importance, the US is an important export market	12	↗	3	↗	**15**
Market size through cross-linkage of economic areas	11	↗	3	↗	14
Reduction of trade barriers combined with the harmonization of standards	8	↗	2	↗	10
Positive impact on standards and globalization	6	↗	2	↗	8
Impact not assessable	11	→	0	-	11
Scope and complexity of the agreement	7	→	3	→	10

Particularity	Companies		Associations		Total
	Mention	Assessment	Mention	Assessment	Mention
Conflicting interests of the negotiating partners	7	→	2	→	9
Long-term changes	7	→	0	-	**7**
Lack of legal certainty: concern about lowering of EU legislation, particularly in the area of consumer protection	**14**	↘	0	-	**14**
Public perception, polemicization by the media and NGOs	**6**	↘	**8**	↘	**14**
Transparency of negotiations and content	10	↘	3	↘	13
Only advantages for US visible	9	↘	2	↘	11
Negative impact on standards and globalization	8	↘	0	-	8

To highlight some of the negotiation issues subject to intense discussion, the participants were asked to assess their importance. The issues were specified and are regarded non-tariff trade barriers.

- Customs duties, import taxes and quotas (C, T, Q)
- EU quality labelling schemes: Geographical Indications (GIs), Protected designation of origin (PDO), Protected geographical indication (PGI)) and Traditional speciality guaranteed (TSG) (EU-QL)
- Procedure for rules of origin/proof of origin (RoO)
- Local certifications, standards and safety requirements (stards/cert)
- Approval procedures in the veterinary and phytosanitary sectors (vet/phyt)
- Regulations governing pesticide use (pesticide)
- Processing times and administrative burden arising from freight, registration and permits etc. (admin).

The analysis of Table 4 shows that the issues were generally of strong to very strong importance for both groups of participants. Scanning the issue of standards/certification, it is clear that over 60% of both target groups considered this issue to be of strong to very strong importance.
The issues associated with quality management, such as EU quality labelling and procedures for proof of origin, were also of high to very high topicality (> 60%). Concisely, all the non-tariff trade barriers examined are significant.

Table 4: Presentation of the importance of defined negotiation issues of non-tariff trade barriers in companies (A) and trade associations (B)

A: Results of companies														
	C, T, Q		**EU-QL**		**RoO**		**stards/cert**		**vet/phyt**		**pesticide**		**admin**	
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%
very strong importance	29	24.8	34	29.1	28	24.1	**39**	**33.3**	**29**	**25.0**	**30**	**25.4**	23	19.5
strong importance	**43**	**36.8**	**43**	**36.8**	**44**	**37.9**	35	29.9	28	24.1	28	23.7	**39**	**33.1**
medium importance	17	14.5	21	17.9	21	18.1	26	22.2	22	19.0	20	16.9	31	26.3
low importance	17	14.5	11	9.4	12	10.3	9	7.7	11	9.5	17	14.4	11	9.3
not important	6	5.1	3	2.6	4	3.4	3	2.6	16	13.8	15	12.7	2	1.7
do not know	5	4.3	5	4.3	7	6.0	5	4.3	10	8.6	8	6.8	9	7.6
n =	117		117		116		117		116		118		118	
B: Results of associations (n = 20)														
	C, T, Q		**EU-QL**		**RoO**		**stards/cert**		**vet/phyt**		**pesticide**		**admin**	
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%
very strong importance	**6**	**30**	6	30	**8**	**40**	4	20	**8**	**40**	1	5	5	25
strong importance	3	15	**8**	**40**	2	10	**8**	**40**	4	20	**4**	**20**	**6**	**30**
medium importance	5	25	3	15	4	20	4	20	1	5	3	15	5	25
low importance	4	20	2	10	4	20	2	10	2	10	1	5	3	15
not important	1	5	1	5	1	5	2	10	3	15	7	35	0	0
do not know	1	5	0	0	1	5	0	0	2	10	4	20	1	5

4.2 Knowledge regarding the US Market

TTIP is linked to the US market. It was therefore necessary to ask how familiar the companies were with this market and what their expectations and plans were for the next 12 months.

Figure 5 shows that 55% of the companies consider their knowledge of the US market to be good to very good. The associations responded similarly (60%). This contrasts with around 40% of the respondents, who stated that they had only limited or no knowledge of the US market.

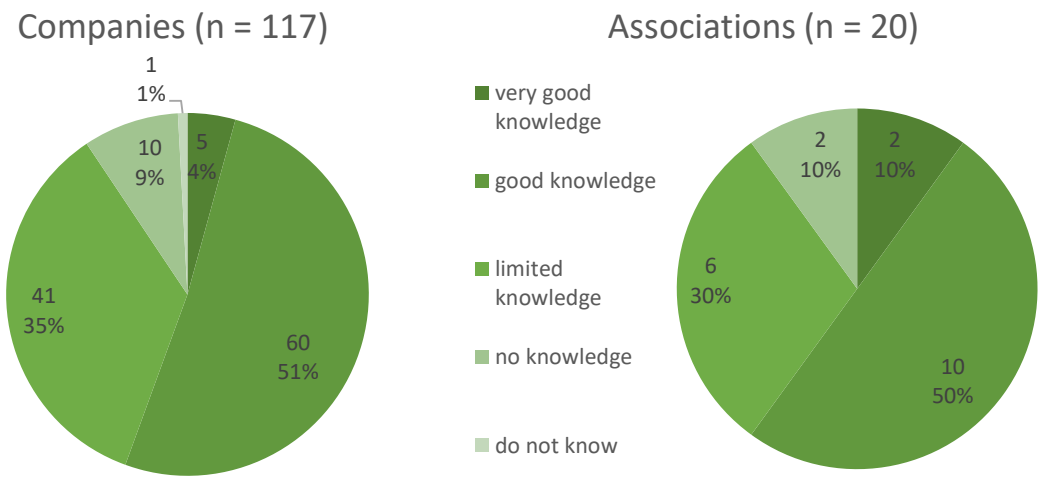

Figure 5: Self-assessment of expert knowledge of the US market: companies and association representatives compared

In this context, the survey of both target groups revealed that a number of meaningful support measures are requested by the business representatives. The main demand is for an increase in competent expert support by official representatives of the authorities and transparent information. The following measures were frequently mentioned in open text blocks or as free comments:

- Coordination of requirements, particularly for veterinary and phytosanitary measures
- Government funding for e.g., trade fairs, further training and Chambers of trade and commerce
- Government monitoring of origin
- Reduction of bureaucracy and non-tariff trade barriers
- Official translations of the US regulations
- Protection of intellectual property
- Development of legal certainty
- Positioning the EU as an economic entity
- Establishment of a state-owned trading and logistics company.

In addition to this list of requirements, the provision of transparent information was requested, for example continually updated fact sheets on the regulations, import regulations, customs duties/customs clearance, market uniqueness, labelling regulations, FDA approvals of companies and ingredients. The respondents also requested industry structure analyses, forecasts and simplified basic portrayals on the regulations/legislative amendments in the US and each individual

US state. They also suggested that networks be developed between the EU and the US and subsidized industry representatives be appointed on site. In terms of quality management, food quality evaluation procedures are to be developed and researched.

With regard to quality standards, the respondents anticipate more planning reliability and the harmonization of existing procedures. In contrast to these extensive proposals, 29 respondents stated that they did not need any or any further support measures.

The analysis also revealed that ten association representatives (50%) see no possibility of strengthening trade relations with the US in the sense of increased compatibility, economy, reliability and sustainability. A further seven representatives (35%) did not answer this question. Only three participants see opportunities in bilateral, sector- or product-group-specific individual agreements in connection with tariffs, trade volumes, standard settlements and their recognition. This raises a future-oriented approach to the further development of international standardization.

As for expectations regarding the customer-supplier relationship along the entire value chain, both target groups agreed that the coordination process between their US business partners would not change or, rather, would increase slightly over the next 12 months (Figure 6).

None of the association representatives assumed that mutual coordination would be minimized. Furthermore, the situation is not expected to change significantly on the conclusion of the TTIP negotiations. Due to the increased number of "do not know" responses, it can be concluded that there is a high degree of uncertainty in the forecasts.

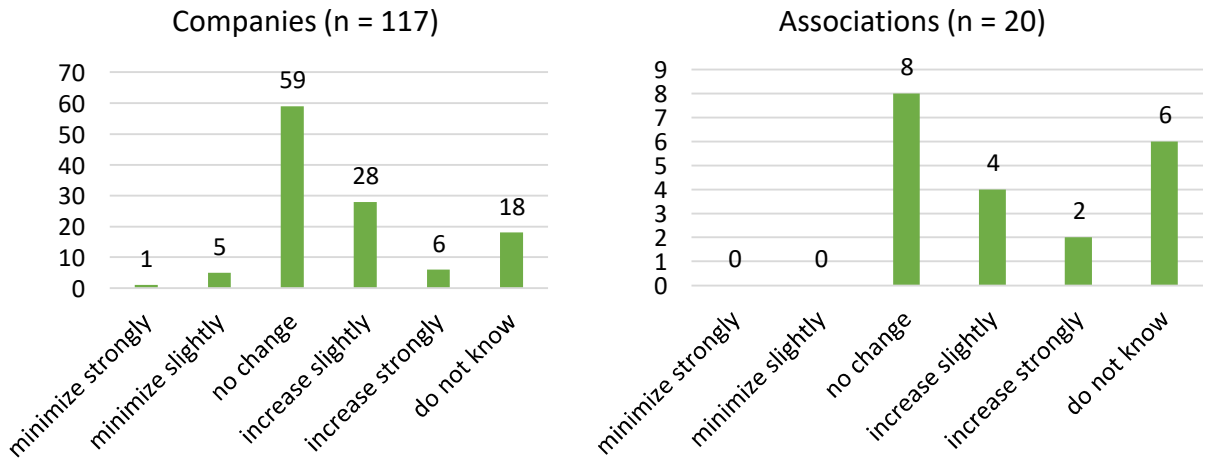

Figure 6: Assessment by companies and associations of developments in the coordination process in the customer-supplier relationship over the next 12 months

This uncertainty is also reflected in the propensity to invest (Figure 7). In their annual planning, 70 export-oriented companies (60%) have not earmarked any additional investments for the US market. Only 18% (21 participants) want to increase their investments in this respect. Twenty respondents (17%) did not comment.

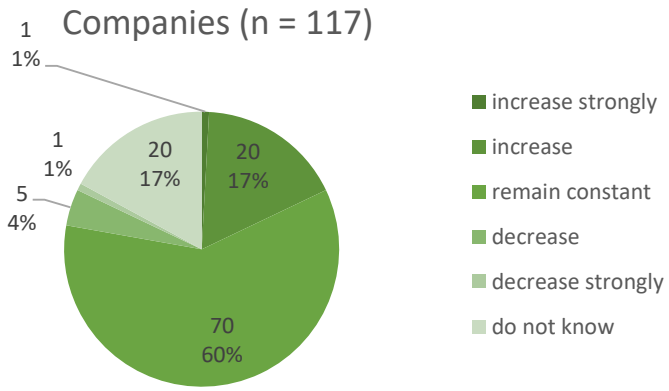

Figure 7: Illustration of the companies' propensity to invest in the next 12 months

4.3 Knowledge regarding Quality Management

To increase the participants' awareness of quality management, they had to assess the role of international quality standards in trade with the US and give a prediction of the change in role in the TTIP agreement. The following phases had to be observed:

- the current role (first phase)
- the role during a transition phase following the entry into force of the TTIP agreement (second phase)
- the role following the consolidation of the TTIP agreement (third phase).

Half of the association representatives thought international quality standards play a large to very large role in all phases, although 58.8% thought the role would increase somewhat in the transition phase. One third of the respondents from the associations considered the importance to be medium to low in all three phases. No participants in either survey group deemed international quality standards to be irrelevant. In contrast, 10 - 20% of the group of companies opined the quality standards in all phases to be insignificant. Another third (33%) of those surveyed from the companies rated the importance as medium to low in all three phases.

Only 40 company representatives (40.8%) rated the role of standards to be large to very large. It should be noted that chronological sequence has no influence on international quality standards being of large to very large importance.

The specific results are represented graphically in Figure 8. To substantiate the level of relevance, a survey was conducted regarding the application of quality standards in the company. It was found that DIN EN ISO standards are more likely to be used for exports to EU Member States than for exports to the US. Standards ISO 9000 et seq. and ISO 22000 in connection with FSSC certification were highlighted. The companies also considered the standardization for environmental and energy management to be important. In comparison, standards were seen as more relevant within a company. The various IFS standards were considered a basic requirement for any trade. The standard of QS Qualität und Sicherheit GmbH was deemed relevant, although not for exports to the US. Other common standards like BRC, GlobalGAP and GMP+ were not perceived relevant for their activities by the companies.

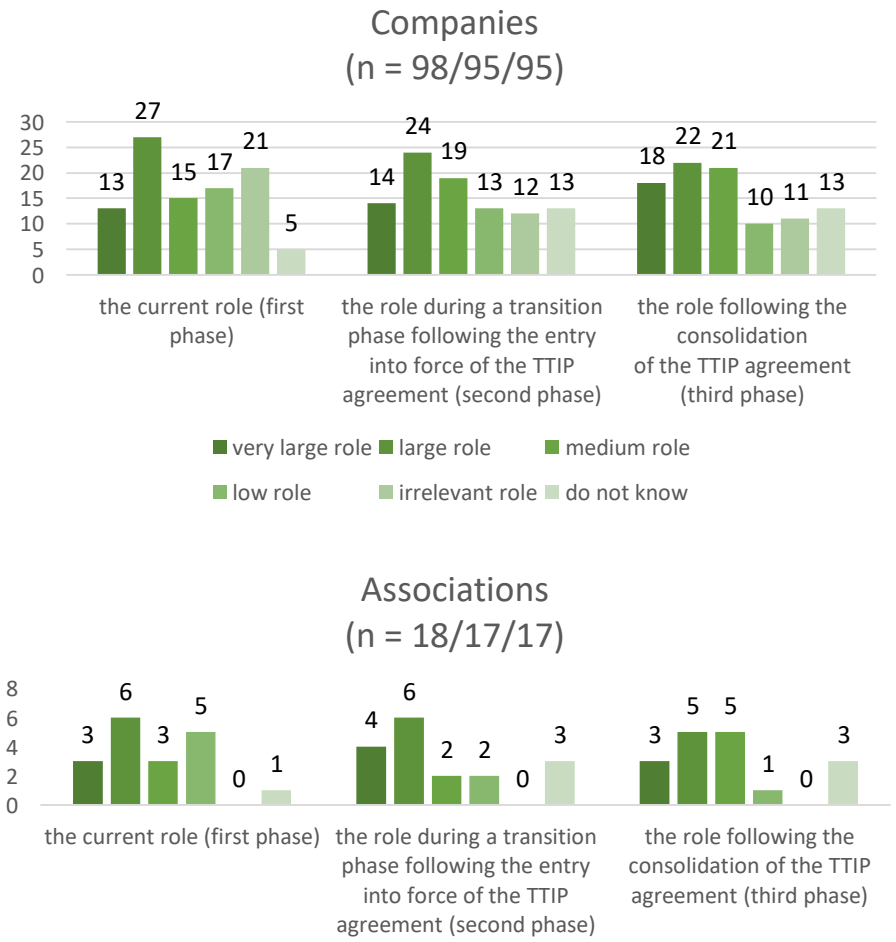

Figure 8: Role of international quality standards from the perspective of companies and associations

The companies ranked the FDA and USDA requirements as the most important for US trade, followed by organic and ecological standards as well as halal and kosher standards. In addition, ethical, environmental, sustainability and regional standards were also important for a large number of companies. These statements are in line with the assessment by the association representatives. They also ranked the IFS standards at the forefront, whereas they also classified the GlobalGAP standard to be widespread. Same as the companies, the association representatives considered organic and ecological standards as well as standards for halal and kosher to be important. DIN ISO EN standards were deemed by the associations to be more relevant. Nevertheless, there is a marked tendency to increasingly implement private-sector standards and cut down use of the European standards system. To reflect the relevance of quality standards, the supply chain must be taken into account. For this reason, the companies were asked to determine whether an interruption in the supply chain to the US due to different standards was identified in the past. A total of 98 companies participated in this survey, with only nine respondents (9.2%) registering an interruption. The reasons for this were industry-specific and related to the existing non-tariff trade barriers in the meat, cheese, alcohol and additives sectors. For one company, packaging and labelling were an obstacle. Only two companies experienced an interruption in exports to the US due to organic certification based on organic standards.

To address the subject of training and further education again, the association representatives were asked to assess whether there was a skills shortage in the area of "quality management" in the agri-food industry. Two representatives from the milk and delicatessen sectors said there was. 59% of the respondents said there was not and 31% did not comment.

5. Outlook

The empirical study includes data that reveals a variety of problems and gaps in knowledge regarding the role of quality standards in the preparation of a free trade agreement between the EU and US. Throughout the study, there is clearly significant uncertainty among the respondents as to the content of the negotiations and their consequences. Recent events concerning the negotiations of the Comprehensive Economic and Trade Agreement (CETA) between the EU and Canada demonstrate that the EU is in a poor negotiating position. The negotiating partners are not accommodating and have been unwilling to ratify (EC, 2016b; NDR, 2016; Bierbrauer, 2015). This problem seems to be due to the fact that even in the EU internal market, there is no agreement on any issues at all (Dreher and Schwäbe, 2016; Matussek et al., 2014).

In the US, the effects of specific non-tariff trade barriers on agricultural trade with the EU have been examined. The US considers the EU to be one of the countries with the strictest standards,

especially in the field of pesticide limits, whereas the US only follows the international standards established by the Codex Alimentarius Commission. In particular, soya exports to the EU have experienced a fall in demand, partly due to retail standards and supplier standards (Shawn et al., 2015).

The results of this study present for the first time the complexity of the interrelationships between the free trade agreement TTIP, market knowledge in opening up the US sales market and quality management in the agri-food industry. One solution-based approach for quality science might be to build a bridge between these issues. To do so, experts of the quality societies and their partners may offer advise during negotiations according to their objectives and take a stand on quality management in the context of global trade. In the TTIP topic area of "Regulatory Cooperation", international standardization should be promoted so that international quality standards can continue to be regarded as an instrument of innovation policy (Dreher and Schwäbe, 2016). This could strengthen the competitiveness of EU companies.

Not only the agri-food sector should be taken into account, but also other industrial sectors such as the automotive and pharmaceutical industries (DIN, 2014; Dreher and Schwäbe, 2016). Corresponding action plans should be jointly developed by the experts in consensus and introduced into the negotiations. Furthermore, the results highlight the need for industry- and country-specific training and further education measures as well as the formation of quality management networks beyond the Atlantic.

Building on this study, further analyses are needed to understand the role of quality standards in such negotiation processes recurring in the future. Using various methods, the concerns and developments of standard owners and other target groups in the EU Member States need to be explored in a structured way. Finally, the media ought to be analyzed in the light of public opinion.

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Appendix I: Questionnaire used for the online survey of the target groups "export-orientated companies" and "trade associations" from the agri-food sector

Informationen zur Umfrage Wirtschaftsvertreter-Umfrage zu TTIP (Agrar- und Ernährungsbranche)

Umfrage-Nr.	293491
Autor	Katja Pietrzyck

Fragebogen

1 Standardseite

Herzlich Willkommen zur Online-Umfrage

durchgeführt vom International FoodNetCenter der Universität Bonn.

Wir freuen uns, dass Sie an der Befragung freiwillig teilnehmen möchten.
Sie beteiligen sich damit an einer wissenschaftlichen Analyse über die Entwicklungen auf den globalen Märkten bezüglich der Rolle der internationalen Qualitätsstandards und -normen bezogen auf den Handel mit Agrarprodukten und Lebensmitteln. Das geplante Freihandelsabkommen (Transatlantic Trade and Investment Partnership, **TTIP**) zwischen der EU und den USA ist dabei von besonderer Bedeutung.
Schwerpunkt der Forschungsarbeit ist, die regulative Kompatibilität beider Freihandelspartner zu untersuchen. In diesem Zusammenhang wird analysiert, ob die EU eine Vormachtstellung mit den existierenden Standards inne hat und ob ein Wettbewerbsvorteil existiert.

Ziel der Umfrage bei exportorientierten Unternehmen aus Deutschland und den Branchenverbänden ist es, eine branchenspezifische Einschätzung von Profis zum US-Exportmarkt und den Wissensstand zu TTIP zu eruieren. Durch die gewonnenen Erkenntnisse soll der höchste Forschungs- und Entwicklungsbedarf für die Branche herausgefunden werden.

Die Umfrage ist in drei fachliche Teile und einen allgemeinen/statistischen Fragenteil gegliedert:
1. Vier Fragen zu TTIP
2. Vier Fragen zum Handel mit den USA
3. Drei Fragen zum Qualitätsmanagement
4. Vier allgemeine Abschlussfragen

Die Teilnahme an der Umfrage wird ungefähr 10-15 Minuten Ihrer Zeit in Anspruch nehmen.
Die meisten Fragen sind bequem durch Ankreuzen zu beantworten und es besteht oft zusätzlich die Möglichkeit Anmerkungen und ergänzende Informationen
(z. B. Literatur- /Quellenhinweise zu Statistiken o. ä.) über ein Textfeld einzugeben.
Bitte verwenden Sie zur Navigation die vorgesehenen Schaltflächen unten auf der jeweiligen Seite.
Selbstverständlich ist Ihre Teilnahme freiwillig und **anonym**. Alle Angaben werden vertraulich behandelt und nur für wissenschaftliche Zwecke genutzt.

Vielen Dank für Ihre Teilnahme und Ihre Unterstützung!

Katja Pietrzyck

Universität Bonn
International FoodNetCenter
Katzenburgweg 7-9
53115 Bonn

Bei Rückfragen kontaktieren Sie uns gerne: katpiet(at)uni-bonn.de

Um die Befragung passend gestalten zu können, bitten wir Sie zu Beginn um Ihre Zuordnung. Ich bin Vertreter/in eines ...

- ○ Branchenverbands der Agrar- und Ernährungswirtschaft
- ○ Unternehmens der Agrar- und Ernährungswirtschaft

2 Filter Filter Unternehmen

v_124 Filterfrage	Um die Befragung passend gestalten zu können, bitten wir Sie zu Beginn um Ihre Zuordnung. Ich bin Vertreter/in eines ... - Filterfrage (von Seite 1: Standardseite)	gleich 2

2.1 Standardseite

1. Teil: Fragen zu TTIP

1) Welche Informationsquellen zu TTIP nutzt Ihr Unternehmen?

1. Wahl

2. Wahl

3. Wahl

Anmerkungen / Ergänzende Informationen

2) Wie ist das Bewusstsein für das Thema TTIP in Ihrem Unternehmen?

- ○ sehr hoch
- ○ hoch
- ○ neutral
- ○ niedrig
- ○ sehr niedrig
- ○ weiß nicht

Anmerkungen / Ergänzende Informationen

3) Was ist Ihrer Einschätzung nach das Besondere an TTIP im Gegensatz zu anderen Freihandelsabkommen?

4) Bitte schätzen Sie die Bedeutsamkeit der folgenden Themen bei den TTIP-Verhandlungen für Ihr Unternehmen ein. Das Verhandlungsthema ist ...

	von sehr hoher Bedeutung	von hoher Bedeutung	von mittlerer Bedeutung	von geringer Bedeutung	nicht von Bedeutung	weiß nicht
Zölle, Einfuhrsteuern, Quoten	○	○	○	○	○	○
EU-Qualitätskennzeichen (g.g.A., g.U., g.t.S.)	○	○	○	○	○	○
Verfahren zu Ursprungsregeln / -nachweisen	○	○	○	○	○	○
lokale Zertifizierungen, Standards, Sicherheitsanforderungen	○	○	○	○	○	○
Genehmigungsverfahren im Veterinärbereich bzw. im phytosanitären Bereich	○	○	○	○	○	○
Regulierungen des Pestizideinsatzes	○	○	○	○	○	○
Bearbeitungszeiten und Verwaltungsaufwand bei Fracht, Registrierung, Genehmigungen etc.	○	○	○	○	○	○

Anmerkungen / Ergänzende Informationen

2.2 Standardseite

2. Teil: Fragen zum Handel mit den USA

1) Wie schätzen Sie die momentane Exportkompetenz (Fachkenntnisstand) Ihres Unternehmens bezogen auf den US-Markt ein?

- ○ sehr gute Kenntnisse
- ○ gute Kenntnisse
- ○ geringe Kenntnisse
- ○ keine Kenntnisse
- ○ weiß nicht

Anmerkungen / Ergänzende Informationen

2) Wie wird sich der Abstimmungsprozess zwischen Ihrem Unternehmen und Ihren US-Geschäftspartnern entlang der Wertschöpfungskette (Kunden-Lieferanten-Beziehung) in den nächsten 12 Monaten entwickeln? Der Abstimmungsbedarf wird sich ...

- ○ stark minimieren
- ○ leicht minimieren
- ○ nicht verändern
- ○ leicht erhöhen
- ○ stark erhöhen
- ○ weiß nicht

Anmerkungen / Ergänzende Informationen

3) Wie werden sich die Ausgaben Ihres Unternehmens für Investitionen bezogen auf den US-Exportmarkt in den kommenden 12 Monaten voraussichtlich entwickeln? Die Investitionen werden ....

- ○ stark steigen
- ○ steigen
- ○ gleich bleiben
- ○ sinken
- ○ stark sinken
- ○ weiß nicht

Anmerkungen / Ergänzende Informationen

4) Welche staatlichen, regulatorischen und wissenschaftlichen Unterstützungsmaßnahmen benötigen Sie, als exportorientiertes Unternehmen, zukünftig?

2.3 Standardseite

3. Teil: Fragen zum Qualitätsmanagement

1) Welche Rolle spielen in Ihrem Unternehmen die internationalen Qualitätsstandards und -normen beim Handel mit den USA vermutlich im zeitlichen Verlauf?

	eine sehr große Rolle	eine große Rolle	eine mittlere Rolle	eine geringe Rolle	keine Rolle	weiß nicht
im Moment	○	○	○	○	○	○
während einer Übergangsphase nach dem Inkrafttreten des TTIP-Abkommens	○	○	○	○	○	○
nach Verfestigung des TTIP-Abkommens	○	○	○	○	○	○

Anmerkungen / Ergänzende Informationen

2) Welche internationalen Qualitätsstandards und -normen kommen in Ihrem Unternehmen zur Anwendung?

Mehrfachantworten sind möglich.

	beim Export in die USA	beim Export in andere Drittstaaten	beim Vertrieb in Deutschland	beim Vertrieb in die EU-Mitgliedsstaaten	keine Anwendung
DIN EN ISO 9000 ff (Normen für Qualitätsmanagementsysteme)	○	○	○	○	○
DIN EN ISO 19011 (Leitfaden zur Auditierung von Managementsystemen)	○	○	○	○	○
DIN EN ISO 22000 (Normen für Managementsysteme für die Lebensmittelsicherheit)	○	○	○	○	○
andere Normen	○	○	○	○	○
IFS Food (International Featured Standard)	○	○	○	○	○
BRC (British Retail Consortium)	○	○	○	○	○
QS (Qualität und Sicherheit GmbH)	○	○	○	○	○
GlobalGAP	○	○	○	○	○
GMP+	○	○	○	○	○
andere Standards	○	○	○	○	○

Welche anderen Qualitätsstandards und -normen sind in in Ihrem Unternehmen relevant?

3) Konnte Ihr Unternehmen in der Vergangenheit eine Unterbrechung der Lieferkette in die USA aufgrund unterschiedlicher Standards feststellen?

- ○ ja
- ○ nein
- ○ weiß nicht

Wenn ja, bitte beschreiben Sie die Situation/en so ausführlich wie möglich!

2.4 Standardseite

4. Teil: Allgemeine Abschlussfragen

1) Welche Größe hat Ihr Unternehmen?

Quelle: KMU-Definition der EU
http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition/index_en.htm (Abruf am 05.04.2016)

- ☐ Kleinstunternehmen (bis 9 Beschäftigte, bis 2 Mio. € Umsatz/Jahr)
- ☐ Kleines Unternehmen (bis 49 Beschäftigte, bis 10 Mio. € Umsatz/Jahr)
- ☐ Mittleres Unternehmen (bis 249 Beschäftigte, bis 50 Mio. € Umsatz/Jahr)
- ☐ Großunternehmen (ab 250 Beschäftigte, über 50 Mio. € Umsatz/Jahr)
- ☐ keine Angabe

2) Zu welcher Branche gehört Ihr Unternehmen?

- ○ Brot und Backwaren, Mühlenerzeugnisse
- ○ Fleisch- und Wurstwaren
- ○ Nicht-alkoholische Getränke
- ○ Alkoholische Getränke
- ○ Molkereiprodukte (Käse, Butter, Milch u. a.)
- ○ Obst und Gemüse, Kartoffeln
- ○ Süß- und Zuckerwaren, Knabbersnacks
- ○ Andere Lebensmittel
- ○ Futtermittel
- ○ Landtechnik
- ○ Pflanzenzucht
- ○ Tierzucht

3) Sind Sie bereit an weiteren Umfragen im Rahmen dieser Forschungsarbeit teilzunehmen?

- ○ ja
- ○ eventuell
- ○ nein

4) Haben Sie noch weitere Anregungen und Ideen, die Sie uns gerne mitteilen wollen?

Wenn Sie über die Ergebnisse dieser Umfrage informiert werden möchten, tragen Sie bitte Ihre E-Mail-Adresse ein:

Ihre Daten werden nicht an Dritte weitergeleitet!

3 Filter Filter Verband

v_124 Filterfrage	Um die Befragung passend gestalten zu können, bitten wir Sie zu Beginn um Ihre Zuordnung. Ich bin Vertreter/in eines ... - Filterfrage (von Seite 1: Standardseite)	gleich 1

3.1 Standardseite

1. Teil: Fragen zu TTIP

1) Welche Informationsquellen zu TTIP nutzt Ihre Organisation?

1. Wahl

2. Wahl

3. Wahl

Anmerkungen / Ergänzende Informationen

2) Wie ist das Bewusstsein für das Thema TTIP bei Ihren Mitgliedsunternehmen?

- ○ sehr hoch
- ○ hoch
- ○ neutral
- ○ niedrig
- ○ sehr niedrig
- ○ weiß nicht

Anmerkungen / Ergänzende Informationen

3) Was ist Ihrer Einschätzung nach das Besondere an TTIP im Gegensatz zu anderen Freihandelsabkommen?

4) Bitte schätzen Sie die Bedeutsamkeit der folgenden Themen bei den TTIP-Verhandlungen für Ihre Mitgliedsunternehmen ein.
Das Verhandlungsthema ist ...

	von sehr hoher Bedeutung	von hoher Bedeutung	von mittlerer Bedeutung	von geringer Bedeutung	nicht von Bedeutung	weiß nicht
Zölle, Einfuhrsteuern, Quoten	○	○	○	○	○	○
EU-Qualitätskennzeichen (g.g.A., g.U., g.t.S.)	○	○	○	○	○	○
Verfahren zu Ursprungsregeln / -nachweisen	○	○	○	○	○	○
lokale Zertifizierungen, Standards, Sicherheitsanforderungen	○	○	○	○	○	○
Genehmigungsverfahren im Veterinärbereich bzw. im phytosanitären Bereich	○	○	○	○	○	○
Regulierungen des Pestizideinsatzes	○	○	○	○	○	○
Bearbeitungszeiten und Verwaltungsaufwand bei Fracht, Registrierung, Genehmigungen etc.	○	○	○	○	○	○

Anmerkungen / Ergänzende Informationen

3.2 Standardseite

2. Teil: Fragen zum Handel mit den USA

1) Wie schätzen Sie die momentane Exportkompetenz (Fachkenntnisstand) Ihrer Mitgliedsunternehmen bezogen auf den US-Markt ein?

