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Entrepreneurship research in economics and management: Understanding the term and research trends

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A B S T R A C T
Objective: The article aims to discuss the most important aspects and areas of entrepreneurship in the newest research and to identify research trends present in the literature.
Research Design & Methods: The article is a literature review of narrative type. The research method we employed is content analysis and synthesis by causal assessment. We used the newest publications, primarily articles from renowned journals indexed in the Web of Science and Scopus databases.
Findings: Entrepreneurship is a multi-thread, interdisciplinary, and multidisciplinary area of research. We may analyse entrepreneurship as a function of: personality, managerial activities, the individual entrepreneur, the market, the SME sector in the economy, self-employment, economic production factor. Many types and categories of entrepreneurship described in the literature have developed over the years, which resulted in a broad diversity of subjects in the field. The evolution of entrepreneurship studies highlights the changing conditions for entrepreneurship and provides new perspectives.
Implications & Recommendations: This article responds to the fragmentation and dispersion of research efforts, summarizing achievements in the field of entrepreneurship studies at the intersection of two disciplines: economics and management. We discuss the most important questions of entrepreneurship synthetically and exhaustively, which allows us to delineate up-to-date and more understandable themes for both researchers and practitioners.
Contribution & Value Added: The article's added value consists in the updated and synthetic presentation of entrepreneurship's most important aspects and areas. The overview presents the current state of the art on entrepreneurship, its functions, classifications, and research directions.
Article type: literature review
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INTRODUCTION

As a sub-discipline or academic specialization, entrepreneurship remains a relatively new field of exploration (Głodowska & Wach, 2022; Wach, 2022). However, as Landström (2010) indicates, the field has a rich tradition in the history of economic thought. Entrepreneurship is genetically and immanently inscribed in human activity and has existed virtually since the very emergence of humankind (Heilbroner, 1993). Entrepreneurship is a multi-thread, interdisciplinary, and multidisciplinary area of research. Broadly speaking, we may assume that the literature scrutinizes entrepreneurship in at least two main categories (Davidsson, 2008), namely entrepreneurship as a social phenomenon and as a research discipline. Undoubtedly, entrepreneurship remains an ambiguous term in both casual and academic language. As a research field, entrepreneurship is characterized by its multidisciplinarity

(studies conducted separately across multiple scientific disciplines) and interdisciplinarity (studies conducted at an intersection of at least two different scientific disciplines). Let us note that most studies on entrepreneurship stem from economics and management. Researchers try to explain different aspects of entrepreneurship by employing a heterogeneous spectrum of perspectives and research methods. Over the years, different types and dimensions of entrepreneurship have crystallized and found their way into scientific research (González-Tejero *et al.*, 2022). The most recent theoretical studies include articles on the following types of entrepreneurship: sustainable (Yakubu *et al.*, 2022; Holzmann & Gregori, 2023), digital (Fernandes *et al.,* 2022; Sabatini *et al.*, 2022), social (Manjon, *et al.*, 2022), female (Ojong *et al.*, 2021), migrant (Sinkovics, 2021), and international (Głodowska, 2022). However, the literature has recently largely omitted an integrating view of the basic entrepreneurial concepts that would present current research nomenclature and trends. This article fills this gap in response to the fragmentation and dispersion of research efforts by summarizing the achievements of entrepreneurship research at the intersection of two disciplines: economics and management. Thus, this article discusses the most important aspects and areas of entrepreneurship in the newest research, identifying the newest trends by providing two key contributions. Firstly, we demonstrate the current state of the art, hence systematizing the rich body of work in the field and making it more accessible to researchers and practitioners. To that end, we organize concepts and functions of entrepreneurship along with reflecting on its different classifications. Secondly, we discuss and consolidate the research threads that have emerged over the years in the field of entrepreneurship, suggesting possible future research avenues.

The research method this study employed was content analysis and synthesis by causal assessment. For this purpose, we used publications from renowned journals indexed in the Web of Science and Scopus databases.

The article is divided into sections. After the introduction, we overview the newest literature in the field of entrepreneurship, its understanding, and its functions. Next, we present and discuss the study results. Finally, we conclude.

RESEARCH METHODOLOGY

The article is based on a narrative literature review. Comprehensive understanding and insights into the content of previous research is an essential step in all research disciplines and academic projects. Referencing to the relevant literature is a crucial contribution to research development. Researchers usually begin their investigation with a description of prior research studies to map and evaluate the research area and to justify the aim of the study and formulate research hypotheses. In our approach, we implement a narrative review, which aims to summarize and synthesize what has been written on a selected topic, but we do not seek generalization or cumulative knowledge from what is reviewed (Wach, 2020). Our review focuses on essential aspects and areas of entrepreneurship, especially from the perspectives of both economics and management.

The research methods applied in the study came down to the content analysis and synthesis by a casual assessment. Our narration uses thematic analysis related to entrepreneurship, its functions, and various classifications. The chronological thread was also taken into account in the context of the conceptualization of the entrepreneur and entrepreneurship terms and the systematization of previous research in this area. Finally, over 70 publications were selected for our study. On their basis, a conceptual analysis of entrepreneurship was made in a retrospective perspective. Then, the functions of entrepreneurship were identified and characterized. Research on entrepreneurship over the years has been systematized (according to different research schools) in chronological terms, and contemporary dimensions and types of entrepreneurship have been discussed.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

A great number and variety of entrepreneurship definitions preclude its consensual explanation. Shane and Venkataraman (2007) claim that the biggest obstacle in creating a theoretical framework for the

study of entrepreneurship is its definition. The first to officially introduce entrepreneurship to scientific literature was Cantilon in 1755, who positioned entrepreneurship in the field of economics and defined the role of the entrepreneur in economic growth. Cantilon described the discrepancy between supply and demand as a chance to buy low and sell high, branding those capable of identifying such chance 'entrepreneurs' (Carlsson *et al.*, 2013). Thus, Cantilon created a framework for the later development of classical equilibrium models by promoting economic prosperity and coping in uncertain conditions (Murphy *et al.*, 2006). To diachronically order attempts at the conceptual definition of entrepreneurship should be associated with the following names: Cantillon (1755), Knight (1921), Schumpeter (1934), Penrose (1959), Kirzner (1973), Drucker (1985), Shane and Venkataraman, (2000), and Reynolds (2005). The results of the diachronic conceptual analysis are available in Table 1.

Table 1. Diachronic overview of entrepreneurship definitions

Authors	Definition
Cantillon (1755)	Entrepreneurship entails bearing the risk of buying at a certain price and selling at uncertain prices.
Say (1803)	An entrepreneur is a person who shifts resources from an area of low productivity to high productivity. Entrepreneurship is about changing resources from a lower productive to a higher productive use.
Knight (1921)	Entrepreneurship means generating profit for bearing the uncertainty and risk of market dynamics.
Schumpeter ([1911] 1934)	Entrepreneurship is any kind of innovative function that could have a bearing on the welfare of an entrepreneur. … Entrepreneurship is based on purposeful and systematic innovation. It includes not only the independent businessman but also company directors and managers who actually carry out innovative functions.
Cole (1959)	Entrepreneurship is the purposeful activity of an individual or a group of associated individuals, undertaken to initiate, maintain or aggrandize profit by the production or distribution of economic goods and services.
Penrose (1959)	Entrepreneurial activity involves identifying opportunities within the economic system.
Kirzner (1973)	The entrepreneur implements planned goals, recognizes and acts upon profit opportunities, and allocates supply to satisfy demand.
Drucker (1985)	Entrepreneurship is the act of innovation involving endowing existing resources with new wealth-producing capacity.
Timmons (1989, p. 48)	Entrepreneurship is a human, creative act that builds something of value from practically nothing. It is the pursuit of opportunity regardless of the resources, or lack of resources, at hand. It requires a vision and the passion and commitment to lead others in the pursuit of that vision. It also requires a willingness to take calculated risks.
Baumol (1990, p. 897)	[Entrepreneurs are] persons who are ingenious and creative in finding ways to augment their own wealth, power, and prestige.
Hisrich & Peters (1998)	Entrepreneurship is the process of creating something new with value by devoting the necessary time and effort, assuming the accompanying financial, psychic and social risks and receiving the resulting rewards of monetary and personal satisfaction and independence.
Shane & Venkataraman (2000)	The field of entrepreneurship involves the study of sources of opportunities; the processes of discovery, evaluation, and exploitation of opportunities; and the set of individuals who … exploit them.
Low (2001)	As an academic field, entrepreneurship is a catch-all.
Reynolds (2005)	Entrepreneurship is a process of discovering opportunities and creating new businesses, often by creating new organizations.

Source: own elaboration and extension of Ahmad and Seymour (2008, p. 7).

As a research thread in economic sciences, entrepreneurship naturally first emerged as part of economics. Only later was it introduced to and still remains dominated by management studies. Stevenson and Jarillo (1990, p. 18) distinguish three main questions in entrepreneurship studies: Why, how, and what happens? Van Ness and Seifert (2016) associate the first of those questions with human characteristics, the second with the process, and the third with the managerial outcome

or corollary of the economy. Based on the traditional approach to entrepreneurship rooted in management sciences, these authors perceive entrepreneurship as a trichotomous construct of an entrepreneur's traits, 'doing' entrepreneurship, and the initiative and enterprise as results of attitude and action (Figure 1). By providing entrepreneurship with a complex definition, Shane and Venkataraman (2000, p. 218) combine these three dimensions of entrepreneurship to conclude that – from a scientific perspective – entrepreneurship deals with the study of who, how, and with what effect uses opportunities to manufacture goods and services.
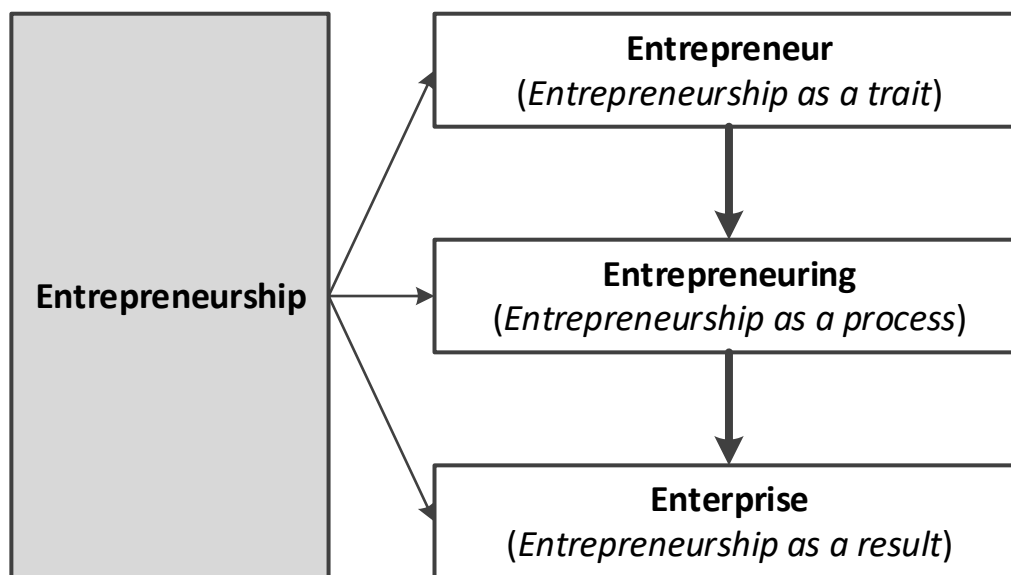
Figure 1. Entrepreneurship as a trichotomous construct
Source: adapted from Van Ness and Seifert (2016, p. 90).

Today, entrepreneurship as a research subject mainly appears in studies prepared from the perspective of management sciences, although its origins lie in economics, so we should apply a holistic approach to entrepreneurship should combine the achievements of these two disciplines. Therefore, elaborating on the above trichotomous classification, we may assume that literature in the field of economics provides (Figure 2) four basic functions of entrepreneurship – namely functions of personality, managerial process, individual entrepreneur, and the market – along with three derivative functions, understood as functions of the SME sector in the economy, self-employment, and economic production factor (Wach, 2022). Despite their prominence, the literature has not sufficiently distinguished these functions against the background of the adopted classification criteria; albeit they do occur at the level of entrepreneurship operationalization in economic models.

Entrepreneurship as the function of personality

Research on entrepreneurship at the level of individuals focuses on human action characteristics and most often concerns the entrepreneur, but also employee teams (Sarwoko & Nurfarida, 2021; Zbierowski & Gony-Zbierowska, 2022). This vein of research interprets entrepreneurship as the first of the three key questions: "Why do entrepreneurs work?" (Stevenson & Jarillo, 1990, p. 18), thus the search for the *causes* of entrepreneurship.

Among the six schools of entrepreneurship, Cunningham and Lischeron (1991) distinguish as many as two that focus on personality: the Great Person school and the psychological characteristics school (Table 2). According to the former, an entrepreneur possesses an intuition or a sixth sense, along with other innate special characteristics and instincts. Thus, an entrepreneur is identified as an extraordinary, successful person. By contrast, according to the psychological characteristics school, entrepreneurs have unique values, attitudes, and needs that drive them. An entrepreneur is identified as the founder in control of the means of production.
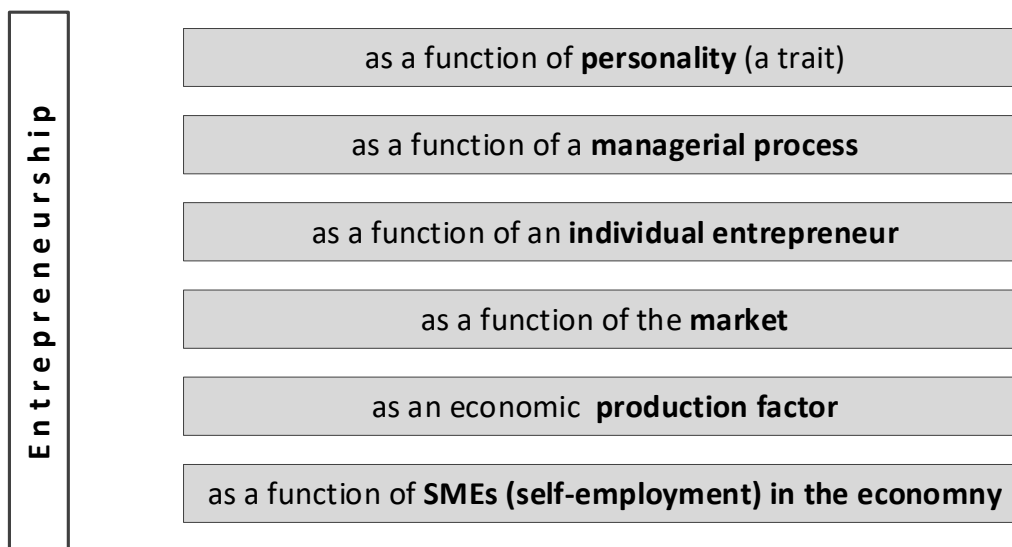
Figure 2. Understanding entrepreneurship in economics and business studies
Source: own study based on Wach (2015a, p. 26).

Table 2. Schools of entrepreneurship according to Cunningham and Lischeron

School	Central focus or purpose	Assumption	Defining the entrepreneur	Behaviours and skills
"Great Person" school	The entrepreneur has an intuitive ability – a sixth sense – and traits and instincts he/she is born with.	Without this "inborn" intuition the individual would be like the rest of us mortals who "lack what it takes".	"Extraordinary achievers"	Intuition, vigor, energy, persistence, self-esteem
Psychological characteristics school	Entrepreneurs have unique values, attitudes, and needs which drive them.	People behave in accordance with their values; behaviour results from attempts to satisfy needs.	Founders who control over the means of production	Personal values, risk-taking, need for achievement
Classical (innovation) school	The central characteristics of entrepreneurial behaviour is innovation.	The critical aspect of entrepreneurship is the process of doing rather than owning.	People who make innovations bearing risk and uncertainty (creative destruction)	Innovation, creativity, discovery
Management school	Entrepreneurs are organizers of an economic venture; they are people who organize, own, manage, and assume the risk.	Entrepreneurs can be developed or trained in the technical functions of management.	People creating value though the recognition of business opportunities, the management of risk-taking.	Production planning, people organizing, capitalization and budgeting
Leadership school	Entrepreneurs are leaders of people; they have the ability to adapt their style to the needs of people.	An entrepreneur cannot accomplish his/her goals alone, but depends on others.	"Social architects" who promote and protect values.	Motivating, directing, leading
Intrapreneurship school	Entrepreneurial skills can be useful in complex organizations; intrapreneurship is the development of independent units to create market and expand services.	Organizations need to adapt to survive; entrepreneurial activity leads to organizational building and entrepreneurs becoming managers.	People who pull together to promote innovation.	Alertness to opportunities, maximizing decisions

Source: adaption from Cunningham and Lischeron (1991, p. 47 & 56).

Studies on entrepreneurial personalities utilize three main methodological trends rooted in behavioural sciences: (i) personality instrumentalization, (ii) personality ontology, (iii) theoretical pragmatics. Behavioural studies on entrepreneurial personalities distinguish eight key approaches called 'schools of thinking on personality' (Wickham, 2006, pp. 53-59):

— *psychodynamic approaches* identify the entrepreneurial personality with internal psychological processes that determine human behaviour as per the Freudian concept of three processes: *Id* – unconscious, *Superego* – conscious and unconscious, *Ego* – conscious;

— *dispositional approaches* follow the trait approach to personality, or trait theory, which are the so-called classical theories of personality in psychology, as individual psychological theories in this approach most often focus on extraversion and introversion because entrepreneurs differ in this respect just like the whole population, so one cannot easily attribute to these theories great importance in explaining the phenomenon of entrepreneurship; scholars developed the qualifying approach in leadership theory based on the dispositional approach in management, among other sources;

— *biological approaches* postulate that entrepreneurial personality is a biological process shaped by genes, and some studies even speak of the *gene of entrepreneurship*; one of the most famous genetic studies on twins at King's College London confirmed that entrepreneurs are born thanks to specific genes, as the research (Nicolaou, 2011) shows that 37-48% entrepreneurship-related aspects are genetically determined, with other research teams arriving at similar results (van der Loos *et al.*, 2013);

— *evolutionary psychological approaches* argue that human cognitive skills were shaped in the Palaeolithic and that the sources of the entire human species' entrepreneurial personality – not just that of the individuals – should be sought in the Stone Age;

— *phenomenological approaches* assume that every person is different and that their entrepreneurial personality is shaped by unique historical and introvert factors related to their own experience; theories built following this approach assume that one has free will to make own choices and that one is a self-perfecting entity in terms of health, well-being, and psychological maturity;

— *behavioural approaches* posit the entrepreneurial personality as determined only by external environmental factors that can only be explained by observing human behaviour; this approach is heavily criticized in the literature;

— *social-cognitive learning approaches* are based on learning and explain entrepreneurship as a feature of human action, not through the prism of an inherited or shaped personality but through individual social experience and interactions; entrepreneurship is transferred to someone by other actors in social life, while the socio-cognitive learning approach in itself is very diverse in its multiple concepts and theories; empirical research conducted in this trend focuses on whether entrepreneurs as a group differ significantly from other groups in terms of acquiring, storing, and processing knowledge in the decision-making process;

— *attribution-based approaches* assume that an entrepreneurial personality is attributed to an individual by others.

Entrepreneurship as the function of managerial processes

Entrepreneurship as a function of managerial processes is an analysis performed from the perspective of the second key question "How do entrepreneurs work?" (Stevenson & Jarillo, 1990, p. 18), meaning an exploration and explanation of managerial behaviours. This research thread was pioneered by Gartner (1988), who proclaimed that from a managerial viewpoint, what bears the most importance is the study of the entrepreneurial process. Bygrave and Hofer (1991, p. 14) elaborate on this by stating that "the entrepreneurial process involves all the functions, activities, and actions associated with the perceiving of opportunities and the creation of organizations to pursue them." Based on a detailed analysis of the rapidly developing literature on the subject, we should distinguish two main research branches (Landström, 2010, pp. 18-19):

— entrepreneurship as the process of creating new ventures,
— entrepreneurship as the process of discovering and utilizing opportunities.

Theories of entrepreneurship pay special attention to Schumpeter's concept of the entrepreneur-innovator, for whom economic reality means creative destruction by the introduction of new combinations through repeated tearing down and realignment of products and services. Schumpeter distinguishes five new economic combinations identified with innovation: introducing new production technologies; introducing a new product or a product of new quality; introducing a new organization to the sector; entering new markets; use of new raw material sources. Today, these new combinations have an entirely different scope. In the classical sense, they have remained relevant to traditional enterprises, albeit the age of turbulence has enforced the adoption of a different outlook on business processes and the introduction of innovation (Kotler & Casoline, 2009).

The entrepreneurial process founds each entrepreneurial action, which results in growth and development. In the classical view, the process consists of several successive sequences that vary depending on the author. Bygrave's proposition (2004, p. 3) seems to be the most universal one in application. In the entrepreneurial process, Bygrave distinguishes four different stages:

– idea or conceptualization whose attribute is innovation;
– an event initiates operations;
– implementation;
– growth and development.

Each stage shows different determinants and witnesses different entrepreneurial behaviours. Another very interesting approach grounded in strategic entrepreneurship is introduced by Wickham (2006, pp. 224-228), who views the entrepreneurial process dynamically, establishing four contingencies, clearly referring to the contingentism theory in philosophy: entrepreneur, market opportunity, enterprise organization, resources. Between these variables happen interactions based not on necessity but subjectivism, which characterizes the entrepreneur. These interactions are essential to the entrepreneurial process, between which appear mechanisms coordinated by the entrepreneur: entrepreneurial configuration, entrepreneurial fit, and entrepreneurial focus. Entrepreneurial fit consists in adapting the organization to market requirements, which can sometimes be identified with the previously discussed concept of creating individual value for the customer in the era of "new" innovations (Prahalad & Krishnan, 2008, p. 11). For the organization to adapt to market opportunities, it must configure – and often reconfigure – its resources accordingly.

Entrepreneurship as the function of individual entrepreneur

Economic studies most often analyse the entrepreneur's role. Etymologically, the term stems from the French *entreprendre*, already in use in the fifteenth century, popularized in theoretical writings much later by French economists such as Richard Cantillon (1680-1734) or Jean-Baptiste Say (1767-1832), but also François Quesnel (1542-1619), Nicolas Baudeau (1730-1792), and Anne-Robert Jacques Turgot (1727-1781). At that time, English literature on the subject used such terms as "adventurer," "projector," "undertaker" (Hébert & Link, 2010, p. 24). German literature used its own notion, closest to the French equivalent – *der Unternehmer* – initially promoted by von Thünen (1785-1850) and von Mangoldt (1824-1858). This is term that was used by Schumpeter (1883-1950) in 1912, who in the translation of his breakthrough work into English in 1934 used the term "an entrepreneur."