- ○ sehr gute Kenntnisse
- ○ gute Kenntnisse
- ○ geringe Kenntnisse
- ○ keine Kenntnisse
- ○ weiß nicht

Anmerkungen / Ergänzende Informationen

2) Wie wird sich der Abstimmungsprozess zwischen den Wirtschaftsparteien entlang der Wertschöpfungskette (Kunden-Lieferanten-Beziehung) im Verhältnis EU zu USA in den nächsten 12 Monaten entwickeln? Der Abstimmungsbedarf wird sich ...

- ○ stark minimieren
- ○ leicht minimieren
- ○ nicht verändern
- ○ leicht erhöhen
- ○ stark erhöhen
- ○ weiß nicht

Anmerkungen / Ergänzende Informationen

3) Sehen Sie Möglichkeiten die Handelsbeziehungen mit den USA stärker international abzustimmen, um diese beispielsweise kompatibler, ökonomischer, zuverlässiger und nachhaltiger zu gestalten?

- ○ ja
- ○ nein
- ○ weiß nicht

Wenn ja, welche?

4) Welche staatlichen, regulatorischen und wissenschaftlichen Unterstützungsmaßnahmen benötigen exportorientierte Unternehmen Ihrer Meinung nach zukünftig?

3.3 Standardseite

3. Teil: Fragen zum Qualitätsmanagement

1) Welche Rolle spielen bei Ihren Mitgliedsunternehmen die internationalen Qualitätsstandards und -normen beim Handel mit den USA vermutlich im zeitlichem Verlauf?

	eine sehr große Rolle	eine große Rolle	eine mittlere Rolle	eine geringe Rolle	keine Rolle	weiß nicht
im Moment	○	○	○	○	○	○
während einer Übergangsphase nach dem Inkrafttreten des TTIP-Akommens	○	○	○	○	○	○
nach Verfestigung des TTIP-Abkommen	○	○	○	○	○	○

Anmerkungen / Ergänzende Informationen

2) Wie schätzen Sie den Verbreitungsgrad von internationalen Qualitätsstandards und -normen bei Ihren Mitgliedsunternehmen ein?

	sehr hoch	hoch	mittelmäßig	niedrig	nicht verbreitet	kenne ich nicht	weiß nicht
DIN EN ISO 9000 ff (Normen für Qualitätsmanagementsysteme)	○	○	○	○	○	○	○
DIN EN ISO 19011 (Leitfaden zur Auditierung von Managementsystemen)	○	○	○	○	○	○	○
DIN EN ISO 22000 (Normen für Managementsysteme für die Lebensmittelsicherheit)	○	○	○	○	○	○	○
andere Normen	○	○	○	○	○	○	○
IFS Food (International Featured Standard)	○	○	○	○	○	○	○
BRC (British Retail Consortium)	○	○	○	○	○	○	○
QS (Qualität und Sicherheit GmbH)	○	○	○	○	○	○	○
GlobalGAP	○	○	○	○	○	○	○
GMP+	○	○	○	○	○	○	○
andere Standards	○	○	○	○	○	○	○

Anmerkungen / Ergänzende Informationen

3) Besteht in Ihrer Branche ein Fachkräftemangel im Bereich "Qualitätsmanagement"?

Bitte geben Sie im Textfeld die Branche an.

- ○ ja
- ○ nein
- ○ weiß nicht

Angabe der Branche und Anmerkungen / Ergänzende Informationen

3.4 Standardseite

4. Teil: Allgemeine Abschlussfragen

1) Wie viele Mitgliedsunternehmen hat Ihre Organisation?

2) Sind Sie bereit an weiteren Umfragen im Rahmen dieser Forschungsarbeit teilzunehmen?

- ja
- eventuell
- nein

3) Haben Sie noch weitere Anregungen und Ideen, die Sie uns gerne mitteilen wollen?

4) Wenn Sie über die Ergebnisse dieser Umfrage informiert werden möchten, tragen Sie bitte Ihre E-Mail-Adresse ein:

Ihre Daten werden nicht an Dritte weitergeleitet!

4 Endseite

Vielen Dank für Ihre Teilnahme!

Appendix II: Leaflet used to advertise the online survey

universitätbonn
Rheinische Friedrich-Wilhelms-Universität Bonn

food•net•centerbonn

TTIP und die Qualitätsstandards in der Agrar- und Ernährungsbranche

Einladung zur Online-Umfrage!

Zielgruppe sind exportierende Unternehmen der Agrar- und Ernährungsbranche aus Deutschland

Ich bitte Sie herzlich: Nehmen Sie sich heute einige Minuten Zeit und seien Sie dabei!

Starten Sie heute und hier:

https://ww2.unipark.de/uc/wirtschaft-umfrage-qm-ttip/

Noch schneller geht es mit dem QR-Code:

Die Umfrage ist bis zum **26.08.2016** für Sie geöffnet.

Die Umfrage dient einer wissenschaftlichen Analyse über die Entwicklungen auf den globalen Märkten bezüglich der Rolle der internationalen Qualitätsstandards und -normen bezogen auf den Handel mit Agrarprodukten und Lebensmitteln. Das geplante Freihandelsabkommen (Transatlantic Trade and Investment Partnership, **TTIP**) zwischen der EU und den USA ist dabei von besonderer Bedeutung.
Schwerpunkt der Forschungsarbeit ist, die regulative Kompatibilität beider Freihandelspartner zu untersuchen. In diesem Zusammenhang wird analysiert, ob die EU eine Vormachtstellung mit den existierenden Standards inne hat und ob ein Wettbewerbsvorteil existiert.
Ziel der Umfrage bei exportorientierten Unternehmen aus Deutschland ist es, eine branchen-spezifische Einschätzung von Profis zum US-Exportmarkt und den Wissensstand zu TTIP zu eruieren. Durch die gewonnen Erkenntnisse soll der höchste Forschungs- und Entwicklungsbedarf für die Branche herausgefunden werden. Aus diesem Grund bitten wir um Ihre Einschätzung!

Vielen Dank für Ihre Teilnahme und Ihr Engagement!

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APPENDIX 3.2

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THE ROLE OF QUALITY MANAGEMENT IN THE CONTEXT OF THE TRANSATLANTIC TRADE AND INVESTMENT PARTNERSHIP (TTIP): THE CASE OF THE POLISH AGRI-FOOD SECTOR

KATJA PIETRZYCK
BRIGITTE PETERSEN
SEBASTIAN JARZĘBOWSKI

Abstract

Since 2013, the European Union has been negotiating with the United States of America a Free Trade Agreement (FTA), the Transatlantic Trade and Investment Partnership (TTIP). A controversial topic in the negotiations are the different quality standards in the agri-food sectors of both negotiating partners. In order to put into force a FTA all the EU Member States have to agree to the implementation of the contract. Poland has been a full EU Member State since 1 May 2004 and gained a strong position within the EU. Thus, the importance of this EU Member State is of great relevance to the EU's trade policy. The main objective of this article is to analyse Poland's trading position and its domestic interests. The study primarily aimed at investigating the awareness of the TTIP in the agri-food sector with focus on the quality standards of this industry. There has been no in-depth discussion of this sensitive issue within Polish companies of the sector yet. In particular, the study identified an uncertainty regarding the application and interpretation of international standards in cross-border customer-supplier relationships of food supply chains. For this reason, it is recommended to define these uncertainties and develop proposals for the harmonization and exploitation of synergies. In summary, the results have relevance for the sector.

Keywords: Transatlantic Trade and Investment Partnership (TTIP), Free Trade Agreement (FTA), agri-food sector, quality management, quality standards, food safety, Poland.

JEL codes: F14, F55, P45, Q17, Q18.

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Introduction

In June 2013, the European Union (EU) and the United States of America (US) turned towards intensive negotiations about a bilateral Transatlantic Trade and Investment Partnership (TTIP) (EC, 2013a). Since the beginning of 2017, negotiations with the US government have been paused (BMWi, 2018). In spring 2018, the US President – Donald Trump, threatened several countries to impose import tariffs on steel and aluminum (White House, 2018). Consequently, the EU is in close contact with the US and tries to turn the trade relations into positive ones and prevent punitive tariffs (EC, 2018a, 2018b, 2018c). As a result, business representatives, such as the Association of German Chambers of Commerce and Industry (DIHK) and the American Chamber of Commerce in Germany (AmCham), appealed for resumption of the TTIP negotiations on the grounds that such trade conflicts will not flare-up within an existing Free Trade Agreement (FTA) (DWN, 2018). After all, the TTIP has not yet been completely given up and there is a possibility that the talks will be resumed. The EU has underlined that this FTA will reduce regulatory barriers, thus having a positive impact on the EU foreign trade (EC, 2013b; BMWi, 2018).

The agreement covers a broad range of negotiating objectives; hence the focus of this paper is on the international quality standards of the agri-food industry, which are among the non-tariff trade barriers. The present paper is a sub-study of an on-going research project (PhD studies) aiming to identify the role of quality standards under trade agreements. The focus of the present study is Poland.

This paper aims to verify the hypothesis that the knowledge about the TTIP is very low in the companies of the Polish agri-food industry, while confirming the importance of quality standards regarding foreign trade. As an empirical research method, a survey was conducted among experts in the sector.

Poland's food industry at a glance in the context of the TTIP

Poland has been a full EU Member State since 1 May 2004 and is on a good level as a global player with a strong position within the EU. The Ministry for Foreign Affairs developed the Polish Foreign Policy Strategy for 2017-2021, which considers the EU strategy. This contains a national liaison with the US (MFA, 2016, 2018). Poland mainly exports machinery, non-ferrous metals, transport equipment and services to the US (World Trade Institute, 2016).

Moreover, Poland is one of the most important food producers of the EU. The sector is dominated by small and medium-sized enterprises. First of all, it is the largest producer of apples, poultry meat and carrots. In addition, Poland has a significant share in production of white cabbage, rye, oat, triticale and dairy products (MARD, 2015). Polish food and beverages are popular abroad. Thus, an aim is to further boost exports. About one third of the Polish-made products are directly destined for export and with a ratio of 84%, mostly exported to the EU Member States. The most important exporting countries (57% share) are Germany, the United Kingdom, France, the Czech Republic, Italy and the Netherlands. The main

EU importing countries are Germany, the Netherlands, Spain, Denmark and Italy, which accounts for 49%. After the Russian embargo in August 2014, the exporters of agri-food products began efforts to enter alternative markets, for instance the US (GTAI, 2017a, 2017b, 2017c). According to the Ministry of Agriculture and Rural Development, Polish export "is a very important channel for utilizing surpluses and constitutes an import source of income for the domestic food industry" (MARD, 2015, p. 66). Due to Poland's distinctive position in terms of the value of food products, these commodities are competitive and recognized in many foreign markets (Wrzesińska-Kowal and Drabarczyk, 2014).

In the past, a number of studies were commissioned by the EU to assess the potential benefits and economic effects of the TTIP. These studies highlight the overall situation of all EU Member States (Ecorys, 2009; CEPR, 2013; Fontagné, Gourdon and Jaen, 2013; Felbermayr, Heid and Lehwald, 2013).

Regarding the TTIP effects on the Polish economy, the most important scientific study was published under the title *The Impact of TTIP on Selected Sectors of the Polish Economy – an Analysis* in 2016 (Dunin-Wąsowicz (eds.) et al., 2016). This study is based on qualitative and quantitative research and used the computable general equilibrium model the GTAP (Global Trade Analysis Project). Contrary to the aforementioned EU studies, this one figured out that the effects of the TTIP on the Polish market will be relatively moderate. With regard to the Polish agri-food sectors, it has been found that the share of total exports is generally rather marginal and, therefore, a significant increase in the foreign trade is not expected. Instantly, it is presumed that increased market access to the US could weaken Poland's strong position in the EU trade. In summary, it was noted that dynamic transatlantic trade is expected, with exports remaining marginal. Despite the TTIP, the existing barriers will be constraining foreign trade.

Another study outlined that a "too widely advanced liberalization of agricultural markets, especially for bovine, pork and poultry, may put the Polish farmers at a competitive disadvantage compared with farmers from third countries, who produce agricultural products cheaper, not only due to lower labor costs and/or optimal production structures, but also because they are not obliged to meet the tight EU standards for the environment or animal welfare, and who, in addition, are not obliged to exclude parts of the land from cultivation" (Kaliszuk, 2015, pp. 13-14). In addition, the study presents Poland's expectations and fears connected with the TTIP. The following negotiation points are considered as sensitive topics: issues of genetically modified organisms (GMO), food safety and sanitary and phytosanitary standards (SPS), protection of meat markets and a better access to the US markets (agricultural trade liberalization) (Kaliszuk, 2015). Similar results were also presented in a German study by Konrad-Adenauer-Stiftung (Maier, 2014).

Further significant studies which highlight the most important assumptions, objectives and scope of the TTIP regarding the Polish economies were conducted by Pawlak (2017), Hagemejer (2015), Grzelak and Roszko-Wójtowicz (2015), Pera (2015) and Hajdukiewicz (2014).

Poland's agricultural trade statistics

Poland operates much of its trading business with the EU countries. Polish goods, destined for export, are in over 80% distributed in the EU. Only 3% are exported to Russia and 2% to the US. On the other hand, 72% of agricultural products are imported to Poland from other EU countries. In addition, 8% come from China and 6% from Russia (CSO, 2017).

Table 1

Overview of import and export dates of selected product groups

Product group	Import		Product group	Export	
	Value (USD million)	%		Value (USD million)	%
Animal and vegetable by products	6.27	1.97	Animal and vegetable by-products	1.12	0.27
Margarine	2.59	41.31	Margarine	0.691	61.7
Stearic acid	2.22	35.41	Rapeseed oil	0.223	19.9
Other pure vegetable oils	0.47	7.49	Other pure vegetable oils	0.146	13.1
Others	0.99	15.79	Others	0.056	5.3
Animal products	75.2	23.65	Animal products	123	29.57
Fish fillets	49.9	66.36	Pig meat	91.3	74.23
Non-fillet Frozen fish	21.9	29.12	Cheese	8.4	6.83
Others	3.4	4.52	Others	23.3	18.94
Foodstuffs	188	59.12	Foodstuffs	242	58.17
Wine	40	21.28	Chocolate	46.4	19.17
Other edible preparations	39.1	20.8	Prepared meat	44.4	18.35
Raw tobacco	36	19.15	Hard liquor	27.6	11.4
Hard liquor	27.8	14.79	Processed fish	22	9.1
Processed fruits and nuts	14.2	7.55	Baked goods	15.2	6.3
Others	30.9	16.43	Others	86.4	35.7
Vegetable products	48.5	15.25	Vegetable products	49.6	11.92
Other nuts	23.7	48.87	Wheat	13.5	27.2
Ground nuts	4.27	8.8	Frozen vegetables	9.08	18.3
Vegetable juice	3.93	8.1	Dried vegetables	7.05	14.2
Dried fruits	3.47	7.15	Starches	6.04	12.2
Others	13.13	27.08	Others	13.93	28.1
Total value	318	100	Total value	416	100

Source: own calculations upon OEC (2018).

Poland's trade position with the US in all sectors can be illustrated by the following data. The current trade statistics show that in 2016, the total import value from the US to Poland amounted to USD 5.5 billion and the total value of exports was USD 4.81 billion. There is an evident export surplus. Regarding the agri-food sector, the total import value in 2016 was at about USD 318 million, share was at 5.8 %, and the total export value – USD 416 million, with a share of 8.6%. It has been evaluated that the share of commodity flow in the agri-food sector is relatively low (OEC, 2018).

Table 1 reveals the import and export dates of selected product groups with the US (OEC, 2018). In the product group of animal and vegetable by-products, margarine accounts for the largest share of both imports (41.31%) and exports (61.7%). With regard to animal products, the most commonly imported products, the most commonly imported products are fish fillets (66.36%) and the most commonly imported ones are pork meat (74.23%). It should be noted that exports of butter accounted for only a small share of 0.71%, with total amount of USD 878 thousand. Moreover, the share of milk exports was 0.19% and a total amount of USD 237 thousand. Therefore, both products have a very low share in trade. Poland is the EU's strongest producer of poultry meat. Although an increase in poultry meat production is taking place and export demand has increased, the US market plays only a very minor role. The main export markets continue to be the EU and Asia (USDA, 2016). With regard to hard liquor, more or less the same values were imported (USD 27.8 million) and also exported (USD 27.6 million). In addition, it can be stated that wheat exports have large share of 27.2% (OEC, 2018).

Material and methods of the empirical analysis

The research question requires to conduct an analysis. Data were collected with the use of empirical methods, i.e. a survey which was created and developed by own inquiries and was addressed to a very narrow specific target group. Only export-oriented companies from Poland were invited to participate in the survey. The interviews covered the most important experts from Poland's agri-food industry. The survey could be done online on an Internet platform as well as directly via paper questionnaire. The participants received a flyer, which pointed out detailed objectives of the research and defined the target group. A logo has been developed to clearly recognize this project. To access the survey, the web link and QR code were announced. The language of the survey has been adapted to the target group. Both the paper questionnaire and the online questionnaire were available in Polish, German and English.

The online survey was implemented with the use of the "EFS Survey" software of the Questback GmbH within the academic program "Unipark". The online survey was validated by consistency check and time exposure analysis. Voluntary and anonymous participation was ensured. In order to do a correct evaluation, the data from the paper questionnaires were transferred to the online tool by four eyes principle. The data export and the descriptive evaluation has been done with Microsoft Excel. The survey was divided into three technical parts and a statistical question part:

- Four questions about the TTIP,
- Four questions about the US trade,

- Three questions about quality management,
- Four general questions.

Most questions were obligatory, and the answers were provided with the help of the Likert scale by ticking the selected box. Moreover, the respondent had the possibility to give optional comments and additional information (e.g. references to literature, sources, statistics, etc.) to the respective question in a free text field.

Results and discussion

Regarding the research question, the following results point out the most important empirical findings. Only the technical parts of the questionnaire were of relevance for the evaluation.

Participants

The target group of the survey included only experts in the export sector of the Polish agri-food industry; 150 participants were invited. The field report of the online survey indicates that 86 interested participants (gross participation) have accessed the survey. The participation rate is 57.3%. Net participation, at 70 records, is 81.4%. In total, 24 participants completed the full survey. The response rate is 27.9%. These datasets were analysed.

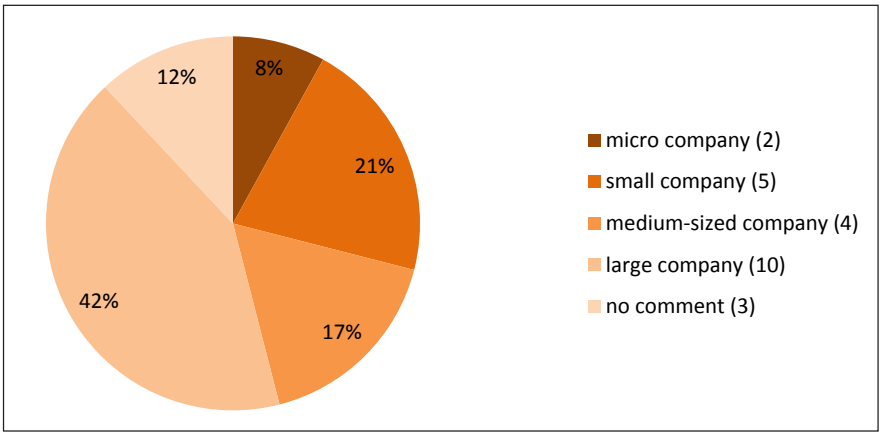

Fig. 1. Overview of allocation of different participating company categories (n=24).
Source: own calculations.

The allocation of enterprises by specific branches is summarized as follows. In total, 24 agri-food companies took part in the survey. Eight companies (33.3%) said they belonged to other branches of the industry for instance IT, consulting and analysis, logistic and transport and machinery production; 25.0% (six enterprises) were from fruit and vegetables, and potato industry. Three participants (12.5%) were producers of dairy products (cheese, butter, milk, etc.). One respondent (4.2%) was

a producer of alcoholic beverages, meat and sausage products, fish products and plant production and one conducted animal breeding. Three participants (12.5%) have not made a statement.

According to the EU definition for small and medium-sized enterprises (SMEs), agri-food companies can be broken down into four different entrepreneurial classes either according to their staff headcount or according to their turnover (EC, 2003).

- micro company (< 10 employees, ≤ EUR 2 million turnover/year);
- small company (< 50 employees, ≤ EUR 10 million turnover/year);
- medium-sized company (< 250 employees, ≤ EUR 50 million turnover/year);
- large company (> 250 employees, > EUR 50 million turnover/year).

Representatives of all business classes attended the survey. The large companies had the highest share in the survey (41.7%). Three participants (12.4%) provided no information on their company size. Figure 1 shows the allocation.

The first section: knowledge regarding the TTIP

At the beginning of the survey, panel participants should specify their sources of information about the TTIP. The respondents could mention their first to third choice in an open question. Multiple responses were possible. The answers indicate that there are no exact sources, only global generic terms. Resulting from that, the entrepreneurs obtain necessary information by means of secondary sources, as Figure 2 shows. The main source of information is generally the media (74%), whereas the Internet plays a major role (49%). However, it cannot be deduced which sources are used exactly, so that the quality of the information content cannot be estimated. It is notable, that no respondent has stated to obtain information from the institutions of the EU and the Polish government. Obviously, the associations of the agri-food industry play a minor role in gathering information about this topic.

In order to make a qualitative statement, the participants assessed the awareness of the TTIP in their company. As can be seen from Figure 3, it is estimated that the awareness of the FTA is low to very low; 33.3% are neutral on the topic. Only five respondents say that there is a high awareness of the TTIP in their enterprise.

Some participants have noted that they have no opinion or knowledge about the TTIP and its specificities. This shows clearly a gap in knowledge, and thus a disadvantage in foreign trade.

During the TTIP negotiations, some contentious issues were revealed, which are listed below:

- tariffs, import taxes, quotas (T, IT, Q);
- EU geographical indication (PDOs, PGIs, TSG) (EU-GI);
- procedures for rules of origin / evidence (RoO);
- local certifications, standards, security requirements (Cert/Stards);
- authorization procedures in the veterinary or phytosanitary sectors (vet/phyt);
- regulations on the use of pesticides (pesticides);
- processing times and administration costs for freight, registration, approvals, etc. (admin).

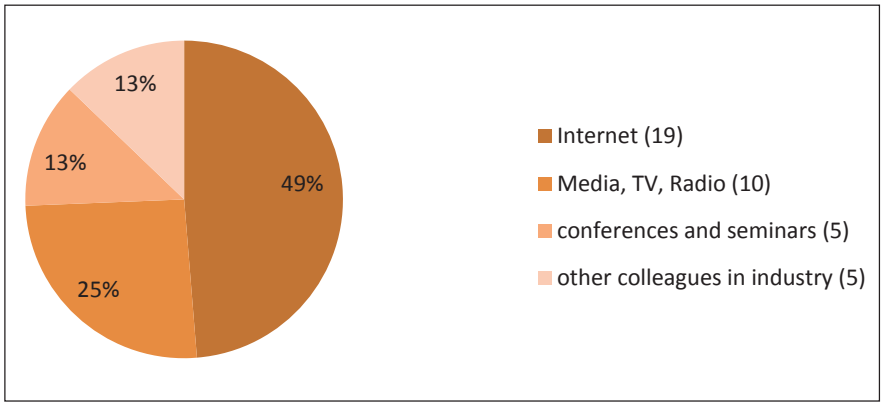

Fig. 2. Sources of information about the TTIP (n=39).

Source: own calculations.

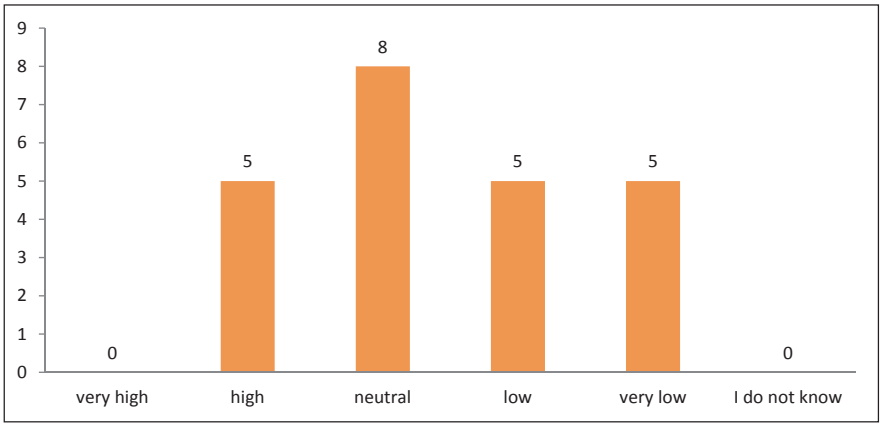

Fig. 3. Rating of awareness to the TTIP in the company (n=24).

Source: own calculations.

All the above topics are non-tariff trade barriers. To highlight these controversial negotiation topics, participants were asked to rate their significance for their own business. Table 2 shows the results. The respondents stress that the importance of all topics is generally high. Concerning the topic of standards and certification, nearly 80% of the participants assess this topic as of a high to very high importance. The issues, which are linked with the quality management such as the EU-GI labels (43.5%) as well as the procedures for rules of origin (75%), are also ranked from high to very high significance.

Overall, it should be noted that all non-tariff barriers to trade are of high importance within the TTIP negotiations for the agri-food sector.

Table 2

Importance of established negotiating themes of non-tariff trade barriers in companies

Level of significance	T, IT, Q		EU-GI		RoO		Cert/Stards		vet/phyt		pesticides		admin	
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%
very high importance	5	21.7	2	8.7	5	20.8	8	33.3	7	29.2	4	16.7	8	34.8
high importance	9	39.1	8	34.8	13	54.2	13	54.2	12	50	12	50	9	39.1
medium importance	3	13.0	6	26.1	2	8.3	1	4.2	3	12.5	2	8.3	4	17.4
minor importance	4	17.4	4	17.4	2	8.3	1	4.2	0	0	1	4.2	1	4.3
not significant	1	4.3	1	4.3	1	4.2	0	0	1	4.2	4	16.7	0	0
I do not know	1	4.3	2	8.7	1	4.2	1	4.2	1	4.2	1	4.2	1	4.3
n =	23		23		24		24		24		24		23	

Source: own calculations.

The second section: knowledge regarding trade with the US

The US is a key trading partner for all the EU Member States. For this reason, it is important to have relevant market knowledge about and an overview of the legal regulations in trade. Hence, it was necessary to ask to what extent the companies are familiar with this market. Moreover, it was important to know about their expectations and plans for the next twelve months. Nearly 74% of the respondents estimate their knowledge about the US market as minimal (Fig. 4). Only three participants believe that they have good skills. Nobody has developed very good knowledge about the US market. Only three participants estimate that they have good skills. For the second time, it has exposed a gap in knowledge.

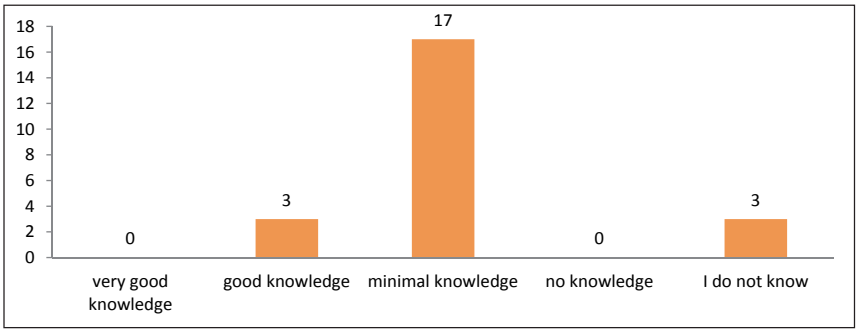

Fig. 4. Export competence (level of expertise) regarding the US market (n=23).
Source: own calculations.

The survey showed that the enterprises of the agri-food sector have a need for more support in the areas of legal security, information about new and modified regulations and consistent requirements. In addition, governmental export support programs are requested. These requirements could also be practiced in the area of quality management.

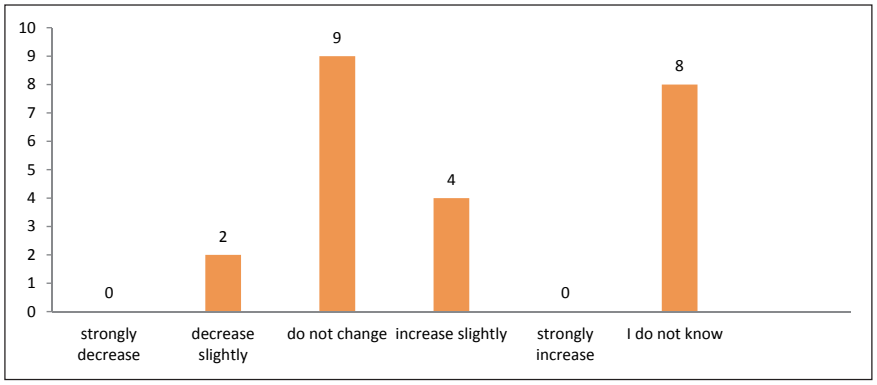

Fig. 5. Developments in the customer-supplier relationship in the agreement process over the next twelve months (n=23).

Source: own calculations.

In terms of the customer-supplier relationship, nine respondents (39.1%) consider that the approval process between their US business partners along the value chain will not change over the next twelve months (Fig. 5). A strong increase or strong decrease in the length of the process is hardly to be expected. Ultimately, due to lack of experience, there are some uncertainties that are unpredictable, expressed by eight respondents (34.8%), who do not imagine how their relationships between their US partners will change due to the TTIP. This precariousness should be eliminated through increased communication and capacity building.

As Figure 6 shows, the uncertainty is also reflected in the investment strategy of the companies. In the annual planning of the US trade activity, nine export-oriented enterprises (39%) do not want to change their current investments in the US market. The majority (44%) is noncommittal. Only 17% (four participants) want to increase their investments. It can be concluded that the TTIP negotiations incline to adopt a "wait-and-see" position in the transatlantic trade activities of the Polish companies, and that the propensity to invest initially stagnates until clear agreements are achieved.

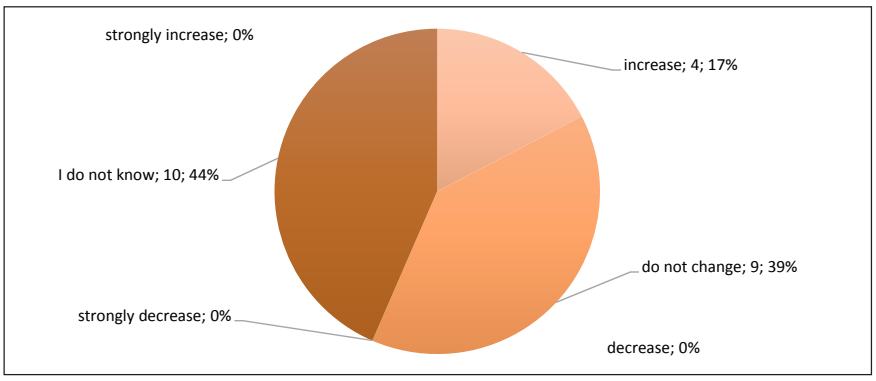

Fig. 6. The tendency of companies to invest in US exports in the next 12 months (n=23).
Source: own calculations.

The third section: knowledge regarding quality management in agri-food sector

Regarding quality management, respondents should assess the role of international quality standards in terms of the US trade. Furthermore, they should prognosticate the change through the TTIP agreement in terms of business with their US partners. The following phases should be considered:

- the role at the moment (1st phase),
- the role during a transition period after the TTIP agreement entered into force (2nd phase),
- the role after consolidation of the TTIP agreement (3rd phase).

According to nine respondents (37.5%), the international quality standards play a large to very large role in all phases, whereby they will decrease a bit in the third phase (see Fig. 7). At least a quarter of the interviewees rate the importance as medium to low in all three phases. In the current first phase, four respondents (16.7%) rate the standards as irrelevant. However, this will change over time, leading to their increased relevance.

In order to gain deeper insights into the utilization of the quality standards, a survey followed on the most popular standards (these were given) and their application spectrum in the company. The survey asked about four possible application scenarios for the specific standards:

- application for export to the US,
- application for export to other third countries,
- application for distribution in Poland,
- application for distribution to the EU Member States.

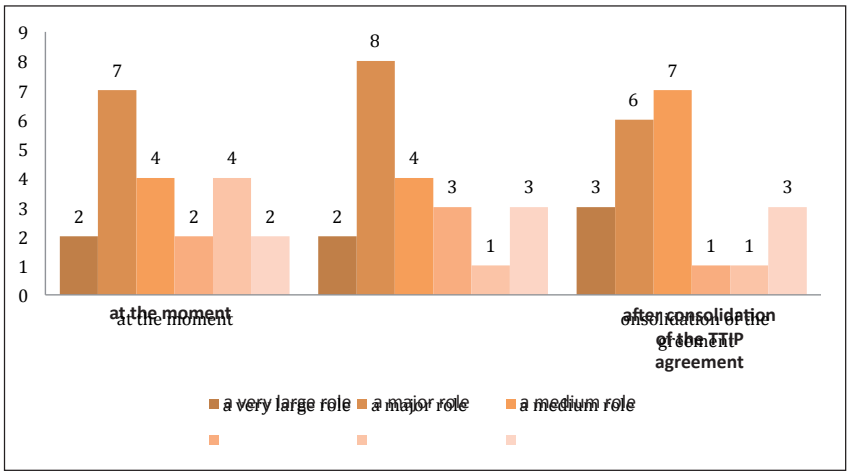

Fig. 7. The role and importance of quality standards in transatlantic trade plotted over time (n=24).
Source: own calculations.

It yielded a surprising result, which is demonstrated in Table 3. It was found that the DIN EN ISO standards are hardly ever applied in all four scenarios. All in all, 66.7-85.7% (14-18 replies) of respondents stated that the DIN EN ISO standards were not implemented. This was not expected because the assumption was that the DIN EN ISO standards were used in all export markets. In comparison, the private standards were given a higher relevance in the companies. The two main private standards are the IFS Food and BRC. Both are equally important in all four scenarios. Nonetheless, nine participants (42.9%) said they had not implemented these standards. Furthermore, the two standards GlobalGAP and GMP+ are used, but not for export activities to the US and other third countries. These are only used for distribution in Poland and the other EU Member States. The QS standard was not implemented by 85.7% of respondents. In addition, it was stated that the standards of FSSC 22000, MSC and ASC and some Polish standards, for example PN-N-18001, are generally important.

Finally, the entrepreneurs were asked if there had been a disturbance in the US supply chain due to different standards in the past. Six respondents (28%) indicated that they had already an interruption. The exact causes were not named. Other six participants did not know if there were such incidents. Nine companies (43%) have not been affected by any supply chain disruptions due to different quality standards.

Although the survey has been conducted among export experts, there are gaps in knowledge about the TTIP. A study, carried out in 2014, showed that the Polish media hardly reported on the TTIP and there had been no public discussion so far. The topic was only superficially presented by the media. In addition, no counter movements have been established (Maier, 2014). The Polish media analysis concerning FTAs, created in 2017, showed a discrepancy between social perception and "expert knowledge". This finding is supported by the fact that more than a half of the examined media

reports contained only very few scientific components (≈ 8%). However, it was also noted that agri-food issues (e.g. GMO and food safety) had relatively high position in the media and played a significant role in reporting (Działo, Gawrońska-Nowak and Jura, 2017).

Table 3

Overview of international quality standards, which are implemented in Polish agri-food companies

n=21	Implemented for export to the US		Implemented for export to other third countries		Implemented for distribution in Poland		Implemented for distribution to the EU Member States		None standards implemented	
International standards	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
DIN EN ISO 9000 ff (quality management system standards)	1	20	1	20	3	18	4	17	**15**	6
DIN EN ISO 19011 (guidelines for auditing management systems)	0	21	0	21	1	20	1	20	**18**	3
DIN EN ISO 22000 (Food safety management system standard)	1	20	1	20	5	16	5	16	**14**	7
other international standards	2	19	1	20	2	19	3	18	**17**	4
International private standards	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
IFS Food (International Featured Standard)	6	15	7	14	**9**	12	**10**	11	9	**12**
BRC (British Retail Consortium)	7	14	7	14	**9**	12	**10**	11	9	**12**
QS Standard (Qualität und Sicherheit GmbH)	0	21	0	21	0	21	1	20	**18**	3
GlobalGAP	3	18	3	18	**7**	14	**6**	15	13	**8**
GMP+	0	21	2	19	**4**	17	**4**	17	14	7
other private standards	2	19	2	19	2	19	2	19	18	3

Source: own calculations.

Conclusions

The rapid transformation of foreign trade, intensified by the EU's trade policy and novel Free Trade Agreements (FTAs), is a challenge for all stakeholders in the food supply chain. This leads to the need to constantly improve knowledge and skills, in particular in quality management. To better understand the attitude to the FTAs, in

this case specifically the TTIP, this study analysed the trade position and domestic interests of Poland by reviewing the relevant literature and trade figures. Moreover, a survey among experts of the agri-food sector was conducted aimed to examine the awareness of the TTIP and the status of knowledge about the US trade in the context of quality management. The choice of Poland was motivated by its strong position in the EU. The agricultural trade statistics confirm that Poland is one of the leading exporters of foodstuff and a robust global actor as an EU Member State. Consequently, Polish trade activities are taking place predominantly within the European countries. Hence, the US is of minor importance to Poland. In particular, the expert survey focused deeply on the industry. In this respect, the investigated sample of 24 export experts revealed unique results around these challenges. Although the findings cannot be generalized, because the study was conducted on Polish enterprises with a sample that was not representative of the entire Polish agri-food industry, they provide some novel contributions to the current debate on the role of quality standards in the context of the FTAs. The hypothesis was verified. As a result, it has been confirmed that the knowledge about the TTIP and the US-trade is very restricted. Gaps in knowledge and lacks of experience were identified in each specific part. The survey also validated the importance of international quality standards, revealing that private standards play a greater role than the DIN ISO standards.

The key message from this paper is that some necessary improvements should should be made. Firstly, it is essential for export-oriented companies to strengthen their competitiveness in sharing and improving knowledge and skills on foreign trade, in particular the US. Secondly, it is worth encouraging economic development by means of innovative quality management and ongoing elaboration, harmonization of international quality standards. And finally, helping companies acquire the skills needed to realize a high quality management will be equally crucial. Capacity building should be a major goal. These aspects provide some important indications for further research, not only in Poland, but also throughout the EU.

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ROLA ZARZĄDZANIA JAKOŚCIĄ W KONTEKŚCIE TRANSATLANTYCKIEGO PARTNERSTWA HANDLOWO-INWESTYCYJNEGO (TTIP): NA PRZYKŁADZIE POLSKIEGO SEKTORA ROLO-SPOŻYWCZEGO

Abstrakt

Od 2013 roku Unia Europejska prowadzi negocjacje ze Stanami Zjednoczonymi Ameryki w sprawie umowy o wolnym handlu (FTA), transatlantyckie partnerstwo handlowo-inwestycyjne (TTIP). Kontrowersyjnym tematem w negocjacjach są odmienne standardy jakości w sektorach rolno-spożywczych obu partnerów negocjacyjnych. W celu wprowadzenia w życie umowy o wolnym handlu wszystkie państwa członkowskie UE muszą wyrazić zgodę na wdrożenie umowy. Polska jest pełnym państwem członkowskim UE od 1 maja 2004 roku i zdobyła silną pozycję w UE. W związku z tym Polska jako członek unii ma ogromne znaczenie dla polityki handlowej UE. Głównym celem tego artykułu jest analiza polskiej pozycji handlowej i jej interesów krajowych. Badanie miało na celu przede wszystkim zbadanie świadomości na temat TTIP w sektorze rolno-spożywczym, ze szczególnym uwzględnieniem standardów jakości w tej branży. Nie przeprowadzono jeszcze dogłębnej dyskusji na temat tego delikatnego zagadnienia w polskich przedsiębiorstwach tego sektora. W szczególności określono niepewność dotyczącą stosowania i interpretacji międzynarodowych norm w transgranicznych relacjach klient-dostawca łańcuchów dostaw żywności. Z tego powodu zaleca się zdefiniowanie tych niepewności i opracowanie wniosków dotyczących harmonizacji i wykorzystania synergii. Podsumowując, wyniki są istotne dla sektora.

Słowa kluczowe: transatlantyckie partnerstwo handlowo-inwestycyjne (TTIP), umowa o wolnym handlu (FTA), sektor rolno-spożywczy, zarządzanie jakością, normy jakościowe, bezpieczeństwo żywności, Polska.

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APPENDIX 3.3

energies

MDPI

Article

Exploring Sustainable Aspects Regarding the Food Supply Chain, Agri-Food Quality Standards, and Global Trade: An Empirical Study among Experts from the European Union and the United States

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Abstract: Sustainability is increasingly a priority in the policies of the European Union, especially in the Common Agricultural Policy. This paper focuses on Sustainable Development Goals, the European Green Deal, and the Farm to Fork Strategy in an attempt to establish a relationship with the European Union's trade policy. Three selected components of the agri-food sector—the food supply chain, agri-food quality standards, and global trade—are examined in relation to defined sustainability aspects. The aim is to understand the interrelationship between the three components with specific regard to sustainability, to highlight their high complexity and current relevance, to contribute to systematic analysis in this area, and to present current progress. This qualitative–explorative study is empirically supported by a survey of market experts, and the Transatlantic Trade and Investment Partnership between the European Union and the United States is used as an example. The results show the complexity between the relationships of the three components with a focus on sustainability and reveal a deep uncertainty. The most notable results are the limited level of knowledge and the insufficient attention from business representatives to sustainability aspects. Finally, the study identifies the state of integrating a sustainable perspective into European Union trade policy and provides suggestions for further research.

Keywords: agri-food industry; food safety; global supply chains; sustainable trade; quality management; quality standards; farm to fork strategy; European Green Deal; German chambers of commerce abroad; Transatlantic Trade and Investment Partnership (TTIP)

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1. Introduction and Background

One of the most important economic sectors of the European Union (EU) is the production and trade of agricultural products and foodstuffs [1]. In this context, increasing globalization and market integration are becoming a vital concern. As a result, market structures are constantly changing, companies are experiencing increased competitive pressure, and export volumes are rising significantly [2], which is reflected in the EU trade policy [3]. Global agricultural trade is determined by a complex combination of international regulations, agreements, national laws, and requirements. These established regulations aim to ensure the safety of processes and products in the agri-food industry so that the quality and safety of food are guaranteed worldwide [4].

Food quality standards are effective throughout the process chain and are an essential tool for ensuring safe, standardized, and comparable processes and products in international trade [5–7]. Consequently, international quality standards are a key element for successful global trade. Nevertheless, they are considered non-tariff barriers to trade [8–11].

For this reason, there is a risk of complications occurring within the global food supply chain (FSC), for instance, double certification, no recognition of the product, origin identification, and labeling.

In recent years, the EU adopted a number of policies and strategies that address the international trade in agricultural and food products [1]. The most important of which is the EU's Common Agricultural Policy (CAP), which follows three paths to sustainability: social sustainability, environmental sustainability, and economic sustainability [12].

Regarding sustainable aspects in global trade, the European Commission (EC) presented a new trade and investment strategy called "Trade for all", in 2015, which included for the first time a sustainability chapter [13]. In 2018, the EC presented a 15-point action plan, which envisaged a new EU approach to trade and sustainability in its trade agreements and presented a comprehensive set of binding provisions and multilateral standards [14]. The topic of sustainability in trading will thus receive increased attention and obligations in the negotiation of free trade agreements (FTAs) [15].

The European Commission's priorities for 2019–2024 [16,17] include the European Green Deal (hereafter Green Deal) [18,19], of which the Farm to Fork Strategy (F2F strategy) is an integral part [20,21] (Section 1.2).

1.1. Background: Food Supply Chains

We observe currently that FSCs, and in general, agribusiness systems, are transformed into a coordinated food system [22]. This leads to competition not only between individual companies in a food chain but also to competition between supply chains and networks [23,24]. Therefore, research on developing new models for food markets is required. In addition, there is an increase in consumers' demand on food safety and its functionality, consumers require product diversity, higher packaging quality, and the quality of services [25]. The protection of the environment and the economy of sustainable development is nowadays the most current trend [26]. Therefore, food production systems must be operated in a sustainable way [27]. Sustainable production and distribution systems should be implemented as more attention is paid to the relationship between sustainable development and the functioning of supply chains [28].

Sustainable supply chain management has become a focus for business practitioners and supply chain researchers [29]. Issues of climate change, geopolitics, labor conditions in emerging economies, and pressure from stakeholders and supply chain partners all play a role in shifting corporate focus toward the triple bottom line (TBL), the simultaneous achievement of environmental, social, and financial performance [30–35].

In conducting sustainable and responsible trading, it is important to know the market, generate sustainable knowledge, and establish stable FSCs. Sustainable FSCs in international trade activities have the potential to reduce environmental problems and the carbon footprint, mitigate greenhouse gas emissions, and promote responsible business and marketing practices, e.g., fair supply chains without the abuse of power [36].

Currently, sustainable FSC management includes various activities like strategy, risk management, organizational culture, quality and transparency [33,37]. The fundament of sustainable FSCs is to ensure policy coherence at the EU and national levels in agri-food policy. A number of research studies show that short FSCs (SFSCs) lead to sustainable behavior, albeit with complexities [38–40]. A meta-analysis published in 2013 found *"that the degree of sustainability varies among different types of SFSCs, their products, locations*, etc. *Also, various participants in SFSCs may interpret sustainability differently and experience different impacts"* [38] (p. 14). On the other hand, exporting is the driver of international cooperation, economic growth and prosperity [41–44]. Therefore, conducting mutual trade that is sustainable at all levels is essential. The literature has often observed a disruption in the flow along international FSCs because of, for example, differing quality standards, and frequently observed a change in valid standards. This results in wasted time, increased costs, and double certifications see, e.g., [34,45–49]. Thus, the process must be changed in a sustainable manner.

This qualitative study empirically assessed this theory. For this, one section of the survey conducted in this study (Section 4.2.3.) determined the coordination processes with the trading partner along the supply chain using the example of an intended free trade agreement (FTA).

1.2. Background: The European Green Deal and the European Farm to Fork Strategy

The Green Deal marked a tremendous turning point in European sustainable policy. The developed strategies follow a broad approach to foster sustainability in agriculture. These include sustainable food production, sustainable food consumption, sustainable food processing and distribution, and prevention of food losses and waste. These changes could affect global agricultural commodity markets, as the EU is a major agricultural producer and participant in international agri-food trade relations [18,19,50].

We observed that critical voices argue that the Green Deal could also be a potential non-tariff barrier to trade and could complicate further trade negotiations. In this respect, several studies highlight the potential impact of the Green Deal on international trade [50–54] and global dimensions (e.g., on the Global South) [50,55–59]. A currently published US study [50] considered, on the basis of three scenarios, the impact of the strategies over a period of 8–10 years. The results indicate that there will be a general reduction in trade activities in the agri-food industry. The results show eight effects due to the proposed measures: decrease in production, increase in food prices, increase in imports, decrease in exports, decrease in the gross income of farmers, increase in food costs, increase in food insecurity, and decrease in gross domestic product (GDP) [50]. In terms of the impact on international trade, it was predicted that all world regions would experience a decline of 2–4% as a result of the Green Deal [50] (pp. 12–16).

In May 2020, the EC published the F2F strategy [20,21] as part of the European Green Deal [18,19] and made it mandatory for every EU member state, as per the CAP [12]. In addition, the F2F strategy is aligned with the Sustainable Development Goals (SDGs) of the United Nations (UN) [60–62].

The F2F strategy aims to increase the stability of the European food system in many facets and positively change their sustainable impact on third countries [63]. The strategy has a holistic approach and affects many sectors, from farming to food labeling. A comprehensive schedule with a time frame of 10 years defines the transition to a fair, healthy, and environmentally friendly food system in Europe. A key factor in this process for all stakeholders in the food system is gaining knowledge through education and training in achieving sustainable management and operations. The aim of the new European food policy is to implement concrete measures and targets for each stage of the food value chain to increase the stability of European food systems. The mission is to ensure sustainable food production and processing, as well as food safety, by promoting sustainable food consumption and diets, reducing food waste, and addressing food fraud [20,21,63,64].

1.3. Relationship with Sustainability

At the global level, the F2F strategy aims to raise standards worldwide and reduce the environmental footprint by means of international cooperation and trade policy. Initiatives relevant to this study, which were presented by the EC, mainly concerned with economic sustainability, and intended to stimulate sustainable practices, are shown in Table 1. These specific measures were organized with respect to the three main research aspects of this study, and some measures can be assigned to more than one main aspect. The interaction of the theoretical topics presented is illustrated by means of a relationship diagram (Figure A1).

We observed that investigations of sustainability aspects with regard to FSCs, quality standards in the agri-food sector, and global trade (exemplified by a free trade agreement) have rarely been conducted and analyzed in detail. In this context, there has been limited systematic research on the sustainability aspects of this topic. A recent bibliographic analysis of publications showed an increasing interest in sustainable food systems and

revealed that publications in the field of policy and government on sustainable agri-food systems are overlooked [65] (pp. 13–14). Thus, we are aware that this issue is currently very topical and will continue to be relevant in the future. Our work contributes to the systematic analysis in this field and presents the current progress. Moreover, the aim of the online survey was to explore the opinions of trade experts in this context during the preparatory phase of the Transatlantic Trade and Investment Partnership (TTIP), a leading FTA between the EU and the United States (US). Although time has passed since then, transatlantic trade relations are still relevant today and the issues are still important, as we are not aware of any major changes or strong improvements.

Table 1. Initiatives to stimulate sustainable practices, divided into the three main research aspects.

Practices in the Food Supply Chain	Practices in Food Quality Standards	Practices in Global Trade
Development of a contingency plan (2021) for ensuring the food supply and security in times of crisis	Development of a contingency plan (2021) for ensuring food supply and security in times of crisis	Proposal for the revision of the EU legislation on food contact materials (food safety, environmental footprint; 2022)
Develop an EU code and monitoring framework for responsible business and marketing conducted in the FSC (2021)	Stimulate reformulation of standards in processed food (2021/2020)	Proposal to require origin indication for certain products (2022)
Revision to EU marketing standards for agricultural, fishery, and aquaculture products to ensure the uptake and supply of sustainable products (2021–2022)	Proposal for the revision of the EU legislation on food contact materials (food safety, environmental footprint; 2022)	Promotion of global transitions caused due to international cooperation
Proposal for a sustainable food labeling framework to empower consumers to make sustainable food choices (2024)	Work through international standard-setting bodies (e.g., Codex Alimentarius)	Inclusion of ambitious sustainability chapter, including food, in all EU bilateral trade agreements
Proposal to require origin indication for certain products (2022)	Environmental aspects considered when assessing requests for import tolerances (e.g., standards for pesticides)	Environmental aspects considered when assessing requests for import tolerances (e.g., standards for pesticides)
Promotion of appropriate labeling schemes—to ensure that food imported into the EU is gradually produced in a sustainable manner	Promotion of appropriate labeling schemes—to ensure that food imported into the EU is gradually produced in a sustainable manner	Promotion of appropriate labeling schemes—to ensure that food imported into the EU is gradually produced in a sustainable manner

Source: own illustration based on Westhoek (DG SANTE) [64].

One of the characteristics of the agreement is the extent of the economic areas to be incorporated. The EU and the US have the most intensive trade relations in the world. Together, the two economies account for nearly half of the global gross domestic product, about 30% of global trade in goods, and about 40% of global trade in services. The focus of the study was not only on the situation in Germany, but also on the situations in the entire EU and the US. Furthermore, this empirical qualitative study addressed the experience of trade experts from the EU and the US in the development of an FTA while considering the quality standards and focusing on the awareness in the agri-food sector. This study also determined the current state of knowledge and compared the EU and US survey data. We used an online survey to address the questions. The purpose of this research is to understand the complexity of the defined determinants so as to have them considered in trade operations and treaty negotiations. The data allowed us to show the status-quo of knowledge and the impact of an FTA on bilateral trade between the EU and the US, taking sustainability aspects into account. In the following section, the empirical results are presented and discussed. The last section contains a conclusion and suggests further research.

2. Empirical Framework

This empirical investigation is a pre-study to identify the role of quality standards in the agri-food sector in the negotiation phase of FTAs. The specific example of the TTIP, an FTA between the EU and the US, was applied because the TTIP is a critical example of a comprehensive FTA. The study design allowed us to compare the two negotiating partners and focus on sustainability aspects. Based on the SDGs and the F2F strategy, we defined and examined the nine sustainability aspects in Table 2.

Table 2. Nine defined sustainability aspects (examined on the basis of the SDGs) addressed in the online survey conducted in the EU and US.

Sustainable Development Goals	Sustainability Aspects
	1. knowledge of trade, trade agreements, free trade 2. intercultural skills 3. education and training
	4. agri-food quality standards 5. awareness for trade relations 6. prospects of international trade
	7. resilient food supply chains 8. customer–supplier relationship 9. agri-food quality standards

Source: own description according to the SDGs [60–62].

For the empirical part of the study, we used data from an online survey undertaken by representatives of the member states of the EU and the US in 2016. The survey collected data on the trade activities in each country from the agri-food sector and reviewed the knowledge of trade experts.

The objectives of this study were as follows:

- Assess the trade situation between the EU and the US;
- Reflect qualified opinions on the subject matter;
- Explore the level of knowledge of TTIP;
- Frame the complexity;
- Consider the sustainability mindset; and
- Obtain the perspectives not only of Germany, but also of the entire EU, and the US.

3. Materials and Methods

3.1. Profile of Survey Respondents

For a qualitative and valid survey, independent experts engaged in the daily trading business were interviewed. Respondents were representatives of the foreign missions of the Federal Republic of Germany who work for the German Chambers of Commerce Abroad (AHKs). The AHKs represent the interests of the German economy worldwide, and the network comprises 140 locations in 92 countries. These membership organizations have approximately 45,000 membership companies worldwide. The mission and unique characteristic of the AHKs is to open access to international markets for German companies and build a connection with Germany for foreign companies. The AHKs represent the voice of the business community, provide a platform, offer the opportunity to establish valuable contacts, exchange information, attend events and organize specialist events, and act as liaisons with politicians. Moreover, the AHKs support export-oriented companies in the fields of market development, market entry, market presence, and market expansion.

Mostly, the AHKs are the first point of contact in foreign markets for export-oriented companies [66–69].

For this survey, 22 AHKs located in EU member states were invited. In the US, the AHKs have three main locations, in Atlanta, Chicago, and New York, and two branch offices, in Philadelphia and San Francisco [70]. All these AHKs were invited to participate in the US part of the survey.

In addition, experts from the umbrella organization the Association of German Chambers of Industry and Commerce (DIHK), in Germany, and the Delegation of German Industry and Commerce (RGIT), in Washington D.C., which operates as the point of contact for transatlantic economic relations, were invited to participate in the survey [71–74]. All the institutions have been part of the German foreign trade promotion and co-funded by the German Federal Ministry for Economic Affairs and Energy (BMWi) [68]. All invited participants (i.e., men and women) were German native speakers. The selection of experts was not made randomly and arbitrary, but target-oriented and with the permission of each participant. For the qualitative knowledge acquisition, it was very important that the participants would have practical export knowledge and not just theory-based answers.

3.2. Data Collection and Analysis

The Delphi method was used for preparing the methodology and metrics (criteria for organizing and analyzing interviews). The Delphi method belongs to the group of heuristic methods in which the knowledge, experience and opinions of experts in a given field are used. The research consists of conducting a series of surveys among experts. The stages of the research in the Delphi method include: defining the problem, selecting a group of experts, preparation of the survey, analysis of feedback responses, development of results see, e.g., [75–79]. This study investigated the results of an online survey conducted in the EU member states and the US. The online survey was conducted by using the survey software "EFS Survey" from Questback GmbH through the academic program "Unipark." The survey was conducted by using a self-explanatory questionnaire (Section 3.3) in the German language, which was online for 6 weeks in April and May 2016. The experts were contacted individually by personal email and invited to participate in the online survey by clicking a direct link. Participation was voluntary, and responses were analyzed in accumulated form. The data export process and the descriptive statistics of the survey were conducted and analyzed, respectively, with Microsoft Excel. No software program other than Excel Software was used. For categorical and ordinal variables, absolute and relative frequencies were calculated. The exploratory study data are highly qualitative, as it involves a small group of experts who are important knowledge carriers in the field.

3.3. Structure of the Questionnaire

The design of the questionnaire was an important step because the wording of the questions had to be precise and in a structured form (see Supplement S2: Questionnaire and codebook). Based on previous research in the field, important topics were identified for the systematic preparation of questions. First, a prototype of the questionnaire was created with closed and open possible responses. Following this, the questions with the corresponding proposed responses were tested by researchers and master's students. Then we simulated the complete online survey. When the final version of the questionnaire was created, the questions were made more precise and the time required was recorded. This procedure was repeated several times. To structure the analysis, the empirical model was fragmented into the three defined groups and examined with regard to the sustainable aspects of international trade, the characteristics with a focus on quality management (QM) and various attributes of the FSC. The first group of questions was related to knowledge of TTIP (seven questions). The second group of questions aimed to capture the link between QM, trade, and economic growth (five questions). The last group of questions shows the topics of FSC (five questions). In the end, four general closing questions were asked. The questionnaire comprised 21 questions, with closed and open questions, and was validated

by a consistency check and time exposure analysis. For each question, open text fields were provided to clearly express the opinion. Furthermore, the questionnaire contains two filters, one for the survey of the US-AHKs and one for the EU-AHKs, to tailor the questions to the target group. In the introductory part of the questionnaire, the research project was briefly introduced to inform the respondents about the topic and purpose of the research, as well as the timeframe to complete the survey, which was approximately 10–20 min.

4. Results and Discussion

The tables and figures in this section outline the empirical findings of the online survey regarding the nine sustainability aspects examined based on the SDGs and the TTIP by comparing the EU and the US.

4.1. Survey Respondents

Table 3 shows the number and allocation of all survey respondents. Notably, 26 participants from 19 locations completed the survey. Overall, the quota of 65.5% was significant. The difference between the participating locations and the sample size was due to allowing different departments of an individual AHK to participate, for example, the CEO, the agri-food experts, or the legal department.

Table 3. Overview of the frequency of participation.

Focus Group	Locations (Potential Participants)	Participated Locations	Quota	Total Participants
EU-AHKs	22	13	59%	18
US-AHKs	5	4	80%	6
DIHK	1	1	100%	1
RGIT	1	1	100%	1
Total	29	19	65.5%	26

Source: own calculation. EU, European Union; AHKs, German Chambers of Commerce Abroad; US, United States; DIHK, Association of German Chambers of Industry and Commerce in Germany; RGIT, Delegation of German Industry and Commerce, in Washington D.C., US.

4.2. Results for the Defined Sustainability Aspects

4.2.1. Results for SDG 4–Quality Education

The following results reflect the collected data on sustainable aspects 1–3 related to education. Accordingly, the data were examined in terms of (1) knowledge of trade, trade agreements, and free trade; (2) intercultural skills; and (3) education and training (Table 2).

Participants were asked how they rate the level of information on the TTIP negotiations and the content of the TTIP agreement. A comparison was made between the general public of the EU and the US as well as business professionals of the EU and the US. The findings on the level of information on the trade agreement TTIP (Table 4) imply that the general public of the EU (very low level of information ranked 70.6%) and the US (very low level of information ranked 57.1%) are not well informed about the TTIP negotiations and the content of the TTIP agreement. By contrast, the business professionals in the EU (intermediate level of information ranked 36.8%) and the US (intermediate level of information ranked 57.1%) are on an intermediate level of information. Thus, we came to the result that probably the business community is better informed than the mainstream of society. One reason for this phenomenon could be that both groups (according to the experts) are only informed by secondary sources and that both groups considered their access to information as generally very difficult. Moreover, a lack of transparency was criticized by the surveyed participants and therefore an increase in the level of transparency was required.

Table 4. Comparison of the level of information on TTIP negotiations and content of TTIP agreement in the EU and US general public and business professionals.

Level of Information	EU General Public n = 17	US General Public n = 7	EU Business Professionals n = 19	US Business Professionals n = 7
very high	0%	0%	5.3%	14.3%
high	0%	0%	5.3%	28.6%
intermediate	17.6%	0%	**36.8%**	**57.1%**
low	11.8%	42.9%	31.6%	0%
very low	**70.6%**	**57.1%**	21.0%	0%

Source: own calculation. The bold font denotes the highest values. TTIP, Transatlantic Trade and Investment Partnership; EU, European Union; US, United States.

As aforementioned, survey respondents perceived gaining access to information as difficult. Generating knowledge requires information sources that report correctly and comprehensively on a specific topic, supported by facts [74,80,81]. For this reason, survey respondents were asked what source of information they typically use to obtain information and use as a basis for decision support.

The following sources of information were mentioned:

- The mainstream press and public media (e.g., local daily newspapers and the business press);
- Government institutions, e.g., the EC, Ministry of Agriculture, Ministry of Economy of the respective European country, US Administration, and US trade representatives;
- Local economic associations; and
- Business websites and other recommended websites.

On the basis of the cited sources of information, assessing the quality is difficult, but notably, the sources are largely secondary. This result allows us to conclude that the level of information on the TTIP negotiations and the content of the TTIP agreement among companies and experts should increase and that organizations should increase their efforts in gathering information to avoid information asymmetries.

The analysis of export competence in EU and US companies revealed similar results. Participants were asked to assess the level of export knowledge among AHK member companies. Notably, the level of expertise was rated as minimal to good (Table 5). The results imply that the knowledge and global market intelligence of the member companies must be improved in a sustainable manner.

Table 5. Comparison of the degree of export knowledge in relation to the EU and US market; degree of knowledge: strong (+++), medium (++), low (+), weak (-).

	Very Good Knowledge	Good Knowledge	Minimal Knowledge	No Knowledge Present
EU companies	-	+++	+++	-
US companies	+	-	++	-

Source: own calculation. EU, European Union; US, United States.

Relationships with individuals from other cultures play an important role in sustainable trade relations along the FSC. In international business settings, intercultural distinctions are often perceived as obstacles in negotiating and developing a fruitful trade partnership. Therefore, this topic relates particularly to education and training and thus the learning of cross-cultural skills, solutions and international business communication [82–86]. In our investigation, this issue plays an important role in the customer–supplier relationship, discussed in Section 4.2.3.

Furthermore, the experts were asked about education and training in the field of QM regarding global trade relations. They reported (open text boxes of the questionnaire) that the EU and the US have a shortage of specialists in this area or a fear that a shortage could occur; therefore, training and staff development initiatives were rated as very important.

There was approval among the experts that QM training should focus on the various standards and certification mechanisms so that professionals would be sensitized to the subtleties and complexities and understand the complex interrelationships so that they could use them as a decision-making tool in their day-to-day work. In this context, the experts believed that the harmonization of international standards might reduce the level of difficulty of education in QM. Recommendations for international education and training concepts in QM, especially in the agricultural and food sector, have been frequently discussed and conceived, and corresponding programs have been established [87–89]. Nowadays, challenges still remain in the implementation of the concepts and the application of customized solutions. Due to permanent change, the concepts must be constantly modified and adjusted. The impact of the SARS-CoV-2 pandemic has uniquely exemplified the challenges of QM, the risks to FSCs, and the consequences for global food systems [65,90–94]. For sustainable education and training, the concept of lifelong learning and capacity building should be the focus [95–97]. In this context, we highlight a quote by Quendler et al. [96]: *"Globally speaking education is a beautiful, complex, and intricate tapestry in its own right. Many challenges of sustainable development go hand in hand with individual human needs, the solution to which is part of a process of human-centered education. Underlying this vision is the assumption that investing in education can create "manifold dividends" for the SDGs and ensure job opportunities for the next generations. Investment in education and technological change is essential to support this vision"*.

4.2.2. Results on SDG 8—Economic Growth

To understand the economic context for the agri-food sector, we empirically assessed sustainable aspects 4–6. For this purpose, knowledge of (4) international quality standards were surveyed; (5) awareness for trade relations was assessed; and opinions on the (6) prospects of international trade were evaluated (Table 2).