From the viewpoint of economics, entrepreneurship as the function of individual entrepreneur is most often identified with the function of the market. Thus, we could try to separate these two functions of entrepreneurship and treat the entrepreneur's function at the microeconomic level, while the market function at the level of macroanalysis, with elements of meso- and microeconomic theory. At this point, let us mentione Von Mises (1998), who writes that "[e]conomics, in speaking of entrepreneurs, has in view not men, but a definite function." The literature most often distinguishes five basic functions of the entrepreneur, referred to as market entrepreneurial functions (Hébert & Link, 1989; Landström, 2010):

– risk-taking (Cantillon, Say, Knight),
– creating opportunities and introducing innovations (Schumpeter),
– organizing and coordinating limited economic resources (Say),
– seeking profitable opportunities (von Mises, Kirzner),

− accumulating and allocating capital (Smith, Ricardo, Marshal).

Entrepreneurship as the function of the market

In traditional economics, market theory in terms of supply-demand analysis as well as the theory of price or the theory of the firm explain the market mechanism based on certain idealistic assumptions (*homo economicus*), ignoring in their models that which is elusive, including the role of entrepreneurship and entrepreneurs (Baumol, 1968, p. 72; Kirzner, 1973). An important element of theory is therefore Mises's notion of human action: "built into the propensity for alertness toward fresh goals and the discovery of hitherto unknown resources with which *homo agens* is endowed" (Kirzner, 1973, p. 34).

Hébert and Link (2009, p. 4) emphasize that the level of entrepreneurship in the economy and society depends on three key conditions:

− free market and open economy guarantee equal access to entrepreneurial opportunities;
− guaranteed private ownership;
− stability of institutions reinforcing the above two conditions.

As a function of the market, entrepreneurship is analysed from the perspective of the third question "What happens when entrepreneurs work?" (Stevenson & Jarillo, 1990, p. 18), meaning the search for *effects* of entrepreneurship. In this case, entrepreneurship is most often reduced to the functions of the sector of micro, small, and medium-sized enterprises, but only for empirical research operationalization. Such research attempts to analyse the influence of the SME sector on growth, both in terms of GDP and the growth of employment in the economy.

Entrepreneurship as the production factor

In classic economics, especially in the theory of production and cost, there are three factors of production, namely (i), (ii) labour, and (iii) capital. Alfred Marshall in 1890 was the first to formally recognize the need to consider entrepreneurship for production. In his seminal work *The Principles of Economics*, Marshall states that there are four factors of production: (i) land, (ii) labour, (iii) capital, and (iv) organization. For him, the organization is the coordinating factor that connects other factors. Entrepreneurship and especially the entrepreneur is a key element here that benefits from a combination of three classic factors. Moreover, Marshall believed that entrepreneurship was the driving force of an organization. By organizing themselves creatively, entrepreneurs create new goods or improve "the plan of producing an old commodity" (Marshall, 1994).

Drucker (1985) is considered the promotor of the entrepreneurial economy paradigm. He saw the coming changes of the entrepreneurial revolution in his visionary article in the late 1970s, and then in the mid-1980s he developed his concept in the seminal book *Innovation and Entrepreneurship* (Drucker, 1985). The term was popularized by Audretsch and Thurik in the early 2000s (2000, 2001, 2004) when a fundamental shift towards an entrepreneurial economy was noticed. The transition from the domination of large enterprises in the economy, and thus the emergence of the economic phenomenon of small and medium-sized enterprises, resulted in changes in the processes of internationalization of enterprises and globalization of the world economy. The loss of the comparative advantage of large developed economies in favour of developing countries – due to their cost advantage in mass production – caused a strategic reorientation based on knowledge, information and innovation, as a result of which the knowledge-based economy paradigm became popular in the literature and in business practice. As noted by Audretsch and Thurik (2000), an economy whose comparative advantage is new knowledge requires a completely different industrial structure as well as economic values, hence the key role in the reorganization of economies was played by small and medium-sized enterprises and all entrepreneurial activities, and the basis for growth has become – according to Audretsch (2009) – an entrepreneurial society. In the knowledge-based entrepreneurial economy, the policy-making reformulate their question from 'How can governments encourage businesses to exploit market potential?' to 'How can governments co-create an environment that supports business success and viability?' (Audretsch & Thurik, 2001, pp. 31-32).

Entrepreneurship as the function of SMEs (self-employment) in the economy

Undoubtedly, entrepreneurship is difficult to measure, in fact it is impossible to quantify entrepreneurship in its entire scope, especially its creative and innovative aspects of human and business activities. Hence, in numerous economic models it is simplified to the function of small and medium-sized enterprises (SMEs) or to the function of self-employment.

The literature assumes specific attributes to the SME sector, proving that entrepreneurship in this sense stimulates economic growth by activating innovative processes and generating new jobs (Brich, 1987). A dynamic approach to the environment characterizes the SME sector. These companies can react the fastest to consumers' changing needs and preferences (Okyere, 2017). Understanding this entrepreneurial function relates to the classification of firms according to their size (usually regulated by country-specific law).

Table 3. Definition of small and medium-sized enterprises according to EU criteria

Firm size	Staff headcount	Turnover (EUR)	Balance sheet total (EUR)
Self-employment	0	≤ 2 million	≤ 2 million
Micro	< 10		
Small	< 50	≤ 10 million	≤ 10 million
Medium-sized	< 250	≤ 50 million	≤ 43 million

Source: Adapted from European Commission (2003).

Alternative definitions of SMEs are also adopted depending on the country (Wach, 2015b). The criterion of the number of employees or financial thresholds may then differ from the EU ones. Considering the size of the company, it is SMEs that attract the greatest attention of entrepreneurship researchers.

Entrepreneurship of individuals and its effects can be formalized in the form of self-employment. Self-employment can be understood as the economic activity of an individual or professional practice, whereby one of the conditions is required: these people work for profit, run their own business, or conduct activities aimed at setting up their own business (European Commission, 2010).

RESULTS AND DISCUSSION

Directions and evolution of research on entrepreneurship

As we highlighted above, science scrutinizes entrepreneurship since long (Chandra, 2018), albeit few consider it a separate, independent scientific discipline. Suffice it to consider the current classification of scientific disciplines in Poland, which treats entrepreneurship as a subdiscipline of management, which in turn, is a component of two scientific fields: economics and humanities (Gorynia, 2018). Nevertheless, we should keep in mind that entrepreneurship was recognized by economic sciences for a long time. The notion of entrepreneurship was introduced and developed by economists. The subject appeared much later in management sciences, most probably in the mid-twentieth century.

Considering the current expansion of entrepreneurship in economic life, the dynamic development of research resulted in the appearance of numerous publications, journals, and study programs dedicated to the matter, we may posit entrepreneurship meets all the criteria to be considered an independent scientific discipline. Thus, we may regard entrepreneurship as a relatively young field that continues to develop its identity. The emergence of entrepreneurship as a science dates back to the 1950s. However, the real intensification of research in the field began only 30 years later (Low & MacMillan, 1988), which is related to the dynamic growth of related publications and thematic journals. Orthodox researchers continue to undermine the independence of entrepreneurship as a scientific discipline. Low (2001) believes that entrepreneurship receives a lot of attention but little respect. The main objections to the scientific maturity of entrepreneurship concern the lack of universal theoretical foundations and paradigms. Leitch *et al.* (2010) add that researchers of entrepreneurship focus their methodological considerations on the analytical unit and research design, rather than on the basic

ontological and epistemological aspects that determine the choice of research projects and shape the perception of a phenomenon.

Therefore, the lack of scientific legitimacy of entrepreneurship results from the lack of an explicit, original canon that would be strictly assigned to entrepreneurship and used not by another specialization. We cannot fully agree with this view, considering the interdisciplinarity desired by virtually all modern disciplines. As a counterargument, Veciana (2007) states that such an irrefutable core of entrepreneurship may be the issue of entrepreneurial functions and the creation of new companies – small and medium-sized enterprises – and family businesses. Of course, this does not exhaust the catalogue of issues considered by entrepreneurship studies – as we demonstrated in the sections above that showed the dimensions, types, and kinds of entrepreneurship – but scholars indicate these elements as the specific elements of entrepreneurship studies, not appropriated by other scientific fields. Veciana (2007) distinguishes four successive stages that led to the formation of entrepreneurship as a scientific discipline:

1. stage one (the eighteenth to the nineteenth century): defining the entrepreneur and entrepreneurship;
2. stage two (first half of the twentieth century): perceptions of entrepreneurship through the lens of the history of economic thought;
3. stage three (second half of the twentieth century): the beginning of entrepreneurship studies;
4. stage four (from the 1980s to date): consolidation and flourishing of entrepreneurship studies.

An essential part of current entrepreneurship studies is interdisciplinarity (Branco *et al.*, 2021). The first studies on entrepreneurship emerged in economics, which considered entrepreneurship in comparison with uncertainty, risk, innovation, and economic growth (Khalilov, 2021). Among the non-economic approaches to entrepreneurship research, we should mention the psychological and sociological approaches, which focus on behavioural factors and individual traits as predictors of entrepreneurship (Hornaday & Aboud, 1971). With the development of entrepreneurship as an autonomous discipline, there occurred a behavioural reorientation that emphasized what entrepreneurs do in terms of recognizing, assessing, and exploiting opportunities (Shane & Venkataraman, 2000). Gradually, entrepreneurship studies became more fragmented, which some researchers use as an argument against considering entrepreneurship as a science (Gartner, 2001). Cherukara and Manalel (2011) note that after the initial appearance of entrepreneurship in economics, it was absent from economic models. Neoclassical economics, which support the idea of perfect competition and symmetrical information, has never held much respect for entrepreneurship characterized by risk factors and innovations. In Table 3 we present a chronology of theoretical definitions of entrepreneurship.

Table 4. Chronology of theoretical definitions of entrepreneurship

Period	School name
1700-1800	French Classical school
1750-1850	British Classical school
1800-1900	Austrian Classical school
1850-1900	Neoclassical school
1900-1980	Neoclassical Austrian school
1920-1940	Schumpeterian approach
1950-1980	Psychological and sociological approaches
1980- to date	Modern approach

Source: own elaboration based on Pittaway and Freeman (2011, pp. 3-33).

Chandra (2018) argues that the contribution of entrepreneurship studies to date is undeniable. It is crucial for entrepreneurs, policymakers, and various global institutions as it helps to understand the rationales, factors, obstacles, and principles that influence value creation, economic growth, resource allocation, and political agendas, with all of this consequently shaping social well-being. We should regard the 1980s a special period of entrepreneurship studies expansion, manifested not only in the increased number of studies but also in the diversification of research approaches, dimensions, and fields.

The circumstances that intensified entrepreneurship studies related to the reorientation of business in many developed economies – which began as early as in the 1970s – when large corporations ceased to be perceived as economic engines, and attention shifted to smaller companies. Moreover, state authorities paid greater attention to entrepreneurship, its authorization, support, and promotion, especially in developed economies. Furthermore, scholars noticed cultural changes in popular approach towards entrepreneurs and enterprises, while a positive image of the entrepreneur was popularized in the media (Pittaway & Freeman, 2011). Significant changes in the global economy related to increased global competition and technological progress have contributed to increased uncertainty and risk, and greater fragmentation of the market. All this contributed to the weakening of the position of large companies in favour of smaller businesses (Carlsson, 1992). Thus, we may assume this reorientation became a turning point for the contemporary concept of entrepreneurship, simultaneously initiating the growth in relevant studies. Notably, the intensification of entrepreneurship studies in the last three decades has gone far beyond the perspective of small businesses, which is why the literature often emphasizes a dissonance between the issue of small business and entrepreneurship (Carland *et al.*, 1984). Small business researchers primarily focus on the business experience of companies and small business operations (Onwe *et al.*, 2020). Entrepreneurship researchers consider the broader context of running a business, not limited to start-ups but including the creation of new ventures, high-growth ventures, and corporate entrepreneurship (Kim, 2022).

The 1980s witnessed a significant revival in the field of entrepreneurship studies. Resulting mainly from exogenous factors, this orientation caused an increase in the number of journals focused on entrepreneurship, thus increasing the number of related publication, policymakers' decisions, academic courses, and conferences (Vesper, 1982). Most of all, this period showed a particularly dynamic growth of economic activity (Gartner & Shane, 1995). Scientific studies from the period presented entrepreneurship, new companies, and small enterprises as the key driving forces of economic growth: flexible, reactive, innovative, easily adapting to external changes, and generating jobs (Ács, 1984). Gartner (1990) identifies several research themes that emerged in that period: the entrepreneur, establishing an organization, innovation, value creation, profit versus non-profit activity, uniqueness, and owner-manager relations. According to Carlsson *et al.* (2013), research from the period focused on the entrepreneur and their personal characteristics, also the successes and failures of individual entrepreneurs and companies. These studies were dominated by psychological and sociological approaches. The focus on individuals and teams was firmly rooted in behavioural sciences, primarily referring to the intra-personal processes of individual entrepreneurs. Mainstream studies in economics from the 1980s reveal attempts to delimit the boundaries of entrepreneurship (Carlsson *et al.*, 2013).

In turn, the 1990s revisited the problem of defining the identity and foundations of entrepreneurship studies, which remained informal. During this period, representatives of management and economics dominated the field. Three lines of entrepreneurship studies originated from that period, and scholars recognize the following related themes (Casson, 1990; Carlsson *et al.*, 2013):

1. Economic-theoretical approach: risk and uncertainty, market process, innovation, entrepreneur and enterprise;
2. Empirical studies of firms and industries: establishing new firms, firm multiplicity, market entry, innovation, employment, regional development.
3. Culture and economic development: personality, immigrants' motivation, social mobility and culture, development and regression.

We may view the 2000s as a particularly prolific period in the development of entrepreneurship studies. One may say that after the entrepreneurial inclinations ignited in the 1980s, the process continues to escalate as we observe extensive and intensive research development in this area. Westhead and Wright (2000) predicted that after the year 2000, studies would focus on the following issues – which indeed was mostly the case – theories of entrepreneurship, methodology, corporate finance, processes of identifying business opportunities, types of entrepreneurs, environment for initiating and developing ventures, corporate entrepreneurship, family businesses, knowledge-based entrepreneur-

ship, innovative entrepreneurship, and internationalization. At that time, some attempts to systematize and summarize the previous achievements in the field of entrepreneurship are also visible. Scholars assume that two concepts of research had crystallized by this period: explorational and exploitational (Shane & Venkataraman, 2000; Ács & Audretsch, 2003). The former studies entrepreneurship as seeking entrepreneurial opportunities, involved individuals and actions, and utilizing opportunities. The latter recommends studying entrepreneurship as creating new companies and its importance for the economy. The literature on the subject differently assesses these two perspectives. Authors recognize that these dimensions are not complementary, so they consider other levels of reference. On the other hand, both concepts ultimately refer to the creation of new economic activities, which are desirable and provide useful and functional knowledge about entrepreneurship (Davidsson, 2003).

Table 5. Typology of different types of entrepreneurship

Criterium	Types

Scope of the activity	– domestic entrepreneurship
	  o local entrepreneurship
	  o regional entrepreneurship
	– international entrepreneurship
	  o cross-border entrepreneurship
	  o global entrepreneurship

Area of the activity	– business entrepreneurship – social entrepreneurship – public entrepreneurship
Nature of the activity	– innovative entrepreneurship – technological entrepreneurship – ecological entrepreneurship – academic entrepreneurship – intellectual entrepreneurship
The person of the entrepreneur	– female entrepreneurship – family entrepreneurship o copreneurship – senior entrepreneurship – immigrant entrepreneurship – entrepreneurship of ethnic groups – entrepreneurship of the unemployed – entrepreneurship of the disabled – youth entrepreneurship
Pattern of behaviour	– spontaneous entrepreneurship – evolutionary entrepreneurship – ethical entrepreneurship – systemic entrepreneurship
Research level unit	– individual entrepreneurship – team entrepreneurship – corporate entrepreneurship

Source: own study.

Chandra (2018) exemplifies one of the latest reviews of literature in the field of entrepreneurship, presenting achievements in this field from 1990-2013 with the use of sociometric techniques. Chandra selected several dozen issues from the 24-year history of entrepreneurship studies, which allowed the author to identify five themes undertaken throughout the research period: (i) institutional entrepreneurship, (ii) innovation and technology, (iii) development and policy, (iv) entrepreneurial process and opportunities, (v) new ventures creation.

Today, entrepreneurship studies are blooming and exist in each economic and business life segment, which we seek to capture in the typology of entrepreneurship. Systematization of entrepreneurship dimensions may provide us with a more transparent and orderly picture of the essence of entrepreneurship in the face of considerable chaos in its understanding (Table 5).

CONCLUSIONS

As a multidimensional, dynamic, and complex construct, entrepreneurship constantly contributes to the implementation of new projects and forms of development. The various dimensions of research on entrepreneurship presented above confirm that we may associate and analyse entrepreneurship in various contexts such as people, behaviours, business entities, or processes. Over the years, this has led to the development of various forms and types of entrepreneurship. Most often, entrepreneurship is associated with running a business and categorizing business entities by their size or ownership and legal structure. The multi-aspect and multi-thread nature of entrepreneurship requires a more precise delineation, one that exceeds the boundaries of definitional inquiries.

In classical economics, entrepreneurship was treated rather superficially. Only Smith recognized the role of entrepreneurs who, as he claimed, could multiply wealth through savings while remaining aware of the involved risks (Smith, 2007). One of the most widespread concepts of entrepreneurship refers to creative destruction and innovation, which was introduced by Schumpeter (1934). Schumpeter attempted to create an economic theory based on change, which opposed contemporary definitions. In his seminal text, he distinguishes the category of steady-state economic growth from economic development, while defining the entrepreneur as an entity that breaks the balance by introducing innovation. Schumpeter argues that this creative destruction is the foundation of capitalism, while the entrepreneur is to be the elementary agent of economic change. Initially, Schumpeter understood entrepreneurship to be an individual's attribute, yet later, influenced by the development of large enterprises, he extended this understanding to the domain of organizations (Schumpeter, 1964). Schumpeter's thought was continued by Drucker (1985), according to whom innovations are a specific entrepreneurial tool that imbues unproductive resources with new opportunities. In this approach, innovation is to be an undoubted attribute of the entrepreneur, as entrepreneurship is to be the ability to take advantage of change, along with noticing possibilities and opportunities in change through creative problem-solving.

Today, we witness a growing interest in the study of entrepreneurship as a market function. Works in this vein show the impact of entrepreneurship – or its selected elements – on economic growth or various spheres of economic activity (Gomes & Ferreira, 2022). On the other hand, what seems to remain an important issue is the ability to correctly identify what determines entrepreneurship in the economy.

Understanding the essence of entrepreneurship and all its attributes is important both for political decision-makers and entrepreneurs themselves, who directly or indirectly create this entrepreneurship or create conditions for its development.

This study is not without limitations. First, entrepreneurship is an extensive issue, which is why a more advanced study based on a bibliometric analysis should beapplied. Our findings are descriptive and can be considered as the basis for further investigations. Therefore, the next research stage should be conducted including much broader spectrum in the subject approach. We recommend to conduct more structured research based on a bibliometric analysis, network identification, and mapping in the future. Identifying the most influential entrepreneurship researchers, productive organizations, and countries would also be worth recognizing.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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A comparative analysis of regional integration potential in the Asia-Pacific Region

Wojciech Ficek, Remigiusz Gawlik

A B S T R A C T
Objective: The objective of the article is to verify whether the EU can be perceived as a benchmark for further integration of Regional Comprehensive Economic Partnership Participating Countries (RCEP PC) of the Asia-Pacific region.
Research Design & Methods: We adopted a quantitative research methodology. It employed cluster analysis through Ward's minimum-variance method to analyze the Euclidean distances of eight GDP-based World Development Indicators and build two synthetic development measures: SMD_{RCEP} and SMD_{EU}. They were used to group countries according to their level of economic advancement. Standard deviation was used to measure the differences in the structure of GDP in both environments (σ_{RCEP} and σ_{EU}). The research sample was composed of all RCEP PC and European Union Member States (EU MS). The data sets came from the World Bank database.
Findings: The integrity level of RCEP PC is lower than that of EU MS; however, the differences are less significant than expected. Nevertheless, the possibility of RCEP reaching the next integration levels in the foreseeable future is limited.
Implications & Recommendations: As RCEP PC do not seem to be able to engage in further integration in the near future, RCEP PC policymakers and business entities should focus on keeping the agreement alive in its current form (FTA). We recommend analyzing whether integration in smaller and more homogeneous groups of countries is possible and desirable. Another factor worth further research is whether the inadequate size of the Chinese economy within the agreement has a pro- or anti-integrational influence on RCEP.
Contribution & Value Added: Our research provides an actual insight into the development possibilities of the 'youngest' regional integration agreement, the RCEP, based on the experiences related to the integration of the most advanced regional integration agreement, the EU.
Article type: research article
Keywords: Regional Comprehensive Economic Partnership; European Union; regional integration; economic integration; economic integration indexes
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INTRODUCTION

Since the mid-1990s, the World has witnessed a rapidly growing number of regional integration agreements. It is sometimes referred to as the Spaghetti Bowl Effect (Bhagwati, 1995). Until now, the most advanced form of regional integration is the European Union (EU), formed by the Member States of the European Union (EU MS). However, in the last five years, it was the Transatlantic Trade and Investment Partnership (TTIP) that attracted the attention of most experts. It is believed this agreement would create not only 'winners' but also many 'losers' at the same time. Plenty of sectors both in the EU and in the US would be in danger if the deal kicked in. Therefore, we can see controversies in the microeconomic sphere that impact the macroeconomic environment (Huettinger & Zirgulis, 2020). It is also considered that the removal of tariff barriers would de facto make the US a

part of the EU. Little progress in the TTIP negotiations was mainly caused by the success of Brexit and Trump's election (Huettinger & Zirgulis, 2020). That is why it has been the Regional Comprehensive Economic Partnership (RCEP) which in turn gained enough momentum to significantly impact the global economy. This fact became the main motivation for our research.

The RCEP agreement was signed on 15 November 2020 by 15 countries and entered into force on January 1, 2022. It took 8 years of negotiation to create the largest FTA in the world (Francois & Elsig, 2021). Headquarters are in Hanoi (Vietnam). With almost 2.3 billion people (30% of the global population) and GDP reaching 26 trillion USD equal to 30% of the global GDP (World Bank, 2022), RCEP should be considered bigger than the EU. Sometimes RCEP is called ASEAN Plus Five, because it contains ASEAN countries (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam (Chander & Sunder, 2018)) plus Australia, China, Japan, South Korea, and New Zealand (Gaur, 2021). Chaisse and Pomfret (2019) define RCEP as "A vehicle for Economic Integration and Inclusive Development" (p. 186).

The economic potential of the RCEP is neutralized by some critical remarks. I.e., Francois and Elsig (2021) state that RCEP is a new tool to exercise economic violence for the world's second-largest economy, China. Gaur (2021) sees its weakness in the tremendous economic differences between the RCEP PC. We have found very little literature discussing the possibilities of the RCEP for further integration. Dieter (2021) observes that although the RCEP has shown such potential, its PC are currently far from it. This is the research gap that we intended to fill with the presented research. Park (2017) concludes that "many East Asian countries need to participate in the RCEP in order to solve the noodle bowl effect because their regional bilateral FTAs overlap" (p. 149).