Consequently, participants were asked about their perceptions of the role of international quality standards in global trade. The focus was on the temporal difference between the current situation and the role after the enforcement of TTIP. Table 6 shows no difference between the EU and the US. Both groups reported that the standards play a very large role at the moment and that the role will not significantly change after the TTIP is enforced. None of the respondents opined that international quality standards are not relevant in global trade. In summary, the most important question on the role of international quality standards was answered clearly. The participants agreed that the international quality standards have a major role in global trade at any time.

Table 6. Comparison of the EU and the US on the role of international quality standards in global trade during the TTIP process.

	A Very Large Role	A Major Role	A Medium Role	A Minor Role
EU: at the moment (n = 16)	**43.75%**	**43.75%**	12.5%	0%
US: at the moment (n = 3)	33.3%	33.3%	33.3%	0%
EU: TTIP in force (n = 15)	20%	**46.67%**	13.3%	20%
US: TTIP in force (n = 4)	25%	**50%**	0%	25%

Source: own calculation. The bold font denotes the highest values. EU, European Union; US, United States; TTIP, Transatlantic Trade and Investment Partnership.

For a more intensive assessment of the role of the quality standards, the experts were asked to what extent they assessed the degree of dissemination of the most important quality standards. A difference was made between the international standards of the DIN EN ISO Group and the most known private standards. As a result, only the statements of the EU experts could be evaluated (Figure 1), because the data of the US participants could not be represented graphically, due to the small sample size. All the quality standards surveyed were rated as not widely used or barely used, because other standards are prevalent in the US. The result shows that there are different assessments of the dissemination and thus the

application of the quality standards known in the EU. With respect to the dissemination rate of quality standards in the EU, notably, the DIN EN ISO standards are widespread, according to this survey. Participants reported International Featured Standards (IFS) as the most frequently used private standards (Figure 1). The respondents explained further that in the US, equivalent standards are applied.

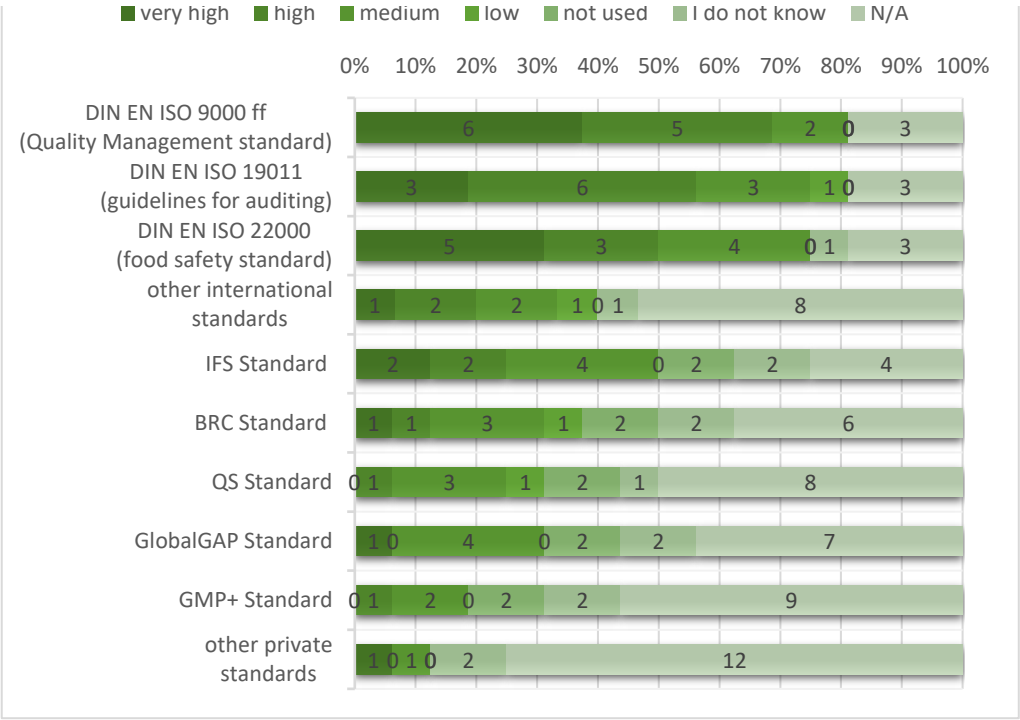


Figure 1. Presentation of the dissemination rate of international quality standards and private standards in the European Union. Multiple answers were possible; n = 159. Source: own calculation.

In addition, participants were asked to estimate what percentage of companies in the EU and the US are certified to international quality standards. On the basis of the responses, a mean of 48% was calculated for the EU, and a mean of 43.75% was calculated for the US. This finding implies that the experts surveyed assumed a certification level of their member companies of less than 50%, i.e., less than half of the known companies fulfilled international quality standards to date.

Overall, the survey revealed substantial knowledge gaps in this area. Respondents were often not aware of the differences between international quality standards and private standards or did not understand them as different basic elements in certification. As a trend, both comparison groups revealed that organic standards are widespread and that their prevalence is increasing.

For sustainable success in global trade and for generating economic growth, trade relations between countries must be recognized within a company, and a strong awareness of trade relations must be implemented in day-to-day business. To obtain opinions on this point, the survey asked the experts about their awareness of trade relations and the TTIP. Basically, a high awareness among EU companies, but with a tendency to a decrease in awareness, was observed (Table 7). By comparison, the US results show a solid, high awareness. Therefore, awareness should be increased and then sustainable economic business success could be achieved.

Table 7. EU and US companies' awareness of TTIP.

	Very High Awareness	High Awareness	Neutral Awareness	Low Awareness	Very Low Awareness	n/a
EU (n = 19)	0%	**26.3%**	21.1%	21.1%	15.8%	15.8%
US (n = 7)	14.3%	**42.9%**	28.6%	0%	0%	14.3%

Source: own calculation. The bold font denotes the highest values. EU, European Union; US, United States.

One of the most important questions regarding sustainable economic growth was which companies would benefit from an FTA. To illustrate an answer to that question, we used the example of the TTIP. In the EU, companies are classified into four groups according to the number of employees: (1) micro-companies (fewer than 10 employees), (2) small companies (10 to 49 employees), (3) medium-sized companies (50 to 249 employees), and (4) large companies (as of 250 employees) [98]. On the basis of this classification, the experts were asked to assess the situation. As shown in Figure 2, the attitudes of the survey participants were different. The respondents from the US reported that micro, small, and medium-sized companies together would benefit more than large companies would. By contrast, the European experts did not consider the opportunities for small companies to be positive and posited that micro-companies and small companies would benefit the least. Notably, 59% of the Europeans believed that only large companies would take advantage of TTIP. The US experts assessed this point differently than their EU counterparts: the former 35% believed that only the large companies would benefit. Overall, Figure 2 shows that per the experts, large companies would be the beneficiaries of an FTA.

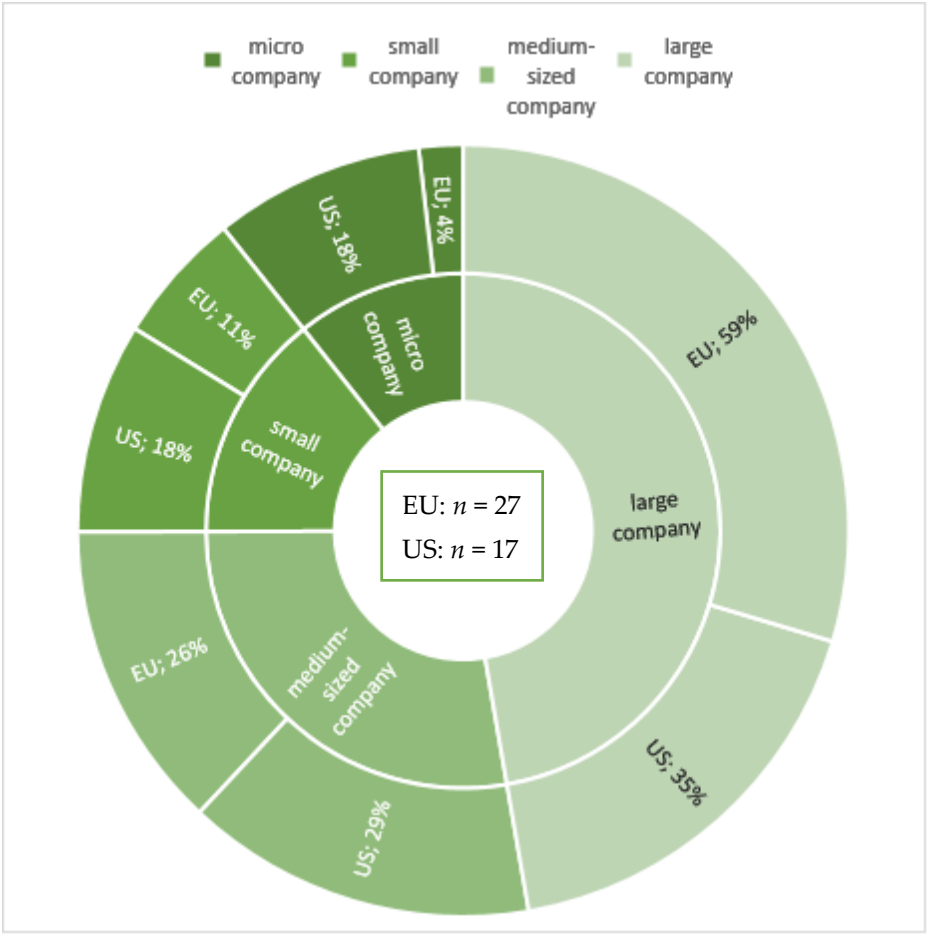
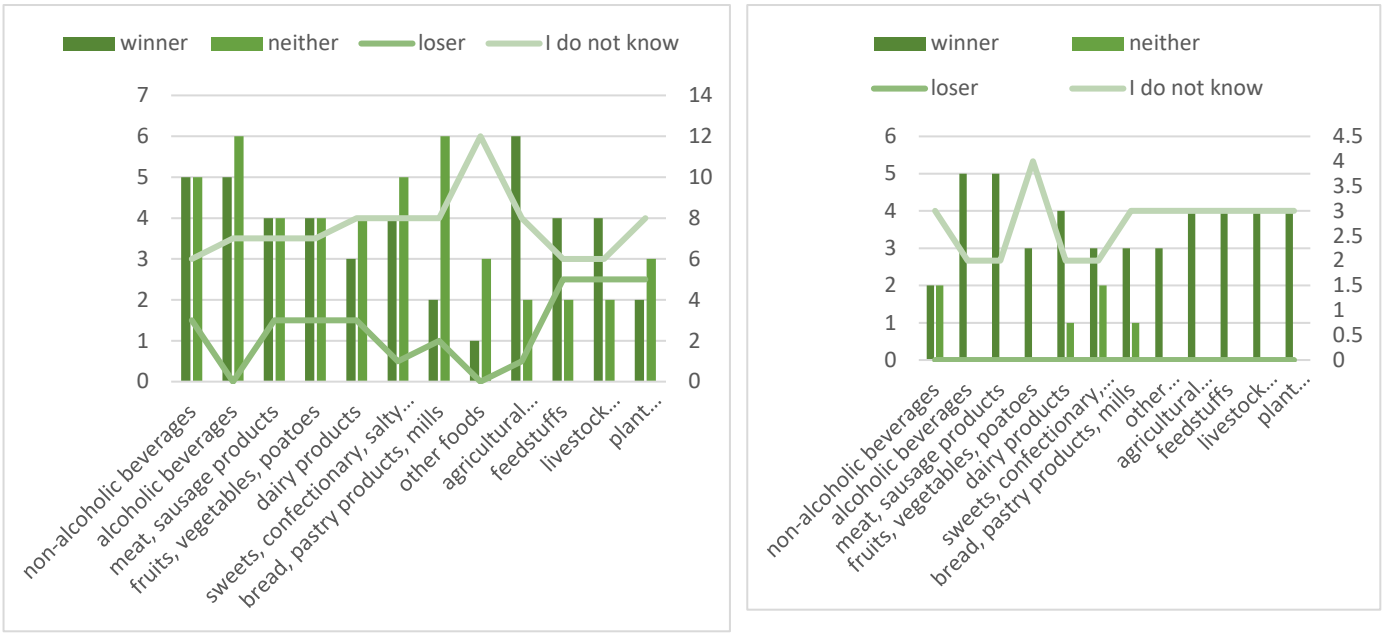


Figure 2. Companies that would benefit from the TTIP. Multiple responses were possible. Source: own calculation.

Another essential question on this area of sustainable economic growth was: Who would be the winners and losers of the agri-food industry due to the enforcement of the TTIP? In developing the question, the most relevant export products and industries of the agri-food sector were included; in the food sector, these were the following: non-alcoholic beverages, alcoholic beverages, meat and sausage products, fruits and vegetables and potatoes, dairy products, sweets and confectionery and salty snacks, bread and pastry products and mills, and all other food products. Among the agricultural industries, the following branches were included: agricultural engineering and machinery, feedstuff products, livestock breeding, and plant cultivation.

The results are shown in Figure 3. The Europeans reported that the sector of agricultural engineering and machinery would benefit the most. Good opportunities were also predicted for the beverage industry and the meat sector. However, they did not report either winner or a loser. By contrast, the respondents from the US reported that the TTIP was positive for industries overall; additionally, they predicted that mainly alcoholic beverage and meat products would be the winners and that the branches of the agricultural sector would have good chances.



(**a**) EU (**b**) US

Figure 3. Winners and losers of the TTIP: (**a**) in the EU; (**b**) in the US; absolute values. Source: own calculation.

4.2.3. Results for SDG 9 and SDG 12—Industry, Innovation, Infrastructure, and Responsible Production

This part of the study mainly refers to the (7) resilience of the FSCs and the (8) customer–supplier relationship, each in the context of (9) the international quality standards (Table 2). The survey results show that at the time of the survey (before the SARS-CoV-2 pandemic), the respondents reported that the state of the FSCs from the EU to the US and vice versa was fundamentally stable and sustainably resilient.

Because international and private quality standards are classified as non-tariff barriers to trade [8–11], survey respondents were asked about their experiences with complications within the global FSC. The results indicate that there have been sporadic interruptions in the FSC due to existing quality standards. The reported interruptions or extensions of deliveries were mainly caused by incorrect certification documents for organic products. Furthermore, the survey participants stated that FSCs could be interrupted if maximum residue levels (MRL) of plant protection products, especially pesticides, are exceeded or if plant protection products are used that are not approved in the destination country. In

the EU, tolerance levels are an important concern, both for imports from the US to the EU and for exports from EU countries to the US. For example, survey participants mentioned EU-produced stone fruit (cherries, peaches, and nectarines), mainly cherries from Poland, which are constantly monitored [99,100].

The opinion of Polish companies of the agri-food sector on global trade and the TTIP was investigated by us through a separate study, where the main objective was to analyze Poland's trade position and its domestic political interests. The results of that study showed a similar opinion of the Polish experts as these present results of this current paper [101]. Our previous study contained the analogical research framework and questionnaire and is therefore comparable.

The participants also reported that in QM, trust in the individual business partners along the entire value chain is of substantial importance. Transparent quality concepts and structures, which can be quickly adapted, if necessary, are an important criterion for trust-building cooperation [102].

The respondents further indicated that an FTA between the EU and the US is not expected to significantly change FSCs. However, changes in the customer–supplier relationship along the entire value chain were predicted (Figure 4). Most European respondents expected the coordination process with US partners to not change much. Again, some people were concerned that when the FTA is enforced, the coordination process with business partners would increase from slightly to greatly; thus, an increased workload was expected. By contrast, the US participants expected the coordination process along the FSC to reduce slightly.

(**a**) EU survey respondents (n = 15) (**b**) US survey respondents (n = 7)

Figure 4. For companies in the EU (**a**) and the US (**b**), the expected shifts in the coordination process of the customer–supplier relationship along the FSC regarding the TTIP; absolute and percentage values. Source: own calculation.

Some participants indicated that cultural differences also play a role in business relationships, due to which the supply chain has been disrupted. In this respect, the experts described different approaches to negotiating in the business process. For instance, some suppliers are *"straight to the point"*, but others expect small talk before the negotiations begin. Thus, gaining knowledge of country-specific negotiation management is particularly important for sustainable business success. Individuals in the US expected those in the EU to have an excellent marketing concept for their products. According to the experts'

self-assessment, some Eastern European countries have shown weaknesses in product marketing and should establish a sustainable marketing strategy.

From the experts' point of view, different philosophies, especially regarding food regulations linked to quality standards, are the most important issues affecting why FSCs are blocked. Thus, the respondents stated that the level of acceptance of the producing and processing processes differs, for example, in the preventive use of antibiotics. At the root of this discrepancy is the fundamentally different approach of the two partners to risk management: the EU's precautionary principle as opposed to the scientific approach of the US. Further bottlenecks in the FSC are often product labels, e.g., genetically modified materials (GMO), preservatives, artificial colors, and flavors.

With regard to the infrastructural aspect of cold chain management, this was considered unproblematic by the experts because interruptions affecting the cold chain were rarely recorded.

For strengthening the FSCs in the long term and making global trade relations more internationally coherent (e.g., more compatible, economical, reliable, and sustainable), survey participants suggested the following options and special needs for export-oriented companies:

- Continually reduce trade barriers and other protectionist measures;
- Fund (from the government) the opening of new export markets, market monitoring, and mentoring in the market entry phase and export promotion programs;
- Harmonize technical standards;
- Harmonize approval procedures along the global FSC;
- Simplify regulations (e.g., clear wording on the legal requirements of ingredients, processes, declarations, and consumer guidelines);
- Defend the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement);
- Increase transparency, especially in the negotiation contents of FTAs;
- Agree to a memorandum of understanding at the intergovernmental level;
- Strengthen the establishment of international partnerships in the private and public sectors (to promote private–public partnerships);
- Adopt strict, uniform consumer protection guidelines;
- Improve the links between academia and industry;
- Strengthen established international partnerships between industry and government;
- Receive additional governmental support for research and development;
- Provide a global platform for exchanging best practices and model projects; and
- Supporting capacity building and education.

The list presented contains no order of priority, as the importance of each need is equal.

The mentioned special requirements for sustainable global trade clearly indicated the interdependencies and the relationship between the three selected components of the agri-food sector—the food supply chain, agri-food quality standards, and global trade. We observed that some of the requirements of the business experts were implemented in the new EU trade strategy, which is important for the agri-food sector.

The EC's 15-point action plan, launched in 2018, conceptually integrated some of the issues and established a set of binding provisions and multilateral standards [14]. The plan also generates more attention and commitments to sustainability in FTA negotiations [15]. In addition, an experts' group on trade and sustainable development has been attempting to resolve the concerns and implement the 15-point action plan [103]. Particularly remarkable is the EU's willingness to strengthen innovations, setting up of partnerships and cooperation with international organizations and the mutual setting of standards, establishment of responsible business practices, increase in funding, and increase in transparency and improving communication by involving civil society. Hence, the measures align with the demands of the experts surveyed in this study. Thus, the EU is aware of the problems experienced by business representatives.

Due to the SARS-CoV-2 pandemic and the objectives of the Green Deal [18,19], a public consultation was conducted in 2020 to review trade policy. This process was followed by

the presentation of the new EU trade strategy in February 2021 [104]. In the context of this review, the topic "Enhancing resilience and sustainability of value chains" is of particular importance for the agri-food sector. The primary objective is to promote sustainability standards across global value chains. Other EU priorities are to strengthen cooperation in Green Deal-related activities, particularly biodiversity, sustainable food policy, environmental protection, and the circular economy. [105] (pp. 15–18).

> *"The Commission will pioneer work on developing standards for sustainable growth and shape international standards in line with the European Green Deal, while engaging with its partners to develop and implement rules that are similarly ambitious"* [105] (p. 17).

In addition, regulatory cooperation at the international level must be further strengthened, and international standards will be further developed with the cooperation of standard-setting bodies [105] (pp. 19–20).

5. Conclusions

The purpose of this research was to understand the relationship and the complexity of the defined three components of the agri-food sector, the food supply chain, agri-food quality standards, and global trade regarding sustainability. We used an empirical survey, which aimed to explore the opinions during the preparatory phase of the TTIP of EU and US trade experts on the defined nine sustainability aspects (Table 2) examined on the basis of the SDGs. The data available from the online survey allowed us to show and compare the level of knowledge on the TTIP negotiations and the content of the TTIP agreement, and the impact of an FTA (in this case, the TTIP) on bilateral trade between the EU and the US by considering sustainability aspects. The comparison between the EU and US participants was conducted to investigate the differences in attitudes and knowledge levels. In addition, the following question arose: What expectations and requirements do trade agreements set for trade operations of agri-food sectors? The results were similar to those we expected, which were derived from our experience of three other studies conducted as part of our research [101,106,107]. Notably, we found evidence for significant differences in participants' attitudes: the US participants were noticeably more positive than their EU counterparts about the expectations of an FTA.

Additionally, the results framed the complexity of the relationship between global FSCs, quality standards, and aspects of global trade in the agri-food sector. The outcomes reveal a deep uncertainty, limited knowledge, and insufficient attention to this issue; a sense of uncertainty was evident in global market intelligence.

The results show that the selected sustainability aspects play an immensely important role for the three components under investigation. Successful global trade of agri-food products along the FSC can only be achieved by integrating elements of quality management and considering sustainability.

The analysis is not exhaustive but reflects multiple factors that shape sustainability measures, particularly in the areas of FSCs, quality standards, and global trade in agricultural products and food. The limitation of this survey was that the sample of experts was small. Eventually, survey respondents identified specific necessities and expressed precise needs for sustainable trade in agri-food products.

The aspects of EU trade policy led us to the general conclusion that there is a strong intention to further develop and strengthen the sustainability aspects examined in this study. In sum, our findings reveal particularly important approaches for policymakers and quality managers. However, discussions of education and capacity building are limited in the EU institutions in this surveyed context, even though it being an SDG. In times of crisis, it is crucial to employ well-trained specialists in the agri-food sector along the entire value chain to guarantee the general high quality of food.

Moreover, this paper exemplified the EU's free trade negotiations with the US with regard to the agri-food sector. We observed that the EU's approach to global trade in agri-food products is currently facing some of its greatest challenges ever. This is not only a result of the SARS-CoV-2 pandemic, but also of protectionism, and likewise the great

demands for continued adaptation to global structural changes in global trade. However, recent discussions among experts indicate that due to the new Biden administration, there is currently a positive atmosphere and favorable business climate between the EU and the US. This positive business climate could be used by policymakers to build new mutual trust and relaunch transatlantic relations, as well as to agree on restarting negotiations of an FTA. By collaborating closely, new and novel ideas could be developed, for example, in the area of food safety in the biotechnology sector. Additionally, we perceive a trend towards more FTAs between the EU and third countries and therefore a necessity for high-quality standards to ensure food safety in global trade.

Finally, because of the attitude of market experts in the AHKs, we suggest that further research should focus on sustainable FSCs regarding global trade and the agri-food quality standards and their relations in the context of responsible acting. One possible line of further research could be deepening the analysis of the types of EU trade partners. In addition, comparisons of other EU free trade agreements with third countries could provide further insights into the mechanisms of international trade activities with regard to sustainability aspects. Overall, additional attention should be paid to agri-food quality standards in national and international research and policy agendas.

Supplementary Materials: The following are available online at https://www.mdpi.com/article/10.3390/en14185987/s1, Supplement S1: List of abbreviations and acronyms; Supplement S2: Questionnaire and codebook.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

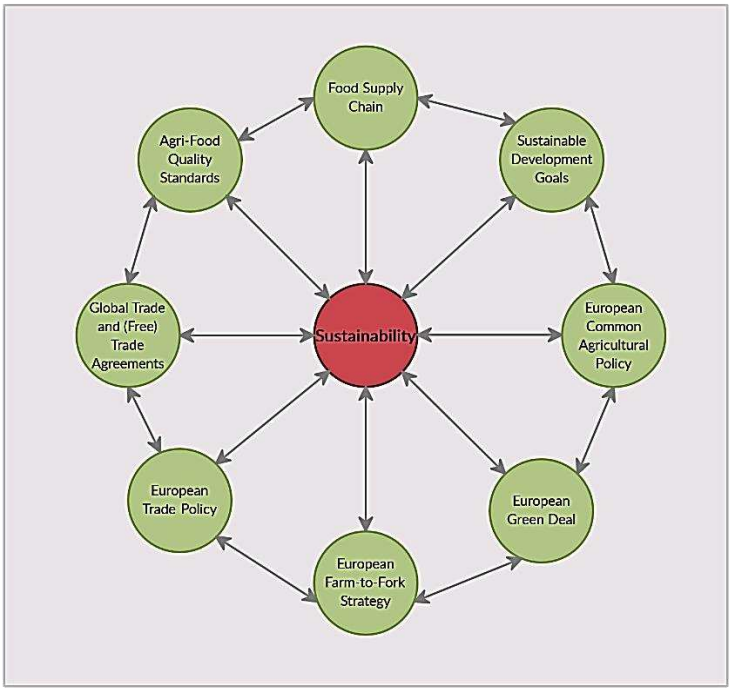

Figure A1. Relationships among the theoretical topics. Source: own illustration.

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APPENDIX 3.4

THE TRANSATLANTIC TRADE AND INVESTMENT PARTNERSHIP (TTIP): THREAT OR AN OPPORTUNITY FOR EU-MEDITERRANEAN AGRICULTURE AND AGRI-FOOD SECTOR? AN EXPLORATORY SURVEY [3]

Abstract

Agricultural and food sectors are well-developed in both the European Union (EU) and the United States of America (US), highly productive and strongly protected. Over last 50 years, much of the current regulations which have emerged does not interfere with abundantly transatlantic trade, while some sub-segments of the markets are still subject to quantitative restrictions, import duties or regulatory barriers. For these reasons, agriculture and food-related issues have always played an important role in trade negotiations. In June 2013, the European Commission (EC) launched negotiations on the Transatlantic Trade and Investment Partnership (TTIP), an agreement that aims to remove barriers to trade and investment between the EU and the US. However, important political responsiveness, regulatory regimes heterogeneity in particular agri-food safety standards are still existing. Furthermore, EU Member States are fairly heterogeneous as regards the relative importance of agri-food trade for their economies. The agri-food industries are of particular strategic interest for many governments. Changes in the EU's Common Agricultural Policy (CAP) and thus the Euro-Mediterranean zone have direct implications for farmers, consumer protection and for the animal welfare. The research question was, if EU Mediterranean countries will benefit from TTIP and what effects would TTIP have on CAP, agri-food quality standards and food safety? The present article attempts to investigate whether TTIP negotiations and CAP instruments and their adjustments improve the prospects that the Euro-Mediterranean regions can be food secure in the future and a sustainable development is possible as well as ensure food safety.

Keywords: Transatlantic Trade and Investment Partnership (TTIP), Common Agriculture Policy (CAP), Agri-food, Food safety, Euro-Mediterranean region.

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1. Introduction

The European Union (EU) and the United States of America (US) are politically and economically closely interlinked and rank among the world's largest economies. Both are members of the World Trade Organisation (WTO). In June 2013, the two partners launched negotiations on a Transatlantic Trade and Investment Partnership (TTIP) (EC, 2013a). It is defined as a bilateral Free Trade Agreement (FTA) with the primary objective of reducing tariff and non-tariff barriers (EC, 2013b). The established food safety and quality standards as well as their certification systems are among the non-tariff barriers and have an effect on trade policy. Due to globalization, trade policy debates have intensified in recent years and more trade agreements have been launched. Not only the major industrial nations but also the developing countries are affected.

The present paper is a sub-study of an on-going research project (PhD studies) aiming to identify the role of quality standards under trade agreements. Under the framework of the entire research project, different EU countries and defined EU zones as well as the US are considered. Therefore, the present study is focusing on the EU-Mediterranean countries. Furthermore, based on TTIP background in the context of the CAP, the investigation has been developed around three specific research questions:

- What benefits do the EU-Mediterranean countries have from TTIP?
- What effects would TTIP have on CAP?
- Will be agri-food quality standards and food safety affected by TTIP?

In order to discuss the effects of TTIP on the EU´s Common Agricultural Policy (CAP), it should be pointed out that the FTA must be integrated into an existing framework of the current world trade regime. Moreover, economic aspects and regional specificities of the EU Member States must be considered. Consequently, the first theoretical part of this paper outlines the rationale towards a new model and simpler CAP 2020+ as well as agricultural trade statistics. Moreover, the differences in EU and US regulatory systems regarding the food law in the context of TTIP are highlighted. It follows a literature review of the most important studies. Based on two studies, the authors have formulated a thesis for the specific research question. To find an answer to the thesis, the third part of this paper describes an empirical analysis, which is based on an online survey. Regarding to this, the results and a conclusion are presented.

2. Theoretical framework

2.1 Rationale towards a new model and simpler CAP post 2020

The relationship between increased trade and food security has been debated intensively for many years, because it is an essential element of trade policies and development strategies of most countries. It is generally acknowledged that an effective trade policy must be consistent with development policy as well as with foreign policy. Thus, the pressure to liberalize agricultural trade in line with the rise of liberal economic policies on a global scale has been growing for the past decades. But how exactly trade liberalization affects food safety and security is a hotly contested question.

Worldwide are over 30% of the active workforce engaged in agricultural work (World Bank, 2014). For the 70% of the world's poor people who live in rural areas, who are also among the most food insecure people in the world, agriculture is their main economic activity (World Bank, 2014). Some 2.5 billion people are engaged in small-scale agriculture on either a full or part-time basis (IFAD, 2013).

At European level, the European Commission (EC) has been reported in 2017, that the European agriculture sector (farming and rural areas) "*is one of the world's leading producers of food and guarantees food security for over 500 million European citizens.*" Accordingly, 22 million people work regularly within the sector. Looking at the broad food sector, 44 million jobs are provided. Short recapped, a large number of jobs depend on agriculture (EC, 2017a). Thus, agriculture sector plays a key role for sustainable economic development. To keep this up, the various measures of the CAP have been set up to support their farmers.

An important component is the trade policy. Basically, the entire CAP has been subject to WTO discipline since 1995 and is "*affected by agricultural concessions granted to a wide range of countries under several multilateral and bilateral agreements*", for instance, with the African, Caribbean and Pacific countries, Mercosur, the Euro-Mediterranean Area, Mexico, Chile and others. "*These preferential agreements must also be compatible with WTO rules*" (Massot, 2017).

In this context, the EU has been set itself the goal of achieving "*a balanced and progressive trade policy to promote globalization*" and sustainable development (EC 2017d). For this purpose, the EU defined specific rules for modern trade agreements, see Box 1.

Box 1: Sustainable development in EU trade agreements.
Source: EC, 2018

The EU and its trade partners must:

- follow international labor and environment standards and agreements
- effectively enforce their environmental and labor laws
- not to deviate from environmental or labor laws to encourage trade or investment, and thereby preventing a 'race to the bottom'
- sustainably trade natural resources, such as timber and fish
- combat illegal trade in threatened and endangered species of fauna and flora
- encourage trade that supports tackling climate change
- promote practices such as corporate social responsibility.

The EU also uses its trade agreements to:

- promote sustainable public procurement
- remove barriers to trade and investment in renewable energy.

With regard to the Agenda 2020 and the 17 Sustainable Global Goals (SDGs) proposed by the United Nations (UN) in 2015, the EU has transposed these themes into EU policies. In this context the agriculture ministers of 69 nations have been *"fully acknowledged their responsibility for improving food security and nutrition, sustainably improving the efficiency and profitability of the food and agriculture sector and the right to adequate nutrition, in particular SDG 2"* (GFFA, 2018). *"Notably, the CAP underpins the policies spelled out in the 2030 Climate and Energy framework, which calls upon the farming sector to contribute to the economy-wide emission reduction target of -40% by 2030 and EU Adaptation strategy"* (EC, 2017a).

To stress out the particular significance, a highly relevant statement of EU-Commissioner Hogan is cited in Box 2.

However, the CAP has long been criticized for its damaging effects on developing country agriculture. Even if EU's food security at short run is not threatened, the real food security challenge affects the poor and smallholders in developing countries including the Mediterranean ones. The CAP should respond to this challenge by promoting an open and stable trade regime for agricultural products (Driouech et al., 2013). With view on the developing countries is a lack of a level playing field in the agricultural sector evident. A study of the Quaker United Nations Office (QUNO) (Clapp, 2014) underlines that compared to the industrialized countries, which are members of the

Organization for Economic Cooperation and Development (OECD), the developing countries paid enormously low subsidies to their own farmers. Hence, the level of state support to the agricultural sector is a key competitive advantage.

Box 2: Statement of Mr. Hogan on behalf of the Commission, 01 February 2017.
Source: European Parliament, 2017

"The agri-food sector is one of the most important and dynamic economic and job-creation sectors throughout the EU and currently supports some 44 million jobs in direct agricultural production and in the food-processing sector. One of the key purposes of concluding trade agreements is to increase employment and income opportunities as a whole as well as for the agri-food sector. Over the past decade, the value of agri-food exports from the EU has increased from EUR 60 billion to almost EUR 130 billion per year. Opportunities to increase food demand within the EU are limited while, at the same time, there is rapidly growing demand in many new markets, including a number of emerging economies. A recently published study confirms the opportunities in twelve major trade negotiations for many agricultural sectors such as dairy, pig meat, cereals, wines and other beverages. The study also reveals the sensitivities for important EU agricultural sectors in some of these negotiations, in particular for beef, sheep meat, rice, poultry and sugar. The Commission fully acknowledges these sensitivities in each individual negotiation and its negotiating position reflects those sensitivities by limiting market access in those particular sectors through the use of tariff rate quotas. Through its Common Agricultural Policy, the EU also provides basic income support, a safety net for market volatility and a wide range of rural development instruments, in particular encouraging farmers to innovate, improve environmental performance, food safety, quality and competitiveness and to explore new market opportunities."

The principal point is that, the CAP, as a central component of the EU's internal policy, must continue to respond to well-established challenges but also has an essential role to play in realising the Juncker priorities (see Box 3). The main challenges are:

- boosting employment, growth and investment;
- harnessing the potential of the bio-economy, the circular economy and Energy Union;
- bringing research and innovation out of the labs and onto the fields and markets;
- fully connecting farmers and the countryside to the digital economy and
- contributing to the European Commission's agenda on migration (EC, 2017a).

Box 3: The common agricultural policy (CAP).
Source: EC, 2017c

CAP is the European Union's (EU) answer to the questions of how to ensure food security, the sustainable use of natural resources and the balanced development of Europe's rural areas. Its aim is to help provide a decent standard of living for European farmers and agricultural workers and a stable, varied and safe food supply for citizens. It also contributes to the EU's priorities such as creating jobs and economic growth, tackling climate change and encouraging sustainable development. The CAP has three interconnected routes to help it reach these goals: income support for farmers (so called "direct payments"); market measures, for example to combat a sudden drop in prices, and rural development.

2.2 Agricultural trade statistics

To underline the importance of trade relations, some statistics are presented. The current trade statistics (EC, 2017e) show that in 2016, the total trade value of world export of the EU28 amounted to 1743.7 billion Euro and the value of imports was 1710.8 billion Euro. Regarding the total agri-food trade of the EU28, the export amounted to 131.1 billion Euro (share of total trade is 7.5%) and import is 112.5 billion Euro (share of total trade is 6.6%) in total.

Concerning to the US the total value of exports from the EU28 to the US amounted to 362.1 billion Euro (share of EU28 total trade is 14.6%). The value of imports from the US amounted to 249 billion Euro (share of EU28 total trade is 20.8%). Regarding to the agri-food trade in 2016, the value was for exports from the EU28 to the USA 20.7 billion Euro and imports from the US totaled 11.2 billion Euro. For exports, the annual rate of change is 4.7% and for imports it is 5.5%. A glance at the Figures 1 and 2 (Appendix I) reveals the import and export figures of selected products, which represent more than 10% of total EU trade with the US.

2.3 Differences in the regulatory system regarding the food law of the EU and the US regarding TTIP

The European agri-food sector is characterized by a complex system of different economic actors. It covers all stages of the food supply chain. In the area of food production, traceability across all stages is essential in order to create high quality and safe products. Each participant has to be in close contact with the upstream and downstream stages. This is known as "from farm to fork" approach (Regulation (EC) 178/2002). In addition to hygienic acceptability, food safety also includes aspects such as genetic modified organism (GMO), safe manufacturing processes and product labelling, which were discussed in the context of the TTIP negotiations. With the aim of ensuring a smooth production process and guaranteed quality standards of the products,

manufacturers from all sectors act according to established national and international standards (BfR, 2018; Regulation (EC) 178/2002).

Barrier-free international trade is based on the application and recognition of common standards. In the context of TTIP, mutual recognition of standards, especially in the agri-food sectors, will play a much more important role than full harmonization (EC, 2016). The EU's TTIP negotiators have always stressed that none of the existing European standards in the agri-food sector will be adapted to US regulations (EC, 2016). For instance, the European Consumer Organisation (BEUC) called on EC, that they *"should strive for upward harmonization in the food area by upholding 'best in class' food safety and consumer protection policies which are currently in place on both sides of the Atlantic*" (BEUC, 2014). Since it cannot be generalized that the EU standards have stricter regulations in all areas, first the regulatory differences have to be considered. Table 1 shows the different EU and US regulations at a glance. Detailed investigations about the regulatory differences were made by Matthews (Matthews, 2014) and Rudloff (Rudloff, 2014). From this, recommendations for action for the negotiations of the agreement were developed.

However, it can be assumed that both TTIP partners are pursuing similar goals despite these differences. Both the EU's general food law (Regulation (EC) 178/2002) and the US Food Law revised by the Food Safety Modernization Act (FSMA) consider at the entire supply chain and tracking linkages to international standards.

Table 1: Overview of the different EU and US regulations.
Source: BEUC (2014)

In brief		
'Precautionary principle'	Fundamental part of risk	Concept not endorsed as a basis for policy making
Societal, economic, ethical or environmental concerns	Taken into account in risk management decision in line with the consumer right to information and choice	'other factors' considered as barriers to trade
Approach to ensuring food safety	Integrated "farm-to-fork" approach	Safety mostly verified at the end of the process
Food risk evaluation	Full scientific assessment by EFSA for regulated products such as GMOs and additives.	Largely relies on companies' own private assessment

The controversial matters in food safety between the EU and the US are repeatedly the Sanitary and Phytosanitary issues (SPS), which are non-tariff trade barriers. The EC has recently been asked by the European Parliament to seriously consider import restrictions on pork, chicken and beef from the US (Haeusling, 2018).

The reasons are worrying lack of hygiene in US meat production, which revealed by The Guardian. The British newspaper claimed to have internal records of the US government on hygiene violations in meat processing. *"A new analysis reveals that as many as 15% (one in seven) of the US population suffers from foodborne illnesses annually"* (Guardian, 2018). The rates at which infectious foodborne illnesses occur in the US are significantly higher than in the EU. The US meat industry is accused of not engaging in serious consumer protection. One reason for the high number of food infections could be a loophole in law. This makes it possible to place Salmonella-contaminated meat on the market, since Salmonella detection does not require the entire batch to be withdrawn from the market. In the US, it has already been requested to revise the legal regulations on contamination with Salmonella. Other reasons for the problems in the meat supply chain are careless handling of animals, poor hygiene, contamination with feces in meat production, and rationalization in processing. Experts pointed out the risk that infectious pathogens spread from carcasses to carcasses and between meat pieces (topagrar, 2018).

3. Literature review

Since the beginning of closely debates on a possible trade agreement between the EU and the US, the question has been asked what economic effects can be expected from an FTA. Therefore, the European Commission has been funded studies to examine these effects and experts analyzed the possible benefits deeply. The groundbreaking studies, which forecast the macroeconomic consequences are presented in Table 2. Furthermore, the models and results are shown. An in-depth analysis (Bendini and De Micco, 2014) summarizes the results of above-mentioned studies as follows:

- According to an EU funded study, TTIP will be beneficial to the EU economy.
- Not all EU Member States will benefit equally from the conclusion of the agreement, however.
- Studies produced by CEPR (CEPR, 2013) and ECORYS (Ecorys, 2009) have stressed that most gains would come from regulatory approximation and that the benefits from tariff cuts would be limited.

- The CEPR (CEPR, 2013) study was based on calculations for the EU as a whole and do not provide projections for individual Member States.
- The study published by Bertelsmann (Felbermayr et al., 2013a), used an alternative method and pointed out that north and Western Europe are projected to benefit greatly from TTIP.

As part of the literature review, the study about awareness of TTIP abroad by Konrad-Adenauer-Stiftung (Maier, 2014) as well as the WTI study "TTIP and the EU Member States" (World Trade Institute, 2016) were considered in detail.

It was found that the results of both studies are a general assessment in all branches. Furthermore, the thesis that has been developed, based on the findings of the same studies, was: In the EU countries the attention for TTIP negotiations is not high and so far, not been reflected about lasting implications. In addition, up-to-date studies were lacking on how stakeholders, in the EU-Mediterranean agri-food sector, have addressed these issues. The aim was, to examine the thesis based on an empirical analysis, which has been explained in the next chapter.

Table 2: Overview about the macroeconomic studies, models and results.
Source: Ecorys, 2009; CEPR, 2013; CEPII, 2013; Felbermayr et al., 2013a; Team Stronach Akademie (2015); Ankenbrand, 2015

	ECORYS[4] (2009)	CEPII[5] (2013)	CEPR[6] (2013)	Bertelsmann/ifo[7] (2013)
CGE[8]	GTAP[9]	MIRAGE[10]	GTAP	Gravity model
used datasets	GTAP 7	GTAP	GTAP 8	not specified
non-tariff barriers	Ecorys	CEPII and Ecorys	Ecorys	ifo Institute
forecast period	2008-2018	2015-2025	2017-2027	10-20 years
number of scenarios	7	5	5	3

[4] Ecorys is an international company providing research, consultancy and management services http://www.ecorys.com/about/profile-and-history
[5] CEPII is a French research center in international economics which produces studies, research, databases and analyses on the world economy and its evolution. http://www.cepii.fr
[6] Centre for Economic Policy Research. London. UK. https://cepr.org/
[7] ifo Institute – Leibniz Institute for Economic Research at the University of Munich. https://www.cesifo-group.de/ifoHome/CESifo-Group/ifo.html
[8] CGE is a Computable General Equilibrium Modell. https://www.gtap.agecon.purdue.edu/models/cge_gtap_n.asp
[9] GTAP is a Global Trade Analysis Project. https://www.gtap.agecon.purdue.edu/about/project.asp
[10] MIRAGE is for Modelling International Relationships in Applied General Equilibrium. https://www.gtap.agecon.purdue.edu/resources/download/1256.pdf

tariff reductions to goods	75%-100%	100%	98-100%	100%
reduction of non-tariff barriers	25%	25%	25%	not specified
Change EU GDP[11] in %	0.32-0.72	0.0-0.5	0.02-0.48	0.52-1.31
Change US GDP in %	0.13-0.28	0.0-0.5	0.01-0.39	0.35-4.82
Change bilateral EU Exports in %	not specified	49.0	0.69-28.0	5.7-68.8
Change total EU Exports in %	0.91-2.07	7.6	0.16-5.91	not specified
Change EU real wages in %	0.34	not specified	0.29-0.51	not specified
rate of unemployment in %	unchanged	unchanged	unchanged	-0.42

4. Empirical Analysis

4.1 Background

Based on the formulated thesis in the literature review, an empirical analysis has been conducted. As a primary objective has been defined that the survey should focus exclusively on agri-food industry. In order to obtain a qualified opinion on the topic, the evaluation should only be carried out by market experts based in the EU-Mediterranean countries.

4.2 Material and Methods

To answer these research questions, fresh data were collected from a self-administered online survey. The survey was carried out by means of a software "EFS Survey" of Questback GmbH within the academic program "Unipark". The Euro-Mediterranean area target countries were Croatia, France, Greece, Italy, Portugal, Slovenia and Spain. As for the online survey participants, the experts of the German Chambers of Commerce Abroad (AHK) have been selected. The selection was based on the fact that their employees are intensive market knowledge in the respective country (DIHK, 2018). Respondents were personally invited. From the individual AHK several persons per country could participate. Only the personally invited persons have received a link to the website to complete the questionnaire. Participation in the survey was voluntary and anonymous and precise instructions on how to fill in the survey have been given. The questionnaire used mainly close-ended questions (Likert-Type Scale), allowing free text inputs and comments.

[11] GDP short for Gross Domestic Product

The survey was made available between a period of 6 weeks in 2016. It was structured and developed into three technical sections and one section on demographic data:

- First section: seven questions regarding TTIP
- Second section: five questions about trade with the US
- Third section: five questions regarding quality management in agri-food sector
- Fourth section: four general questions/ statistics.

4.3 Online survey findings and discussion

The following charts outline the most important empirical findings regarding the research question. The order corresponds to the structure of the questionnaire. The results are subjective assessments and provide insights about TTIP in the EU Mediterranean countries, specifically in the agri-food sector.

First section: questions regarding TTIP

In order to be able to assess the level of knowledge about TTIP, the degree of information about the negotiations and the content of the contract had to be requested. It was shown how the population in the country is informed in comparison to the agri-food economy. The results in Figure 3 clearly show that the population in the EU-Mediterranean countries has a very low level of information on the topic. In comparison, it has been assessed that the agri-food sector is rated as average to low informed. It is noticeable that according to the respondents, nobody has high or very high knowledge of the TTIP negotiations and its contractual content.

One reason for this can be, that access to the information is not without barriers. The access to information was considered as generally very difficult. To an identical result came a media analysis which was carried out at the same time. In this, consumers were identified as uninformed and non-expert (Pietrzyck et al., 2017).

In a different investigation conducted with non-experts, it has been reported that only 50% of surveyed population had heard of TTIP before this survey. "*However, the level of knowledge of TTIP was quite low, only 6% of the respondents knew in-depth what the agreement comprehends*" (Västi, 2016).

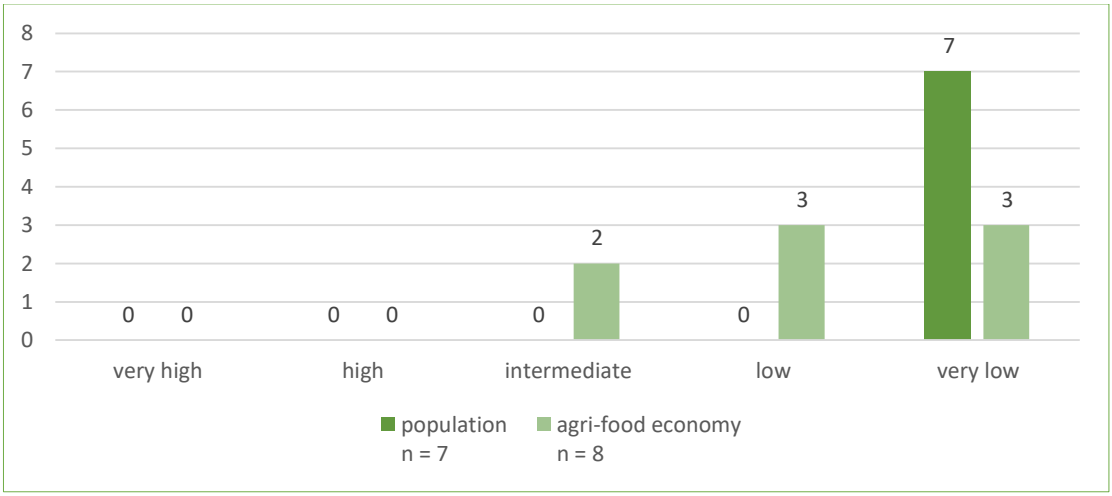

Figure 3: Level of information about TTIP negotiations and/or content of TTIP agreement in 7 EU-Mediterranean countries. *Source: own calculations*

One of the most important question was, which companies will take advantage of TTIP. The results of Figure 4 point out that, in the opinion of respondents, especially large companies (70%) will be deriving advantage from the TTIP agreement. Nobody suspects that it will be beneficial for micro or small companies. After all, two respondents (20%) believe that the agreement could also benefit medium-sized companies.

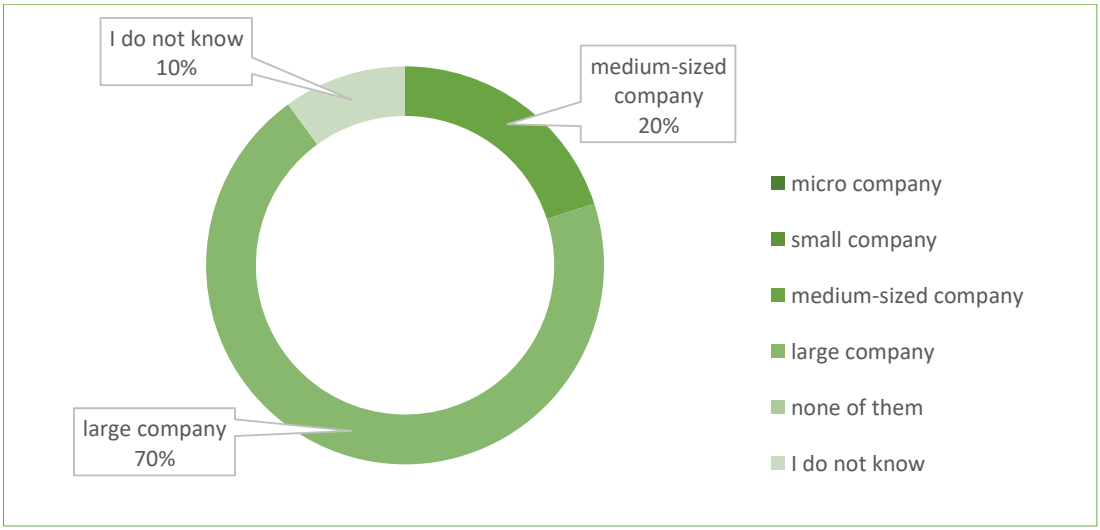

Figure 4: Total and share, which companies will take advantage of TTIP (n=10)

Source: own calculations

Another important question was, who will be the winners and losers of the agri-food industry on TTIP. The results are shown in Figure 5. The participants have been voted, that the beverage industry, which includes non-alcoholic and alcoholic beverages, will benefit the most. Moreover, the sector of agricultural engineering will be one of the winners. Secondly, it has been noticed, that

the most industries should not have any winners or losers, because there are not clear indications. For example, there is a balanced result at the dairy production industry, which is a focused industry in the TTIP negotiations. Most other industries show a similarly balanced result, e.g., meat, fruits and vegetables, bread and pastry as well as livestock breeding and plant cultivation industries. It should be highlighted, that the sweets and snacks industry will be a stable economy. It has been recognized, that no one in the agri-food sector might be TTIP's total losers.

In another study with different approach, Felbermayr et al. (Felbermayr et al., 2013b) had concluded that:

- EU trade with neighboring states in North Africa or Eastern Europe would decline by an average of 5% from the comprehensive agreement. This results from the circumstance that TTIP partially devalues existing preference agreements.
- A free-trade agreement between the United States and EU has important welfare effects on the countries directly involved, and on countries that are only indirectly affected by the agreement. Within the EU, as well, there are differences cutting across the countries. Within Europe, the Baltic States benefit most from eliminating tariffs in trade with the United States. Relatively high gains arise also in Great Britain and in the countries bordering the Mediterranean. Germany can expect an increase in real, per capita income of 0.24%. Located at the other end are France, the Benelux countries, and Austria, with its neighbors. The average is 0.27%.

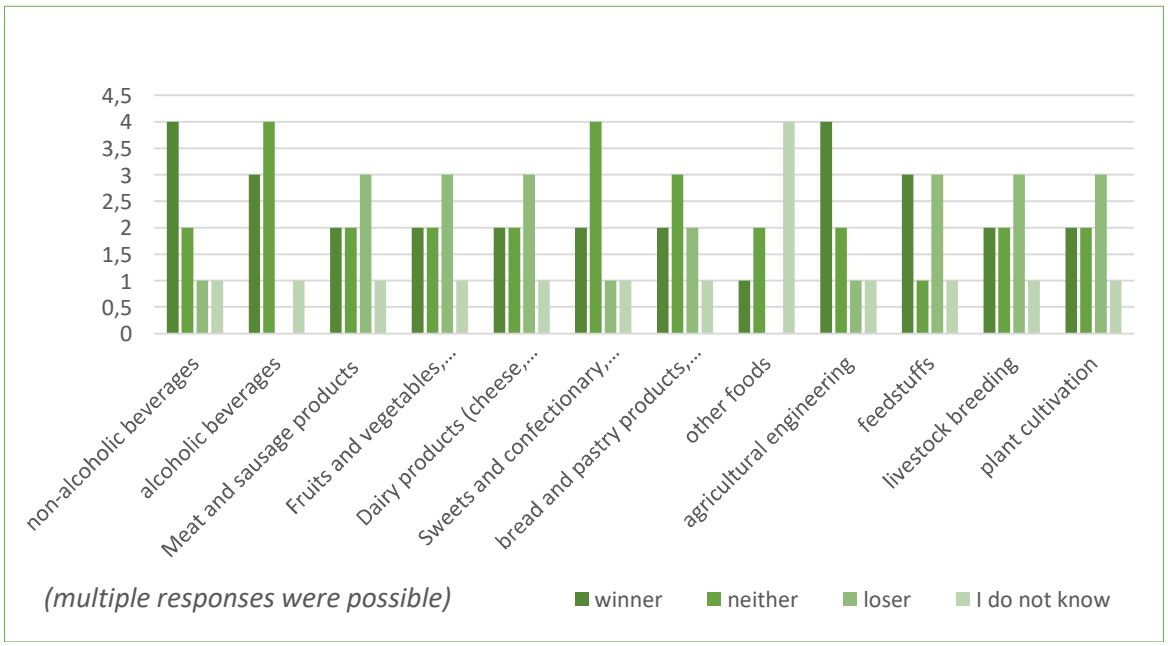

Figure 5: Presentation of expected winners and loser of TTIP. *Source: own calculations*

Second section: trade with the US

In order to establish trade relations with other countries, it is important to have in-depth economic knowledge of the trading country. For this reason, it was important to know, as distinctly the export competence concerning the US market in the seven EU-Mediterranean countries is. The following Figure 6 highlight the results. With regard to export competence, it is noted that the level of expertise is scored minimal. There is a need to improve the skills.

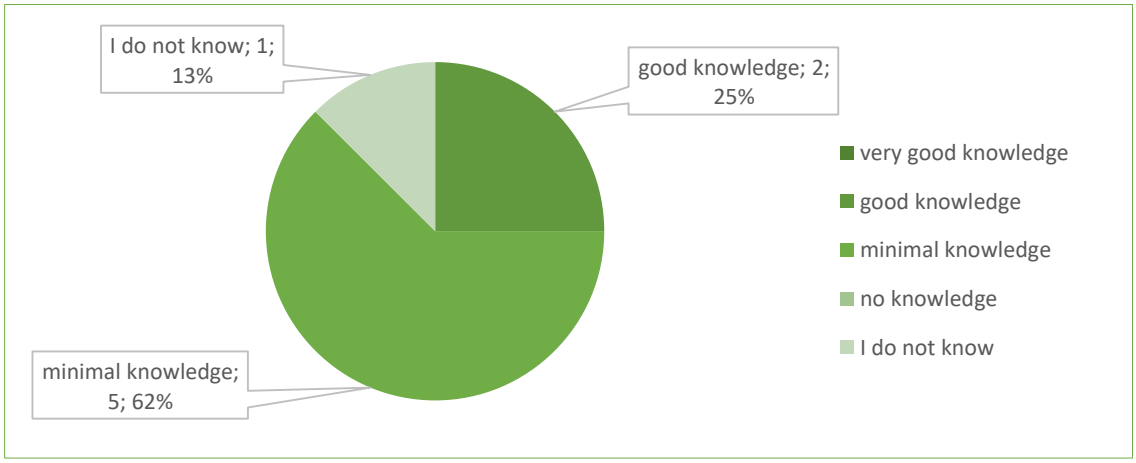

Figure 6: Display the export competence regarding the US-market of the seven EU-Mediterranean countries (n=8). *Source: own calculations*

It was expected that the EU-US partnership will have an impact on the customer-supplier relationship. Associated with this, the coordination process between the partners will change along the entire value chain. By means of the question, how will the approval process along the value chain develop over the next twelve months, it can be concluded, that the customer-supplier relationship will not change or will maybe intensify (see Figure 7).

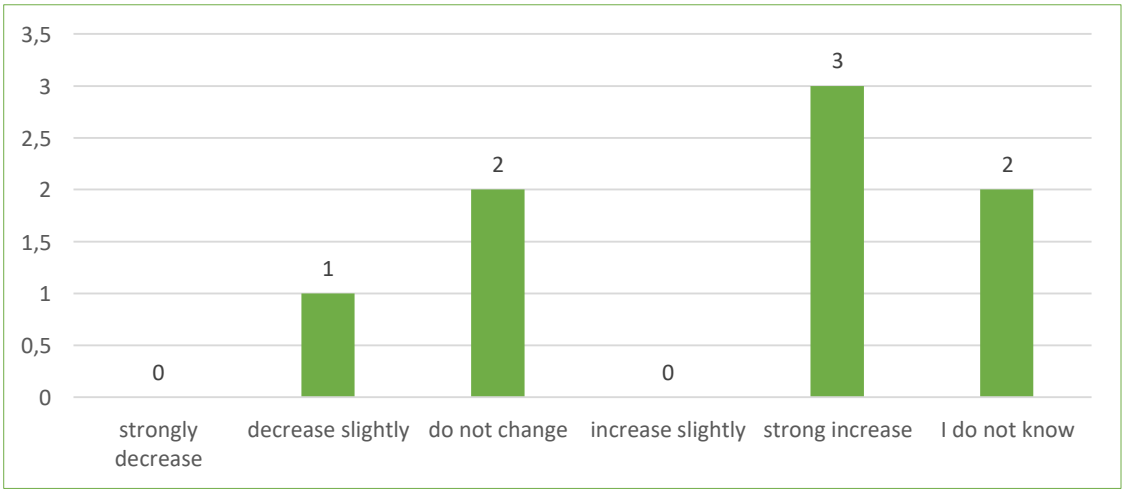

Figure 7: Expected transformation of the approval process along the value chain (customer-supplier relationship) due to TTIP (n=8). *Source: own calculations*

Third section: quality management in agri-food sector

The question about the role of international quality standards in the agri-food sector was answered clearly. Figure 8 shows that over 60% of the participants agreed, that the standards have a very large or major role.

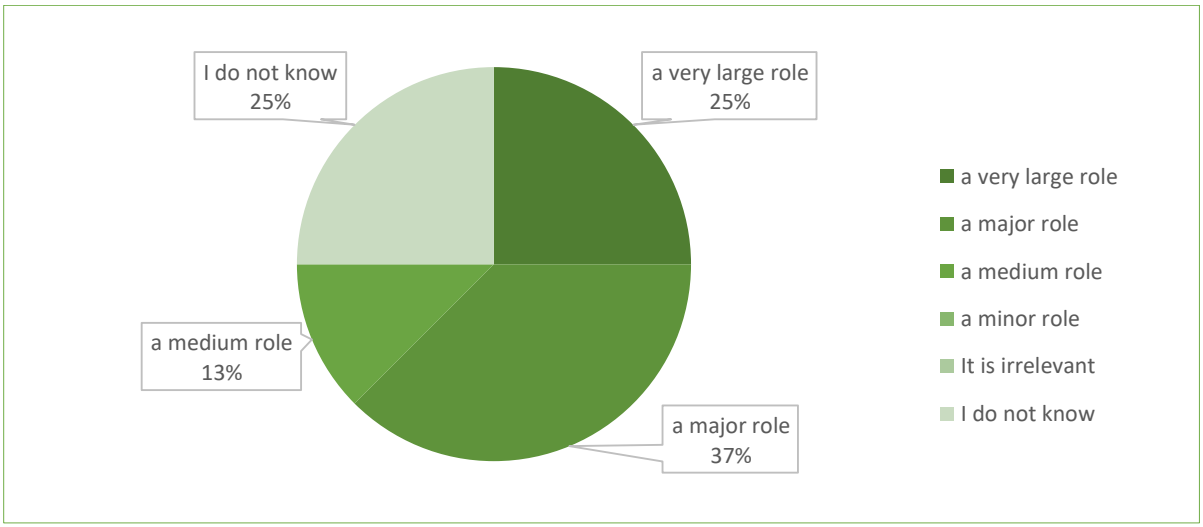

Figure 8: Role of international quality standards in global trade in total and percentage share (n=8). *Source: own calculations*

In a study on TTIP carried out by the German Federal Association of Green Business (UnternehmensGrün e. V.) had reported that the "*harmonisation of standards would represent an existential threat to many companies in the farming sector and to many medium-sized processing businesses in the food production sector"* (Büchel and Reute, 2015).

5. Summary and Conclusions

The results of this study show the complexity of the relationship between the CAP instruments and the planned free trade agreement TTIP as well as the quality standards in the agri-food sector and food safety with focus on the EU-Mediterranean countries. It is clearly stressed out, that there is a need to coordinate the CAP with the EU trade policy.

There is an absolute need for more transparency of the TTIP negotiation, because the results of the online survey confirm the thesis that in the EU countries is the attention for the TTIP negotiations not very high and it has so far not been reflected about lasting implications.

Because of the current trend towards more trade agreements due to growing global markets and globalization, it is essential to ensure high standards of food safety and advance the process of

international standardization. The resulting challenges consisted of developing know-how, increasing international competitiveness and seeking pragmatic regulations (Petersen et al., 2017). In order to tackle these common challenges, well established networks of professionals from a variety of thematic areas have to build up between the EU and the US. To be effective and to achieve the aims of the CAP's objectives, it must take account of the trade policy. It is of prime importance that the agri-food trade will be integrated into CAP instruments beyond 2020 as well.

It could be concluded, in case the negotiations regarding TTIP will be reactivated or opened, that an independent academic study and investigation on agricultural implications of TTIP in the EU-Mediterranean countries should be carried out. The research must be progressed further and continued.