The highest level of regional integration was achieved by a group of countries grouped in the EU. The integration, which started as a common market for two goods, with the formation of the European Coal and Steel Community (Treaty of Paris, 1951), turned into an FTA, the European Economic Community (Treaty of Rome, 1957), converted into its actual form, an economic union, the European Union (Treaty of Maastricht, 1992), with some countries participating also in the European Monetary Union (established by the same Treaty). The integration started with six countries (Belgium, France, Germany, Italy, Luxembourg, and the Netherlands) and was later enlarged 7 times: in 1973 (Denmark, Ireland, the United Kingdom), 1981 (Greece), 1986 (Spain, Portugal), 1995 (Austria, Finland, Sweden), 2004 (the EU-10 enlargement: Czechia, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia, Slovakia), 2007 (Bulgaria, Romania) and 2013 (Croatia). After the United Kingdom decided to leave the EU (Brexit), the block counts 27 EU MS. Its headquarters are in Brussels (Belgium), Luxembourg (Luxembourg), and Strasbourg (France). With 448 million inhabitants (5.8% of the global population) and a 15 trillion USD GDP equal to 18% of the global GDP (World Bank, 2020), despite being more advanced in the stage of economic integration, the block is significantly smaller than RCEP. However, European integration exceeds the economic dimension. Foster (2013) describes it as "the 'civilized zone' of the European continent" (p. 375) with Browning (2018) adding a surrounding "buffer zone of a so-called ring of friends" and a "threatening world" outside (p. 127).

Critical votes to the EU are called Euroscepticism, which is defined as "opposition to the process of European integration" or "opposition to European integration and/or the EU" (Treib, 2020, p. 3). Their nature seems to be more political, than economic – most Euroscepticism comes from the far-right-wing parties in the European Parliament (Götz et al., 2018). The recent Russian invasion of Ukraine also shed some new light on the geopolitical interests of autocratic Russia in impeding European integration and destabilizing the EU.

The objective of the article is to verify whether the EU can be perceived as a benchmark for further integration of RCEP Participating Countries (RCEP PC) – above the recently signed Free Trade Area (FTA). The research gap in the existing literature is the lack of analysis of RCEP's potential for further integration. Therefore, the research problem of this study is to explore the possibilities of RCEP's development into higher forms of economic integration in the foreseeable future.

We formulate three research questions:

RQ1: What indicators of the economic conditions have been previously analyzed in the literature and why the issue is still not resolved?

RQ2: Does the GDP structure of the RCEP PC show similarities that provide reasons to consider their further economic integration following the EU MS model?

RQ3: Is the European Union a good benchmark for Asian regional integration agreements?

We applied a quantitative research methodology with cluster analysis using Ward's minimum variance method to analyze the economic integration potential of the RCEP PC. We used quantitative data sets from the 2015-2020 World Development Indicators of the World Bank.

Our article starts with a review of the literature on regional integration, followed by a section on materials and methods, a presentation and discussion of the results of the research, and a conclusion.

LITERATURE REVIEW (AND HYPOTHESES DEVELOPMENT)

Regional Integration

Mlambo (2019) defines regional integration as "a significant initiative with regard to stimulating economic growth amongst member states and enhancing intraregional trade, security initiatives, and bilateral and multilateral agreements"(p.1). It can also be interpreted as the concept of a functional region with strengths and trends in evolving political, economic, and cultural relations compared to relations with external structures (Pacuk *et al.*, 2018). Mlambo and Mlambo (2018) postulate for intergovernmental cooperation within regional integration agreements to benefit from "jointly implementing policies that are aimed at spurring regional development" (p. 258).

From the entrepreneurial perspective, Głodowska (2017) confirms the dependence of regional integration and economic growth on the business environment using quantitative analysis. Startups become creators of the new business model of the 21st century. Their development brings advantages to the entire economy in regional, national, and world dimensions. An increase in the number of micro-enterprises contributes to the increase in GDP level per capita (Szarek & Piecuch, 2018). Balawi (2021) shows entrepreneurship performance (ecosystem) and its influence on the economy.

Cluster Analysis

Cluster analyses aim to examine convergence (or divergence) within a group (of countries). In the EU we can see a high level of convergence between countries regarding business structure and demography. On the other hand, the EU cannot be seen as a homogeneous group, since there is a significant difference between EU-15 (before Brexit) and EU-13 countries. We can observe the decrease in dissimilarities. Hence, the process of constant convergence is a thing in the EU (Kamińska & Zielenkiewicz, 2019). When it comes to RCEP, also two intra-groups can be distinct in terms of bilateral trade. RCEP-4 (Japan, South Korea, Taiwan, and Australia) and RCEP-11 (other RCEP PC). Taiwan is not widely recognized as a country. In our research, we do not separate Taiwan from the People's Republic of China. RCEP-4 countries seem to be relatively more integrated, based on their intra-trade flows (Chang *et al.*, 2020). The similarity between the EU and the RCEP in the field of cluster analyses is significant. In both environments, we can observe a line between two intra-major groups. With that being said, EU-15 may be seen as a benchmark for RCEP-4 and EU-13 for RCEP-11. It thoroughly fits in the 'two-speed Europe' concept that assumes the divergence between countries within the EU (Kundera, 2019).

We decided to ground our set of indexes on GDP, as the GDP structure is crucial to examine those potential differences between countries, both in the EU and in the RCEP. Therefore, nine indicators were chosen to measure the dissimilarities between the members of both blocks. Our research focuses on differences based on the structure of GDP between RCEP and the EU.

The empirical evidence from prior literature studies allowed us to build the following Main Research Thesis (MRT):

MRT: In the foreseeable future, the RCEP will evolve into a Common Market.

To prove (or reject) the MRT, we assumed the following hypotheses:

H1: It is possible to create a consistent set of socio-economic indicators that assess the potential of countries participating in regional integration agreements for further integration.

H2: The discrepancy in the GDP structure between the RCEP PC is low enough to engage in the next level of economic integration, the Customs Union.

H3: The European Union is a good benchmark for Asian regional integration agreements.

The following section discusses the research methodology and data.

RESEARCH METHODOLOGY

The research design is quantitative. It aimed to identify more homogeneous subgroups within RCEP PC to exclude the countries with the highest divergence. Then, the RCEP's potential for further economic integration was derived from its comparison with the EU.

Data sets on the chosen GDP-based World Development Indicators of RCEP PC and EU MS came from the World Bank database. We used Microsoft Excel (v2203, build 15028.20228) for data analysis and forecasting, ADE-TAX (created by Pisulak & Bauer) for minimum-variance method calculations, and Statistica (v13.3) for graphic presentations. Literature selection is derived from in-depth studies of research articles on regional integration agreements, cluster analysis, and European Treaties.

We used Ward's minimum-variance – a cluster analysis method. Kovacova *et al.* (2019) state that "the use of the cluster analysis focuses on the identification of homogeneous subgroups of explanatory variables to sort the variables into clusters so that the variables within a common cluster are as similar as possible" (p. 744). Our application consisted of the following steps.

First, data were standardized with Maciejewski's (2017) Formula (1):

$$z_{ij} = \frac{x_{ij} - \bar{x}_j}{s_j} \tag{1}$$

where:

z_{ij} - standardized value of the *j*-th index in the *i*-th country;

x_{ij} - value of the *j*-th index in the *i*-th country;

$\bar{x}_j$ - arithmetic mean of index *j*;

s_j - the standard deviation of index *j*;

i - RCEP PC and EU MS, $i_{RCEP} = [1,2,\dots,n_{RCEP}], n_{RCEP} = 15; i_{EU} = [1,2,\dots,n_{EU}], n_{EU} = 27;$

j - number of indicators, $j = [1,2,\dots,m], m = 8.$

Second, we apply Ward's minimum-variance method for hierarchical clustering to obtain a hierarchical structure of similarities between RCEP PC and EU MS (within each block independently, not between two blocks). The resulting dendrogram illustrates the arrangement of the clusters (Ward, 1963), which can be quantified. The initial cluster distances are the Euclidean distance between the countries, defined after (Kovacova *et al.*, 2019, p. 752) by Formula (2):

$$d_{ij} = \sqrt{\sum_{k=1}^{k} \left(x_{ik} - x_{jk}\right)^2} \tag{2}$$

where:

x_{ik} - value of variable k for the in the country referred as i;

x_{jk} - value of variable *k* of the *j*-th index (interpreted as a maximum value).

Fallucchi *et al.* (2019) observe that Ward's method, contrary to the k-means method, specifies the number of types (groups). In our research, we split the research samples into four groups (separate for RCEP and EU).

Third, we calculate (3) the Synthetic Measure of Development (SMD). Mazur and Witkowska (2006) point at SMD, providing a more transparent visualization of such aggregated Euclidean distances.

$$SMD = 1 - \frac{d_i}{d_0} \tag{3}$$

where:

SMD - Synthetic Measure of Development (SMD);

d_i - Euclidean distance for $i = \{1, 2, \dots, n\}$, where i stands for an individual country;

d_0 - Euclidean distance max value.

The maximum value of the Euclidean distance can be calculated using Formula (4).

$$d_0 = \max_i\{d_i\} \tag{4}$$

The SMD values range from 0 to 1, with greater values reflecting a higher level of development. As a result, we obtained a grading of economic development distances between members of researched regional integration agreements, RCEP and EU, separately within each agreement.

Additionally, after obtaining SMDs, we used the standard deviation to measure the divergence between countries within the RCEP and the EU (Formulas 5 & 6).

$$\sigma_{RCEP} = \sqrt{\frac{\sum |x_{RCEP} - \mu_{RCEP}|^2}{N_{RCEP} - 1}} \tag{5}$$

where:

σ_{RCEP} - the standard deviation for RCEP PC;

x_{RCEP} - specific value in a data set;

μ_{RCEP} - arithmetic mean;

N_{RCEP} - the number of countries (15).

$$\sigma_{EU} = \sqrt{\frac{\sum |x_{EU} - \mu_{EU}|^2}{N_{EU} - 1}} \tag{6}$$

where:

σ_{EU} - the standard deviation for EU MS;

x_{EU} - specific value in a data set;

μ_{EU} - arithmetic mean;

N_{EU} - the number of countries (27).

As variables, we employed eight GDP-related indicators, presented as GDP %. The initially considered set of socio-cultural-legal-economic indexes proved to be too large and not homogeneous enough. Therefore, after preliminary research, we decided to limit this set to GDP-related indexes, addressing various spheres of economic well-being. Their presentation as GDP % provides greater transparency. GDP-based indicators seem to be the most appropriate and adequate indexes when it comes to empirical analysis. As they do not measure the social sphere itself (Giannakitsidou, 2016), we treated GDP as a benchmark for our indicators. We decided not to employ the most popular economic integration indexes, such as openness to foreign trade or capital flows, because of countries like Singapore. Justification: the openness to the foreign trade of Singapore extends over ten times the same index for China or Japan (World Bank, 2021b). Although it is impossible to carry out an economic analysis with Singapore not suppressing the results, we concluded, that our set of indicators protects extensively the examination from data distortion.

We employed the following indicators, defined by the World Bank (2021a):

− Final Consumption Expenditure (FCE) – expenditure by resident institutional units, including households and enterprises whose main economic center of interest is in that economic territory, on goods or services that are used for the direct satisfaction of individual needs or wants or the collective needs of members of the community;

− Foreign Direct Investments (FDI) – net inflows of investment to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor; it is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments;

- Military Expenditure (ME) – all current and capital expenditures on (i) the armed forces (including peacekeeping forces); (ii) defense ministries, and other government agencies engaged in defense projects; (iii) paramilitary forces, if these are judged to be trained and equipped for military operations; (iv) military space activities (military and civil personnel, including retirement pensions of military personnel and social services for personnel); (v) operation and maintenance; (vi) procurement; (vii) military research and development; (viii) military aid;
- Current Health Expenditure (CHE) – estimates of current health expenditures include healthcare goods and services consumed during each year, excluding capital health expenditures such as buildings, machinery, IT, and stocks of vaccines for emergencies or outbreaks;
- Exports of Goods and Services (EX) – the value of all goods and other market services provided to the rest of the world; they include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services;
- Services Value-Added (SVA) – includes the value-added (VA) in wholesale and retail trade (with hotels and restaurants), transportation, and government, financial, professional, and personal services such as education, health care, and real estate services;
- Industry Value-Added (IVA) – it comprises VA in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas;
- Agriculture Value-Added (AVA) – includes VA in forestry, hunting, and fishing, the cultivation of crops, and livestock production.

Five of the above indicators are stimulants (raising the indicator value increases the dependent variable), and three are destimulants (raising the indicator value decreases the dependent variable). The three last indicators (SVA, IVA, AVA) are calculated as value-added, which is the net output of a sector after adding all outputs and subtracting intermediate inputs. It is calculated without making deductions for the depreciation of fabricated assets or the depletion and degradation of natural resources (World Bank, 2021a).

Despite some limitations enumerated in the Conclusions section, we managed to propose and standardize a set of economic development indexes applicable for both integration agreements. This confirms H1.

The third section contains a presentation of our research results and their discussion.

RESULTS AND DISCUSSION

Table 1 presents the calculated Euclidean distances between RCEP PC for each index individually.

Table 2 presents similar calculations for the Euclidean distances between EU MS for the same set of indexes.

The application of the minimum-variance method allowed us to create two Synthetic Measures of Development (SMD_{RCEP} and SMD_{EU}) one for each regional integration agreement. Table 3 presents the SMD for RCEP PC (SMD_{RCEP}).

The SMD_{RCEP} values presented in Table 3 prove a relatively similar economic advancement of RCEP PC, with two exceptions: Singapore and Lao PDR. Singapore's outstanding economic performance is mainly due to the highest scores on FCE, FDI, EX, SVA, and AVA indexes (Table 1). The other extreme is represented by Lao PDR, due to the lowest values of ME and CHE indexes (Table 1). We can therefore state that the differences between GDP structures of RCEP PC are not thwarting further integration. However, tighter integration circles (various integration fields and speeds) could prove necessary because of the two mentioned exceptions. Therefore, H2 can be conditionally confirmed.

Table 4 presents the SMD calculated for EU MS (SMD_{EU}).

Table 1. Economic development indicators for the Regional Comprehensive Economic Partnership Participating Countries

RCEP PC	FCE	FDI	ME	CHE	EX	SVA	IVA	AVA
Australia	75.09	3.21	1.98	9.38[a]	21.76	66.91	24.07	2.34
Brunei Darussalam	46.26	2.52	3.25	2.36[a]	53.10	40.04	60.54	1.10
Cambodia	77.83	12.61	2.11	6.24[a]	61.26	39.06	31.55	23.30
China	54.97	1.59	1.75	5.10[a]	19.44	52.98	39.39	7.62
Indonesia	66.99	1.78	0.82	2.92[a]	19.51	43.77	39.28	13.23
Japan	74.49	0.64	0.95	10.71[a]	17.05	70.00[a]	28.42[a]	1.05[a]
Korea, Rep.	64.01	0.67	2.57	7.28[a]	40.25	55.97	33.75	1.83
Lao PDR	81.59[b]	6.63	0.15[d]	2.44[a]	36.94[b]	42.14	30.41	16.35
Malaysia	69.44	2.80	1.19	3.76[a]	66.91	53.06	37.66	8.05
Myanmar	71.76	4.53	3.22	5.05[a]	26.08	39.99	35.80	24.21
New Zealand	76.33	1.11	1.26	9.30[a]	26.34	65.61[c]	20.27[c]	5.37[c]
Philippines	85.23	2.43	1.02	3.97[a]	27.87	59.96	30.03	10.01
Singapore	45.90	25.55	3.01	4.22[a]	173.90	70.29	24.20	0.03
Thailand	67.03	1.23	1.40	3.77[a]	62.86	56.84	34.71	8.45
Vietnam	74.52	6.14	2.37[c]	4.82[a]	100.53	41.05	33.64	15.36
Variables:	*D*	*S*	*S*	*S*	*S*	*S*	*D*	*D*

[a] data set: 2015-2019 (forecasted for missing data); [b] data set: 2015-2016 (forecasted for missing data); [c] data set: 2015-2018 (forecasted for missing data); [d] data set: 1992-2013 (forecasted for missing data); *variables* – statistical features (stimulants – S or destimulants – D)
Source: own elaboration based on World Bank (2022), indicator codes: NE.CON.TOTL.ZS; BX.KLT.DINV.WD.GD.ZS; MS.MIL.XPND.GD.ZS; SH.XPD.CHEX.GD.ZS; NE.EXP.GNFS.ZS; NV.SRV. TOTL.ZS; NV.IND.TOTL.ZS; NV.AGR.TOTL.ZS (accessed on March 25, 2022).

Table 2. Economic development indicators for the European Union Member States

EU MS	FCE	FDI	ME	CHE	EX	SVA	IVA	AVA
Austria	71.66	-3.27	0.75	10.37[a]	53.64	62.88	25.33	1.13
Belgium	74.62	-2.70	0.93	10.68[a]	80.94	69.43	19.30	0.65
Bulgaria	76.72	3.39	1.69	7.38[a]	63.27	59.57	23.08	3.71
Croatia	78.88	2.03	1.69	6.83[a]	47.39	59.50	20.42	3.00
Cyprus	81.14	67.82	1.64	6.75[a]	73.55	74.07	11.68	1.89
Czechia	66.51	3.63	1.08	7.36[a]	76.76	55.89	32.32	2.01
Denmark	71.24	1.00	1.24	10.09[a]	55.73	65.01	20.76	1.13
Estonia	70.24	5.44	2.07	6.56[a]	74.99	60.85	23.60	2.38
Finland	76.70	2.90	1.41	9.27[a]	37.05	60.16	23.85	2.34
France	77.57	1.64	1.91	11.30[a]	30.49	70.38	17.24	1.56
Germany	72.42	2.56	1.21	11.38[a]	46.25	62.25	27.16	0.74
Greece	89.63	1.64	2.63	8.06[a]	34.93	69.39	14.12	3.81
Hungary	69.68	28.31	1.15	6.70[a]	84.13	55.75	25.24	3.61
Ireland	42.85	24.44	0.31	7.07[a]	124.45	55.22	37.11	0.96
Italy	79.07	0.86	1.36	8.72[a]	30.36	66.55	21.33	1.97
Latvia	77.74	2.53	1.75	6.11[a]	60.51	64.67	18.94	3.65
Lithuania	78.42	4.13	1.74	6.63[a]	72.66	60.97	25.73	3.21
Luxembourg	49.36	24.00	0.59	5.28[a]	197.05	79.52	11.39	0.22
Malta	63.78	28.98	0.51	8.75[a]	146.94	75.73	12.51	0.78
Netherlands	68.74	4.16	1.24	10.18[a]	81.78	70.03	17.78	1.70
Poland	76.19	3.00	2.04	6.45[a]	53.67	56.87	28.70	2.49
Portugal	82.31	3.11	1.87	9.39[a]	41.26	65.47	19.23	2.08
Romania	78.91	2.67	1.76	5.28[a]	40.78	57.41	28.44	4.14
Slovakia	75.41	2.57	1.35	6.87[a]	92.49	58.52	29.14	2.02
Slovenia	71.45	2.91	1.01	8.39[a]	80.76	56.62	28.49	2.04

EU MS	FCE	FDI	ME	CHE	EX	SVA	IVA	AVA
Spain	77.17	2.74	1.25	9.03[a]	33.90	67.87	20.09	2.81
Sweden	71.47	3.10	1.08	10.85[a]	44.71	65.46	21.84	1.41
Variables:	*D*	*S*	*S*	*S*	*S*	*S*	*D*	*D*

[a] data set: 2015-2019 (forecasted for missing data); *variables* – statistical features (stimulants – S or destimulants – D).
Source: own elaboration based on World Bank (2022), indicator codes: NE.CON.TOTL.ZS; BX.KLT.DINV.WD.GD.ZS; MS.MIL.XPND.GD.ZS; SH.XPD.CHEX.GD.ZS; NE.EXP.GNFS.ZS; NV.SRV. TOTL.ZS; NV.IND.TOTL.ZS; NV.AGR.TOTL.ZS (accessed on March 25, 2022).

Table 3. Synthetic Measure of Development for Regional Comprehensive Economic Partnership Participating Countries

RCEP PC	$\sum_{k=1}^{k}\left(x_{ik}-x_{jk}\right)^2$	$\sqrt{\sum_{k=1}^{k}\left(x_{ik}-x_{jk}\right)^2}$	SMD$_{RCEP}$
Australia	33.75	5.81	0.253
Brunei Darussalam	56.37	7.51	0.035
Cambodia	40.42	6.36	0.183
China	42.37	6.51	0.164
Indonesia	57.88	7.61	0.022
Japan	41.50	6.44	0.172
Korea, Rep.	33.19	5.76	0.260
Lao PDR	60.55	7.78	0.000
Malaysia	41.29	6.43	0.174
Myanmar	51.55	7.18	0.077
New Zealand	38.72	6.22	0.200
Philippines	51.76	7.19	0.075
Singapore	6.32	2.51	0.677
Thailand	39.94	6.32	0.188
Vietnam	35.96	6.00	0.229
Max:	−	**7.78**	−

Source: own calculations in Microsoft Excel.

Table 4. Synthetic Measure of Development for European Union Member States

EU MS	$\sum_{k=1}^{k}\left(x_{ik}-x_{jk}\right)^2$	$\sqrt{\sum_{k=1}^{k}\left(x_{ik}-x_{jk}\right)^2}$	SMD$_{EU}$
Austria	71.59	8.46	0.138
Belgium	57.89	7.61	0.225
Bulgaria	75.11	8.67	0.117
Croatia	76.97	8.77	0.106
Cyprus	39.98	6.32	0.356
Czechia	75.19	8.67	0.116
Denmark	58.48	7.65	0.221
Estonia	60.20	7.76	0.209
Finland	72.96	8.54	0.130
France	58.91	7.68	0.218
Germany	65.67	8.10	0.174
Greece	79.49	8.92	0.091
Hungary	66.05	8.13	0.172
Ireland	68.02	8.25	0.160
Italy	71.30	8.44	0.140
Latvia	73.45	8.57	0.127
Lithuania	73.64	8.58	0.125
Luxembourg	34.94	5.91	0.398

EU MS	$\sum_{k=1}^{k}\left(x_{ik}-x_{jk}\right)^2$	$\sqrt{\sum_{k=1}^{k}\left(x_{ik}-x_{jk}\right)^2}$	SMD_{EU}
Malta	32.27	5.68	0.421
Netherlands	47.50	6.89	0.298
Poland	78.15	8.84	0.099
Portugal	65.68	8.10	0.174
Romania	96.29	9.81	0.000
Slovakia	71.64	8.46	0.137
Slovenia	72.19	8.50	0.134
Spain	70.12	8.37	0.147
Sweden	61.60	7.85	0.200
Max:	−	**9.81**	−

Source: own calculations in Microsoft Excel.

The creation of GDP within the EU block seems to be distributed much more equally. Even though Malta, Luxembourg, and Cyprus score the best, and Poland, Greece, and Romania have the lowest SMD_{EU} values, no extremes similar to SMD_{RCEP} can be identified. These findings are supported by standard deviation calculations: $\sigma_{RCEP} = 0.161$ vs. $\sigma_{EU} = 0.095$ proves that the EU MS are more convergent than the RCEP PC. However, we need to acknowledge a calculation bias coming from Singapore being an indisputable leader within the RCEP.

Distances in economic development between the countries are presented in the dendrograms below, for RCEP PC (Figure 1) and EU MS (Figure 2) separately.
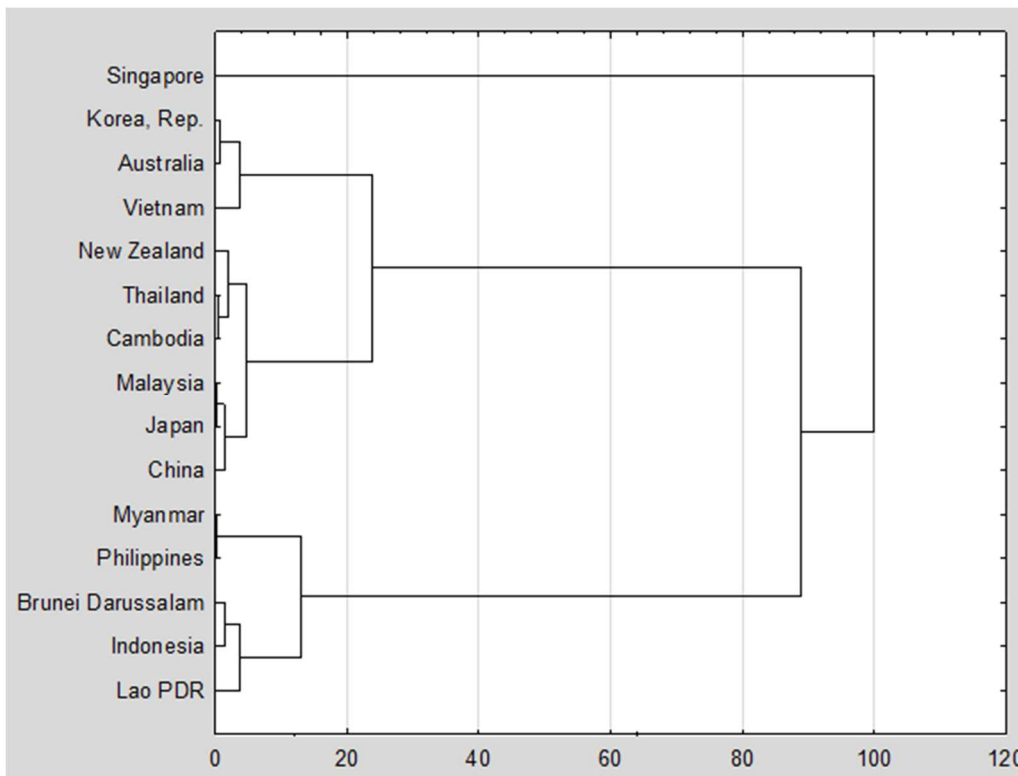
Figure 1. Distances in economic development between RCEP PC (SMD_{RCEP})
Source: own elaboration with the use of Statistica based on calculations in ADE-TAX.

Both in Figures 1 and 2 we use an internal comparative unit for dendrograms imposed by the Statistica software (Formula 7).

$$u_{stat} = 100 \cdot \frac{BD}{MD} \qquad\qquad (7)$$

where:

u_{stat} - an internal comparative unit for dendrograms imposed by the Statistica software;

BD - binding distance in a dendrogram;

MD **-** the maximum distance in a dendrogram.

Our analysis shows that around the distance of 15 units we can distinguish four groups of countries based on their SMD$_{RCEP}$ values: (i) Singapore; (ii) South Korea, Australia, Vietnam; (iii) New Zealand, Thailand, Cambodia, Malaysia, Japan, China; (iv) Myanmar, Philippines, Brunei Darussalam, Indonesia, Lao PDR.
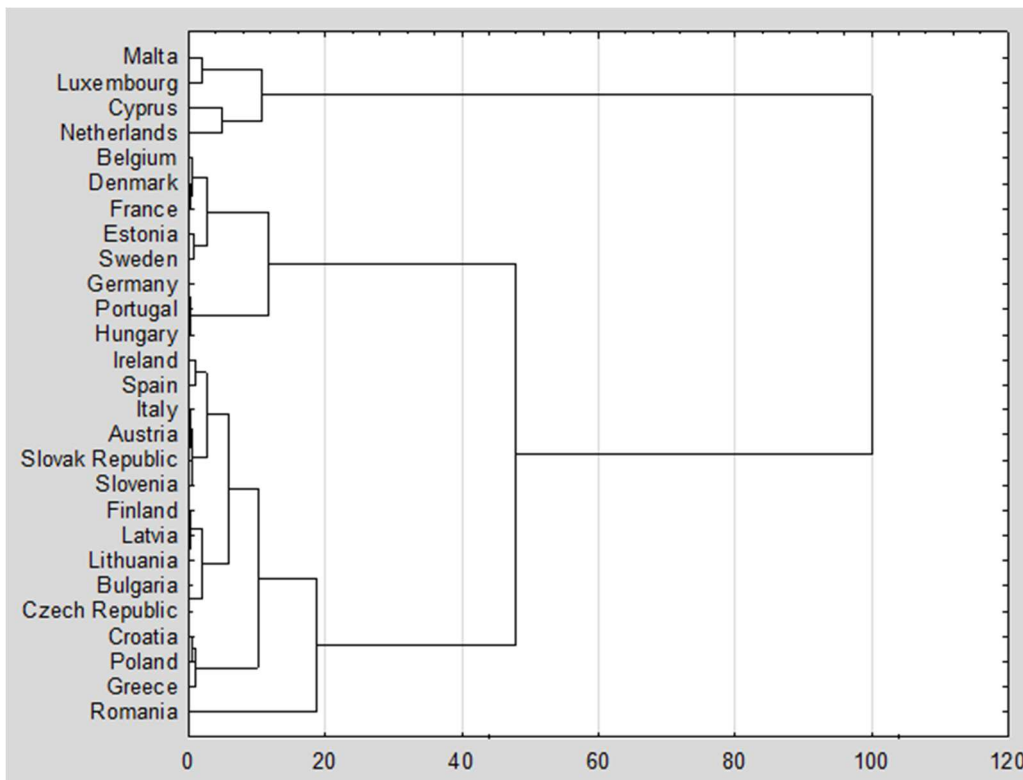
Figure 2. Distances in economic development between EU MS (*SMD$_{EU}$*)
Source: own elaboration with the use of Statistica based on calculations in ADE-TAX.

Similar reasoning within the EU also identifies four groups, more homogeneous in their level of economic advancement, since the distance of around 12 units is sufficient to obtain the same number of groups. These groups are (i) Malta, Luxembourg, Cyprus, Netherlands; (ii) Belgium, Denmark, France, Estonia, Sweden, Germany, Portugal, Hungary; (iii) Ireland, Spain, Italy, Austria, Slovakia, Slovenia, Finland, Latvia, Lithuania, Bulgaria, Czechia, Croatia, Poland, Greece, and (iv) Romania. It is worth mentioning that group No. 3 seems to be remarkably numerous. We can find 14 countries within; mainly PIIGS countries and new Member States (accession after 2004). The core countries of the EU were placed in groups No. 1 and 2.

The above shows that drawing direct conclusions from EU integration towards RCEP's potential for further economic approach is premature. Dieter (2021) backs our findings by saying that RCEP is a great FTA but the odds that it will become a Customs Union (CU) are rather limited.

Flach *et al.* (2021) claim that the value of trade between the RCEP PC has the potential to increase, because: "(i) trade relations and interdependencies between RCEP countries are more prominent compared to third countries, (ii) the relative importance of intra-RCEP trade has increased over the years, (iii) complex value chains play an important role in the region, and (iv) for giant China,

'Factory RCEP' is the most important partner network"(p. 98). Nevertheless, even with such arguments in favor of the growing importance of RCEP, the mentioned authors do not risk statements about taking RCEP PC at higher integration levels.

Rahman and Ara (2015) quantified the potential economic impact of the elimination of all import tariffs between the current RCEP PC and concluded that it could result in a drop in exports in most of them. Surprisingly, India would gain significantly from the FTA, even though it did not sign the RCEP agreement. A possible explanation comes from the fact that RCEP includes other trade blocks, e.g., ASEAN+6 countries (without India).

In addition to vertical integration, the RCEP can evolve horizontally, by accepting new PC. Chakraborty *et al.* (2019) claim that India would join the agreement if services became part of it. Being beneficial to India, the agricultural and service market of this country (mainly the technological industry) would bring great added value to other RCEP PC. Zhou *et al.* (2021) argue that "RCEP will have huge economic effects on members, such as GDP, welfare, and trade, and India's accession will bring greater benefits to RCEP members"(p. 13). India's accession would start a cycle synergy effect, as it pushes the agreement toward a Common Market – another vertical level of economic integration.

Kurihara (2017) predicts potential conflict areas by saying that developed RCEP PC will benefit from a larger increase in trade than the developing ones. He also predicts tensions between the Trans-Pacific Partnership (TPP) signatories and RCEP PC, as "the members are overlapping each other, and there might occur unexpected and unwanted effects on both and/or one of their economies"(p. 105).

Chaisse and Pomfret (2020) claim that RCEP has the potential to play an important role in the modern globalized economy but are not certain of the level of integration it will finally achieve. Chang *et al.* (2020) prove that the effect created by intra-regional trade is higher within RCEP than within the EU. They also notice the importance and similarity of sub-groups within the integrated environment. Thus, we can see the EU as a benchmark for the RCEP. On the other hand, some countries, i.e., China, Indonesia, Singapore, and Malaysia, can relatively easier (than EU-13) transcend and become part of RCEP-4 because divergence between RCEP's sub-groups (RCEP-4 and RCEP-11) is lower than in the EU (EU-15 and EU-13). Hence, only can we confirm H3 conditionally.

CONCLUSIONS

The objective of the article was to verify whether the EU can be perceived as a benchmark for further integration of RCEP Participating Countries (RCEP PC) in the foreseeable future. With the minimum-variance methods, based on World Bank's data on the GDP-related economic development indexes, we came to the following conclusions:

− RCEP PC are less integrated than the EU MS, however, the differences between the two regional integration agreements are less significant than expected;
− after excluding the extremes (Singapore and Lao PDR) the level of economic integration between RCEP PC seem to be satisfactory for further integration.

We managed to confirm H1, whereas H2 and H3 were confirmed only conditionally. Therefore, our Main Research Thesis, stating that "In the foreseeable future the RCEP will evolve into a Common Market" cannot be confirmed.

Our research bears the following implications and recommendations for policymakers:

− the European model of economic integration can be used as a benchmark for RCEP PC;
− however, the cultural, social, and political similarities in the actual stage of development of EU MS shall be also considered;
− therefore, the indicators employed for analyses and predictions of RCEP's future integration potential shall include also cultural, social, and political factors;
− the scenario of RCEP's integration in smaller, more homogeneous groups of countries is worth being analyzed by the policymakers.

Business entities shall notice that the higher level of integration, the higher volume of trade flows among the integrated countries. This is backed by Savinsky (2020), Ishikawa (2021), Shimizu (2021), and

Drysdale and Garnaut (2022). Therefore, we perceive them as potentially strong pro-integrational motivators. In this way, the microeconomic sphere can influence the macroeconomic environment. The more bilateral trade relations national entities have gotten between countries within FTA, the easier integration at the governmental level will be and this can lead to greater stages of economic integration.

Our article brings value-added to the Science of Economics by providing new information on RCEP's development potential. It also highlights the fact, that although conclusions on EU-RCEP similarities can be drawn from an economic perspective, direct comparisons of these two integration blocks can be misleading.

We observed the following limitations of the presented research: (i) choice of indexes – we used only economic indexes presented as GDP %, whereas adding social, cultural, and political factors would enrich the picture; (ii) some of the indexes can be interdependent, e.g.: lower health expenditure may equalize high military expenditure; (iii) dividing the indexes into stimulants and destimulants can result in some indicators being interpreted as nominants where "normal" (nominal) values of a given factor are desirable, while any deviations from the "normal" level are perceived as a negative phenomenon – e.g.: ME – difficult to be classified strictly as stimulant or destimulant, but treated here as a stimulant; (iv): lack of recent data from some RCEP PC, notably from the Lao Statistics Bureau, e.g. GHDx data – we had to forecast missing data, which can cause data distortion and calculation bias.

Future research on both RCEP and EU should concentrate on: (i) empirical research on up-to-date effects of economic integration; (ii) exploring further integration opportunities (including enlargements) and their limitations; (iii) simulating intra-RCEP trade after an alleged accession of India; (iv) anticipating the geopolitical threats for economic integration, e.g. under the light of Russia-China or China-Taiwan relations; (v) repeating our calculations with a broadened set of indicators, e.g. with focus on FDI structure; (vi) creating integration criteria hierarchies, e.g. with the use of Analytic Hierarchy Process method.

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New-generation trade agreement with Japan: Significance to EU Companies

Małgorzata Czermińska

A B S T R A C T
Objective: The New-generation trade agreements, which include the agreement with Japan, provide wide coverage – not only the liberalisation of trade in goods or services but also the protection of intellectual property rights, the public procurement market, sustainable development and others. This paper aims to demonstrate key provisions and (both ex post and ex ante) opportunities that the agreement creates for EU companies.
Research Design & Methods: The research methods include a critical review of existing literature, an analysis of relevant legal and official documents of the European Union, as well as the provisions of the EU-Japan trade agreement. The empirical research focused on Eurostat data.
Findings: The provisions of the EU-Japan agreement provide an incentive for European companies to strengthen their position on the Japanese market. The elimination of import duties and other barriers to trade in Japan in relation to certain agricultural products on the entry into force of the agreement contributed to higher exports from the EU for these groups of goods. What might be expected is the additional effect of the liberalisation of bilateral trade on third countries. In fact, standards or rules agreed by Japan and the EU may become even more attractive to third countries, as their adoption would facilitate access to two large markets.
Implications & Recommendations: Japan is a relatively important trading partner for the EU and vice versa. One of the biggest achievements of the agreement made between the European Union and Japan includes the wide and deep liberalisation of trade in goods. Despite the fact that the overall level of tariff protection is relatively low, there are still some groups of goods for which the protection in the form of customs duties constitutes an important barrier, as a result of which the conditions for competing on the partner's market deteriorate. It seems that EU entrepreneurs should make more use of the opportunities which are created by the provisions of the free trade agreement with Japan. So far, the trade crisis caused by the pandemic has stood in the way.
Contribution & Value Added: Research conducted so far is of an ex ante nature, both regarding the provisions of the agreement (publications written before 2018) and the evaluation of its potential effects on economy, trade, production or selected sectors. The research carried out in this article is of an ex post nature; it covers the period following the entry into force of the agreement and does not present any growth scenarios or forecasts, as was the case in the existing research. The article attempted to juxtapose the provisions of the agreement with Japan with trade conditions applicable to EU companies, as well as with the growth rate, volume and coverage of bilateral trade in goods.

Article type:	research article
Keywords:	new-generation trade agreement; free trade agreements (FTAs); Japan; the European Union; customs duties; non-tariff barriers
JEL codes:	F13, F15

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INTRODUCTION

The European Union has made a number of preferential trade agreements (PTAs) that provide for reciprocal preferences. The EU's PTAs vary substantially, depending on partners. They can be classified into four types:

- "First generation" trade agreements, i.e. focused on trade in goods and tariff elimination, negotiated before 2006. They include agreements with: Norway, Switzerland, eight Mediterranean countries, Mexico and Chile; Customs Union with Turkey, Andorra and San Marino; Stabilisation and Association Agreements with five Western Balkan countries.
- Economic Partnership Agreements (EPAs) with the African, Caribbean and Pacific regions are centred around development needs and support the gradual liberalisation of trade with partner countries.
- Deep and Comprehensive Free Trade Agreements (DCFTAs) focus on strengthening economic ties between the EU and its neighbours by bringing their regulatory framework closer to EU law. They include agreements with Ukraine, Georgia and Moldova.
- new or "second generation" free trade agreements are agreements negotiated after 2006 with selected third countries that go beyond trade in goods, also covering services and potentially other aspects such as procurement, intellectual property rights, customs cooperation, sustainable development and/or some investment related issues. They encompass agreements with South Korea, Colombia, Peru and Ecuador, Central America, Canada, Japan, Singapore and Vietnam.

The 2006 "Global Europe" European Commission Communication (2006) set out the main reasons for starting the negotiations of new free trade agreements. They included, first and foremost, economic grounds, second, the fact that the existing trade agreements were ineffective in the achievement of the EU's economy-related goals; third, a deadlock in the Doha Development Round; and finally; commercial policy pursued by the main competitors of the EU, in particular, the United States. The reasons behind choosing major trading partners with whom preferential trade agreements are to be made should be of an economic nature; indeed, attention must be given to their market potential (size and economic growth) and the level of security in exports from the EU (tariff and non-tariff barriers)(European Commission, 2006). The protection of the European trade interests is the prime motive for new free trade agreements. Indeed, the majority of previous first-generation trade agreements and EPAs was justified by political factors, foreign policy, security reasons and trade interests. Nevertheless, ACP countries account only for 4% of the EU's exports, the EU's southern neighbours (twelve countries) represent slightly above 4% of the EU's trade, whereas the Western Balkans countries comprise approx. 1.5%; therefore, trade with these countries is not that relevant for the interests of economic operators from the EU.

In the Union commercial policy strategy, Japan was considered a priority partner of the EU in the context of new-generation free trade agreements. Japan is the EU's second-biggest trading partner in Asia after China and the EU is Japan's third largest trading partner worldwide. In the past, European companies used to face barriers for exports to Japan, which they perceived as impediments preventing them from competing on the Japanese market (high rates on some products in the Japanese customs tariff, low level of internationalization of Japanese standards, technical barriers to trade, which concern, the inability to submit offers in public procurement in some sectors by foreign enterprises). This country is inhabited by more than 127 million citizens, who have considerable purchasing power. This market is of considerable relevance to exporters, service providers and investors from the European Union. The terms of trade with Japan are therefore very important for EU businesses. Detailed research questions include the following issues.

RQ1: What were the main barriers to trade with Japan?

RQ2: What are the main provisions of the Free Trade Agreement with Japan that are particularly important to EU companies?

RQ3: Have there been any changes in trade with Japan in recent years (in particular after the entry into force of the agreement)?

RQ4: Is there a correlation between changes in bilateral trade and the liberalization of trade in goods specified in the agreement?

Research conducted so far is of an *ex ante* nature, both regarding the provisions of the agreement (publications written before 2018) and the evaluation of its potential effects on economy, trade, production or selected sectors. The research carried out in this article is of an *ex post* nature; it covers the

period following the entry into force of the agreement and does not present any growth scenarios or forecasts, as was the case in the existing research. The article attempted to juxtapose the provisions of the agreement with Japan with trade conditions applicable to EU companies, as well as with the growth rate, volume and coverage of bilateral trade in goods.

The structure of the article encompasses, firstly, the reasons for concluding and the main provisions of the new generation free trade agreements. Secondly, the main barriers to trade with Japan and the most important provisions of the EU agreement (from the point of view of European entrepreneurs) are presented. Finally, the volume and structure of bilateral trade in recent years are characterized.

LITERATURE REVIEW

The effects of the EU-Japan trade agreement (EUJEPA) have already been investigated in some research papers. The substantial part of research used the CGE (Computable General Equilibrium) and NQTT (New Quantitative Trade Theory) models in order to determine the effects of the agreement, with various base assumptions (e.g. pertaining to free trade agreements in force) and a number of liberalisation scenarios being applied. One of the first studies, in which the CGE was used, was conducted by the EU's Directorate General for Trade in 2010 (Sunesen *et al.*, 2010). Under the maximum liberalisation scenario (if barriers to trade were to be reduced to the greatest extent), the results revealed that the EU's exports might increase by almost 50%. It must be noted that the said research had been conducted before the negotiations of the agreement with Japan began, a time-frame for the reduction of barriers to trade was also not known. Another study on the effects of the EUJEPA had been also performed prior to the commencement of the negotiations, by Francois *et al.* (2011), when the text of the agreement was unknown. Authors analysed both the elimination of import duties and the liberalisation of non-tariff measures, considering 8 liberalisation scenarios.

The results of research performed by Benz and Yalcin (2015) also deserve attention. Contrary to other research, the model adopted by the aforesaid researchers considered intra-industry trade and employment. The labour market model that was developed enabled the authors to quantify the effect of trade liberalisation on employment. The purpose of this paper was to shed light on two possible liberalisation scenarios, less ambitious and comprehensive trade liberalisation.

Before the agreement was signed, during negotiations, the European Commission (2016a) had compiled a report on the agreement with Japan. Calculations were based on the CGE model and simulations provided for the reduction of both tariff and non-tariff barriers. The results showed that reducing customs duties and non-tariff barriers would contribute to an increase in nominal GDP both in the EU and Japan, as well as would be conducive to a growth of their exports. The most recent report by the European Commission's Directorate-General for Trade, published in 2018 (European Commission, 2018a), is based on the provisions set up by the EU and Japan in the EPA. As revealed by the simulations based on the CGE model, by 2035 (when EPA is fully implemented), GDP and exports of both parties to the agreement will rise. A study by Lee-Makiyama (2018) provides detailed information on the EU-Japan relations and informs about the current potential for growth and prosperity in both regions after the full implementation of the economic partnership agreement. Kawasaki (2017), on the other hand, adopted the CGE model to measure the effect of the agreement on basic micro indices, assuming that tariff rates would decline immediately to zero and non-tariff barriers (NTBs) would be reduced by 50%. It seems that the positive effect of trade liberalisation is proved by all existing research, although expected overall benefits (an increase in GDP, growth of exports, employment and production growth) vary from research to research (due to different assumptions for the model and trade barrier reduction scenarios). Most research investigates the overall impact on the entire EU. An exception is research conducted by the Ifo Institute (Felbermayr *et al.*, 2017), which covers also the impact of EPAs on individual Member States of the EU. In this context, one has also to mention research regarding the effects of the Agreement with Japan on selected countries (Przeździecka *et al.*, 2019) or sectors of economy (Ambroziak, 2017; Drelich-Skulska & Bobowski, 2019; Mazur, 2018).

It must be emphasised that research conducted so far is of an ex ante nature, both regarding the provisions of the agreement (publications written before 2018) and the evaluation of its potential effects on economy, trade, production or selected sectors. Moreover, none of the research conducted so far examines the effects of the pandemic on international trade.

The research carried out in this article is of an ex post nature, covering the period after the entry into force of the agreement, which is an added value of the research. Relying on current data (the latest data pertains to 2020, that is to say, two years after the agreement became effective), it endeavours to evaluate the effects of EU-Japan trade liberalisation on EU companies engaged in trade with Japan and on bilateral trade.