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Appendix I: Overview of trade statistics regarding selected products

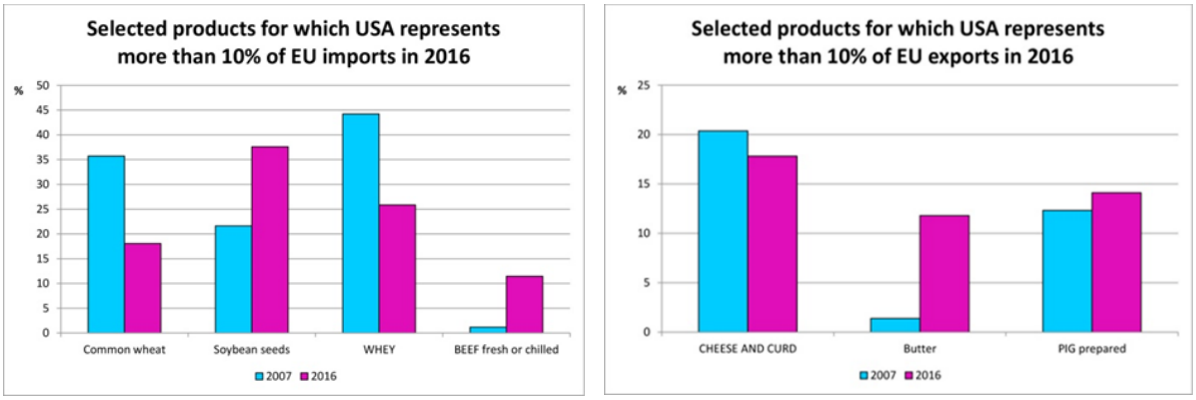

Figure 1: EU´s import and export of commodities, which represent more than 10% of total EU trade with the US: comparison of 2007 to 2016. *Source: EC (2017b)*

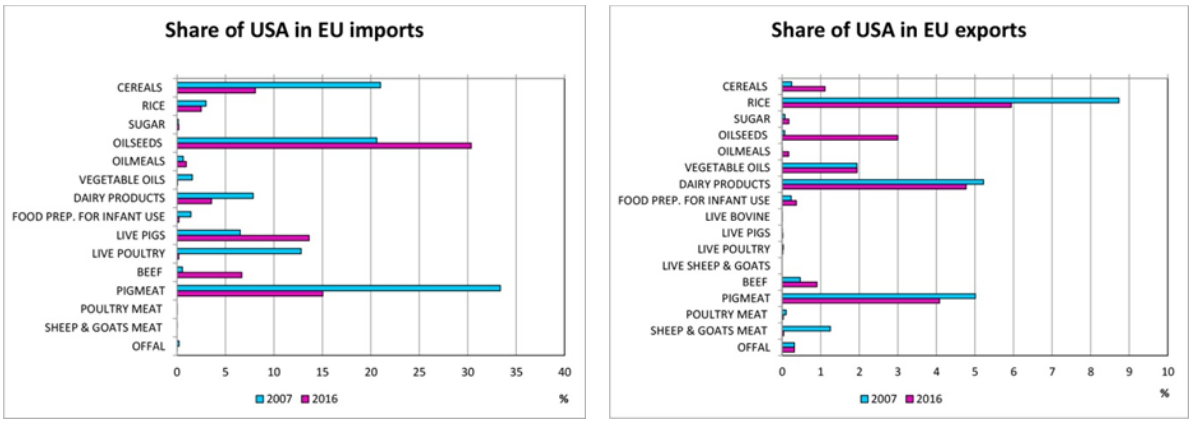

Figure 2: Share of US in EU´s import and export by commodity: comparison of 2007 to 2016

Source: EC (2017b)

agriculture

APPENDIX 3.5

MDPI

Article

Understanding the Importance of International Quality Standards Regarding Global Trade in Food and Agricultural Products: Analysis of the German Media

Katja Pietrzyck [1,*], Nora Berke [1], Vanessa Wendel [1], Julia Steinhoff-Wagner [1], Sebastian Jarzębowski [2] and Brigitte Petersen [1]

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Abstract: Rapid globalization of the agrifood industry has important impacts on international trade and quality management (QM). Likewise, the European Union has negotiated a series of bilateral free trade agreements. Of note was the Transatlantic Trade and Investment Partnership (TTIP) with the United States of America, where the debate focused on the mutual recognition and harmonization of quality standards, especially for agricultural and food products. This topic offered the mainstream media excellent substances for coverage. This paper explores German print media, television, and radio on the importance of international quality standards in the agrifood sectors in light of the TTIP. A quantitative and qualitative empirical content analysis was performed to investigate media reporting regarding (a) it is scientific character, (b) the use of the term "quality standards" of the agrifood industry, and (c) the reporting on the agrifood industry and QM linked with TTIP, focused on harmonization. The results showed that interrelations between QM and global trade were not presented to recipients in-depth. A trend toward information asymmetries in recipient's knowledge is indicated. The study addresses recommendations for future collaborations between media, policy-makers, and further cooperation in the mutual recognition and harmonization of quality standards and control procedures within global trade.

Keywords: quality standards; quality management; food safety; free trade agreement; global trade; agrifood sector; transatlantic trade; transatlantic trade and investment partnership

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1. Introduction

In the European Union (EU), several regulations on food safety and quality management (QM) in the agrifood sector apply to all Member States. In 2002, the EU substantially revised food legislation and set its main objectives. These are the protection of public health, plant health, and animal health with the observance of animal welfare, protection against fraud, and proper information; see Article 5, General Food Law (Regulation (EC) No 178/2002) [1]. The EU's main objective is, therefore, to apply, promote, maintain, and defend these principles of high food safety standards [2].

The rapid globalization of the agrifood industry has important impacts on international trade and QM. To foster fair world trade, the EU has been negotiating so-called second-generation free trade agreements (FTAs) bilaterally with other states for several years [3,4]. In the negotiations, the topic of harmonizing standards—as well as the agrifood sector—came up on the agenda regularly. The Transatlantic Trade and Investment Partnership (TTIP) between the EU and the United States of America (US), which has been negotiated since June 2013, is a leading example [5]. After 15 rounds of negotiations and the election of the 45th US President, Donald Trump, the activities were paused in 2017 [6] and declared obsolete in April 2019 [7]. On 25 July 2018, the two partners launched a new phase

of the Transatlantic Partnership [8] and agreed on a joint declaration. With this, they agreed to completely eliminate tariffs, non-tariff barriers to trade, and subventions. They also agreed on a close dialogue on standards to facilitate trade [9]. Consequently, on 18 January 2019, the European Commission (EC) presented the first drafts of negotiation mandates [10] and the US announced their negotiating objectives for a trade agreement [11]. With the election of the 46th US President, Joe Biden, on 20 January 2021, much optimism has been expressed by the EU side and in Germany that the new administration will inject new impetus into transatlantic trade relations [12–15]. This is a clear sign that trade relations between the two partners are gaining momentum and the mainstream media will once again report on the negotiations, with the aim of improving recipient's knowledge.

This study provides an overview and contributes to existing knowledge surrounding media coverage of FTAs for quality managers and political decision-makers, as well as the media competence (see Table S2) of recipients. Given today's globalized markets, it will be of great significance to understand the influencing mechanisms of media reporting on recipient's knowledge and acceptance. With this knowledge, policy-makers could adjust free trade developments and transparency, and the agrifood industry could further improve product quality and quality standards that require a high level of safety. The retrospective media analysis is therefore of enormous strategic value. For the democratic decision-making of recipient's, the mandate of the media is to report neutrally and comprehensively on contemporary events. Thus, it is worth reviewing and analyzing media coverage during the TTIP negotiations since 2013 on the crucial issue of mutual recognition and harmonization of quality standards in the agrifood sector (AFQ Standards). It is well known that mainstream media have a multiplier function, acting as information providers and opinion influencers [16,17]. The present study centered on the regulations of the European General Food Law, international DIN EN ISO standards, and private standards. The principle of providing proper information to the public is anchored in the EU's General Food Law [1]. Therefore, it was investigated whether the German public media and other selected mainstream media followed this principle in their reporting.

Germany is the US's third most important EU trading partner [18]; therefore, this study focuses primarily on the analysis of German print media and electronic media. The applied research method was an empirical content analysis (ECA), which was combined with a guideline analysis for quantitative and qualitative evaluation [19].

2. Literature Review

Since the beginning of TTIP negotiations, there has been intensive media discussion about the possible effects of the FTA on European consumer protection standards and the EU's food quality policy, as the two partners pursue fundamentally different approaches in practice. Although the EU has always emphasized that none of the existing EU standards in the agrifood sectors will be lowered in line with US regulations and thus no compromises will be made, a public controversy has arisen.

As Matthews (2016) [20] recognized, several disputes regarding food safety standards, notably the sanitary and phytosanitary measures (SPS), were the focus of public debate. He noted that the discussion of the potential impact of a possible FTA between the US and the EU on EU's food standards had attracted a high degree of attention and immense distrust among the public. For instance, Matthews (2016) [20] mentioned the EU import bans of hormone-treated US beef and pork treated with growth-promoting additives. The typical US treatment of poultry washed with antimicrobial rinses to reduce the number of pathogens was specifically highlighted [20,21].

Following the TTIP negotiations, the media also reported on the use of genetically modified organisms (GMOs), as both partners have different standards in this field. Vigani and Olper (2013) [22] have confirmed, by utilizing a composite index on GMO regulatory restrictiveness, that the US, a GMO user, is polarizing compared to the EU, a non-user. Regarding the role of the media, the same empirical study found that reporting on food safety issues is skewed toward predominantly negative headlines. This implied that

the media play a fundamental role in determining the stringency of GMO standards, as their reports create stricter GMO standards and other political distortions [22]. Further, it was identified that the majority of the population is uninformed about the GMOs but is nevertheless vehemently opposed to their use and has a negative attitude toward their use [23–26]. Opponents of GMOs used this attitude in all media platforms to anchor the risks of GMOs in people's minds by "creating images that spring from the imagination".

Public information on food safety issues is generally considered problematic [27], because it is more frequent and widespread than it has been traditionally, thus increasing public awareness of the risks. Therefore, the provision of proper facts plays a special role in media coverage. Moreover, the agrifood industry has evolved from national to international in scope, meaning that food safety concerns must be placed in a global context. As such, mainstream media provide a platform for shifting public discourse and influences the political agenda concerning global food safety topics.

As the issues of food safety and agriculture have drawn the attention of the public and the media, several research projects with references to global trade were conducted to examine the interaction between media coverage and agriculture [26,28–30], food safety [26,27,31–34], and related consumer behavior [4,35–40].

Two revealing papers addressed the assessment of the media's coverage of the TTIP: Conrad (2018) [41] provided insight into the EU's image in US newspapers during TTIP negotiations. The Irish media were investigated by Finnegan (2018) [42] for coverage of the TTIP and the Comprehensive Economic and Trade Agreement (CETA) between the EU and Canada. The aim of the study was to investigate the media reporting about AFQ standards during the preparatory phase of the TTIP-FTA, which is of importance for the understanding of the international quality standards regarding global trade in food and agricultural products.

3. Methodology and Data Collection

3.1. Design of the Media Analysis

A widespread method suitable for media analysis is ECA [43]. It is used for the logical-systematic, intersubjectively comprehensible description of content, and formal characteristics [44,45]. Systematic, in this context, means that each analysis is based on an individual category scheme that provides the analyst with precise work instructions [43].

This study aims to examine the motives and attitudes of journalists and their impact on the recipient, thus revealing trends in reporting on the scope of agrifood industry issues related to TTIP negotiations, as well as the temporal evolution of coverage of the defined thematic.

The key techniques of the applied ECA were frequency, valence, intensity, and contingency analyses. In this investigation, quantitative and qualitative ECA was performed. For quantitative data analysis, a category scheme with sample code sheets and coding guidelines was developed [43].

To supplement the ECA, guidelines for qualitative data analysis were designed [44]. The questions in the guidelines were derived from the hypotheses that were formulated. For verification, the media content compiled was analyzed descriptively.

The analysis period was set from the start of TTIP negotiations in June 2013 to December 31, 2016. The contributions from the media types of print, television (TV), and radio were analyzed, with only German contributions being considered. To make the content analysis procedure intersubjectively comprehensible, the analysis was grouped into four phases: planning, development, test, and application [43].

3.2. Analytical Framework: Definition of Research Objectives and Hypotheses

This study is geared toward the systematic search, evaluation, and synthesis of political and research evidence on the importance of international quality standards for global trade in food and agricultural products in the context of FTAs. The following main research questions (Box 1) reflect the research interest and the topic of the analysis.

Nine sub-research questions were prepared, resulting in nine hypotheses (Table 1).

Table 1. Sub-research questions with the corresponding hypotheses of quantitative and qualitative media analysis.

Sub-Research Questions	Hypotheses (H)
Quantitative Media Analysis	
Frequency	
1. What kind of frequency does the TTIP have in print media, TV, and radio?	H1: The frequency of the TTIP in the media is high.
2. What kind of frequencies do the agrifood industry and QM issues have?	H2: The frequency of the agrifood industry and QM issues is not very pronounced.
Temporal changes in reporting	
3. Is the number of reports after certain events higher? Are there any temporal changes?	H3: After certain events, reporting is tendentiously higher.
The embodiment of the TTIP in the media in the context of the agrifood industry	
4. How is the TTIP presented in the media? Is there a discernable opinion? Which positive and negative statements are mentioned?	H4: Due to the mandate of public media, neutral reporting is expected.
Reporting on the standards and quality management of the agrifood industry linked with the TTIP	
5. In which thematic context was the TTIP discussed? Which branches were mentioned?	H5: The TTIP is often mentioned alongside the defined keywords and within certain branches, and there is an explicit connection to the sectors related to the SPS Agreement of the WTO.
6. How is the TTIP presented in connection to the standards of the agrifood industry and other QM issues? What is the state of opinion? Which standards are most commonly mentioned?	H6: A link is established with the standards of the agrifood sectors and with other QM issues. The opinion is neutral. Reporting regarding standards is vague.
Qualitative Media Analysis	
7. Is the reporting scientific and factual?	H7: Non-scientific reporting is expected.
8. How is the term "quality standards" used?	H8: The use of the term "quality standards" is not consistent with regard to the terminology used in QM.
9. How is the TTIP presented in linkage with the agrifood industry, the standards, and other QM issues? Is an opinion recognizable? Which positive and negative statements are mentioned?	H9: Due to the mandate of public media, neutral reporting is expected.

Source: own description.

Box 1. Main research questions of the media analysis.

> Was there any reporting in German print media, TV, and radio about international quality standards in the agrifood sectors in the context of the Transatlantic Trade and Investment Partnership (TTIP) during the investigation period?
> Which related topics were discussed and how were they expressed and reflected?

The hypotheses were derived from general literature review but not related to a specific article. Therefore, quotes for each hypothesis are absent. Instead, by means of the literature review (Section 2), the targeted hypotheses on the research question (Box 1) were verified by the conducted media analysis experiment. The quantitative studies were based on six sub-research questions and six hypotheses (H1–H6). In the quantitative part of the study, the frequency, temporal changes in reporting, embodiment of the TTIP, and the link to the AFQ Standards were examined. Furthermore, three sub-research questions focus on qualitative aspects, for which three hypotheses (H7–H9) were defined. In the qualitative study, the reporting was assessed and the coherence with opinion formation was indicated.

3.3. Data Collection

By selecting the media, the investigation unit for the media analysis was defined and based on a nationally representative sample in Germany. The overviews of all selected media are available as Supplementary Materials (Table S1a–c). Only media with a high broad impact were selected, which are considered to be high-quality journalism in Germany. To obtain a representative overview of the frequency and presentation of the topic in Germany, 15 different TV programs (Table S1a) and five public radio broadcasters

(Table S1b) were analyzed. Their online media libraries were included in the analysis. Political and economic broadcasts of the categories "education" and "information" were of particular importance. The print media analysis included three news magazines, four national daily newspapers, and two national weekly newspapers. This selection, which is shown in Table S1c, reflects a comprehensive picture of print media in Germany, of which a subsample of the respective category was analyzed.

Searching for the relevant contributions, an extensive list of unambiguous phrases was created, and a trial search was launched to identify the keywords. The following keywords were defined: "chlorine-washed chicken*", "genetic modification (GMO)*", "use of hormones*", "hormone meat*", "cloning*", "use of pesticides*", "use of antibiotics*", "precautionary principle*", and "standards*". Wild Cards (*) were used to expand the search and ensure that all relevant contributions could be collected. Explanations of the selected keywords are available as Supplementary Materials (Table S2). Furthermore, the contributions were scanned regarding the regulations of EU General Food Law [1], DIN EN ISO standards, and private standards. The main international standards are DIN EN ISO 22000, which specifies the requirements for a food safety management system; the DIN EN ISO 9000ff family of QM systems; and DIN EN ISO 31000, which defines the measures for risk management [46]. The following international private standards, which ensure product and process quality in the agrifood sector, were of interest in this study: IFS–International Featured Standards, BRC–British Retail Consortium Standards, FSSC22000 and QS-Standard (Qualität und Sicherheit GmbH) for quality assurance in the food industry, GLOBALG.A.P in the agricultural sector, GMP+ in the feed industry, GS1 Germany as process standard in the supply chain, and EQAsce-Standard (Education and Qualification Alliance SCE) for knowledge management and capacity building. Additionally, the international environmental and sustainability standards MSC–Marine Stewardship Council (fisheries) and ASC–Aquaculture Stewardship Council (aquaculture), as well as REDcert (biomass and agricultural raw materials), were also observed. The selection was based on Theuvsen et al. (2014) [47].

The design of a coding scheme was a major step in the ECA process because it converts the raw data into a structured form. For these media analyses, a five-level system was used whose categories were described by variables. Theoretical and empirical categories were generated, and different variables were assigned to each category. The category system was developed based on the analysis material and had to be continuously revised and adapted in the analysis process. This ECA was based not only on the keyword collection, but also mainly on the analysis through the guidelines. The guidelines contain questions about title, author names, sources, stylistic, content-related and formal means, and portrayal of TTIP (positive, neutral, or negative). The category system of the guidelines had to be extended by numerical coding instructions because variables may assume different values. In doing this, it was possible to present the complex analysis results in a reduced form. Using the category scheme and the guidelines, a pretest was conducted with a subset of the articles to be examined. The sufficient validity, objectivity, and reliability of the system could be confirmed by repeated, unsystematic random sampling examinations. The systematic approach of the analysis was ensured by the combined application of content and guideline analysis [43,44,48].

To perform the quantitative analysis, the texts, as well as TV and radio broadcasts, were scanned for certain characteristics, which were determined based on the research questions, transferred to the sample code sheet, and encoded. The formal categories were used for frequency analysis, so nominal scaling was chosen. According to their emphasis, a difference between dichotomous and polytomous attributes was made. Additionally, multiple answers to a category were possible.

Concerning the qualitative guideline analysis, an individually modified questionnaire was developed for each medium and contribution, which reflected the research questions. The guide contained the following three aspects:

- "Analysis of the media contribution regarding its scientific character". The entire media contribution was analyzed concerning its expressiveness. The classification was made according to the criteria of whether a contribution is factual scientific or entertaining with generalized illustrations. It was examined whether the media contribution provided expertise to the recipient through relevant sources so that the recipient could form their own opinion. Thus, the principle of providing the public with proper information was examined.
- "Analysis of the use of the term 'quality standards' of the agrifood industry in media reporting". The media contributions were analyzed regarding the use of the terms. The classification was based on (1) general mention, (2) explanation, and (3) misuse. Confusions and other interpretations of meaning were also recorded.
- "Analysis of the reporting on the agrifood industry and QM linked with TTIP". The media contributions were examined concerning the dominant view on TTIP considering the main topics addressed, which concern the AFQ Standards. Three criteria were defined: favorable/positive position, opposing/negative position, and neutral position.

The selected TV shows were watched and radio programs were listened to several times until all content was documented and transferred into the questionnaire (guideline). No transcription was performed. In total, we used 31 h and 20 min of TV material (n = 51; range 8 min to 3 h and 30 min) and 3 h and 15 min of Radio broadcasts (n = 34; range 2 min to 23 min).

3.4. Data Elaboration

The analysis was based on raw data tables (MS Excel), in which the codes of all media contributions were recorded during the analysis. No software program other than Excel Software was used. A contribution was classified as relevant if it was related to the agrifood sector and QM. For the univariate analysis of the quantitative data, the frequencies of the coded characteristic values were counted, and the nominal scale was converted into metric frequencies. Next, the relative (percentage share) and absolute (number) frequencies of characteristic expression were calculated and considered bivariate or multivariate. Dissemination analysis was used to determine the distribution of the relevant contributions to the media, as well as to the investigation period, and to identify the temporal change in the frequency of reporting [44]. The data were analyzed descriptively in tabular and graphical form. The qualitative evaluation was conducted with the contributions of the TV and radio broadcasts, though not with print media. For this, a variance analysis with target–actual comparison and a manual sentiment analysis [49,50] were used.

4. Results and Discussion

4.1. Quantitative Results: Frequency

The media response analysis revealed that between June 2013 and December 2016, a total of 1017 media reports on the TTIP appeared in print media, TV, and radio stations. The print media published 704 articles, of which 447 were relevant to the research question (63.5%), because 257 contributions were not recognized. Of the 144 TV reports, 51 (35.4%) were considered relevant and 93 were excluded. From the 169 radio broadcasts, 34 broadcasts (20.1%) were extracted as relevant to the research question, of which 135 were not of interest. Thus, 532 media contributions were defined as the data basis for further analyses, 485 were rejected. This is a share of 52.3% of relevant contributions.

Print media investigations were centered on nine different formats. The national daily newspapers were the media format most frequented with the research topic. From this category, 379 of 595 articles (53.8%) were examined. Each of the 34 relevant articles, both from national weekly newspapers (55 articles) and news magazines (54 articles), accounted for 4.8% of the total analysis.

Regarding the sub-research question, it was noted that the frequency of the TTIP topic in the examined media formats during the analysis period was classified as "high" based on 1017 contributions; thus, hypothesis (H1) was confirmed. Concerning the sub-question

on the frequency of reporting about the agrifood industries and QM, hypothesis (H2) was confirmed, as the relevance was not very pronounced at 52.3%.

4.2. Quantitative Results: Temporal Changes in Reporting

From the sample of 447 articles in print media, 486 analysis units were determined for this question, as several topics were addressed in one article. These analysis units were allocated over the years (Table 2). It was revealed that 285 contributions (58.64%) were related to a specific TTIP event. The TTIP negotiations started in the second half of 2013 and three rounds of negotiations were completed by the end of 2013, thus reporting was rather low. In the following years, public interest increased continuously and various major demonstrations in German cities took place, which resulted in an increase in reporting. Most of the articles related to events were published in the framework of the negotiation rounds (68.3%). Subsequently, of the 13th round of negotiations, 28% of the contributions appeared as debates on regulatory cooperation [6] that also had relevance for the agrifood sectors occurred during this round. The climax of media coverage was evident in 2016, whereupon an abrupt end to coverage was observed with the elections of the US President Donald Trump. In the years 2017 and 2018, reporting on the TTIP was very sporadic, whereby the AFQ Standards no longer played a significant role after 2016.

Table 2. Overview of the temporal allocation of coverage of specific Transatlantic Trade and Investment Partnership (TTIP) events per year in the print media and outline of the selected analysis units related to a specific TTIP event during the media analysis.

Year	Specific TTIP Events in The Considered Year	Analysis Units (per Year, in Total)	Analysis Units Related to a Specific TTIP Event (per Year, in Total)	Analysis Units Related to a Specific TTIP Event (per Year, in Percent)
2013	launch of TTIP negotiations; rounds of negotiations 1 to 3	16	9	56.25%
2014	rounds of negotiations 4 to 7	88	40	45.45%
2015	rounds of negotiations 8 to 11; the conclusion of TPP	157	51	32.48%
2016	rounds of negotiations 12 to 15; Obama visits Hannover Fair; TTIP leaks by Greenpeace [51]; G-20 Summit in Hangzhou; US President election	225	185	82.22%
Total		486	285	58.64%

Source: own calculations.

Despite the EU–US Joint Declaration on the resumption of the Transatlantic Partnership [8] on 25 July 2018, and the concrete negotiation mandates and objectives of both the EU [10] and the US [11], the mainstream media had not yet renewed the topic in any meaningful way. The very recent events in the US—the election of Joe Biden and his new trade policies—could not be included in the present analysis in the immediate time, as these events does not cover the analysis period of the media analysis. The focus was on the most important and the high-profile events during the course of the actual TTIP negotiations.

Regarding radio as a medium, increased broadcasting of programs became evident after the publications of the TTIP Leaks by Greenpeace (34.2%). Additionally, the analyzed TV and radio shows indicated that more reports were broadcasted around the rounds of negotiation (20.6%), the opening of the Hannover Messe by Barack Obama (14.7%), and in the context of major demonstrations against the TTIP on 23 April and 17 September 2016 (17.6%). Consequently, to answer the research question, a tendency was discernible in the dissemination analysis, which related the time of publication of a media article to a significant event (print 58.64%; TV 51%; radio 11.8%). The hypothesis (H3) was thus confirmed.

4.3. Quantitative Results: The Embodiment of the Transatlantic Trade and Investment Partnership in the Media in the Context of the Agrifood Industry

This quantitative consideration of positive, neutral, and negative aspects of the TTIP in the context of the agrifood industry was solely conducted in the relevant print media with defined statements (Figure 1). The strategic themes of the EU's trade and globalization policy were reflected in this investigation [52,53]. The results of the print media analysis (Figure 1a) revealed that 38.7% of the relevant contributions contained no positive statements regarding the TTIP, nor did they list perspectives for opportunities or advantages. All other articles often mentioned the predicted benefits of the TTIP as positive aspects, with advantages relevant to the QM among the positive claims. Observing the negative aspects (Figure 1b), it was noted that in 24.2% of the print articles, no negative statements were made. The negative aspects were hardly related to QM, with just 1.34% of the articles referring to a loss of standards. Meanwhile, 47% of the articles contained critics' votes, though they were not heavily dramatized.

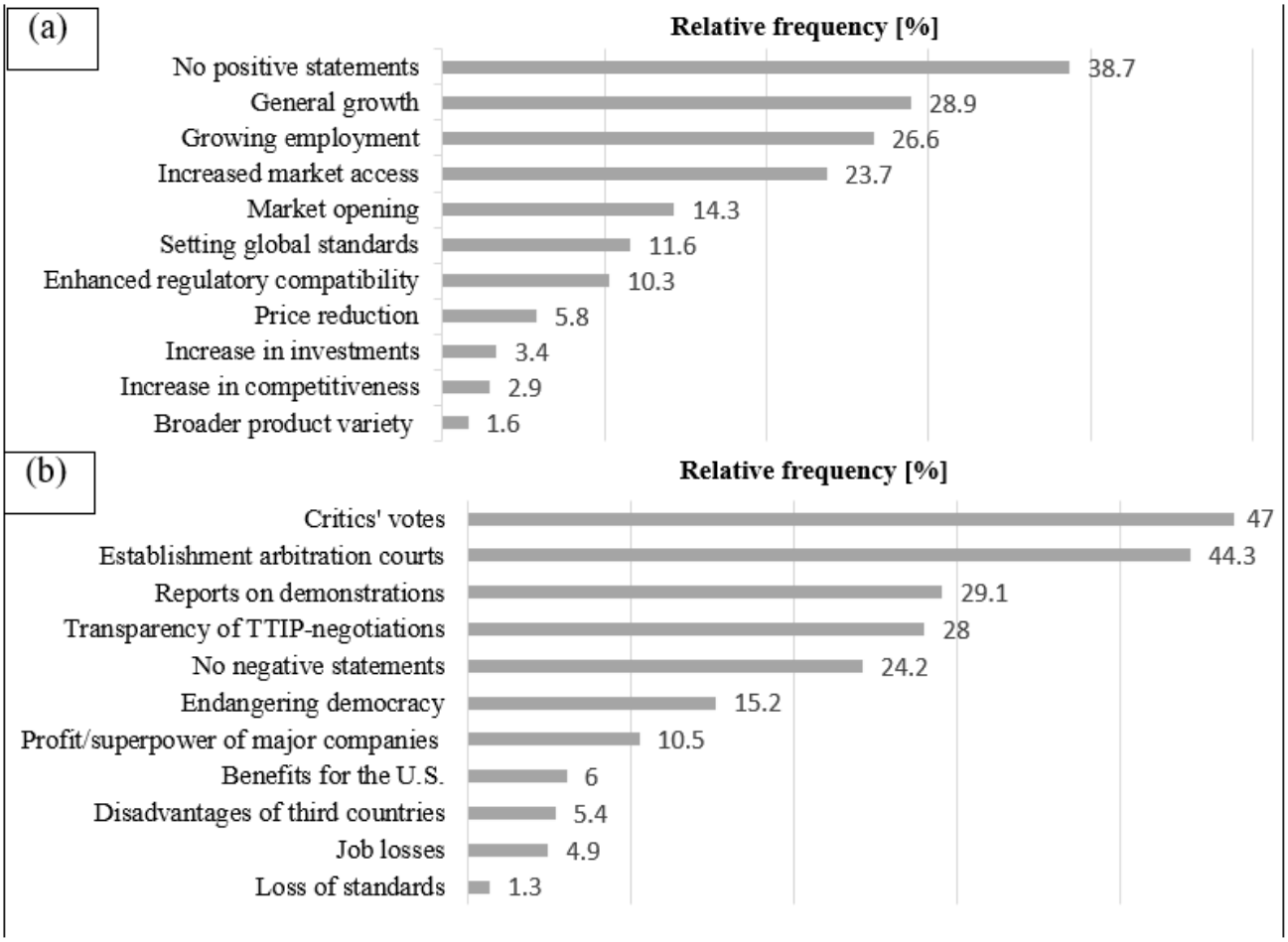

Figure 1. Relative frequencies of positive (**a**) and negative (**b**) statements in print media. Source: own calculations.

As expected, based on hypothesis (H4), the results indicate predominantly neutral reporting with unclear opinions on TTIP concerning the agrifood industry during the analysis period.

4.4. Quantitative Results: Reporting on the Standards and Quality Management of the Agrifood Industry Linked with the Transatlantic Trade and Investment Partnership

The thematic context was examined at all types of media using defined keywords (Figure 2). The most widespread use of all the examined keywords was found on TV. With

an average of 51.6% and a maximum of 78.4% on TV, "genetic engineering" was the most important topic. The keywords were used in connection with standards at a mean value of 46.5%, being achieved primarily via TV shows. Printed media were analyzed with regard to the individual branches of the sectors (Figure 3). Among these, the meat and meat products industry (69.8%) was discussed the most. This could be attributed to the divergent hygiene measures of the two negotiating partners, as well as the SPS Agreement of the [54]. Based on the frequency analysis of the thematic context and the industry reference, the hypothesis (H5) was confirmed.

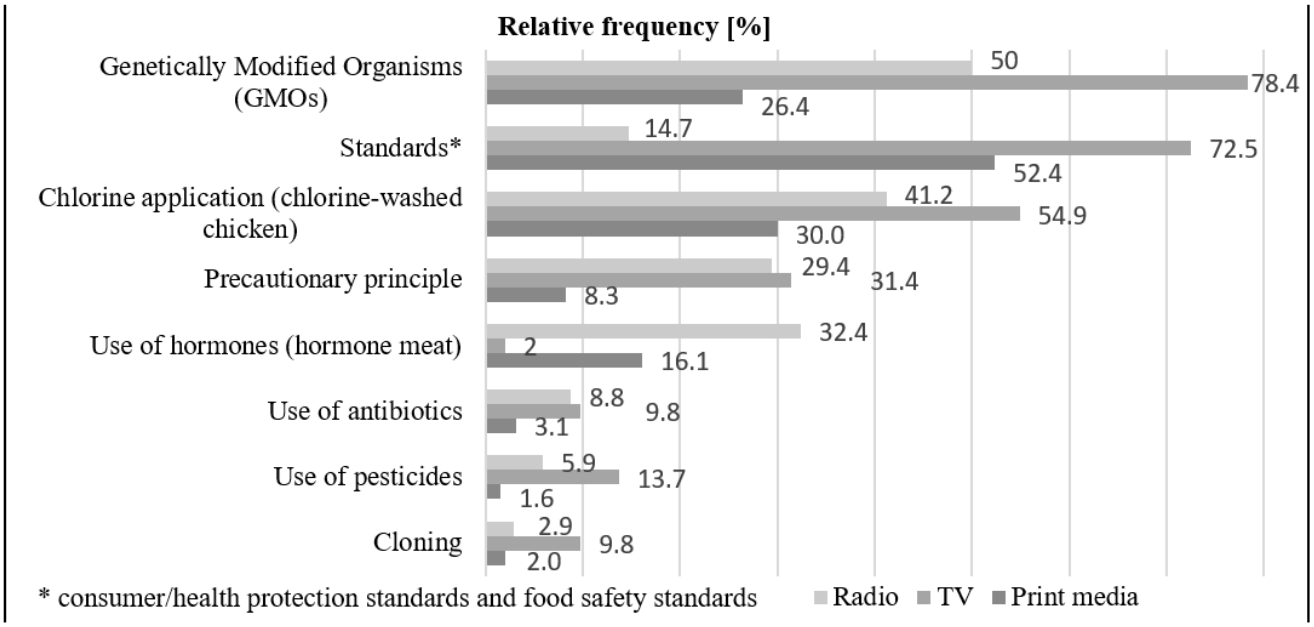

Figure 2. Relative frequencies of industry-relevant keywords differentiated by media type. Source: own calculations.