RESEARCH METHODOLOGY

The research methods include a critical review of existing literature, an analysis of relevant official documents of the European Union, as well as the provisions of the EU-Japan trade agreement. Japan is an important trading partner of the EU, hence the conditions for trade, access to the Japanese market are of considerable significance to EU companies engaged in trade. In order to present the conditions for access to the Japanese commodity market after 2018, not only the contents of the EU-Japan agreement, but also of EU documents pertaining to the agreement were used. EUROSTAT data was used to demonstrate bilateral trade streams. Due to text length requirements applicable to the article, the research covers only trade in goods.

RESULTS AND DISCUSSION

Key Provisions of New-Generation Free Trade Agreement with Japan

The European Commission's documents referenced above, indicated that the process for making the EU's trade relations bilateral should encompass not only emerging economies, but also developed countries. A decision on entering into the negotiations of such agreements with third countries is based on economic criteria and aims to provide European companies with greater access to very dynamic and competitive markets, specifically, in Asia.

Due to the fact that EU Member States and Japan hold membership in the World Trade Organisation, before making the agreement, both economies had applied the rates of customs duties based on the MFN (most favoured nation) clause. Furthermore, around one-fourth of goods is not subject to import duties in both regions (Table 1). The average applied MFN duty rates for all goods in Japan and in the EU are low and amount to 4.4% and 5.1% respectively. The EU has a lower average MFN duty rate on agricultural products (both simple and trade weighted averages) than Japan and higher average duty rate on non-agricultural one. The average EU duty rate for non-agricultural products is around one-third of the tariff applied to agricultural products. In Japan, the weighted average duty rate for agricultural products is seven times higher than for non-agricultural products (Table 1). As regards non-agricultural products, relatively high customs duties in Japan are levied on leather, footwear (10.1%). For agricultural goods, particularly high import duties are imposed in Japan on dairy products (an average MFN rate – 89.3%), coffee, tea (15.1%), cereals and preparations (34.6%), sugars and confectionery (22.1%), beverages and tobacco (14.4%), as well as animal products (11.1%) and oil seeds, fats and oils (12.9%) (WTO, 2021). Furthermore, agricultural subsidies (state aid) are considerable both in the EU and Japan. In 2016, estimated annual support for manufacturers in Japan, measured by annual gross transfers for agricultural manufacturers, amounted to approx. 48% of total farm proceeds (EUR 38bn in aggregate), compared to 21% of total farm proceeds in the EU (EUR 90bn in aggregate) (OECD, 2017). This explains, to a certain degree, why the EU urged Japan during trade negotiations to allow, as far as possible, duty-free access to the Japanese agricultural market.

Furthermore, it must be noted that an average rate applicable to imports from Japan to the EU, similarly to the import-weighted one, in 2018 (before the agreement was made) was relatively high (28% and 16% respectively) with respect to agricultural products (according to tariff lines), while with respect to non-agricultural products, it was low (4% and 1.4% respectively). An average tariff rate (also

an import-weighted average rate) in Japan in relation to agricultural products imported from the EU was nearly 50% lower. As for non-agricultural products, an average tariff rate and an import-weighted average one were higher than in the EU (Table 1).

Table 1. Rates of Customs Duties in European Union's and Japan's Customs Tariff in 2018 and 2019* (%)

Specification	Total	Agriculture	Non-Agriculture
European Union			
Simple average tariff rate MFN applied	5.1	11.2	4.1
Trade weighted average tariff rate	2.9	8.3	2.6
Duty-free tariff lines (% of all tariff lines) (MFN applied)	27.0	18.9	29.3
Simple average of MFN duties based on tariff lines in relation to imports from Japan	–	25.7 (27.6)	3.9
Trade-weighted average MFN duty in relation to imports from Japan	–	15.3 (16.2)	1.4
Duty-free imports from Japan (% TL)		48.5 (23.1)	94.5
Duty-free imports from Japan (Value in %)		40.4 (18.0)	93.4
Japan			
Simple average tariff rate MFN applied	4.4	15.8	2.5
Trade weighted average tariff rate	2.3	13.3	1.3
Duty-free tariff lines (% of all tariff lines) (MFN applied)	40.5	24.5	44.5
Simple average of MFN duties based on tariff lines in relation to imports from EU	–	14.4	4.4 (4.5)
Trade-weighted average MFN duty in relation to imports from EU	–	8.2	2.8 (2.8)
Duty-free imports from EU (% TL)	–	11.9	21.0 (21.0)
Duty-free imports from EU (Value in %)	–	30.6	41.2 (41.9)

TL – tariff lines; * Figures for 2018 – before the agreement with Japan entered into force; Figures for 2019 – after the agreement with Japan entered into force; Figures in brackets mean data available for 2018
Source: own elaboration based on WTO (2019a, 2020a, 2020b, 2021).

Regarding non-tariff barriers (NTBs), sanitary and phytosanitary (SPS) and technical barriers to trade (TBT), requirements in Japan are much stricter than international standards and sometimes higher than those in the EU (Felbermayr *et al*., 2017, p. 33). Japan has in place stringent requirements for sanitary and phytosanitary measures, including regulations on food safety and health. The database of the United Nations Conference on Trade and Development relating to non-tariff barriers contains 99 sanitary and phytosanitary measures in Japan having an impact on trade (UNCTAD, 2017).

The negotiations of the EU-Japan trade agreement began in 2013, more or less contemporaneously with negotiations with the USA on the Transatlantic Trade and Investment Partnership (TTIP), however, they gathered pace only when it was clear for the EU that the conclusion of the agreement would be very unlikely (Frenkel & Walter, 2017). Japan also accelerated the negotiations when the new US administration explicitly objected to free trade. The United States' withdrawal from the Trans-Pacific Partnership (TPP) – a multilateral agreement setting out the rules for trade in the Asia and Pacific region confirmed these concerns and forced Japan to further accelerate the negotiations with the EU. After 18 negotiation rounds, in mid-2017, the parties announced the conclusion of the trade negotiations and a new text of the agreement was unveiled at the end of that year (European Commission, 2017a). The EU-Japan Economic Partnership Agreement (EUJEPA) was signed on 17 July 2018, and entered into force on 1 February 2019 (Agreement between the European Union and Japan for an Economic Partnership). It was notified to the WTO on 14 January 2019 (WTO, 2019b). It is the world's largest free trade area with signatories together accounting for nearly one third of world GDP whereas economic operators from the EU may save up to USD 1 billion of customs duties paid for exports to Japan each year (European Parliament, 2018, p. 7).

Due to the low level of internationalization of standards in Japan, many goods admitted to trading in the world require special tests or adaptation to different Japanese standards. Therefore, the process of admitting new goods to the Japanese market is usually very time-consuming, costly and

cumbersome. This mainly applies to food products – quarantine, phytosanitary regulations, the approval of flavors or colors.

The specific objectives of the agreement with Japan, which are of crucial importance to EU companies, include, in particular (elaborated based on: own elaboration on the basis of the Agreement between the European Union and Japan for an Economic Partnership):

— The elimination of customs barriers to mutual trade in relation to manufactured and agricultural goods, the facilitation of access to the market for EU food producers.

— The reduction of non-tariff barriers. The negotiations between the EU and Japan related to a number of non-tariff measures which raised EU companies' concerns, as certain Japanese technical requirements and certification procedures often hinder the export of European products to Japan. The example of such barriers which were eliminated and had significance to EU companies includes, e.g. motor vehicles. The agreement ensures that both Japan and the EU will fully adhere to the same international standards relating to product safety and environmental protection, which means that European cars will be subject to the same requirements in the EU and Japan. Another example includes medical devices. In November 2014, Japan adopted the international standard for quality management systems (QMS), which is also valid in the EU for medical devices. In March 2015, Japan adopted an international textiles marking system, which is similar to the one used in the EU. Therefore labels used for textiles no longer have to be changed for clothing exported to Japan. Next example includes "quasi medicines", medical products and cosmetics (European Commission, 2018a). The agreement will facilitate EU companies' access to strongly regulated Japanese market. For technical barriers to trade – the agreement aims ensure that their standards and technical regulations are based on international standards. It will facilitate access to the Japanese EU market for electronic, pharmaceutical, textile and chemical products, cosmetics.

— The liberalisation of the public procurement market (ensuring that EU and Japanese suppliers may compete on a level playing field on both markets). Companies from the EU will have an opportunity to compete on equal terms with Japanese businesses for contracts put out to tender in so-called Japan's "core cities" (i.e. cities having a population of around 300,000-500,000 people or more). The agreement also removes the existing impediments to contracts in the railway sector (Günther, 2017).

— The liberalisation of trade in services and better access to the services markets. The free trade agreement will facilitate the provision of services by EU companies in Japan, for instance: business and financial services, in particular insurance, telecommunications, transport, distribution, as well as postal and courier services. Details are provided in Chapter 8 of the EJEPA on Trade in Services, Investment Liberalization and Electronic Commerce and related appendices (Annex 8B) setting out obligations that go well beyond what the parties agreed at the WTO.

— The protection of intellectual property rights, in particular specific trade marks, copyright, Geographical Indications (GIs) and in particular 56 Japanese geographical indications and 205 EU geographical indications. These products will be given the same level of protection in Japan as in the EU (Pereira, 2018; European Commission, 2018a). This will make it easier for European producers and exporters to expand their marketing activities in Japan.

— Promotion of Sustainable Development. The EU and Japan have committed themselves to implement the fundamental standards of the International Labour Organisation (ILO) and international environmental agreements.

In 2019, 26% of tariff headings in the EU customs tariff was already covered by a zero MFN tariff rate, which accounted for 39% of the EU's imports from Japan between 2016 and 2018. Immediately after the arrangement entered into force, customs duties for further 70% of tariff lines were eliminated. This meant that when the agreement became effective, 95.8% of tariff lines under the EU's customs tariff was duty-free, which accounted for 80% of the EU's total imports from Japan between 2016 and 2018 (chart 1 and chart 2). After the end of the transition period, customs duties will continue to apply only to 87 tariff lines (0.9% of all TLs), which comprises a marginal portion of the EU's imports from Japan between 2016 and 2018 (live animals, vegetable products, prepared food).

	2019	2022	2024	2026	2029	2031	2034
Japan	84,9	87,8	88,6	89,0	94,6	94,7	95,7
EU	95,8	96,5	97,1	98,0	98,2	98,7	98,7
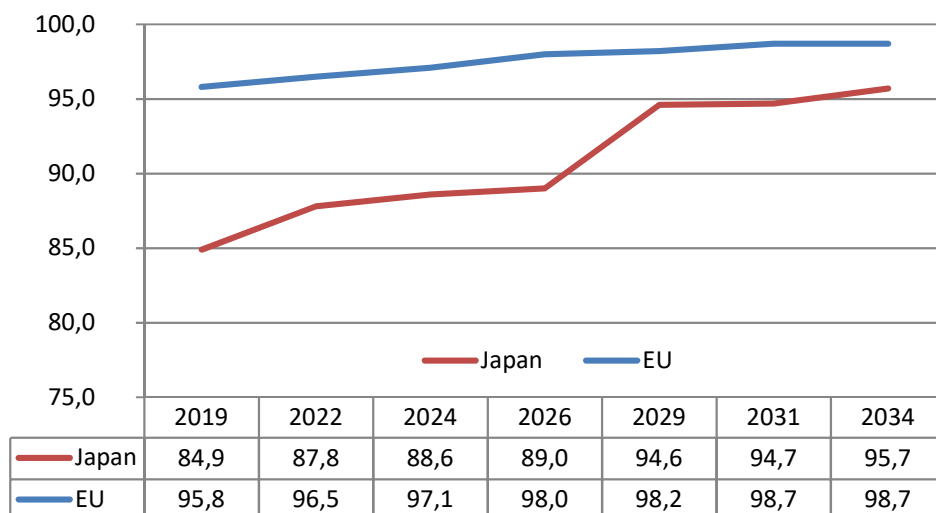
Figure 1. Timeline for Reduction of Tariff Rates Specified in EU-Japan Free Trade Agreement (in accordance with tariff lines)
Source: own elaboration based on WTO (2019c).
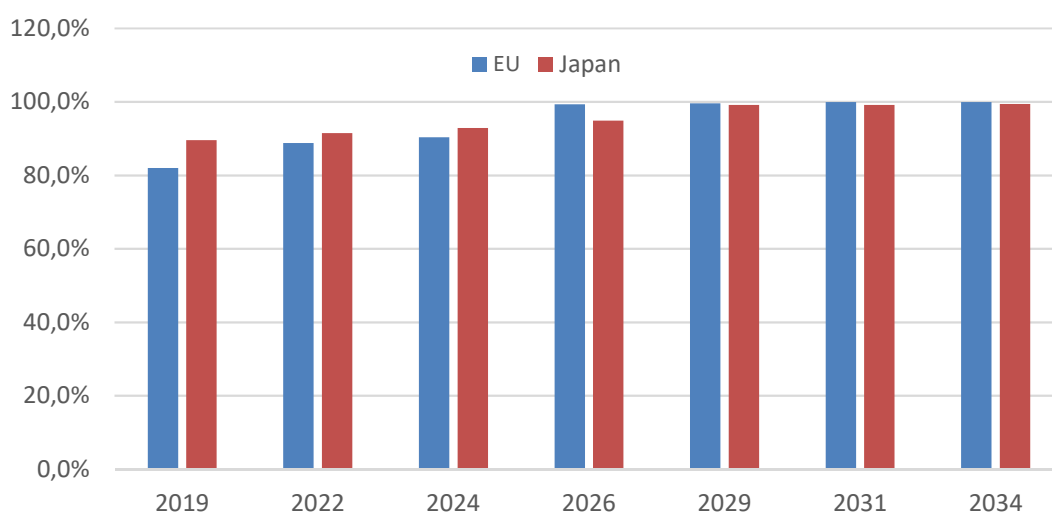
Figure 2. Timeline for Reduction of Tariff Rates Specified in EU-Japan Free Trade Agreement (in consideration of import volumes in 2016-2017)
Source: the same as for Figure 1.

On the other hand, in 2019, 40% of all tariff lines in Japan was covered by a zero MFN tariff rate, which accounted for 73% of Japan's imports from the UE between 2016 and 2017. After the agreement entered into force, customs duties on imports from the EU were abolished in relation to 44.5% of tariff lines. This meant that 85% of tariff lines in the Japanese customs tariff was duty-free, which comprised 90% of Japan's imports from the EU between 2016 and 2017 (chart 1 and chart 2). At the end of transition periods (the gradual elimination of customs duties: up to 15 years), liberalisation will cover 99% of the value of imports from the EU. At the end of the liberalisation period in 2033, only 390 tariff lines will be still subject to customs duties (4.2% of all tariff lines in the Japanese customs tariff), which accounts for 0.7% of Japan's imports from the EU between 2016 and 2017. The 390 lines excluded from tariff elimination are: live animals, vegetable products and prepared food.

Customs duties on manufactured goods will be completely abolished on both sides, however, timelines for the elimination of customs duties in both countries are slightly different. Japan will abolish customs duties in stages only for timber, leather and footwear. Customs duties on timber and timber

products (relatively low: 4%-6%) which are interesting for the EU will be eliminated gradually within seven years. The EU secured better conditions for the export of these goods than under other agreements. It is expected that removing quotas on footwear and leather and leather skins, which hindered the export of footwear from the EU due to extra costs being generated will be even more significant. The sector was traditionally considerably protected and it might be expected that the gradual abolition of high customs duties (30%) over a ten-year period, with customs duties being reduced to 21.6% on the entry into force of the agreement, will have powerful impact on trade flows for footwear to Japan. The effects of eliminating customs duties will be relevant, in particular, also for clothing and chemicals, as customs duties on these goods are still relatively high and the EU has considerable potential for penetrating the Japanese market as regards these goods.

The reduction of customs duties on agricultural products was the principal priority for the EU (European Commission, 2017b). The agreement will eliminate or significant reduce duties on agricultural products in which the EU has a major export interest, such as pork (from 43% to zero rate in 10 years), wine (15% to 0% at entry into force), meat of bovine animals (38.5% to 9% in 15 years), pasta and chocolate (elimination of customs duties in 10 years) (Table 2). The EUJEPA will not change EU rules for beef treated with hormones and GMOs. Like the EU, Japan has strict GMO laws. For cheeses, the EUJEPA will ensure full liberalization for hard cheeses and will provide tariff quotas with duty free access for fresh, processed and soft cheeses (Table 2). The elimination of pork duties is of great importance for EU exporters. In 2017 the EU exported to Japan pork products totalling $1.7bn, securing a 33% share in the market (Atlantic Council, 2018). With lower tariffs, less bureaucracy and higher quotas, it will be easier for European farmers and producers to export and seize new market opportunities in Japan.

Table 2. Pre- and post-agreement customs duties on agricultural products in Japan

Product	Pre-agreement tariff (MNF rate)	Post-agreement tariff
Wine and sparkling wine	15%	Elimination of customs duties at entry into force
Alcoholic beverages	15%	Elimination of customs duties at entry into force
Pork	Quota + average tariff of 43%	Elimination of customs duties over 10 years
Processed pork	8.5%	Elimination of customs duties at entry into force
Pasta	Up to 24%	Elimination of customs duties over 10 years
Chocolate	Up to 30%	Elimination of customs duties over 10 years
Hard cheese	Up to 28.9%	Elimination of customs duties over 15 years
Soft and fresh cheese	Up to 28.9%	Quota equivalent to EU exports
Meat of bovine animals	38.5%	Tariff reduction to 9% over 15 years
Herrings, Mackerel	10%	Elimination of customs duties over 10 years (Herrings); over 15 years (Mackerel)
Milk and cream	25%	Reduction of customs duties to 12.5% over 5 years

Source: own elaboration based on (Annex to the agreement with Japan – EU/JP/Annex 2-A-4/en 7; European Commission, 2017a).

The economic partnership agreement is completely consistent with the European Union's policy, hence there will be no need for amending its provisions or standards of any other field that must be regulated, e.g. technical regulations and standards applicable to products, sanitary or phytosanitary regulations, health and safety standards, GMO, environmental or consumer protection regulations. The exception includes a deviation from the size of bottles, which is expected to facilitate the export of Shoshu, a spirit drink in traditional bottles, from Japan. Japanese Shoshu liquor is traditionally sold in 720 ml or in 1,800 ml bottles (the sizes of spirits bottles in the EU are strictly regulated and only certain other capacities are allowed on the EU market) (European Commission, 2018c, p. 2).

Apart from the liberalisation of trade in goods and services, the aim of the agreement is to reduce non-tariff trade barriers (NTBs). It is expected that this will produce significant economic benefits (European Commission, 2012). This is confirmed by the number of new protectionist interventions undertaken by Japan on EU imports. Following the signing of the agreement with Japan, the number of new non-tariff instruments introduced by Japan decreased to an average of three per year in 2018-2021, while in the previous years there were twice as many (more on this topic: Global Trade Datebase, 2022).

Trade Relations between European Union and Japan in the Context of EUJEPA

Japan is the EU's second-biggest trading partner in Asia after China. At the same time, Japan is the seventh largest partner for EU exports and imports of goods. The balance of bilateral trade in goods between the EU and Japan is negative. 2020 was an exception to that rule (figure 3). It must be noted that the growth rate of exports in 2019 (the year in which the EUJEPA entered into force) was, compared to 2018, considerably higher than of imports (8.4% and 5.6% respectively), which contributed to a four times lower mutual trade deficit in that period.
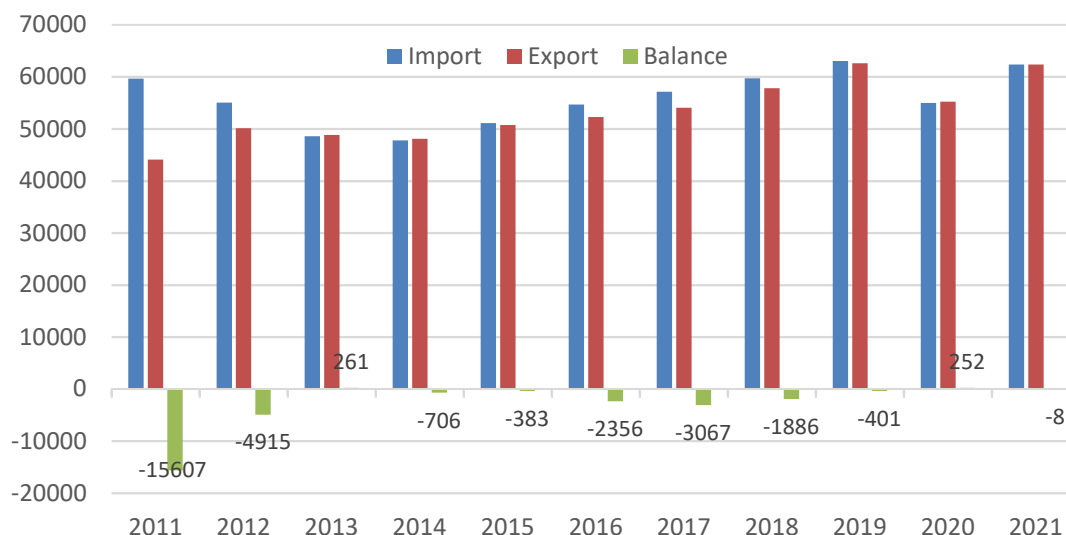
Figure 3. European Union (EU27 after 2019) – Japan Trade between 2011 and 2021, in mEUR
Source: own elaboration based on Eurostat data.
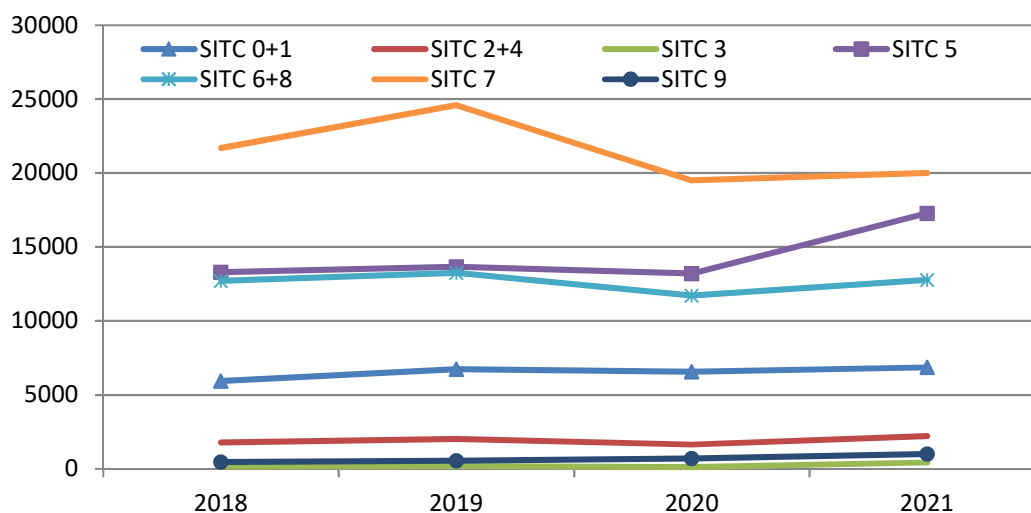
**Figure 4. EU Exports to Japan Broken Down into Main Groups
of Standard International Trade Classification (SITC)**
Note: SITC – Standard International Trade Classification; Goods classified under the following sections:
SITC 0+1 – Food, live animals, beverages and tobacco; SITC 2+4 – Raw materials;
SITC 3 – Mineral fuels, lubricants and related materials; SITC 5 – Chemicals and related products, n.e.s.;
SITC 6+8 – Manufactured goods classified chiefly by material and Miscellaneous manufactured articles;
SITC 7 – Machinery and transport equipment; SITC 9 – Commodities and transactions not classified
elsewhere in the SITC
Source: own calculations based on Eurostat data.