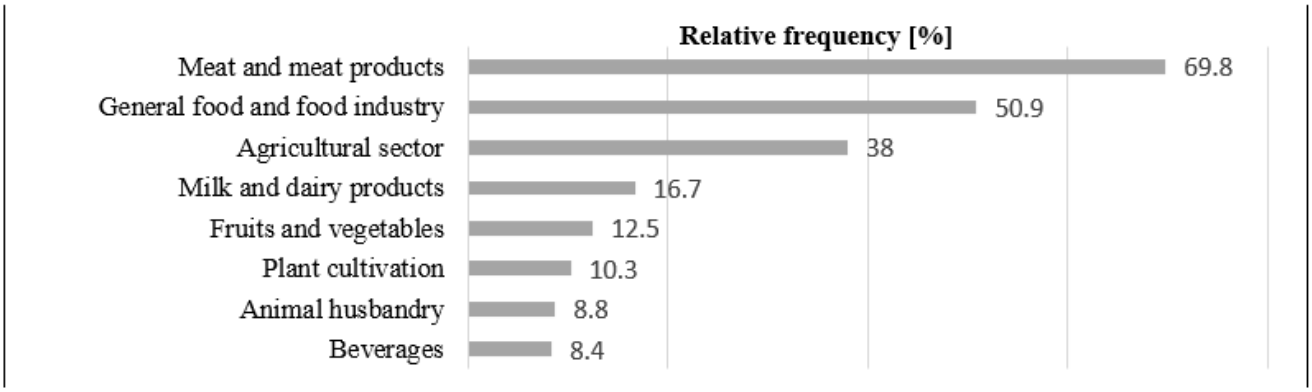

Figure 3. Relative frequencies of printed articles with a specific industry reference. Source: own calculations.

Print media highlighted the impact of the TTIP on various sectors of the agrifood industry. GMOs (28.1%) and the market opening (19.4%) were the most discussed topics. Food safety was mentioned in 13.3% of articles. "Standard loss" (3.4%), "regulatory compatibility" (1.1%), "discrimination of farmers" (0.8%), and "growth potentials" (0.8%) were addressed only slightly. In 48 print articles (10.7%) of this analysis, special attention was paid to QM. The following keywords were mentioned: "standard labels" (n = 20; 41.7%), "EU Quality schemes on Geographical Indication (GIs)" (n = 23; 47.9%), and certification (n = 28; 58.3%). No reference was made to the Hazard Analysis and Critical Control Point concept, Good Manufacturing Practice (GMP), and Good Agricultural Practice.

References to legal regulations and national/regional standards contained 372 printed contributions (83.2%), while only 84 articles (18.8%) alluded to international standards. The general term "standards" was used in 70.7% of all contributions. Besides environmental protection standards (36.8%), consumer protection standards (27.7%) were the most frequently discussed. Food safety terms were mentioned in 14.2% of articles, as well as "hygiene standards" (8.9%), "product standards" (5.4%), and "trade standards" (3.8%). In comparison, the following terms were used very rarely: "quality standards" (1.1%), "animal welfare standards" (1.1%), "sustainability standards" (0.8%), and "organic food standards" (0.3%).

The private standards relevant to the sector were not mentioned in any article. DIN-ISO standards were also mentioned in print articles, but without the individual designation or specific number, so that exact identification was not possible. Thus, it was stated that unclear and inaccurate designations of food safety regulations and standards left readers in the dark and caused confusion. Perhaps the press could have managed to give a non-expert, simple, and clear language version of a specific regulation so that they could get a clear idea.

Regarding statements on standards, it was claimed most often that the TTIP would lead to weaker standards (32%). The harmonization of existing standards was addressed in 31.3% of printed articles. At least one-quarter of the contributions (26.8%) explained that the TTIP would set a benchmark for the future level of standards.

Based on the coverage of the agrifood industry and QM on TV and radio, the connection between the positive, neutral, and negative aspects of the TTIP and selected keywords was quantitatively clarified. Details of the frequency of keyword naming in relation to the image were shown in Table 3.

Table 3. Percentage allocation and percentage frequency of the naming of examined keywords of the agrifood industry in positive (+), neutral (~), and negative (-) depictions of TTIP on TV and radio.

Keywords	**TV (*n* = 51)**			**Radio (*n* = 34)**		
Image	**+**	**~**	**-**	**+**	**~**	**-**
Chlorine-washed chicken	10%	40%	**60.7%**	0%	38.7%	**66.7%**
GMOs	33.3%	80%	**82.1%**	0%	**51.6%**	33.3%
Use of hormones	0%	20%	**46.4%**	0%	32.3%	**33.3%**
Use of pesticides	0%	5%	**21.4%**	0%	**6.5%**	0%
Standards	66.7%	**80%**	67.9%	0%	**16.1%**	0%
Precautionary principle	0%	30%	**35.7%**	0%	29%	**33.3%**
Use of antibiotics	0%	0%	**14.3%**	0%	**9.7%**	0%
Cloning	0%	0%	**17.9%**	0%	**3.2%**	0%

Source: own calculations. The bold font highlights the highest values.

Considering the frequency with which the examined keywords were presented in terms of a positive, neutral, or negative evaluation, it became evident that all examined keywords were used more frequently with a neutral or negative influence than in positive reporting. Additionally, with few exceptions, increased use of keywords in negative reports compared to neutral reporting was identified. The precautionary principle was presented in a negative light by reporting mainly on the loss or abolition of them.

In conclusion, the research questions were answered and hypotheses (H5 and H6) were confirmed. The mainstream media established a link between the TTIP and the agrifood sectors, as well as QM. Standards were generally presented nonspecifically and very superficially, and loss scenarios were often constructed.

4.5. Qualitative Results

The qualitative analysis was based only on TV and radio reports. A total of 51 TV programs and 30 radio reports were declared relevant, thus 81 media contributions were analyzed. The qualitative questions were examined with regard to the three defined aspects

and their interdependencies, and were analyzed based on the main research question using guidelines.

4.6. Qualitative Results: Analysis of the Media Contribution Regarding Its Scientific Character

To assess whether the TV and radio media platforms ensure that the public are properly informed according to Article 5 of the EU General Food Law [1], the reporting was examined regarding a comprehensive, complete, and scientifically correct presentation. The reports were subjected to a variance analysis with a target vs. actual comparison.

It was observed that the mainstream media used different tools to shape the public opinions: verbal and non-verbal methods of communication, stylistic elements, suggestive power (combination of moving images, sound, and live reporting), used sources of information, and the manner of wording.

Moreover, it was found that a unilateral reporting and rudimentary reflection of the negotiating positions produced depictions of the topic that cast it in a positive light. In the negative reports, the recipient's emotions were predominantly portrayed through dramatizations, musical effects, visual means, and evaluative linguistic formulations, as well as a one-sided and generalized description. GMOs and the symbol of the "chlorine chicken" were the most frequently used objects in making the public aware of the dangers of TTIP for the agrifood industries. AFQ Standards were mentioned marginally.

Additionally, radio broadcasts were less informative than longer TV broadcasts due to their shorter length. Apart from that, the level of information was dependent on the focus of the analyzed contributions, as more detailed information was provided on topics other than the agrifood sector. This supported the analysis of used information sources, as 98.3% of all examined report statements were made about the agrifood sector by persons who were not experts in the field.

In summary, it was found that only limited knowledge of the facts and benefits were conveyed to the recipients by generalizing descriptions. The results suggest that mainstream media were unable to empower the recipients to form their own comprehensive and differentiated opinions, leading to an assessment of the reporting as non-scientific, which confirmed the hypothesis (H7). The principle of proper information based on the General Food Law [1] was not granted.

4.7. Qualitative Results: Analysis of the Use of the Term "Quality Standards" of the Agrifood Industry in Media Reporting

All contributions with references to AFQ Standards were examined concerning the use of the terms in the media. In 75% of the print articles, the term "standards" was generally used or merely mentioned. An explicit naming or confusion could only be determined in rare cases (<1%). In the case of TV and radio, it was noted that AFQ Standards were generally mentioned, but not explained. Misuse of terms or other interpretations could not be found significantly. General statements on quality standards were most frequently provided by TV stations (53%), while they were minimal on the radio (17.7%). In all media, a combination of the general explanation of possible alterations of standards and further enumeration of keywords could be noticed, without either being discussed more intensively. All media were dominated by statements about the lowering or loss of standards because of the TTIP-FTA, with none of the examples citing detailed content or concrete AFQ Standards that would change by the agreement.

Therefore, there was a recognizable trend that the term "standards" was used by the media to describe the European legal regulations in force, while they failed to mention specific European or international standards. Surprisingly, private standards were completely disregarded. Consequently, hypothesis (H8) regarding the inconsistent use of the term "quality standards" with regard to the terminology used in QM was confirmed by contingency analysis.

4.8. Qualitative Results: Analysis of the Reporting on the Agrifood Industry and Quality Management Linked with the Transatlantic Trade and Investment Partnership

All 81 relevant media articles related to QM in the agrifood industries were examined regarding the positions presented in the context of the TTIP. To understand the importance of the AFQ Standards regarding the TTIP, the overall impression of the widespread opinion was examined. The following evaluation focused on the issues identified by Matthews (2016) [20] as the basis for fears and negative opinions of the public. To measure the statements' strength, the individual topics were clustered into three blocks (Figure A1):

- Mutual recognition of standards: harmonization of standards, different levels of protection for the two negotiating parties, concern about minimizing the EU's protection level, and intervention or influence of the US in EU standard-setting.
- Different paradigms in risk assessment: the precautionary principle of the EU and the scientific approach of the US.
- Sanitary and phytosanitary measures (SPS measures): statements on hygiene standards using the example of chicken (chlorine-washed chicken), hormone use and antibiotic use in meat production and cloning; statements on pesticide use, and GMO food and feed.

Through the differentiated analysis of media contributions in three clusters, the statements' strength was analyzed. To classify the qualitative facts, it was essential to develop an evaluation method that describes the position and global view universally. Therefore, a manual sentiment analysis was conducted using sentiment scores (SeSc).

Each media statement was evaluated by content, documented in a guideline, and assigned to a SeSc by denoting −1 (negative), 0 (neutral), and +1 (positive). Table 4 shows the results, as well as those topics where specific AFQ Standards were presented and explained by the media.

Table 4. Overview of the qualitative sentiment analysis of media reports (TV and radio) on the three clustered topics and assessment on their explanations regarding specific AFQ standards.

Three Clustered Topics	Number of reports with SeSc −1 (Negative)	Number of Reports with SeSc 0 (Neutral)	Number of Reports with SeSc +1 (Positive)	Explanation of AFQ Standards (YES/NO)
Mutual recognition of standards	19	**21**	2	NO
Different paradigms in risk assessment	11	**15**	0	NO
SPS measures	62	**74**	4	NO
• Chlorine-washed chicken	9	20	3	NO
• GMOs	24	32	1	NO
• Use of hormones	14	14	0	NO
• Use of antibiotics	4	4	0	NO
• Pesticides	6	3	0	NO
• Cloning	5	1	0	NO
Total number of reports	92	**110**	6	

Source: own calculations; Results are expressed by −1 (negative position of media), 0 (neutral position of media), or +1 (positive position of media). SeSc, Sentiment score; AFQ Standards, quality standards in the agrifood sector; SPS measures, Sanitary and phytosanitary measures; GMO, Genetically Modified Organism. The bold font highlights the highest values.

4.8.1. Mutual Recognition of Standards

The majority of reports on this topic was neutral (Table 4). Nevertheless, there was a very high number of negative reports, which tended to lead to more negative reporting. Different statements were made concerning the planned mutual recognition of quality standards. On the one hand, the media argued that divergent food and consumer protection standards might not be accepted through mutual recognition. Thus, the different levels of protection ought to be maintained in the future and common standards developed on both sides of the Atlantic. This should prevent competition from goods with lower standards. On the other hand, the media classified the mutual recognition of standards as an acceptable negotiating point as long as appropriate labeling of origin and production processes was mandatory. The different levels of protection between the standards were discussed critically, but specific standards were not mentioned. Particularly, they referred to the plans of the US to lower the strict EU standards to the level of US standards through the TTIP. Neutral statements were made in the majority of the contributions, which ensured the permanence of existing import bans and excluded a reduction of protection standards.

Additionally, some media articles assessed the different perceptions between the EU and the US on quality criteria and repeatedly argued that the EU does not have higher protection standards in all areas. Examples of higher US standards were lower limits for contaminants and pesticides in fruit juices, stricter microbiological regulations for raw milk products, and prohibited integration of toys in food. Note that none of the topics referred to specific AFQ Standards.

In conclusion, the present study revealed that both trading partners would be perfectly feasible for the mutual recognition of the existing standards, as well as for collaboration on future standards, although the fundamental differences of the established food safety system are expected to remain. Obviously, the potential for improvement for both partners is enormous. The elimination of non-tariff barriers to trade in all current and future negotiations of FTAs is therefore of significant importance for future specifications regarding the quality of European agriculture and food production.

4.8.2. Different Paradigms in Risk Assessment

Table 4 shows that most of the reports on this topic were neutral, with a very high share of negative reports. The EU precautionary principle (see Table S2) and the US scientific approach were at the focus of the examination of this topic group, whereby different points of view and argumentation structures were found. While some supporters of the TTIP argued that the precautionary principle should be maintained, others maintained that both the precautionary principle and the scientific principle were effective approaches that should be combined in the future in the best possible way.

It was noted that the European level of protection was not essentially better than the US level. This thesis was illustrated by the example of the BSE crisis, when the US imposed stricter and faster import bans on beef to protect consumers, compared to the EU. Moreover, the majority of contributions called into question the compatibility of the two approaches to risk assessment. According to the reports, the reason for this was the recognition of the science-based evidence in food safety regulations. A serious risk was posed by the fact that the US would classify essential European protection philosophies as not scientifically justified and would, therefore, be skeptical about the research and the independent opinions of the European Food Safety Authority (EFSA). Further, attention was paid to ethical and moral aspects that were not anchored in US law. Additionally, environmental and animal protection would be of minor importance in the US approach.

The media clearly stated that the US would demand the adoption of scientific principles, and this would be a threat to European standards. It was explained in this context that all protection mechanisms applied in the event of damage would be abolished and the consumer would, therefore, be unprotected.

Another field of conflict presented by the media was the European approach to process hygiene, "From Farm to Fork", which contrasts with the "end-of-pipe" principle of the US. Although both approaches would aim at preventing potentially adverse effects that could be caused by unsafe food products, feedstuffs, or contaminated raw material, their structures were fundamentally different. While in the EU, a complete monitoring of the entire value chain regarding compliance with hygiene standards was legally anchored, the US emphasized the treatment of the final product.

Ultimately, the media failed to explain concrete standards in this regard. For example, DIN EN ISO 22,000 could be mentioned and explained by the media to generate sufficient information for recipients.

4.8.3. Sanitary and Phytosanitary Measures

The purpose of the 1995 WTO SPS Agreement is to ensure the protection of life, as well as the health of humans, animals, and plants from risks arising through direct or indirect international trade [55]. The topics selected for analysis are related to the SPS agreement and were often controversially discussed during the TTIP negotiations. According to the results (Table 4), the German media reported in a predominantly neutral manner about the issues. Despite this, a very high share of negative reports was also recorded, which may imply a negative impact on the consumer. To clarify that, this needs to be investigated in future consumer research.

Chlorine-Washed Chicken

It was found that the media's argumentation of false statements concerning "chlorine chicken", as well as other stereotypes, clouded the TTIP's chances and failed to properly inform the public. The media repeatedly stressed that the EU's meat hygiene standards were much better than those of the US and that chlorine treatment of chickens would be "disgusting", thus triggering the so-called "disgust debate". The recipients were not informed that The German Federal Institute for Risk Assessment (BfR) had indicated that the measures adopted in European meat production were not providing sufficient consumer protection, so treating meat with chlorine would be appropriate if combined with other measures along the production chain [56]. Thus, according to the BfR, there would be no reason for the European consumer to refuse this treatment option to remove *Campylobacter* and *Salmonella* from poultry meat [56]. The positive effects of chlorine, such as the efficient and residue-free neutralization of pathogenic microorganisms, and thus the reduction of meat contamination, were not highlighted by the media in any article. The EFSA study was also not mentioned [57], which could not identify any harmful products because of decontamination of chicken meat via chlorine dioxide.

Despite insufficient technical and factual reporting, the contributions examined were rather neutral concerning the positioning of the media.

Genetically Modified Organisms

Another predominant reporting topic was the placing on the market and labeling of GMOs. The TTIP was predefined as a door-opener for GMOs in the run-up to the negotiations because the EU granted authorization for the placing on the market of food and feed containing genetically modified maize 1507, thus signaling a strong interest in negotiations with the US. As a result, the media became concerned that a chain reaction would result from the individual approval of certain GMO varieties. As a marginal example, the weakening of the labeling of honey (since June 2015) obtained from GMO plants (pollen) was cited. It was pointed out by the media that a complete ban on GMOs in Europe would lead to rising prices for agricultural businesses, which would be faced with an immense economical dilemma and would have no chance to succeed in international competition.

In principle, it was found that the US was portrayed negatively on the subject of GMOs because there would be neither approval regulations nor labeling obligations. Additionally, the US declared the European GMO regulations as trade barriers, which would have to be eliminated by the TTIP. Consequently, an import of unlabeled GMO products from the US would affect the free choice of European consumers and would increase competition and price pressure on European food producers. By further comparison, the media explained that in the EU, the limits of GMOs are mainly of ethical origin; therefore, more than 90% of German consumers would reject GMO foods. While some media articles insisted on maintaining the clearly defined mechanisms and strict criteria for the authorization of GMOs in the EU, other articles discussed refined coordination processes between the US system and European requirements.

The analysis partially confirmed the findings of Vigani and Olper (2013) [22] by addressing consumer rejection of the use of GMOs in all media. As described in previous research [23–26], the analysis also revealed that TTIP critics use consumer ignorance to create negative emotions about the FTA. Moreover, the term "standard" was used as a synonym for legally anchored regulations that describe common manufacturing practices. Throughout GMO reporting, the media failed to address specific standards. Private standards and labels were not significantly mentioned or explained.

Although the media often reported negatively and inadequately, the position of the media in its entirety was considered neutral, as different aspects were taken into account, which, on the one hand, emphasized the rejection of GMOs in the negotiations and, on the other hand, the importance of its use.

Use of Hormones

The ban on growth hormones in 1981 was the result of years of legal proceedings between the EU and the US [58] and was therefore repeatedly presented in media reports regarding the TTIP. It was medially explained that different hormone classes were used in animal breeding in the US, though with the exception of Ractopamine, they were not specified. The media raised public suspicion that the conclusion of the TTIP agreement could force the EU to allow the use of growth hormones in animal husbandry and the unrestricted import of "hormone meat" without consumers being sustained by labeling requirements. The topic of the use of hormones was mainly addressed by TTIP critics and had only a negative symbolic function. International or private standards were not discussed.

Use of Antibiotics

The media also commented on the difference between the EU and the US as it related to their use of antibiotics, whereby the focus was not on standards but production or breeding regulations. It was argued that organic farming requirements were stricter in the US than in the EU. In this context, only the aspect of antibiotic therapy of sick animals in organic animal husbandry was covered, though the differences in the use of medications as growth promoters were not. Additionally, some media reports linked the precautionary principle with the use of antibiotics by comparing the precautionary use of antibiotics in European agriculture with the end-product aftercare chlorine treatment of chicken meat in the US. This indicated that specific legal and scientific basics were not properly investigated and could mislead the reader. In this case, equating the use of antibiotics with chlorine dioxide-based decontamination implied that antibiotics could be used to disinfect carcasses. The presentation of the differences in the uses of antibiotics thus showed that, in addition to a lack of consideration of AFQ Standards, scientific facts were also misrepresented by the media.

Pesticides and Cloning

These topics were only mentioned in a few analyzed items, whereby this was characterized by rather negative reporting. Regarding the agricultural pesticides, various media emphasized that the EU and US limits for residues in food frequently differ significantly, with the European requirements described as stricter in all cases, e.g., residues in baby food and banned pesticides used in the US. By contrast, it was stressed that thresholds for pesticide residues in the US are 300–500 times higher than in the EU. Through the TTIP, the unrestricted importing of foodstuffs treated with prohibited pesticides was feared. Besides the risk was posed that future regulations on residues of potentially carcinogenic pesticides and the further reduction of existing limit values could be prevented through the TTIP. The cloning of animals was predominantly used in the media as a deterrent example, which would be imported to Europe in an unwelcome way due to the TTIP. None of the contributions addressed animal welfare standards or the legal and scientific background of animal cloning.

Moreover, statements on the ethical and moral concerns about the procedures were used to address emotional aspects to convey the threats of a possible TTIP agreement in the interest of consumer safety. Neither for pesticides nor for cloning were references made to AFQ Standards that could be affected by the TTIP.

The results of all three aspects for assessing the importance of AFQ Standards demonstrated that the media reported neutrally with a negative skew. The sentiment analysis confirmed the hypothesis (H9) of a neutral opinion.

5. Conclusions and Policy Implications

Motivated by the necessity to achieve a better understanding of media coverage concerning AFQ Standards regarding globalized trade, this paper has empirically assessed this relationship using the TTIP as an example. To the best of our knowledge, this is the first study on this topic. The present analysis identifies a neutral debate on the AFQ Standards, with noticeable negative explanations regarding the possible changes introduced by an FTA. The reporting, however, showed considerable deficiencies regarding the technical and scientific explanations of the food safety regulations and, most importantly, the AFQ Standards, indicating a trend toward information asymmetries. The fact that neither legal regulations nor international or private standards were explicitly mentioned or explained by the media was regarded as highly problematic. The principle of proper information of the public was not fulfilled by the media. This means that recipients of media coverage could not gain a comprehensive overview that would enable them to classify the actual changes or risks in the agrifood sector as a result of free trade agreement appropriately. Moreover, the media followed the usual practice of making politics the scapegoat. This content analysis could be a first step in the research of the public awareness and attitudes because the role of the media likely forms the public opinion and therefore might influence the debate concerning trade negotiations, which would be interesting to follow up in future studies. A limitation of this study is its restricted sample of Germany's media landscape. Reproducing similar designs in other countries with the awareness of the importance of international quality standards regarding global trade and food safety will likely lead to interesting, contrasting results. Further works are necessary to more critically examine whether mainstream media reports on changes in consumer attitudes affect quality standards in globalization.

Additional studies are suggested for the target group of export-oriented companies in the agrifood industry, regarding the level of knowledge and acceptance of product quality and AFQ Standards with regard to the development of free trade agreements. Within the framework of the authors' research project, Germany [59] and Poland [60] have already been studied; further countries should also be examined in more detail.

Finally, this study serves as a starting point for an appropriate information strategy as anchored in the General Food Law of the EU [1]. The results indicate that each individual EU Member State, together with the EU Commission, has to adopt a proactive and

interactive approach to agrifood governance. As a means of countering any misinformation for the public, transparent decision-making processes should not be neglected in this operation [21,61,62]. For this reason, it is proposed that a public debate with a high level of information be provided in the future. A solid information strategy on free trade of agrifood products would help to explain the food safety rules in the correct context, so as inform the recipient and not to confuse. It should be emphasized that the speculations of the mainstream media, e.g., chlorine-washed chicken, have absolutely of no relation with the existing AFQ Standards and quality management.

During the TTIP negotiations, no other industry was the subject of such detailed and emotional media coverage as the agrifood industry. It is evident that media coverage of quality standards during the pre-phase of future FTAs will continue to play an important role in shaping public awareness. Thus, the study also raises the issue of interaction between the media and the government. Latent interdependencies should be studied to determine whether media rely on governments as important sources of relevant information, while governments rely on media to communicate their food quality policy.

A further important finding is that private standards (e.g., IFS, GlobalGAP, and QS) were not relevant to media coverage in any way. Descriptions of their objectives, influences, and their further development and effects on food safety in global trade were completely omitted by the media. Consequently, it is of particular importance to examine the relevance of private standards to European trade policy for agricultural goods and foodstuffs in subsequent studies.

Finally, it should be underlined that the differences between the EU and the US are in the legal area (differences in risk management) and not in the private sector standards. To the best of our knowledge, the basic legal differences will continue to exist in the future. Furthermore, the private sector food safety standards, which are already approved, will continue to exist. However, we see a need to develop them further, e.g., due to the current SARS-CoV-2 pandemic and economic sustainability. This could be achieved by integrating not only the product and process standards, but also the occupational safety standards relating to the corporate culture and the behavior of employees [63] into quality management.

Supplementary Materials: The following are available online at https://www.mdpi.com/article/10.3390/agriculture11040328/s1, Tables S1a–c: Overview of the surveyed German media; Table S2: Explanation of important terms (in alphabetical order).

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Appendix A

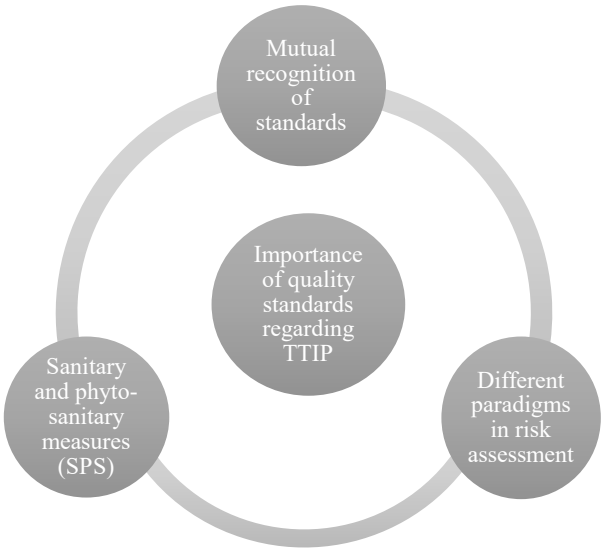

Figure A1. Overview of the topics for assessing the three blocks of qualitative media analysis. Source: own description.

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APPENDIX 3.6

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A VIEW ON THE UNINFORMED CONSUMERS TOWARDS QUALITY STANDARDS IN THE CONTEXT OF THE TTIP NEGOTIATIONS

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ABSTRACT

Radio broadcasts, TV shows and online media make a significant contribution to day-to-day consumer information and have a great impact on public opinion. The present study provides an overview of the German reporting about the quality standards of the agri-food industry in the context of the negotiations towards a EU-US Transatlantic Trade and Investment Partnership (TTIP). On the basis of a guided empirical content analysis, 436 publications released via radio, TV or Internet in the period from June 2013 to December 2016 were quantitatively and qualitatively analyzed. The quantitative analysis showed that the agri-food industry was generally of minor relevance in the coverage of TTIP, but focused mainly on quality standards. The term ‘quality and consumer protection standards‘ frequently appeared in the reportings with the topics such as genetic modification, use of hormones, antibiotics or pesticides and the ‘chlorine-washed chicken‘. These are not standards for official definition of the general food law. It was established that all publications lacked information about specific standards. Thus, the quantitative analysis showed a superficial view of quality standards with only symbolic characteristics. The results of the qualitative media analysis indicated a negative picture of the effects of TTIP concerning the agri-food sector and its standards. Due to the complex structure of the globalised agri-food chains, the importance of comprehensive consumer information was highlighted. Overall, German media failed to provide scientifically based information. Unfortunately, they just highlighted the possible negative changes which could be caused by TTIP.

Keywords: *agri-food industry, food safety, quality management, quality standards, Transatlantic Trade and Investment Partnership (TTIP)*

INTRODUCTION

A possible bilateral Free Trade Agreement (FDA) between the EU and the US has been debated closely since 2011. Negotiations were started in June 2013 (European Commission, 2013). Intensive discussions are being held on possible impact for European standards on consumer protection and EU quality policy. A great interest

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by the media and the attention of the civil society has emerged. In a very short time, countless alliances with the participation of political parties, associations, trade unions and citizens have been established who call the population to protest against the FDA. A strong presence of counter-movements could be achieved mainly by distributing its content to online media. Many of these non-governmental organizations (NGOs) work together in their protests against TTIP and thus achieve an enormous range. So far, only the sector-neutral information events of the anti-TTIP campaign movement in Germany have been analyzed, with the result that citizens are the victims of a professional disinformation campaign (Bauer, 2016). Furthermore, the general mood of TTIP in other European countries and the USA were analyzed. The findings indicated that the TTIP negotiations in the considered European countries do not play a major role (Maier, 2014). This situation has an impact on civil society. According to a study in 2015, the EU-wide acceptance to TTIP decreased by 2% compared to the year 2014 (Bluth, 2016). The reporting in the mass media influences the level of information and the opinion of the consumers significantly. Because of that a comprehensive, complete and scientifically correct presentation is indispensable for differentiated opinion formation (AGR, 2015). Although the media have an educational mandate, the consumer is offered a variety of topics that affect the opinion about the FDA negatively. The population is not properly informed and insecure. The relevance has not yet been properly researched with regard to the presentation of the quality standards of the agri-food industry within the scope of the TTIP negotiations. This study aims at filling this research gap.

MATERIAL AND METHODS

Media can be differentiated into mass media and lead media. Mass media are characterized by a wide range of information. Leading media publications are to be used for information and form opinions of the public and other mass media (Gendolla *et all*, 2009; Hasebrink *et all*, 2013). Three types of media were analyzed: radio broadcasts, TV shows and online media. The radio is considered as background medium, which is used throughout the day (Engel, Breunig, 2015). Consequently, the coverage of radio broadcasts is rather high and it has a significant impact on shaping of public opinion and information status to consumers. As a medium of information and entertainment in Germany, television is of great importance in the everyday life of consumers. TV shows of the category "educational television" were the focus of analysis. In order to establish a representative cross-section in the presentation of quality standards of the agri-food industry within the context of the TTIP reporting, the websites of TTIP-counter-movements and consumer protection organizations (Non-Government-Organizations (NGOs)) were analyzed. The overall analysis took into account 169 radio broadcasts, 144 TV shows and 123 articles from eight websites of NGOs. They have been reviewed in terms of their relevance to the research question, thus the developed category system has been applied to a total of 51 TV shows, 34 radio broadcasts and 19 contributions on the respective websites of NGOs. Because TTIP

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should regulate all European and US standards of the agri-food industry, mainly the standards were considered that are in the media discussions of particular relevance. The following international standards were of particular importance: DIN EN ISO Standards, International Featured Standards (IFS), Global G.A.P, GS1 Germany, QS and EQA Standards. All selected media contributions were analyzed with the focus on Germany. The analysis period was set from the beginning of the TTIP negotiations in June 2013 until 31.12.2016. Data were collected from April 2016 to January 2017. Since the media's portrayal on the quality standards of the agri-food industry as part of TTIP was a complex analysis object, empirical content analysis was combined with the model of guideline analysis. In this way, formal and content-related elements could be presented in a reduced form. For a thorough analysis of the presentation of topics in different media formats and assessing the impact of mass media on public opinion of consumers, various elements had to be considered. Apart from the content, stylistics was also the focus of the investigations. The procedure of content analysis had to be intersubjectively comprehensible and was carried out in four phases (Früh, 2015): the planning phase, the development phase, the test phase and the application phase. Two types of content analysis are distinguished: the manifest analysis and the latent analysis. In this study, the latent content analysis was performed. In order to reflect the underlying significance of a media contribution, each article was read and subjectively assessed. The guideline analysis as a useful addition to the empirical content analysis allows the consideration of complex issues, it captures the content and the function of a media report. Both methods were applied to contributions that dealt with defined keywords on quality standards as well as the impact on the agri-food industry. The eight defined keywords were „chlorine-washed chicken", „genetic modification", „hormone meat", „cloning" and the use of pesticides and antibiotics in agriculture. In addition, the "precautionary principle" was included in the analysis, which plays a key role in the TTIP negotiations and is opposed to the US aftercare principle. The precautionary principle is essential in the European agri-food industry to produce high-quality and safe products. Another keyword was "weakening of standards". The standards of the agri-food industry had to be differentiated from the standards of other industries. Accordingly, only statements were considered, which were directly related to the agri-food industry or those which are responsible for consumer protection. For the analysis a five-stage system was used. Their categories were described by variables. The categories of identification, formal design, origin, content and function were selected. Different variables have been assigned to each category. For each medium an adapted guideline sheet was compiled to answer the research questions. The content and wording of the guidelines were adapted to the respective media format.

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RESULTS AND DISCUSSION

In the following, results regarding relevance, frequency of the keywords, use of subject-related information source and content of the quality standards of the agri-food industry in the context of TTIP reporting are presented and discussed.