Having considered the structure of goods covered by bilateral trade, the biggest group includes processed products, with the SITC 7 group (machinery and transport equipment) having the greatest share – 62% in the EU's import from Japan, and as regards the EU's export, approx. 32% (2021) (figure 4 and figure 6). As regards the EU's imports from Japan, the second largest group is section 5 of the SITC, namely chemicals (14.5% in 2021), followed by goods categorised into section SITC 8, i.e. miscellaneous manufactured articles (approx. 13%). Whereas for exports, the second largest group includes section 5 articles (28%), followed by section 8 goods (14%).

Compared to 2018 (prior to entering into the EJEPA), a marked increase in the EU's imports to Japan was seen for the SITC 1 section (beverages and tobacco – by over 40% in 2021) and SITC 5 (chemicals) – by 30% (figure 4). It must be emphasised that Japan abolished customs duties in relation to the import of the aforesaid groups of goods from the EU on the entry into force of the agreement. Whereas the export of goods classified under section SITC 7 (machinery and transport equipment) declined. Nevertheless, it must be highlighted that 2019 (compared to 2018) saw the export of machinery and transport equipment (SITC 7) growing; the export of clothing and footwear also rose. In 2020, export for these groups of goods dropped, given absolute values, however, reasons for that may be associated with restrictions imposed due to the pandemic.

The structure of EU's exports to Japan also changed to a certain degree: the share of goods categorised into section SITC 5 and SITC 0+1 (food, live animals, beverages and tobacco) rose. On the other hand, the share of goods classified under section SITC 7 (machinery and transport equipment) fell (figure 5).
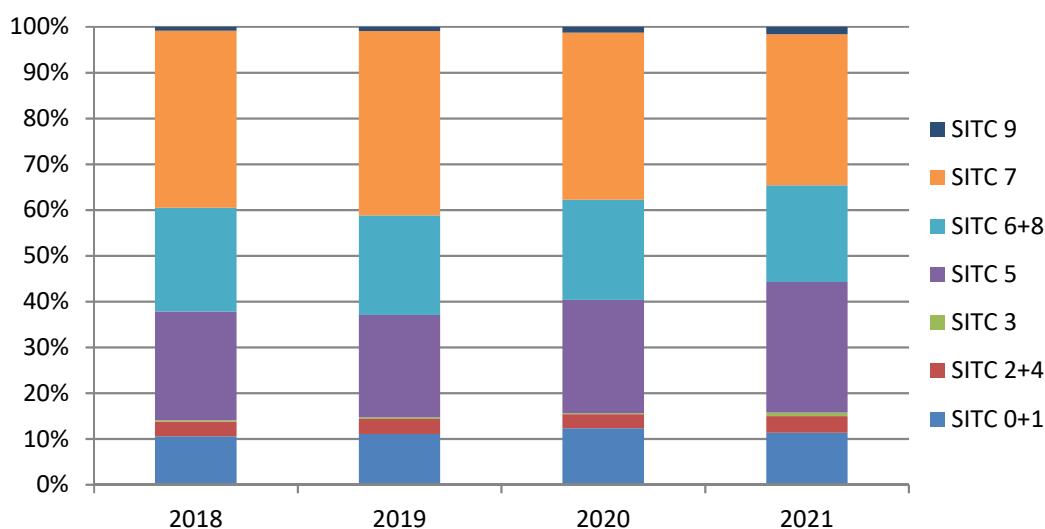
Figure 5. Structure of Goods Exported by EU to Japan, in per cent
Source: the same as for figure 4.

On the other hand, as regards the EU's imports from Japan (after the agreement became effective), there was an increase in the import volume (and the share) of goods classified under section SITC 5 (chemicals), whereas a decline was observed for articles categorised into section SITC 7 (machinery and transport equipment) (figure 6 and figure 7). Nevertheless, it is noteworthy that 2019 (compared to 2018, before the EPA entered into force) saw the export volume for machinery and transport equipment going up (figure 6).

The fact that the provisions of the agreement are attractive to EU economic operators is demonstrated by the degree to which tariff preferences provided for by the EUJEPA are used. The overall preference utilisation rate ("PUR")[1] for the EU-Japan EPA was 63.3% in 2020 (annual average), compared to 53.5% in 2019 (in February 2019, when the agreement became effective, PUR stood barely at 35.4%). PUR for agricultural products was high, in 2020 – 93.6% (compared to 85.2% in 2019). PUR for manufac-

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[1]The PUR Index equals the value of the imports actually benefiting from EUJEPA preferential duties divided by the value of the imports eligible for a preferential duties under this agreement.

tured goods reached 45.6%, which meant that it rose proportionately more than PUR for agricultural goods (European Commission, 2021, p. 7-8). In 2020, PUR grew both in monthly and annual terms, and over the whole year: an average annual PUR in 2020 was approx. 10% higher than in the first year of EPA implementation. This happened despite trade stagnation caused by the Covid-19 pandemic.
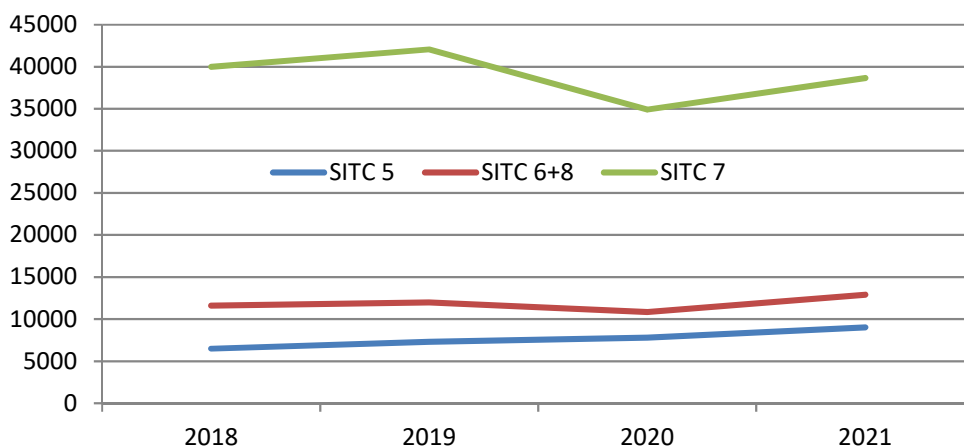
Figure 6. EU's Imports from Japan in Consideration of Three Main SITC Groups
Source: the same as for figure 4.
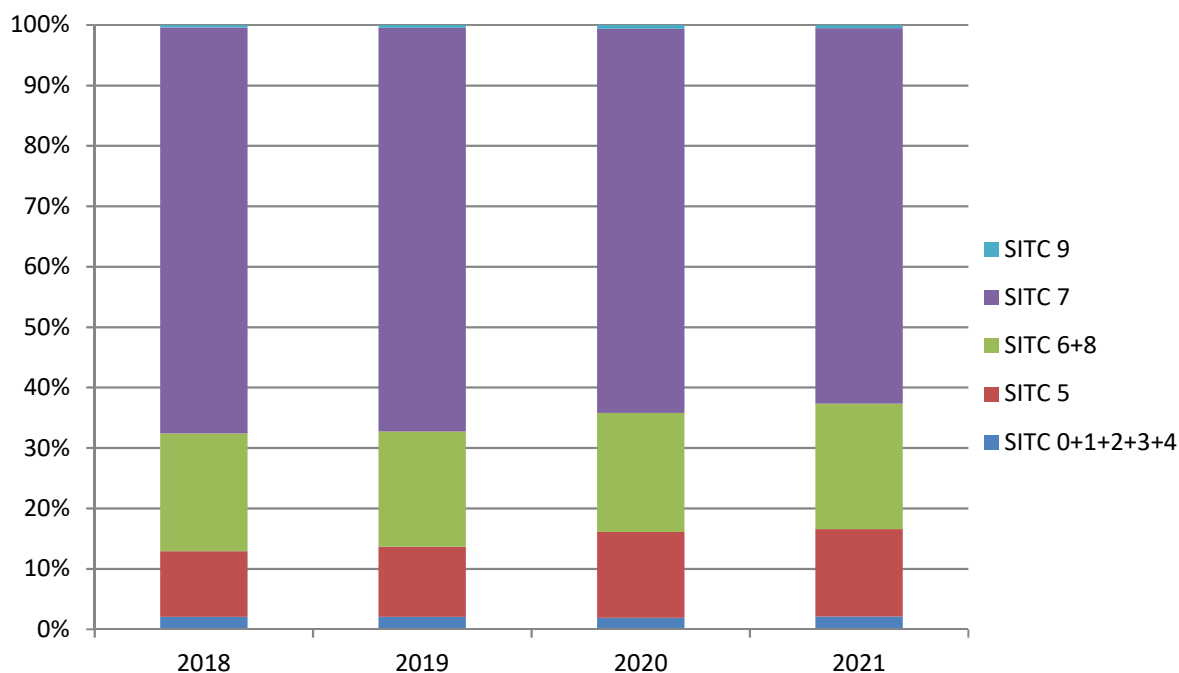
Figure 7. Structure of Goods Imported by EU from Japan, in per cent
Source: the same as for figure 4.

CONCLUSIONS

The main reason for negotiating new-generation free trade agreements referred to in the 2006 strategy for the development of the European Union's common commercial policy is an economic criterion (market potential, economic growth) for the selection of prospective trading partners and de facto a shift from multilateralism to bilateralism. The specific objective is the protection of economic interests

of EU economic operators, especially exporters and importers. The trade agreement of this type entered into by the European Union with Japan fits into this pattern. As a matter of fact, Japan is a relatively important trading partner for the EU and vice versa.

The agreement with Japan stipulates that almost the whole mutual trade (goods) is to be liberalised, and it also provides for the liberalisation of services and elimination of certain non-tariff barriers. One of the biggest achievements of the agreement made between the European Union and Japan includes the wide and deep liberalisation of trade in goods. Despite the fact that the overall level of tariff protection, as a consequence of liberalisation activities under GATT/WTO, is relatively low, there are still some groups of goods for which the protection in the form of customs duties constitutes an important barrier, as a result of which the conditions for competing on the partner's market deteriorate. As demonstrated, the free trade agreement contributed to a reduction in customs and administrative barriers to access to both markets, and consequently, it should be conducive to closer trade and investment co-operation. It may be also an incentive for European companies to strengthen their position on the Japanese market, which is not only important, but also offers good prospects. The elimination of import duties and other barriers to trade in Japan in relation to certain agricultural goods: food, live animals, beverages (some of them were relatively high) on the date the agreement became effective contributed to increased imports from the EU for these groups of goods. There were also minor changes to the structure of goods imported by the EU from Japan: the share of goods classified as section SITC 0+1, and in particular, SITC 5 and SITC 6+8 rose, whereas the share of SITC 7 declined. It must be remembered that from the respective EU economic operators' (exporters', importers') point of view, the liberalisation of trade with Japan is of crucial importance for trade transactions carried out by them. Indeed, the agreement contributed to the improvement of a business environment for companies and economic operators from the European Union engaged in trade with Japan.

The EUJEPA could create attractive business opportunities for European companies. This is also evidenced by a higher preference utilisation rate (PUR). In order to evaluate the potential significance of the agreement to EU economic operators, it must be also considered that non-tariff barriers were a considerable impediment to trade with Japan and generated extra costs. The elimination of these barriers means, among other things, better collaboration in various regulatory areas, to avoid unnecessary differences which generate additional transaction costs and are potentially detrimental to innovation. The European Union and Japan have in many areas similar, stringent requirements for health, environment and food safety. This context facilitates regulatory co-operation, in many cases allowing an opportunity to avoid the wastage of resources for compliance with regulations having a similar purpose, but being different as regards practical aspects. Even if their impact is difficult to assess, more consistent regulations may stimulate innovation, especially when they are achieved by two partners with large markets and state-of-the-art manufacturers. What might be expected is the additional effect of the liberalisation of bilateral trade on third countries. In fact, standards or rules agreed by Japan and the EU may become even more attractive to third countries, as their adoption would facilitate access to two large markets. This standard role of a leader is conditional, first and foremost, on a strong market position, which requires a different assessment of the potential significance of the agreement – an instrument which is not based on the importance of bilateral trade relationships, but on the shared importance of both partners on global markets.

Nevertheless, it is noteworthy that relatively too short time has elapsed since the entry into force of the EUJEPA, and furthermore, one has also to consider the impact of the pandemic (2020), which led to changes in international trade and a drop in trade growth rate. It would be expedient to continue research in the future to examine trends in bilateral trade, in particular, after the completion of timelines for the implementation of customs duties reduction.

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Pro-environmental attitudes and behaviours of young adults in shaping the market offer in the international dimension

Robert Lisowski, Mariola Mamcarczyk, Anita Proszowska, Mariano Soler-Porta

A B S T R A C T
Objective: The objective of the article is to identify selected pro-environmental behaviours (along with their determinants) of young adults from Polish and Spanish universities and to determine which of them should be taken into account in shaping the market offer of modern international companies.
Research Design & Methods: The basis for the conclusions was qualitative research conducted with the use of an online questionnaire. The survey covered students of Polish universities, from whom 540 completed questionnaires were obtained, and students of a Spanish university – 54 questionnaires. The analysis of cross-tabulation in various sections was carried out using the Pearson Chi-square statistics, the contingency coefficient and Cramer's V coefficient.
Findings: Young adults from Spain less often than respondents in Poland believe that their lifestyle is environmentally friendly and are more critical of the intensity of involvement of modern people in pro-environmental activities. The positive opinion of Polish students about themselves does not correlate with their behaviour – they participate in protest marches or monitor the network activity of pro-environmental organisations less often than Spanish students. In the case of respondents from Spanish university, essential determinants of their pro-environmental activity turned out to be the following variables: "a source of income" and "a form of study", while for students from Polish universities, these were "gender" and "a year of birth."
Implications & Recommendations: The pro-environmental elements of the product offer will be appreciated faster in the Spanish market than in the Polish market. At the same time, the offer with such elements will be more popular among younger people, women, and people from big cities. It will be easier to convince the Spanish community of the restrictions on using private cars in urban spaces. The pro-environmental elements of the job offer will be essential only for almost 20% of candidates from Spain and nearly 10% of applicants from Polish universities.
Contribution & Value Added: Describing the intensity of pro-environmental behaviour of young adults from selected universities in Poland and Spain. Separating statistically significant relationships between selected pro-environmental behaviours of young adults from the Polish and Spanish markets and their demographic characteristics.
Article type:	research article
Keywords:	pro-environmental attitudes; consumer behaviour; young adults; the Polish market; the Spanish market
JEL codes:	M31, Q57, R58
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INTRODUCTION

Climate issues, ecology, and the circular economy are terms that are increasingly present in today's reality. They are so important that they affect all areas of modern human life. Therefore, it becomes obvious that entrepreneurs are interested in whether and how to include them in shaping the market offer (Kramarz *et al.*, 2019).

The aim of the article was to identify selected behaviour (along with their determinants) of pro-environmental young adults from Polish and Spanish universities, as well as to determine the impact they can exert on shaping the market offer of modern enterprises in the international dimension. The basis for the conclusions drawn is literature studies and questionnaire surveys of young adults from Poland and Spain. The choice of the students as respondents was dictated by the assumption that they, as university graduates, would constitute the core of the managerial staff in the coming years and thus the most opinion-forming group in society (Proszowska, 2021). It can be assumed that they will be the first to make highly innovative and socially responsible decisions, which may include considering pro-environmental aspects in market decisions. For this reason, analysing the determinants of their behaviour may prove helpful in forecasting the principles of creating future marketing strategies.

The selection of the sample was non-random and purposeful (to reach the respondents considered to be the most opinion-forming). At the same time, it can be considered a convenient choice.

The detailed research areas included, among others: the respondents' attitude to the natural environment, their interest in the activity of pro-environmental organisations, the respondents' attitude to restrictions in car use, the importance of the employer's pro-environmental orientation and pro-environmental aspects of purchasing decisions. The analysis of the obtained results helped to determine, among others if demographic characteristics of young adults influence their pro-environmental behaviour.

Due to the qualitative nature of the analysed information, the χ^2 (Chi-square) test and Cramer's V coefficient was used in the analysis process. A number of multi-way tables were prepared from which the tables significant for the assumed test power were selected. The contingency coefficient was also used to assess the strength of the relationship.

The original elements of this article, in comparison with available publications, include the description of the intensity of pro-environmental behaviour of young adults from selected universities in Poland and Spain and the separation of statistically significant relationships between selected pro-environmental behaviour of young adults and their demographic characteristics for the Polish and Spanish market.

The paper consists of a literature review, a description of the methodology of the research process conducted, research results and conclusions. The research involved young adults from two Polish universities (Krakow) and one in Spain (Malaga). The main focus of the research was to identify differences between pro-environmental attitudes and behaviours of students studying in Poland and Spain.

LITERATURE REVIEW (AND HYPOTHESES DEVELOPMENT)

The growing awareness of the dangers associated with climate change and broadly understood environmental protection contribute to the change of human behaviour. Certainly, they occur at different rates in different societies. This study concerns young adults, belonging to the "Z" generation, who are born between 1995 and 2012 (Herring, 2019).

According to Hatalska (2022), young adults are aware of pro-ecological behaviour and are ready to live this way. Wierzbiński *et al*. (2021) point to a strong correlation between the ecological behaviour of young consumers and their ecological awareness.

The academic community appears as the subject of research in the field of pro-ecological behaviour from the perspective of scientists' behaviour: behaviour of academics (Fawehinmi *et al.*, 2020) and students (Karimi, 2019) and the role of universities in shaping their pro-ecological behaviour (Chakraborty *et al.,* 2017.).

Ciążela (2019) also deals with the subject of pro-ecological behaviour of students of Polish universities. The most frequently undertaken form of pro-ecological behaviour was "Cleaning up the world" campaign. Over 1/3 of the respondents signed a pro-ecological petition at least once.

For Escher and Petrykowska (2015), actions taken by young consumers are not always consistent with their views. It is necessary to intensify the conducted environmental education to educate young consumers about pro-ecological views and to cause consistent behaviour with them (Onwe *et al*., 2020).

Łęska and Kuś (2018) present slightly different results. Their group of respondents is characterised by a high level of environmental awareness and a sense of responsibility for the surrounding environment. The belief in individual influence is reflected in pro-ecological behaviour.

Actions for protecting the natural environment were more often undertaken in rural areas than in cities (Bednarek-Gejo *et al*., 2012).

According to Janczarska-Bergel (2019) the causes of the low resource of natural science knowledge and environmental awareness are multidimensional. They drew attention to the need for changes in environmental education.

Pro-ecological activities are mainly based on saving water and energy and segregating rubbish, but they are related to economic issues (Nguyen, 2020), not conscious pro-ecological attitudes. Few of the inhabitants work actively to protect the local environment. There is a need for wider promotion of pro-ecological behaviour and the role of education in this topic (Kiryluk, 2015). It is confirmed by Radzymińska et al. (2015).

Patrzałek (2016) writes about pro-ecological habits shaped in households in the form of economical use of water, energy or gas and refraining from buying excess products and products harmful to the natural environment. The students of the Faculty of Economic Sciences of the Warsaw University of Life Sciences point to the necessity of coercion in implementing and promoting pro-ecological behaviour (Balińska *et al*., 2019). Today's students will be responsible for society's decisions in the future, so their environmental education is of great importance for progress towards sustainable development (Vicente-Molina *et al.*, 2013,). Women are more inclined to engage in environmentally friendly activities.

The promotion of pro-ecological attitudes and behaviour has been the subject of scientific studies for many years (Aoyagi- Usui *et al.,* 2003; Félonneau & Becker, 2008).

Eco-innovations are becoming more and more fashionable. Jansson et al. (2010) pointed out that values, beliefs, norms and habits determine the will to reduce and adopt eco-innovation. The combination of factors connected with attitudes and practices has proven to be influential determinants of restrictive behaviour and the willingness to adopt eco-innovations (Stanek-Kowalczyk, 2021).

According to Tezel and Giritli (2019), environmental protection, sustainable development, pro-ecological behaviour are topics that combine, complement and create a particular inextricable whole, determining changes and increasing the need for their appearance in various spheres, including sports. It is necessary to introduce new technological solutions enabling functioning in the changing climate (Kellison & Orr, 2021). The indication of the sports context is to show how many spheres are related to activities aimed at environmental protection. Playing sports can also be pro-ecological behaviour because taking care of ourselves and our loved ones, we make fewer medical appointments and take fewer medications.

At every step, you can see the influence of social media on everyday life, shopping, building relationships, and promoting various types of attitudes or behaviour, including pro-ecological ones (Gupta & Syed, 2022).

Online product review has both a direct and indirect impact on your intention to buy organic products (Nguyen & Nguyen, 2020).

Despite the significant increase in environmental and sustainable development challenges, environmental attitudes have not changed significantly over the 10 years (Primc *et al*., 2021). Working to disseminate pro-environmental attitudes in society should make this type of behaviour absolutely natural and obvious for future generations.

Based on the literature review, the aim of the research was defined. Due to the qualitative nature of the research, no research hypotheses were set, but research problems and questions were posed, which are presented in the introduction to this article.

RESEARCH METHODOLOGY

The primary studies were conducted in the period from 15.12.2021 to 30.01.2022. The research was qualitative – it took the form of online questionnaire research – the students received a link to the questionnaire and filled it in on their own. The final version of the questionnaire was developed on the basis of the analysis of the available research results, the results of the authors' own research and the summary of focus group interviews with selected groups of young adults, which helped to refine both the questions of the research questionnaire and clarify the selected answer proposals.

Assumptions for the Statistical Analysis of the Research Results

The data collected during the survey created thirty variables, including 21 dependent variables and nine grouping variables. The number of observations for students of Polish universities was 540 and for the Spanish university, 54. All the variables are qualitative variables, more specifically nominal ones. Therefore, many kinds of statistical multivariate analyses cannot be performed. From among the methods that can be applied, the analysis of cross tabulation in various sections was selected.

Cross tabulation allows to identify relationships between the variables whose values are listed in it. The significance of the relationships found is tested using the Pearson Chi-square (χ2) statistic, which is the basis for the most common significance (or independence) test for qualitative variables (TIBCO, 2017). The Chi-square test becomes significant as the deviation from this expected pattern increases. The value of the chi-square statistic and its significance level depend on the total number of observations and the number of cells in the table. The formula to calculate χ^2 is as follows:

$$\chi^2 = \sum_{j=1}^{k} \frac{(O_j - E_j)^2}{E_j^2} \tag{1}$$

where:

O_j - the size observed for a given group;
E_j - the size expected for a given group;
k - the number of groups.

Then determine the number of degrees of freedom should be determined (df):

$$df = (p - 1)(r - 1) \tag{2}$$

where:

r, p - the sizes of the categories for the first and second variable.

After calculating χ^2 and the degrees of freedom, the critical value χ^2 for the adopted significance level p (assumed p = 0.05) should be read from the statistical tables. When the calculated value of χ^2 is lower than the critical value, there is no reason to reject the null hypothesis about the independence of the studied variables. When the calculated value of χ^2 is greater than the critical value, then we reject the null hypothesis in favour of the alternative hypothesis about the existence of a relationship between variables.

The contingency coefficient is a measure based on chi-square statistic values of the relationship between two qualitative variables. Its value is always between 0 and 1 (0 means independence of variables), its maximum value depends on the size of the table. The contingency factor can only reach 1 for an infinite number of categories (Siegel, 1956; TIBCO, 2017). The formula for the contingency coefficient (C) is as follows:

$$C = \sqrt{\frac{\chi^2}{\chi^2 + n}} \tag{3}$$

where:

n - the number of observations.

Cramér V Factor defines the level of dependence between two nominal variables, at least one of which has more than two values. The coefficient takes values between 0 and +1 (inclusive), and the closer the score is to 0, the weaker the relationship between the examined features.

The coefficients of contingency and V Cramer can be interpreted only when the chi-square indicates the existence of a significant relationship between the variables. In order to verify whether the sample size is sufficient to detect the investigated relationships, a test from the group of tests based on χ^2 – goodness of fit test for contingency tables was carried out. As a type of power analysis a post hoc compute achieved power test was chosen. The level of significance was assumed α = 0,05. The G*Power 3.1 program was used for the calculations.

Based on this, assuming the power of the test (1- β) > 0,95, a limit number of degrees of freedom (different for different tables) was specified, which allows the above condition to be met. Whereas, according to Cohen (1992), the effect size is low if the value of r varies around 0.1, medium if r varies around 0.3, and large if r varies more than 0.5.

Table 1. Analysis of test power

χ² tests – Goodness-of-fit tests: Contingency tables		
Analysis:	Post hoc: Compute achieved power	
Input:	Effect size	0.3
	α err prob.	0.05
	Total sample size	540
	Df	67
Output:	Noncentrality parameter λ	48.6
	Critical χ²	87.108
	Power (1-β err prob)	0.9515

Source: own calculations in G*Power,2022.

As shown in Table 1, the test power exceeding 95% is achieved with a maximum of 67 degrees of freedom, therefore, some cross tabulation was rejected.

As part of the analysis of the research results for Polish universities, based on 189 cross tabulations, taking into account the assumed significance level α (0.05 was assumed) and the number of degrees of freedom, 21 tables were selected for further analysis.

For Spain, the sample was only 54 observations; therefore, a similar power test (as in Table 1) gave the results from several to several dozen per cent, assuming a small number of degrees of freedom and the effect size = 0,5.

Presentation of the Studied Populations

The students of three universities took part in the study: the Cracow University of Economics (Poland), the AGH University of Science and Technology in Cracow (Poland) and the University of Malaga (Spain), both full-time and part-time studies.

After the verification of the obtained results, the analysis process covered the answers contained in 540 questionnaires filled in by the students of the Polish universities and 54 students of the Spanish university. The main assumption of the conducted research process was to observe differences in the behaviour and attitudes of Polish and Spanish young adults. However, the different number of respondents in individual countries meant that a complete analysis of the research conducted in Poland was carried out, and the Spanish market research was considered a pilot study. The obtained results limit full inference but simultaneously make it possible to define preliminary assumptions and plan further detailed analysis.

In the surveyed group (table 2) in Poland, women constitute 55.93% of the respondents, while it is 68.51% among Spanish university students. In Poland, most of the respondents are first-cycle students (95.45%), both undergraduate and engineering, while the Spanish respondents are mainly second-cycle students (92.59%).

Most of the respondents are dependent on their parents (in Poland – 70.93%, in Spain – 72.22%), for the rest their main source of income is their own professional work. More than half of the respondents (in Poland – 52.22%, in Spain – 59.26%) live in large cities (over 50,000 inhabitants).

As for the nature of the place of residence, the largest group in Poland lives in rented rooms or flats (45.18%), a large proportion of the respondents also live with their parents (31.30%), many fewer people live in a dormitory (15.37%), and the least of them declare living in their own apartment (8.15%). In Spain, living with parents is the most popular (51.85%), while renting a room came second (38.89%). Over three-quarters of the respondents from the Polish universities (76.11%) study full-time, among the respondents from the Spanish university there are as many as 94.44%.

Table 2. General characteristics of the studied populations

Gender of the surveyed respondents					
Women		Men		Other	
68.51%	54.44%	31.48%	45.19%	0%	0.37%
Level of study of the surveyed respondents					
1st degree (undergraduate studies)		1st degree (engineering studies)		2nd degree (master's degree)	
1.85%	51.30%	5.56%	43.15%	92.59%	5.55%
Year of birth					
1978-1999			2000-2004		
42.59%		15.74%	57.41%		84.26%
Source of income for the surveyed respondents					
Parents			Own professional work		
72.22		70.93%	27.78		29.07%
Place of residence (a city)					
Up to 5,000 inhabitants		More than 5,000 and less than 50,000 in-habitants		At least 50,000 inhabitants	
7.41	29.26%	33.33	18.52%	59.26%	52.22%
Place of residence of the respondents (a form of ownership)					
The space under the management (or co-management) of the respondent			Space managed by external entities		
55.56%		39.44%	44.44%		60.56%
Place of residence (details)					
Own flat		Living with their parents		Dormitory		Rented flat (room)	
3.70%	8.15%	51.85%	31.30%	5.56%	15.37%	38.89%	45.18%
Form of studies					
Full-time studies			Part-time studies		
94.44%		76.11%	5.56%		23.89%

Note: due to the large size of the table, some indications of the given results and the number of cases were omitted; the first numerical value given for a given answer is the percentage of indications for the research carried out at the university in Spain, the second value is the percentage of indications of the research from the Polish universities.

Source: own research, 2022.

RESULTS AND DISCUSSION

The main goal of the research process carried out was to identify selected pro-environmental be-haviour (together with their determinants) of Polish and Spanish young adults and to determine whether they should be taken into account in the process of shaping the market offer of modern international companies.

As part of the online survey, the respondents answered questions concerning their selected pro-environmental attitudes and behaviour (table 3.).

Most of the respondents are convinced that their attitude towards the natural environment can be considered pro-environmental. They most often believe (73.33% of the respondents from Spain and 59.26% of the respondents from the Polish universities) that the level of environmental awareness and the intensity of involvement of modern people in pro-environmental activities is rather average (peo-ple are aware of the problems, but it is difficult for them to change their current habits). Young adults do not feel the need to fight to improve the condition of the natural environment – more than half (59.26% – Spain; 59.63% – Poland) not only have never taken part in a demonstration to improve the climate, but it has not even occurred to them. They hardly monitor the activity of pro-environmental organisations on social media. Limiting car traffic in city centres is considered necessary by slightly more than one-fifth (22.22%) of the Polish universities and as many as 46.30% of the respondents from

Spain. Most surveyed young adults do not intend to quit working for a company with a negative eco-logical image (applying for a job with a non-ecological employer) – both from the Polish universities and the Spanish one.

Table 3. Distribution of the respondents' responses regarding their pro-environmental attitudes and behaviour

Do you think that your present lifestyle can be considered environmentally friendly?							
Rather not		Sometimes yes, and sometimes not		Rather yes		Definitely yes	
9.26%	6.30%	55.56%	44.07%	35.18%	44.26%	0%	5.37%

How do you rate the level of environmental awareness and the intensity of involvement of modern people in pro-environmental activities?							
The little activity, people live as if they assumed that these activities are unneces-sary, because nature can handle it by itself		The low level of activ-ity, people have more important problems and the environment has to wait		The average activity level, people are aware of the problems, but find it diffi-cult to change their habits		The great commitment of the society is seen, but the finan-cial outlays for these activities are still too low	
7.41%	7.78%	14.81%	11.67%	59.26%	73.33%	18.52%	7.22%

Do you take part in marches and demonstrations for the benefit of the natural environment?									
No, it has never occurred to me		No, but I post positive comments, e.g. under such information in social media		I was planning to participate, but I have a lot of other activities and I haven't managed to do it		I have participated in them (a few times at most) and for the company rather than for the real need to express my views		Yes, I often take part in such demonstra-tions	
59.26%	59.63%	18.52%	19.82%	11.11%	14.44%	9.26%	3.52%	1.85%	2.59%

Do you monitor the activity of pro-environmental organizations (people) in social media?							
No, I never do		Yes, I monitor some		Yes, I follow and actively com-ment on their entries		Yes, and I also run such a channel on social media	
40.74%	48.89%	48.15%	49.26%	11.11%	1.67%	0%	0.18%

Would you accept a city center ban on private cars in your city?					
I will not agree to it in my life		It will be very hard for me, but somehow I will accept it		Yes, I consider such a decision necessary for the benefit of the residents	
22.22%	28.89%	31.48%	48.89%	46.30%	22.22%

When choosing an employer, will you pay attention to their ecological image?					
I'm not going to pay at-tention to that		I will look at this matter, but a negative eco-logical image will not prevent me from ap-plying for a job		Definitely yes and I will not apply for a job in a company with a non-ecological image	
20.37%	28.52%	61.11%	62.59%	18.52%	8.89%

Do you follow the producers' ecological approach to the production process when making purchasing decisions?									
I do not notice such markings and never take them into ac-count		I notice the existence of such information and markings, but do not take them into account		I notice such infor-mation and I am pleased when I buy "bio" products, but it is not necessary		Only in the case of nutritional products, because it directly af-fects my health		Yes, I always look for such information and the lack of it means that I give up the purchase	
0	16.30%	42.59%	20.55%	48.15%	40.37%	1.85%	18.89%	7.41%	3.89%

Note: due to the large size of the table, some indications of the given results and the number of cases were omitted; the first numerical value given for a given answer is the percentage of indications for the research carried out at the university in Spain, the second value is the percentage of indications of the research from the Polish universities.
Source: own research, 2022.

Analysis of the Research Results of the Respondents from the Polish Universities

Using the χ2 test for multiple-choice questions, a statistically significant relationship was found between the answer to the question of whether the respondent considers their lifestyle to be environmentally friendly and the declared age (χ2=10,29; p=0,02, V=0,14). Older people (born 1978-1999) were more often convinced that they live ecologically than younger people (2000-2004). It may be a real reflection of the behaviour of both age groups or the greater awareness of young adults that makes them more critical of the same behaviour.

By analysing the involvement in marches and demonstrations for the benefit of the natural environment, it was found that there is a statistically significant relationship between this variable and the variable "place of residence – a city" (χ2=17.81; p=0.01; V=0.13) and the variable "gender" (χ2=44.26; p=0.00; V=0.20).

It has never occurred to take part in such a demonstration to:

− 71.51% of the people living in towns of less than 5,000 inhabitants;
− 72.95% of the men;
− 48,64% of the surveyed women.

There is a statistically significant relationship between the monitoring of the pro-environmental organisations' social media by the respondents and the variable "gender" (χ2=37.75; p=0.00; V=0.19) and the variable "year of birth" (χ2=10.72; p=0.01; V=0.14). Women most often declare that they follow several such profiles (60.20%), and men that they never look at such profiles (63.11%). Among the people born before 2000, 62.35% never look at such profiles (this is their most common answer), and among people younger than them, the dominant response is "Yes, I watch a few" (52.09%).

A statistically significant correlation was observed between the answer to the question whether you would accept a ban on entering the city centre for private passenger cars in your city, and the variable "place of residence – a form of ownership" (χ2=36.17; p=0.00; V=0.12), the variable "a source of income" (χ2=17.51; p=0.00; V=0.12), the variable "gender" (χ2=23.77; p=0.00; V=0.15) and the variable "year of birth" (χ2=15.57; p=0.00; V=0.17). Opponents of this restriction include, among others:

− 42.60% of those living with their parents;
− 35.05% of the people who make a living from their own professional work;
− 26.37% of those dependent on parents;
− 23.47% of the women;
− 35.66% of the men;
− 17,65% of the people born before 2000;
− 30,99% of the persons born after 2000.

The existence of a statistically significant correlation was also noted between the variable containing the answers to the question of whether, when choosing an employer, you will pay attention to their ecological image and the variables "gender" (χ2=51.97; p=0.00; V=0.22) and the variable "a source of income" (χ2=7.72; p=0.02; V=0.12).

The following are not going to pay attention to the ecological image of the employer:

− 16.33% of the women;
− 43.44% of the men;
− 36.94% of the people who make a living from their professional work;
− 25.06% of the respondents are dependent on their parents.

There is a statistically significant relationship between the answer to the question of whether, when making purchasing decisions, you follow the producers' ecological approach to the production process and the gender of the respondents (χ2=42.46; p=0.00; V=0.20). It is the women who most often declare (49.66% of them) that they notice such information and are happy when the products they buy have such features. Still, it is not necessary (29.51% of the men most often see the existence of such information but do not consider it).

When analysing literature sources in the field of pro-environmental attitudes and behaviour of young adults, a large number of publications on this topic can be observed, but at the same time they deal with slightly different areas of fundamentals and behaviour. The obtained research results on pro-environmental attitudes and behaviour of young adults concern a relatively narrow topic in this field, which makes a direct comparison with the results presented in the literature review difficult.

At the same time, it should be noted that today's changes in attitudes and behaviour are also a result of the impact of the Covid-19 pandemic, which severely limits the possibilities for comparisons with research results from an earlier period.

Therefore, the authors of this article do not refer to earlier research results (treating them as a general background to their findings) but focus on comparing the study groups.

Analysis of the research results of the respondents from the Spanish university

For the Spanish university students, only 54 completed questionnaires were obtained. The smaller group of responses resulted in a smaller number of relationships that could be observed.

In the study of the behaviour of the young adults from the university in Spain, four statistically significant relationships were distinguished (the χ^2 test for the multiple-choice questions) between the answers to the following questions and the selected variables listed:

− whether you monitor the activity of pro-environmental organisations (people) in social media and the variable "a form of studies" ($\chi^2=8.35$; $p=0.01$; $V=0.40$);
− whether you would accept a ban on driving private cars in the city centre and the variable "a form of studies" ($\chi^2=11.12$; $p=0.00$; $V=0.45$);
− whether when choosing an employer, you pay attention to their ecological image and the variable "a source of income" ($\chi^2=9.33$; $p=0.01$; $V=0.42$);
− whether the ecological activity of producers influences the decision to purchase the products they offer and the variable "a source of income" ($\chi^2=8.29$; $p=0.04$; $V=0.39$).

In this part of the research, the values of the Cramer V coefficient deserve attention, which are higher than those obtained during the analysis of the responses of the respondents from the Polish universities, which would suggest that the relationships identified in the studies of the Spanish university students are stronger.

The analysis of the research of the respondents from the Polish universities allowed to distinguish the variables "gender" (six statistically significant relationships) and "a year of birth" (three relationships) as potential determinants of the differentiation of pro-environmental behaviour of young adults. For the respondents from the university in Malaga, the most important variables were: "a form of studies" and "a source of income" (two statistically significant relationships each).

The emerging differences may result from the fact that the Spanish university students were clearly younger than those of the Polish universities. Based on this information, a thesis can be made that the behaviour of young adults is initially determined by their source of income (a very similar distribution of the responses from both the students of the university in Malaga and the university in Cracow), and only later the gender is important.

The research process described here partly confirms the findings presented in the literature review. It can be assumed, following the cited authors, that climate and environmental well-being underlie many of the life decisions of the young adults surveyed and that this process is intensifying. The authors of this article confirm that the intensity of sensitivity to pro-environmental themes depends on various economic and political conditions and on the demographic characteristics of young adults, as detailed within the presentation of the research results.

As indicated within the research results described, there are differences between the attitudes and behaviours of young adults from Spain and Poland.

CONCLUSIONS

As part of the realised research process, it was determined what the attitude of the selected young adults from the Spanish university and their Polish counterparts to selected pro-environmental behaviour have.

It was found, among others, that students from the Spanish university, compared to their colleagues from Cracow universities, are more aware of the need to increase expenditure on pro-environmental activities. They are more critical about the assessment of the environmental performance of their lifestyle.

It can be presumed that the need of a more intensive introduction of the pro-environmental aspects to both the offers for the sale of goods and the job offers will be noticeable in the first place on the Spanish market. It will be crucial in relations with women from larger cities. Men are less interested in ecological information than women. Women are more willing to engage in various activities for the natural environment, and it can be assumed that they will look for such elements more often than men when making their market decisions.

The Spanish market research is subject to a higher degree of uncertainty due to the small size of the research sample from that market. The results obtained in this phase will be verified in subsequent studies. Particular attention will be paid to the variables "gender", "a year of birth", and "a source of income", as those that most often appeared as an element of statistically significant dependencies in the research process.

The results obtained will be of great relevance to managerial decisions made in companies with regard to new product launches (particularly in international markets). The results obtained need to be confirmed on larger samples and using qualitative research methods such as ethnographic research, projective techniques and experiments. Such research would enable a more accurate analysis of the actual behaviour of young adults and not just their declarations and attitudes—authors of the paper plan to continue and develop this research in this area.

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Understanding academic entrepreneurship:
A signalling theory perspective

Marcin Olszewski

A B S T R A C T
Objective: The objective of the article is to apply signalling theory to explain researchers' engagement with the industry and the barriers to collaboration.
Research Design & Methods: A mixed-mode study was carried out among scholars to explain the role of signalling on academic entrepreneurial engagement. The links between signalling and entrepreneurial engagement were assessed in the quantitative part using a sample of researchers from Poland. Moreover, qualitative research helped identify additional forms and barriers of signalling, which were not considered in the quantitative part. The IBM SPSS Statistics and Atlas.ti software was used in the data analysis.
Findings: In line with signalling theory, scientists' signals were divided into three groups: individual and organizational characteristics, researchers' actions, and third-party endorsements. Results show that the third-party endorsements expressed by researchers' active involvement in professional organizations enhance entrepreneurial engagement. In the qualitative part the role of signalling through graduates and the problem of the signalling cost were identified.
Implications & Recommendations: Signalling sheds light on university-industry relationships through a new lens, explaining the matching process and cooperation barriers. Stimulating collaboration requires understanding the specific language of signals used by both scientists and business partners. Therefore, this research calls for action to strengthen scientists' communication skills, more frequent interpersonal contacts with business representatives, and communication of scientific and non-scientific competencies.
Contribution & Value Added: The theoretical focus on signalling theory can advance the extensive research on academic entrepreneurship. This theory explains how actors are selected for cooperation and describes the mechanism of partner selection. It also enables the reinterpretation of previous research related to the characteristics and activities of researchers and their relevance for undertaking collaborations.
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INTRODUCTION

The growing importance of university-industry relationships stems from possible positive effects both for companies and academia. Previous studies indicate numerous benefits of entrepreneurial engagement for researchers, including the inspiration for scientific activity (Rohrbeck & Arnold, 2006; Rudawska & Kowalik, 2019; Siegel *et al.*, 2004), source of research funding (D'Este & Perkmann, 2011; Lai & Lu, 2016; Rohrbeck & Arnold, 2006; Welsh *et al.*, 2008) or improved researchers' financial situation (D'Este & Perkmann, 2011; Sobaih & Jones, 2015). Simultaneously, cooperation between universities and enterprises is considered inadequate, especially concerning the service industry (Thomas, 2012). The problem of mutual match-making between scientists and entrepreneurs interested in cooperation is a crucial reason for

poor university-business relations (He *et al.*, 2021). The article aims to solve this problem as signalling theory allows for a better understanding of mutual matching between university and business partners.

This study explores academic entrepreneurship from a new lens of signalling theory. Earlier studies on university-industry relationships explained the mutual links with a resource-based view (Kashyap & Agrawal, 2019), relational (Giuliani *et al.*, 2010), or entrepreneurial theory (Tijssen, 2006). Two main gaps were identified in the current literature. First, most research on academic entrepreneurship indicates that scientists with specific characteristics are more likely to collaborate, but they do not fully explain the underlying reasons for this. Second, as previous studies have been conducted mainly in the technological and pharmaceutical industries (Welsh *et al.*, 2008), research on the matching process in service industries is scarce (Thomas & Ormerod, 2017). The theoretical focus on signalling theory could advance the extensive research on university-industry collaborations. As a result, the paper is also relevant in terms of implications for theory and practice.

The study aims to apply signalling theory to explain researchers' engagement with the industry and the barriers to collaboration. This study contributes to the current research on academic entrepreneurship by exploring researchers' signalling activities and their impact on commercial engagement. Signalling explains how actors are selected for cooperation and enables the reinterpretation of previous research on scientists' characteristics and activities in terms of entrepreneurial collaboration. In line with Murray and Graham (2007), the commercial science market reflects the labour market with scientists representing supply-side and industry - demand for scientific knowledge. The signalling theory assumes that the informed party (scientist) can send observable signs to the less knowledgeable party (business partners) to disclose information asymmetry and promote exchange (Spence, 1973). In the university-industry knowledge market, scholars signal to companies that they offer a high-quality product (scientific knowledge and expertise) to get the contract.

LITERATURE REVIEW

Scientific knowledge can be described as dual-purpose knowledge (Murray & Graham, 2007). It means that a researchers' work may contribute to both scientific research and, at the same time, be useful for commercial application (Murray & Stern, 2006). As a result, knowledge can be offered in two types of knowledge markets. The first is the traditional academic marketplace, where scientists pursue recognition and prestige through publication, peer review, and participation in scientific conferences (Dasgupta & David, 1994). This type of market is based on a collegiate reputation-based reward system. The second is the commercial marketplace, where scientists are trying to commercialize their knowledge. This article will consider these latter types of knowledge and market.

According to Perkmann *et al.* (2011), university-industry relationships result from a voluntary matching process between academic and industry partners. University-industry relations are similar to other matching strategies, including forming business relationships or even marriage and employment (Becker, 1973; Mortensen, 1988; Perkmann *et al.*, 2011). Both parties enter the relationship willingly and must agree if a match is achieved. Although previous studies have investigated this process, it is "still unclear what determines a good match between faculty and firms involved these relationships" (Mindruta, 2009, p. 2).

Calcagnini *et al.* (2015) studied the characteristics of the matching process between universities and innovative firms and found that the knowledge market implies trading externalities. It stems from the fact that "there is a high probability that a firm searching for a university collaboration will not meet a suitable researcher" (Calcagnini *et al.*, 2015, p.31). Stiglitz (2000) assumes that the imperfection of knowledge and information asymmetry is the primary source of market failure. Also, in university-industry relations, information asymmetry may be the primary reason for the contract limitation (Akerlof, 1970). Natural knowledge asymmetry is expressed because the seller has more information on the product than the buyer. In the scientific knowledge market, this problem is intensified by the fact that buyers (companies) cannot quickly identify suitable sources of knowledge (scientists) (Grover & Davenport, 2001). Scientific publications could serve as an essential signal for firms to recognize potential

academic partners (Polidoro, 2013) "as they allow companies to identify areas of expertise within universities" (Leitner *et al.*, 2020, p. 358). Still, as research shows, the best scientists are not always the best partners for cooperation with business (Perkmann *et al.*, 2011), and there are no direct complementarities and trade-offs between commercialization and academic engagement in research (Reymert & Thune, 2022). Moreover, scientists tend not to disclose their knowledge until published and assessed by the scientific community. It makes the scientific knowledge market even more insufficient and increases the costs of partner search and selection.