Relevance of media reporting

As shown in Table 1, a total of 436 contributions of different media formats were considered, of which 104 articles were relevant for the formulated research question and were analyzed. This corresponded to a relevance of 23.9%. The share of relevant contributions in television was highest with 35.4%. Radio stations have published a larger number (169) of contributions, but their relevance to the research question was lower (20.1%). The least relevance of contributions was found at the NGOs (15.4%).

Table 1. Relevance of the considered analysis items and share of reporting on the agri-food industry (AFI) and quality standards (QS)

	considered	relevance	relevance [%]	AFI [%]	QS [%]	QS on AFI [%]
TV	144	51	35.4	23.9	13.0	54.4
Radio	169	34	20.1	10.7	5.0	46.7
NGOs	123	19*	15.4	text 16.9 film 69.7	11.6 23.5	68.5 33.7
	Σ 436	Σ 104*	**Ø 23.9**			

* The difference is explained by 15 unrecognized contributions from 3 NGOs. In these cases, the value of the analyzed items could not be determined by the structure of the websites, so that only the contributions of 5 other NGOs are summarized.

Decisive for the results is the period during which the study was carried out. During the data collection from April 2016 to January 2017 three rounds of negotiations, the US presidential election and the publication of TTIP leaks by *Greenpeace* took place. Given the broad basis for negotiation and the large number of contentious issues of the agreement, it was expected that the share of reporting on the agri-food industry and its standards would be low, as confirmed by the analysis results.

Frequency of keywords

The most frequent use of all the keywords under investigation was in the medium of television. It is clear from Figure 1 that it was reported most frequently on “genetic modification” (78.4%), “weakening of standards” (72.6%) and “chlorine-washed chicken” (54.9%). Most often mentioned by radio broadcasts were “genetic modification” (50.0%), “chlorine-washed chicken” (41.2%) and the “precautionary principle” (29.4%). The “weakening of standards” was most frequently reported by NGOs in the online media with 79.4%, followed by “genetic modification” (58.8%) and “precautionary principle” (29.4%). Overall, the “genetic modification” (62.4%) was most frequently mentioned in the reporting. The “weakening of

standards" was the second most common statement of the study at 55.6%. The next important keyword with an average consideration of 40.9% was the topic "chlorine-washed chicken". With a share of 30.1% the "precautionary principle" was applied. About the "use of hormones" was reported in 22.2% of all coverage. The most rarely used keywords were "use of pesticides" (9.5%) and "use of antibiotics" (7.2%). Little has been reported on the topic of "cloning" (8.2%). Overall, the frequency of the examined keywords was low in all media formats. The general explanation of quality standards was of most importance in television (53.0%), whereas the radio was the rarest of 17.7%. Furthermore, an increased use of keywords in the negative presentation of TTIP compared to the neutral reporting was to be seen. An exception was the medium radio, which published most frequently neutral contributions. Neutral presentation, meaning without judgment, took place via radio broadcasts on "genetic modification" (51.6%), "weakening of standards" (16.1%), "use of antibiotics" (9.7%), "use of pesticides" (6.5%) and "cloning" (3.2%). The general term "standards" was most frequently used in TV shows with a neutral view regarding TTIP (80.0%). Finally, it should be noted that the fixed keywords of the analysis were significantly used by the media.

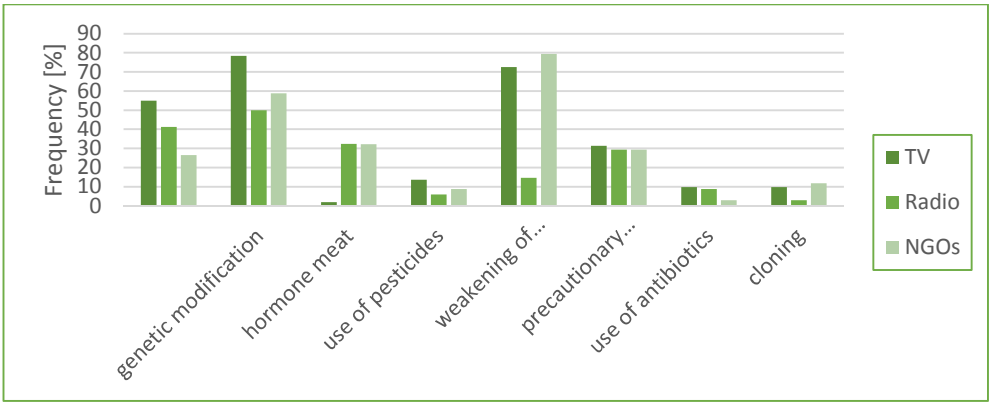

Figure 1: Selection and frequency of used keywords in the analysis items

Sources of information

The results provide an overview of the most common sources of information, which were used by media in terms of the positions and representations of TTIP. The medium of television generally used the most information sources. The most important sources of information were statements by politicians (43.4%), German representatives of industry and commerce (30.3%) and consumers (29.4%). In radio broadcasts, only the moderator or the journalist were involved in 44.1% of the contributions. The most important source of information for the radio were politicians (55.9%). Consumers, upholders of consumer protection and entrepreneurs were of secondary importance in radio shows. Moreover, in 47.1% of the contributions of NGOs, no references were mentioned. Their main sources of information were economic studies (23.5%) and statements of interested entrepreneurs (20.6%). Quotes from stakeholders of consumer protection (2.9%)

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and consumers (2.9%) were the least relevant. Statements by representatives of the European Commission were found at 5.9% less frequently than those of politicians who are not participating in the negotiations (14.7%). With the exception of contributions from affected farmers and food companies, 98.3% of all analyzed items were made by persons who are not familiar with the agri-food industry. Given the fact that reports on the agri-food industry have a extensive impact on consumers as well as a high emotional effect, it has been expected that the anti-TTIP-organizations have often reported about this sector. This aims at mobilizing the population against TTIP. The analysis showed that the expectation of published films and videos, which emphasized the negative consequences of the FDA and invoked consumers to take part in demonstrations, was confirmed. The results on the publications of the NGOs illustrated the organized structure against TTIP. At the same time, it showed that NGOs, through their large presence, were able to influence consumers without having to provide detailed information. De facto, in most of the articles, no sources of information on the agri-food industry and its quality standards were used. Thus, the omission of scientific sources of information can be used as a means to achieve a desired effect on consumers.

Presentation of content

All analyzed media were verified for their content. The results showed a very low positive view on TTIP. At least, TV shows had a positive share of 5.90%. In contrast, radio broadcasts and NGOs did not show any positive depictions about TTIP. The neutral reporting predominated with 91.2% in radio shows. A prevailing negative presentation of the entire analysis period was noticed for TV stations (54.9%) and NGOs (100%). Positive presentations were achieved primarily by the fact that potential negative effects are weakened. The neutral impression was achieved by the simultaneous use of positive and negative contributions. In the case of the positive presentation, sentences were used to insure the future import ban on hormone meat, genetic modification, cloned meat or "chlorine-washed chicken", and to prevent a reduction in consumer protection standards. TTIP supporters recognized the differing perceptions of certain quality criteria between the EU and the US. It has repeatedly been explained that the EU does not have higher standards of protection in all areas, for example in the case of limiting values of contaminants and microbiological quality at raw milk products. Above all, there were different points of view and argumentative structures about the precautionary and aftercare principles. While some of the TTIP supporters require the unaltered maintenance of the precautionary principle, others argue that both the precautionary and aftercare principle are effective approaches that should be better united in the future. Concerning the proposed mutual recognition of protective standards, different statements have been made. On the one hand, the position was held that mutual recognition should not be accepted so that the different levels of protection should continue in the future and common standards have to be developed on both sides of the Atlantic. On the other hand, mutual recognition was seen positively as long as labeling requirements for the origin and production processes are mandatory. Global harmonization could affect the international

standards (e.g. DIN EN ISO, IFS, Global GAP, GS1, QS, EQA). In none of the reports were detailed contents or specific quality standards of the agri-food industry mentioned, which could be altered by the agreement. In addition, it was found that the argumentation with false facts concerning the "chlorine-washed chicken" and other stereotypes prevents an impartial view of the chances of TTIP. In the negative reports, the emotions were mainly achieved through dramatizations, musical effects, metaphorical pictures and evaluative language as well as biased and generalized statements. The quality standards of the agri-food industry were without exception presented as endangered, without mentioning specific regulations. Consumer voices were involved in the media reporting, but the share in positive presentations was lower than in neutral and negative reports. Farmers were mostly negative about TTIP, while representatives of other economic sectors were in positive mood. NGOs were mainly represented in negative reports on TTIP. Negative statements were often dramatized. For example, it has been predicted that unlabelled banned goods will be imported on the European market and the competition between the manufacturers will be increased. TTIP would also contribute to a reduction of the biological diversity, the wide range of products and quality of food. Apart from that the discussion about the "chlorine-washed chicken" was used in order to bring European standards of intensive animal husbandry into a better light. It should be noted that the concept of animal welfare has always been discussed differently in the European population than in the USA. In Europe, animal welfare is part of the transformation processes to more sustainability and is related to healthy animals mean safe food. This is now recognized not only by science, but also by the industry. Of course, it is also part of the preventive idea behind the EU food law. Regardless of the medium, the European agri-food industry was seen as the loser of the TTIP agreement, as the differences in this area were fundamental and the higher-regarded European standards of protection were inevitably seen as jeopardized. By moral concerns about the methods in agriculture especially emotional aspects could be used without distinguishing between scientific and ethical foundations. The different levels of protection of the standards were critically discussed in all media, without any concrete standards being mentioned. In principle, more detailed information were provided on subjects not related to the agri-food industry than on quality standards in the agri-food sector. Their role seems to be underestimated, as in the future, the private standards should be more closely integrated into the negotiations on international trade agreements (Petersen, Lehnert, 2017).

CONCLUSIONS

The planned EU-US Transatlantic Trade and Investment Partnership (TTIP) was presented in the media by supporters as well as by critics. Consequently, the different points of view and statements were the focus of this specific analysis. It has been shown that a change in European quality standards has been recognized in the population and interest has developed. For example counter movements have been established. However, consumers should not be informed and educated, as an

intensive debate on standards of the agri-food industry would automatically lead to a discussion about negative effects. As a result, both the presentation of TTIP supporters and TTIP critics kept the level of information on the agri-food industry low. In reports with a positive attitude towards TTIP, the relationship to the agri-food industry is lower, thereby avoiding the fear of consumers about the threat in this sector. An exclusion of possible negative effects is discussed. The benefits of TTIP for the EU were presented from an economic point of view or in other economic sectors. It was found that in none of the analysis items specific terms of the standards of agri-food industry were declared. The use of the term "standards" in the media does not correspond to the official definition of the European food law and was therefore just of general nature. The discussion about modification of protection standards in the food production was used as a polarizing and emotionalizing aspect in the reporting about the agri-food industry under the TTIP negotiations where the consumer can generally be assumed to be uninformed or non-expert. Indeed, there was a lack of consumer-oriented information.

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APPENDIX 3.7

THE ECONOMIC PARTNERSHIP AGREEMENT BETWEEN THE EUROPEAN UNION AND JAPAN: A COMPARATIVE ANALYSIS WITH FOCUS ON THE QUALITY STANDARDS IN THE AGRI-FOOD SECTOR

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Abstract

In 2013, the European Union (EU) initiated negotiations for an Economic Partnership Agreement (EPA) with Japan, one of the largest economies in the world and a key trading partner. After 18 rounds of negotiations, both partners agreed on the principles and implementation of this Free Trade Agreement (FTA) on 6 July 2017. The final EU-Japan agreement is expected to enter into force at the beginning of 2019 and will give both economies a major boost, lowering tariffs and trade barriers as well. Primarily, it will open new markets for agri-food export. Moreover, it is another strong example of the global supply chain matters and the sharing of values and interests. This study outlines the current situation of quality standards used in the EU and Japan. Japan, as well as the EU, have their own regulatory schemes applied to labeling, certification and trade in the agri-food sector. The purpose of this study is to investigate the differences between their standards and gain more insight into their similarities. The research has three major objectives. Firstly, the food safety regulations of the EU and Japan will be discussed more detailed. Secondly, the primary investigation of this paper is to compare those food safety standards and focus on their equivalency issues. Finally, the study insists on the necessity of understanding the importance of the emerging issues from food safety equivalency in relation to trade between the EU and Japan. Thus, the main research question, namely, till what extent are the food safety standards between the EU and Japan equivalent, will be answered and analyzed in this paper.

Keywords: *agri-food industry, food safety, quality standards, EU-Japan Economic Partnership Agreement (EPA), Free Trade Agreement (FTA).*

Introduction

The economic ties between countries are characterized by globalization. The European Union (EU) applies an open trade and investment policy with respect to the rest of the world. In that sense, the EU promotes free and fair world trade, agreeing to progressive international trade treaties as well as tearing down trade barriers at the same time as to ensure human health. Japan and the EU have been working together bilaterally for decades. They agreed on a joint Economic Partnership Agreement (EPA) in 2017, which has been signed on 17.07.2018. This Free Trade Agreement (FTA) aims to strengthen trade relations and set a strong signal in the world [EC, 2018a; EC, 2018b]. In their negotiations for EPA between 2013 and 2017, the EU and Japan aimed not only to reduce tariffs but also to establish regulatory coherence. Japan is considered a country with very high product standards in the agri-food sector and exemplary consumer protection. Nevertheless, disturbances which endangered human health occurred in the past. Cases of food poisoning, bovine spongiform encephalopathy (BSE), avian influenza and fake labeling have arisen a strong interest and awareness of food safety within the Japanese population [Morishita, 2012]. This study is motivated by the importance for both European food producers and exporters to understand Japanese food safety measures in the light of the EPA. In order to gain a comprehension of the legal framework for food safety and the quality standards of the agri-food sector of the two cooperating parties, the authors have

explained, compared and discussed these aspects in detail, focusing on Japan. The relevance of the EPA in the context of the food safety regulations and quality standards has not been appropriately analyzed yet. Moreover, this study should be useful for policymakers and exporters.

Materials and methods

An intensive desktop analysis was conducted to analyze food safety measures and to compare food safety systems in Japan and the EU under the EPA, including a literature review of available documents and reports on the outcome of the FTA negotiations and food safety regulations in Japan and the EU.

Results and Discussion

Overview of the EU-Japan Economic Partnership Agreement (EPA)

Cooperation between the EU and Japan already has a long history. In the past, several significant agreements were negotiated and adopted between the two partners. In the 1970s, the EU Commission supported European companies in their export efforts and the market entry activities in Japan by special promotional programs. In 1999, the EU-Japan Business Round Table has been established [Felbermayr et al, 2017]. In January 2002, the Mutual Recognition Agreement came into force. Later, in June 2003, the Agreement on Cooperation on Anticompetitive Activities was approved by the EU Council. In the following, the Agreement on Cooperation and Mutual Administrative Assistance came into effect on 01.02.2008. The Science and Technology Agreement between the EU and Japan was signed on 30.11.2009. Following many bilateral discussions and a constructive dialog at the EU-Japan Summit in 2011, the negotiations for an Economic Partnership Agreement, which constitutes a bilateral Free Trade Agreement (FTA), were finally officially launched on 25.03.2013. After 18 rounds of negotiations, the partners reached a basic agreement on 07.07.2017. Afterward, a few technical details were clarified and the fine adjustment has been made so that the EPA could be signed on 17.07.2018 by both partners. Ultimately, formal consent by all EU Member States and the European Parliament must be granted (ratification). In Japan, representatives from two parliaments, the Lower and Upper House, must approve the agreement. The entry into force of the EPA is expected in 2019 [EC, 2018a; Deloitte, 2018; EC, 2018b]. The aim of both partners is to engage in free and fair trade and to counteract isolationism. An important intention of the EPA is to send a strong signal to the world and counteract protectionism. The primary objective is also to strengthen international standards and reduce tariff and non-tariff barriers between the EU and Japan [EC, 2018a]. The EPA consists of 23 chapters, whereby the Agri-Food sector is directly or indirectly affected in many chapters. Chapter 2 (Trade in goods) stipulates the liberalization of Japanese agricultural imports. Nearly 99% of bilateral trade goods have been liberalized, with the exception of rice and seaweed. 91% of all import tariffs will be gradually phased out. A distinction is made between a full tariff elimination and a progressive elimination of customs duties, with product-specific annual installments beginning on the date of entry into force of the FTA. Imports of wine and other alcoholic beverages will be duty-free immediately with the entry into force of the EPA (previously 15%). Customs duties on pork meat shall be eliminated, from 4.3% to duty-free, in six equal annual installments as well as the complicated import regulations shall be reduced. For processed pork, the tariff rate will be diminished from 8.5% to 0%. Moreover, the tariff for beef will be reduced from 38.5% to 9% in 15 annual installments. Due to the FTA, a gradually reducing of import tariffs for hard cheeses from 28.9% to duty-free within the next 15 years is specified. For soft cheese and cream cheese, a duty-free quota has been implemented. Generally, the quotas for dairy products have been increased [EC, 2018a]. Other important chapters of the EPA are Chapter 3 (Rules of

origin and origin Procedures), Chapter 7 (Technical barriers to trade), Chapter 16 (Trade and sustainable development), Chapter 18 (Good regulatory practices and regulatory cooperation) and Chapter 19 (Cooperation in the field of agriculture). By virtue of chapter 6 (Sanitary and phytosanitary measures (SPS)), the two partners reaffirm their rights and obligations under the WTO. The SPS standards and regionalization in disease control have been mutually recognized. Noteworthy is Chapter 14 (Intellectual property), with which Japan recognizes 205 geographical indications (GIs) of the EU and provides trademark protection [EC, 2018b]. Significant studies which analyze the most important assumptions, objectives and scope of EPA regarding the effects on the EU economy are "On the economics of an EU-Japan Free Trade Agreement" [Felbermayr et al., 2017], "Market opportunities for EU agribusiness in the context of the EU-Japan EPA" [Fournel, 2017], "Trade Sustainability Impact Assessment of the Free Trade Agreement between the European Union and Japan" [EU, 2016] and "Assessment of Barriers to trade and investment between the EU and Japan. Copenhagen Economics" [Sunesen et al., 2009]. The EU predicts that the EPA will increase bilateral trade in goods and services by 24% [EC, 2018b].

Food Safety regulations and policy measures in the EU and Japan

This section presents the legal framework, food security policies, state and private quality standards of the EU and Japan and compares them, if possible.

Food Safety in the EU

In response to the BSE scandals, food law in the EU has been revised and restructured. As a result, the legal basis of EU food law is the General Food Law (EU-GFL) (Regulation (EC) No 178/2002) of 28 January 2002, which lays down the general principles and requirements of food law, it establishes the European Food Safety Authority (EFSA) and lays down procedures in matters of food safety. Furthermore, the Rapid Alert System for Feed and Food (RASFF) has been introduced. This law is mandatory for all EU Member States and covers the entire agri-food value chain from production until the point of consumption. The three main objectives of EU food law are settled in Article 5 of the EU-GFL. The three main objectives of EU food law are settled in Article 5 of the EU-GFL and are intended to protect public health, plant health, animal health with respect for animal welfare, prevention of fraud and deception by providing appropriate information. In April 2004, the EU adopted three further important regulations, the so-called hygiene package, which are directly linked to EU-GFL: Regulation (EC) No 852/2004 on the hygiene of foodstuffs, Regulation (EC) No 853/2004 laying down specific hygiene rules for food of animal origin and Regulation (EC) No 854/2004 laying down specific rules for the organization of official controls on products of animal origin intended for human consumption. From all the legal bases mentioned above result the seven basic principles of EU food safety: (1) Principle of the agri-food chain with defined responsibilities, (2) Principle of corporate responsibility, (3) Principle of traceability of the origin of all products „From farm to fork", (4) Risk analysis with independent scientific risk assessment, (5) Separation of risk assessment and risk management, (6) Precautionary Principle and (7) Transparent and efficient risk communication. Furthermore, the application of the concept of Hazard Analysis and Critical Control Point (HACCP) is mandatory in the EU.

In addition to the governmental regulations valid throughout the EU, European food manufacturers also apply the international DIN EN ISO standards and private standards, for instance, IFS Food (International Featured Standard), BRC (British Retail Consortium), QS Standard (Quality and Security GmbH), GlobalGAP and GMP+. At the retail level, many supermarket chains have set their own standards that manufacturers must comply with. These standards are often stricter than EU law and a number of quality labels have emerged.

Food Safety in Japan

The Japanese administrative system is similarly structured to that in the EU and pursues the same goals. The legal framework is the Food Sanitation Law (FSL), the Food Safety Basic Law (FSBL) and the Japanese Agricultural Standard Law (JASL).

The FSL first came into force in 1947 and has been partially modified several times over the years. This law ensures the safety and hygiene of food an in May 1996, the voluntary application of HACCP has been included. In 2002, regulations on import and sale bans were added. Another milestone was the introduction of a "positive list" for agricultural chemical residues in foods in May 2003. At the same time, the Monitoring and Guidance Plan was implemented. In addition, the FSL prohibits to put foods containing harmful substances on the market and lays down guidelines for food standards, additives and packaging. Comparable with the EU basic principles is, inter alia, Article 3 of the FSL which establishes the entrepreneurial responsibility for the entire production chain of food. The law also defines the operating principles of the Ministry of Health, Labor and Welfare (MHLW), which is the food authority at the national level.

The second most important food safety basis in Japan is the FSBL, which came into force in May 2003 and builds/is based on the FSL. It sets the principles for developing a food safety regime and describes the role of the Food Safety Commission (FSC) and Justification of the Prime Minister's Office. Basically, this law is comparable to the EU-GFL.

The Law Concerning Standardization, etc. of Agricultural and Forestry Products, known as JASL, lays down the operating principles of the Ministry of Agriculture, Forestry and Fisheries (MAFF) and specifies the mandatory and voluntary labeling regulations. Also, it is linked to the Food Labeling Act, which is used in the consumer agency division. This law has been in force since 1950 and has been amended several times. It aims to improve quality, increase productivity, enhance fairness and simplicity of transactions, rationalize the consumption and utilization of agricultural and forestry products, as well as the protection of consumer interests. Due to this law, a standardized certification system (JAS system) has been established, which provides the voluntary use of the JAS label. On the one hand, an examination of the products by MAFF is required, on the other hand, the certification must be carried out by authorized certification bodies. The certification ensures a certain quality of agri-food products, which were produced by specific methods. For organic food products the use of the JAS standard is mandatory. The JAS is a consumer protection standard, so labels have been established for consumers visibility. The different JAS labels are shown in figures 1-5.

Figure 1: Logo for General JAS *Source: MAFF, 2018*	Figure 2: Logo for Specific JAS *Source: MAFF, 2018*	Figure 3: Logo for Organic JAS *Source: MAFF, 2018*	Figure 4: Logo for Production Information JAS *Source: MAFF, 2018*	Figure 5: Logo for distribution under fixed temperature control JAS *Source: MAFF, 2018*

The general JAS (figure 1) has been applied to all foods and forestry products. It confirms quality, such as grade, composition and performance. The second logo (figure 2) is awarded to certified products that conform to specific processing procedures or manufacturing methods and that have distinctive characteristics of quality, thus standing out from ordinary products. The organic label (figure 3) is not voluntary, so if an organic product is not certified according to Organic-JAS, it is not allowed to be called "organic". The JAS Production Information logo (figure 4) identifies those products that have declared their ingredients and that comply with JAS production information. For instance, in the case of beef and pork meat, the feed and veterinary medicinal products used must be disclosed. For plant products, the use of pesticides and fertilizers must be expounded. Figure 5 shows the JAS logo, which is used exclusively for Bento (lunchbox) made of rice. The essential prerequisite is, that the Bento Box be transported within the supply chain under constant fixed temperature control [MAFF, 2018].
As in the EU, in addition to governmental standards, private food safety standards also apply. Japan also distinguishes the food quality standards set by the Japanese government and the standards set by Japanese companies. For example, some supermarket chains and retailers have developed their own specific rules, which are even more stringent than government regulations. Particularly, supermarket chains are focusing on compliance with HACCP and ISO standards [Jonkert et al., 2005]. Exemplary the private standards for Good Agricultural Practices (GAP) are presented and compared below. One of the widely known private standard is GLOBALGAP, which is internationally recognized. This is a worldwide voluntary standard for Good Agricultural Practice with the aim of ensuring safe and sustainable food production around the world. The global organization defines itself as a standard provider with a certification system. Every certified company gets the possibility to use the logo (figure 6) [GlobalGAP, 2018]. Also, in Japan, a private standard was created for certification of Good Agricultural Practices, the JapanGAP (JGAP). This is the only international standard in Japan and is managed by the Japan GAP Foundation. The non-profit organization was founded in 2006 and the certification system persists since 2007. Since then, 4,113 farms have been certified (as of 03/2017). The focus is on fruits and vegetables, tea, cereals and legumes as well as animal products and livestock. Equally GlobalGAP, JGAP is a consumer protection and industry standard that aims to contribute to production safety, environmental protection and sustainable agriculture, as well as transparency along the entire value chain. The JGAP labels (figures 7 and 8) attest to the compliance with the required standards of food safety, enviromental protection and occupational safaty and certification schemes [JGAP, 2018].

Figure 6: GLOBALGAP-Logo *Source: GlobalGAP, 2018*	Figure 7: JGAP-Logo *Source: JGAP, 2018*	Figure 8: JGAP Certified Farm Logo *Source: JGAP, 2018*

Comparison of three important basic principles of food safety

The following section highlights and compares only the basic principles of food safety, which are often controversial issues in the negotiations of free trade agreements. It should be noted, that there are only a few fundamental differences between the EU and Japan. In the case of EPA, the different approaches have been mutually recognized by the EU and Japan.

Risk Analysis

According to the Codex Alimentarius Standard (Codex), which is recognized worldwide, risk analysis is executed using the three inter-related components of risk analysis: Risk

Assessment, Risk Management and Risk Communication. This international framework is implemented in the EU due to the Article 6 of the EU GFL, with the food law based on risk analysis. One basic principle is that Risk Assessment and Risk Management are operating separately. The risk assessment has to be carried out by an independent scientific institution. In the EU, the scientific responsibility pertains solely to the European Food Safety Authority (EFSA), based in Parma (Italy). The described separation of roles in Risk Analysis is also implemented in Japan (figure 9) and is consistent with the Codex. The Risk Assessment is ensured by the Food Safety Commission (FSC), which works separately from Risk Management. FSC was established in July 2003 after the adoption of the FSBL. The risk management is under the responsibility of the MHLW on the one hand and MAFF and the Consumer Agency on the other. For hygiene issues, MHLW is also advised by the Pharmaceutical Affairs and Food Sanitation Council. Similar to the EU, Risk Communication takes place, by all institutions and is coordinated by the Consumer Agency. This agency was founded in September 2009. The public warning of the population is ensured by the MHLW.

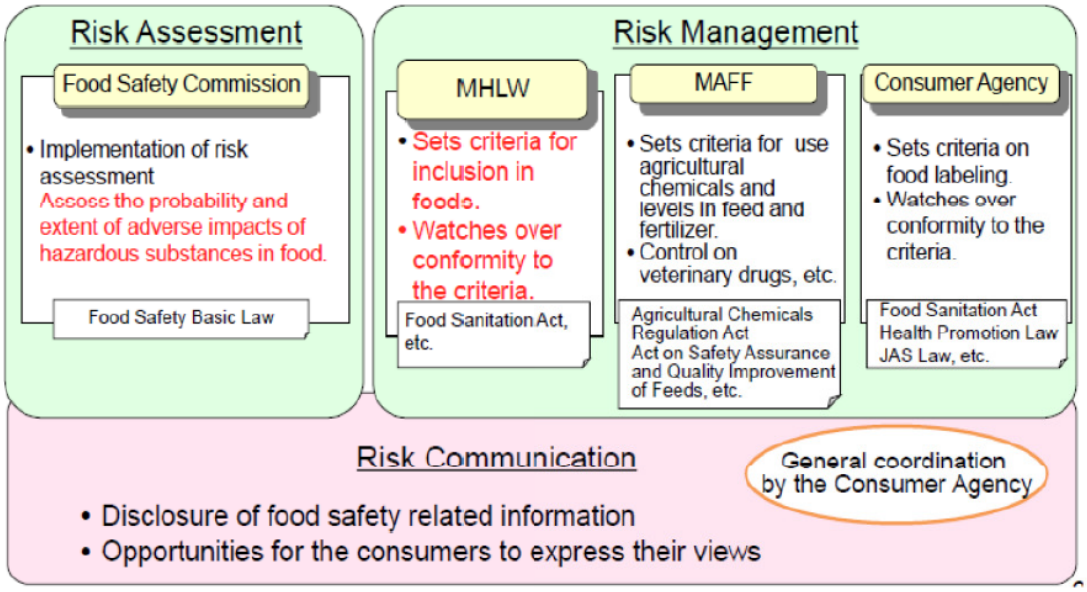

Figure 9: Risk Analysis in Japan. *Source: Sumi, 2014*

Application of the Hazard Analysis and Critical Control Point (HACCP) concept

As a quality management system, HACCP is a globally recognized system to reduce risks in the production of food. It obliges companies to analyze, control and document the entire food processing flow, from the raw material to the final product. Regulation (EC) No 852/2004 of 29 April 2004 legally required European food producers to apply the HACCP principles in conjunction with good hygiene practices. Therefore, all food manufacturers in the EU shall act according to the seven principles of the HACCP concept.

Since 1996, following the Escherichia coli O157: H7 outbreak in Sakai, the Japanese government has been recognized a need to introduce HACCP [WHO, 2006; Sumi, 2014]. So far, HACCP does not necessarily have to be applied in Japan because it is not required by national laws and regulations. As part of the FSL, only a voluntary HACCP approval system was introduced in 1996, which concerns to the production of milk and milk products, meat products, surimi-based products, low-acid canned foods and soft drinks [WHO, 2006]. In Japan, a differentiation is made between HACCP standard A and HACCP standard B. The HACCP standard A is based on the seven HACCP principles and respects the size of the companies. Imported goods, slaughterhouses and poultry processing companies belong to this category. The HACCP standard B allows more flexibility for small-sized businesses and

caterers [MHLW, 2016]. At the 7th Global Food Safety Initiative Focus Day in Tokyo on September 4, 2017, Hideshi Michino, head of department at the MHLW, announced an amendment to the FSL for 2018, which makes systematic implementation of the HACCP mandatory. The aim is to optimize the self-management of hygiene in production, raw materials and the production environment, as well as to eliminate the discrepancy between national and global standards of food safety management. This is justified by the increasing aging of the Japanese population, which raises the risk of food poisoning, the expanding globalization in food trade and the hosting of the Olympic and Paralympic Games 2020 in Tokyo [CGF, 2017].

Precautionary principle and scientific principle

Differences of risk perception pre-exist in the different doctrines. In most countries, including Japan, the *scientific principle* is the preferred approach. In the EU, the *precautionary principle* became legally binding due to Article 168 (1), Article 169 (1) and (2) and Article 191 of the Treaty on European Union and the Treaty on the Functioning of the EU. Internationally, the *precautionary principle* is recognized by the WTO, since it has been integrated into article 5 (7) of the WTO Agreement on Sanitary and Phytosanitary Measures (SPS Agreement) in 1995. In Japan, the precautionary principle is not explicitly embedded in the FSL, but there are regulations, which go along the same lines, for instance, Article 7 of the FSL. For example, the MHLW, in coordination with the FSC, may also prohibit the distribution of high-risk foods as a precautionary measure until evidence has been provided that they pose no risk to health. The precautionary principle was also determined in the EPA, namely in the following chapters: SPS-Chapter, which deals with food safety, animal health and plant health, and the chapter on technical barriers to trade, which governs technical product requirements and regulatory law [EC, 2018b].

Conclusion

This study analyzed the food safety measures and compared food safety systems in Japan and the EU under the EPA. Effective food safety regulations and policy measures play a key role in reducing potential threats to the health of humans and animals. It is well known worldwide, that both the EU and Japan have very high product standards and exemplary consumer protection. This has been verified by the results of this study. In many areas, both EPA partners have created standards that are in some cases higher than the international standards. In Japan, food is a massive political issue, reflected in the state's diverse and complex food security policy.

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