Signalling in University-Industry Relationships

Based on Spence (1973), two types of entities can be assumed from the industry perspective, e.g., high-quality scientists and low-quality scientists. High-quality researchers can be productive for companies and offer them the necessary knowledge and skills. Low-quality researchers are less effective and offer little or no value to businesses. High-quality scientists know their importance for business, but outsiders (e.g., companies, and investors) do not, so information asymmetry occurs (Connelly *et al.*, 2011). Consequently, each researcher has the opportunity to signal or not signal its true quality to companies. Signalling represents a reasonable strategy for high-quality scientists because it increases the possibility of getting a contract with higher remuneration. As a result, high-quality researchers are motivated to signal, and low-quality ones are not.

The review of signalling in the university-industry relations literature found almost no direct use of signalling theory. Fontana *et al.* (2006) conducted a study on signalling from a company point of view. They found that firms' openness to the external environment significantly affects the development of R&D projects with public research organizations. Moreover, those companies that signal competencies show higher levels of collaboration with research organizations. In this study, signalling in companies was linked with patents as "patents signal firms' competences and in this way help to identify potential partners and establish the terms of collaboration as negotiations progress" (Fontana *et al.*, 2006, p. 317). Moreover, Penin (2005) argues that firms use signalling to pass information about their technical and scientific capability to expand their networks and attract new partners for cooperation.

Some researchers utilize signalling theory elements (without mentioning it directly) and point out that scientists involved in comprehensive communication of capabilities can enhance cooperation (Shen, 2017). Moreover, studies on academic entrepreneurship focus on features of scientists and academia that contribute to greater collaboration. These studies confirm that industry partners perceive different scholars' features and behaviours as signals. Based on Courtney *et al.* (2017), three types of entrepreneurial readiness signals can be identified: researchers' characteristics, actions, and third-party endorsements.

Researchers' characteristics signals

According to D'Este and Patel (2007), academic status positively impacts the variety of interactions with industry. They argue that individuals who are well-established in their academic careers are more likely to capitalize on their reputation to increase engagement with the industry. The higher engagement of these scientists can also be explained by the fact that status can serve as an encouraging signal for business. Moreover, institutional characteristics can signal researchers' quality for business. The departmental scientific field was found to be a significant determinant of industry-university knowledge transfer. According to Schartinger *et al.* (2001), technical sciences departments in Austria are more involved in cooperation than others. In the UK, scientists affiliated with engineering, business, and media are the most prolific academic consultants (Abreu & Grinevich, 2013). In Switzerland, Arvanitis *et al.*(2008) found that institutes of economics and business administration, natural sciences, engineering, and medicine are more robust in transfer activities than institutes of mathematics and physics. Department quality can also serve as guidance for reaching researchers willing to cooperate.

Perkmann *et al.* (2011) found that the higher-rated faculty are in technical disciplines, the more engaged their staff are in business relationships. Better scientific performance is associated with stronger ties between industry and university (Balconi & Laboranti, 2006). Fontana *et al.* (2006) have found that firms searching for cooperation usually select scientists based on reputation and domains of competence. Thus signalling these features can lead to a higher propensity to cooperate. According

to Abreu and Grinevich (2013) and Tartari and Breschi (2012), researchers' individual ranks in the academic hierarchy positively impact academic engagement. Stuart and Ding (2006) have found that scientists from the best universities in the USA are almost three times more likely to engage in relationships with business. Similarly, academics who work in departments with a high research status have a higher chance of being involved in an entrepreneurial venture (Clarysse *et al.*, 2011). Taking these into account, the first research question is:

RQ1: What is the role of a researcher's characteristics signals in entrepreneurial engagement with the industry?

Researchers' Actions Signals

Researchers' actions signals are linked with entrepreneurial experience or previous engagement in cooperation and can constitute a significant clue for companies to consider a particular scientist as a cooperation partner. D'Este and Patel (2007) and Schartinger *et al.* (2001) found that academics with previous experience of collaboration engage more frequently and with a greater variety of interactions. According to Leitner *et al.* (2020, p. 369), experienced scientists are "better equipped to join the interests of industrial partners with those of academic members to bridge the cultural gap between these very distinct areas." The action-based signals include scholars' social media activities and appearance in the media as an expert. Scientists can use social media to communicate and promote their knowledge. Information conveyed through social media indicates scientists' readiness and relevance for business and helps potential business partners contact each other. Despite the common-sense assumption that social media communication enables greater visibility (Carrigan, 2016), previous studies (Thomas & Ormerod, 2017) indicate no proof for the link between social media activities and non-academic impact. Public engagement can be perceived as a means to communicate unobservable warranties of the scientists' productivity. Expertise comments through social media channels can directly or indirectly indicate their cooperation potential as entrepreneurial scientists should also communicate effectively to non-scientists (Badgett, 2015). Building on previous studies, the second research question was proposed:

RQ2: What is the role of a researcher's actions signals in entrepreneurial engagement with the industry?

The Third-party Endorsements

The third-party endorsements are signals that are validated externally and serve as an indicator of scientists' competence verified by an external third party. They are issued by external organizations and can influence the perceptions of researchers' quality (Courtney *et al.*, 2017). It includes membership in industrial organizations, prestigious associations, or rankings. As members of industrial organizations, scholars can communicate their knowledge and skills. This is presumably a reliable signal because lower-quality researchers would not be able to express their expertise. Based on these assumptions, the third research question (RQ3) is:

RQ3: What is the role of third-party signals in entrepreneurial engagement with the industry?

Signalling and the Barriers to Academic Entrepreneurship

In this article, signalling means communication aimed at showing readiness and possible areas of cooperation. Constraints in active signalling can stem from a lack of interest in collaboration or the limited awareness of the signalling role and thus may create an intrinsic barrier to cooperation. If scientists choose not to signal, it results in inadequate knowledge among business representatives about what to expect or what needs can be met through cooperation with science.

The lack of signalling was also found in the stream of research on barriers to university-industry relationships. Kashyap and Agrawal (2019) found that lack of academic research output communication is one of the most critical barriers to university-industry cooperation. They found that the industry is unaware of research conducted in academia and that scholars cannot benefit from collaboration without being noticed by the industry. Similar problems were pointed out by Backs *et al.* (2018) and Maietta (2015). Berman (2008) reported that inadequate communication with scientists is a significant

problem for many industry partners interviewed. Similar results were reported by McCartney and Kwok (2022) in the latest study in the hospitality industry. According to Rybnicek and Königsgruber (2018, p. 231), "reciprocal communication (regularly, timely, adequately and accurately) is beneficial to establish positive expectations about the future behaviour of partners."

Given that there is a wide variety of signals that companies assess, there is a need to identify which impacts companies' decisions to cooperate. Linking signalling theory with previous studies on academic entrepreneurship, additional research questions were introduced:

RQ4: What are additional forms of signalling?

RQ5: What are the main barriers to signalling?

An empirical study was employed to get answers to that questions.

RESEARCH METHODOLOGY

Tourism academia was selected as a subject of the research because the relationships between universities and companies in this sector are inadequately explored (Sobaih & Jones, 2015). Moreover, cooperation between these parties is sparse (Thomas, 2018) but potentially crucial for both universities and companies (Olszewski, 2021).

Considering the complex nature of the research questions, a mixed stance of analysis was employed. The quantitative part was carried out with an online survey. This method enabled gathering responses from geographically dispersed respondents and obtaining results in a convenient way for participants. The quantitative analysis enabled answering the first three research questions. The contact information was drowned from the Polish Science database maintained by the National Information Processing Institute, covering all academic researchers in Poland. An invitation with a link to the online survey was sent in 2018 to all researchers who declared tourism and hospitality specializations. Considering that 22 e-mail addresses were incorrect, the questionnaire could be completed by 303 respondents, and 76 questionnaires were received, representing a response rate of 25%, which is an acceptable result compared to other web-based studies (Goethner et al., 2012). Table 1. presents the sample structure by age, gender, and the highest degree obtained.

The survey questions were adapted from previous research (D'Este & Patel, 2007; Thomas & Ormerod, 2017), with some new constructs added. The entrepreneurial engagement was measured as a dichotomous variable describing whether the respondent had collaborated with the industry three years before the survey. Industry partners were broadly defined as private sector companies, local governments, or government-owned corporations. The independent variables (predictors) were both dichotomous and ordinal and were grouped into three types. The first group (scientists' characteristics) includes the faculty level, the type of university, and the scientific position (measured by obtaining a habilitation). The second group (action signals) includes researchers' presence in the media as experts and scholars' professional involvement in social media. The third group of signals related to third-party endorsements was measured by researchers' activity in organizations and professional associations. The logistic binary regression was applied with the IBM SPSS Statistics version 27.0.

The second stage of empirical analysis was necessary to answer the last two research questions and included a qualitative approach often used in university-industry relations research (e.g. Rossi et al., 2017; Shen, 2017). Open-ended questions from 49 scholars' responses on cooperation barriers were considered. Within these answers, manifestations of the signalling theory were tracked. Thematic content analysis was used with support from Atlas.ti software.

The qualitative part was based on the interpretative paradigm. Participants for the analysis were chosen based on their knowledge and intention to take part in the research. The first step in qualitative data analysis was coding, then codes were categorised and sorted into main themes matching research questions on forms and barriers of signalling. Findings were supplemented by suitable quotations.

Table 1. Respondent profile

Variable	Category	Share
Age	under 36	10%
	36-45	52%
	46-55	20%
	56-65	11%
	66-75	7%
Gender	male	59%
	female	41%
Scientific degree	doctoral degree	67.5%
	habilitation degree	31.5%

Source: own study.

RESULTS AND DISCUSSION

Considering personal and organizational characteristics, 13.4% of researchers represent universities of economics; thus, they can be perceived as more business-oriented and better partners for cooperation. Moreover, 31.5% of scholars are experienced as they completed the habilitation process. This higher position in the academic hierarchy can help favour them as potential partners for business. A high faculty level declared by 42.5% of respondents could signal better quality for business. In terms of active signalling, 12.3% of researchers were highly involved in media as an expert, and 35.6% used social media for business purposes, which gave them a possibility to be found and appreciated by potential partners. Finally, 39.7% of scholars were engaged in professional organizations, which are platforms to signal knowledge and expertise.

Logistic regression analysis was employed to predict the probability of cooperation with the industry. The developed model estimates the effect of six predictors on the odds that scientists will undertake collaborations with businesses. The enter method was employed with a classification cut-off at 0.5 and maximum iterations at 20. The logistic regression model was statistically significant, $\chi^2(6) = 21.583$, p < 0.001. The predictive power measured by Nagelkerke R Square was 0.37. It means that 37% of the total variation of the dependent variable was explained by independent variables. Hosmer and Lemeshow's test was insignificant ($\chi^2(8)=13.307$, p=0.102) which means that model is well-fitted to the data.

In Table 2. the logistic regression coefficient, Wald test, and significance for each of the predictors are presented. Based on the 0.05 criterion of statistical significance, activity in professional organizations and faculty level have significant effects on cooperation involvement. Assuming all other variables are constant, scientists actively engaged in professional organisations are 2.7 times more likely to engage in cooperation with industry than scientists who are not involved (p=0.017). Moreover, scientists employed in higher-ranked faculties are less likely to cooperate with industry than scientists from lower-ranked units (ExpB = 0.251, p=0.027). Moreover, it was found that activity in social media (p = 0.404), being an expert in media (p = 0.749), academic experience (p = 0.768) and type of university (p = 0.999) did not add significantly to the model.

Social media and presence in media as an expert appeared irrelevant to establishing relationships between scientists and businesses. This may be because social media may be used more to communicate in the private domain and contribute less to establishing business relationships. As for the type of university, entrepreneurs pay more attention to the competence and ability of scientists to create value for business rather than their affiliation. In terms of experience, younger scientists can also offer more value than older ones. Experienced scientists may also take a more traditional approach to the role of the science sector and underestimate the benefits of collaboration with business (preferring research and teaching work).

A qualitative study was employed to understand signalling processes from a scientist's perspective. Three plots emerge from the data: signals used in communication with the industry, signalling enablers, and barriers. In terms of signalling enablers, researchers suggest organizing meetings with the industry to exchange mutual expectations. In this context, they emphasize the necessity of "facilitating

procedures, the assistance of knowledge transfer offices" (RES 5) and "regular meetings of practition-ers with scientists at universities" (RES 13). The purpose of such activities is to be: an "easy flow of information from entrepreneurs about specific needs" (RES 6). The researchers believe that industry representatives do not sufficiently communicate their expectations and information needs.

Table 2. Variables in the Equation

Predictor	B	Wald	Sig.	Exp(B)
Profesional organizations	0.976	5.697	0.017	2.653
Social media	-0.318	0.698	0.404	0.728
Expert in media	0.158	0.102	0.749	1.171
Faculty level	-1.381	4.884	0.027	0.251
Academic experience	-0.203	0.87	0.768	0.816
Type of university	-21.587	0	0.999	0

Source: own study.

Scholars stress the lack of time as the crucial reason for limited commitment to signalling. Due to teaching, organizational and research responsibilities, they cannot engage in the search for collaborative business partners. According to RES 3, "there is a pressure to deal with strictly university matters; fear and negative attitude of universities towards business contacts (it is better to keep a low profile)."

Additional signals that increase outside observers' perceptions of researchers' quality were also identified. Scientists pointed out that a low level of education process can be a signal discouraging cooperation. One of the respondents emphasized that the way to intensify cooperation could be: "...first of all, a better level of teaching in bachelor's and master's studies, more adapted to the expectations of the market, demonstrating the applied nature of scientific research" (RES 5). The necessity to change the scientists' image stems from the fact that "currently we are perceived as useless relics, and it takes a long time to build a position of a good advisor, who can be trusted even though he has no idea about running a business" (RES 15).

Answering the first research question, it was found that researchers' experience is not an essential attribute that draws business partners' attention, similar to some previous results (D'Este & Patel, 2007). Contrary to Perkmann *et al.* (2011) it was found that the higher-rated faculty decreases the probability of industry engagement in business relationships. In line with Arvanitis *et al.* (2008), the type of university and its specialization can serve as a signal and increase researchers' propensity for cooperation. Researchers from universities of economics seem to be better partners and, as a result, industry representatives cooperate with them more often.

Answering the second research question, no impact of scientists' actions signals on entrepreneurial activity was found. Results on social media use and presence in media as an expert align with Thomas and Ormerod's (2017), which found that this kind of activity is noticed mainly by fellow academics and helps enhance academic rather than non-academic attention.

The third research question helps understand the role of third-party signals in entrepreneurial engagement with the industry. According to the findings, researchers' active involvement in the communication of knowledge within a professional organization can serve as a recommendation and enhance researchers' possibility of entrepreneurial engagement. It was found that the probability of cooperating with business is 2.7 times higher for scientists involved in professional organizations and lower for scientists from higher-ranked faculties. Signalling theory suggests that cooperation within professional organizations allows researchers' practical value to be recognized and valued. Such collaboration reduces information asymmetry – industry partners can assess and appreciate researchers and, as a result, decide to engage in a partnership. These results align with Thomas (2018), who found that professional associations are often considered valuable conduits for knowledge exchange between practitioners and universities.

Connelly *et al.* (2011) found that the cost of sending signals is a critical aspect that differentiates high-quality signallers from low-quality signallers. The qualitative study enabled the answer to the fourth and fifth research questions. This study found difficulty in signalling because it is costly and

time-consuming. Researchers indicate they are not active enough in the signalling process due to a lack of time and focus on current teaching and research activities. It can be hypothesized that the limited action in the academic knowledge market results from the existence of information asymmetry and high non-financial costs of signalling, which discourage researchers from being active in this market. Students and educational activity were found an essential avenue for communication with industry. Scholars perceive risks connected with education and anticipate that practitioners can be discouraged based on the perception of students and their abilities.

CONCLUSIONS

Information asymmetry is one of the sources of knowledge market inefficiency. This study contributes to the literature by establishing the link between the signalling process and researchers' entrepreneurial engagement. An ambiguous impact of signalling on scientists' involvement in cooperation was found.

The results indicate that signalling theory offers both alternative and complementary possibilities for the university-enterprise relationship explanation as it helps to understand the mechanism of mutual matching of cooperation partners. Moreover, it is a new research perspective on barriers to knowledge exchange. It is based on the premise that signalling high productivity and encouraging collaboration implies a cost (financial and non-financial) for researchers and entrepreneurs. Intensification of cooperation will occur if these costs are reduced and researchers are encouraged to signal more. Furthermore, signalling theory sheds new light on the importance of graduates and their "promotional role" in fostering collaboration. Finally, it offers an alternative to proximity and relational approaches (Azman *et al.*, 2019; Bruneel *et al.*, 2010) to explain the significance of cooperation within professional organizations. According to signalling theory, professional organizations serve as a platform to communicate competencies and preselection mechanisms for scholars interested in collaboration.

These findings have implications aimed at increasing collaboration between academia and industry. Both companies and universities need cooperation to succeed and sustain their competitive advantages (Azman *et al.*, 2019). According to this study, scholars should actively communicate that they can solve particular problems of companies. Moreover, signalling opportunities by organizing platforms to share mutual expectations should be created to intensify the knowledge exchange. Such platforms (online or on-site) can also help reduce the signalling cost, which is a crucial barrier in university-industry relationships. It is also recommended to increase attention to developing the scientists' competencies to communicate with the world outside academia. Quoting the conclusion of Hardy *et al.* (2008, p. 33), "researchers should learn how to be bilingual, i.e., they should learn the language of the industry."

When interpreting the results of this research, one has to bear in mind that this study has several limitations. First, it was carried out in Poland, and future studies should include different national settings. Second, it is essential to note that this study only explored the problem of signalling from the perspectives of scientists. Future research should take into account the way entrepreneurs interpret signals. This sampling bias limits the generalizability of findings because it threatens external validity. It should be considered that the sample was also restricted to the tourism academia. Results from such a sample can only be generalized to populations that share characteristics with the sample. An additional limitation of this study is related to the fact that the data were collected at a single point in time, and therefore we need to treat causal inferences with caution. Therefore, in-depth longitudinal studies are necessary, further exploring the matching process's complexity and signals interpretation. Future research could also analyze what makes the matching process works better. It could result in the recommendation to reduce information asymmetry and thus improve exchange in the university-industry knowledge market.

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Conflict of Interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Questing benchmarks for the current ratio:
An analysis of the Warsaw Stock Exchange firms

Piotr Wójtowicz

A B S T R A C T
Objective: The first objective of the article is to assess the benchmarks for the current ratio commonly provided in the accounting and financial analysis literature. The minor objective is to arrange a research methodology permitting the accomplishment of the first objective.
Research Design & Methods: The paper, apart from the literature review and its critique, presents the results of descriptive, quantitative research. The research sample consists of 5 148 firm-years. Data were retrieved from Worldscope Database via Refinitiv Eikon for domestic, going concern, non-financial companies listed on the Warsaw Stock Exchange from 2005 to 2021. For comparison, the U.S.-related data was retrieved from Internet resources as ready-made ratios. Methods used in the analysis include descriptive statistics, parametric and nonparametric ANOVA, confidence intervals, and linear and parabolic trend analysis.
Findings: The tests show that identifying a benchmark for the current ratio is problematic. Benchmarks vary between countries and industries; universal standards do not exist. The benchmark for the current ratio commonly suggested, 1.2-2.0, may be used only as a rough evaluation of the desired value. The findings indicate that the acceptable range for CR is much broader, from 1.1 (the first quartile) to 2.3 (the third quartile) for the total sample. Moreover, the SIC division's quartiles vary from 0.7 to 1.2 (the first) and from 1.6 to 3.6 (the third). Statistical tests indicate that benchmarks do not vary annually. However, the distribution's median and the third quartile change slowly over time toward higher values. The Covid-19 pandemic resulted in a substantial increase. On the contrary, the first quartile of about 1 remains relatively stable over time, indicating the reasonable lower bound for CR. The mean of the distribution is useless as a benchmark because of its sensitivity to outliers. Various techniques must be used to assess the benchmark.
Implications & Recommendations: Since there are material between-industry and between-country differences in benchmarks, analysts and investors should be very sensitive to the standards suggested in the literature and interpret them cautiously. Variability over time exists but is low unless a shock in the economy appears.
Contribution & Value Added: The main contribution of the paper is empirical verification of the benchmarks for the current ratio provided in the literature. Tests show that suggested benchmarks are not universal. Seeking a benchmark, an analyst must compare the firm's financial standing with other firms from the same country, industry, and period.
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INTRODUCTION

The financial health of a firm can be assessed by comparison with other entities in the industry, change in the value of some vital markers, or assessment of the risk of bankruptcy. The industry-based comparison requires a high-quality baseline. The following article is the quest for the benchmark for the current ratio. This ratio measures a company's ability to pay short-term obligations due within one

year. It is commonly believed that a current ratio that aligns with the industry average or is slightly higher is acceptable. On the other hand, a current ratio that is lower than the industry average may indicate a higher risk of bankruptcy. If a firm has a very high current ratio compared with its peer group, management may not be using its assets efficiently (Investopedia, 2022). I follow well-regarded Investopedia.com; however, the point of view presented here is widespread. Unfortunately, these generally accepted rules are not necessarily valid. In other words, I am eager to challenge them.

How can the financial statement reader be confident that the industry average is the proper benchmark? The average of the distribution is susceptible to outliers; hence the benchmark may be biased towards the right tail of the distribution. What is the exact meaning of the *slightly higher* interval? Are differences between industries' current ratios significant? What about industries with high current assets turnover resulting in a low value of those assets and an extended maturity of liabilities resulting in an increased amount? In other words, is the current ratio below one always the signal of the risk of distress? In the next section, these issues are finally formulated in the form of hypotheses.

I only concentrate on the issues around benchmarks for the current ratio. I exclude the quick ratio and cash ratio from the analysis. The main reason for this is the lack of an unequivocal answer to the question about the research methodology permitting identification of the benchmark. Hence, there are two intertwined objectives of the article. First, I investigate the benchmark for the current ratio, the commonly used liquidity ratio. Second, struggling with that, I try to arrange a research methodology permitting answers to the vital question.

The novelty of my article consists of the empirical verification of the benchmark for the current ratio provided in the literature. I empirically test whether the use of a country-based benchmark is the correct assessment procedure. Finally, I use various statistical methods to estimate benchmarks and identify patterns they follow. The use of a variety of techniques results in increased robustness of findings.

The remainder of the article is organized as follows. The next section contains a literature review and develops the hypotheses. It is followed by research methodology, including the sample selection process and the description of the data. Then, results and discussion are presented. The last section concludes the study and explains the limitations and avenues for further research.

LITERATURE REVIEW

To run a financial analysis and compare the findings to other firms in order to assess a company's performance, an analyst requires a benchmark, i.e., a standard, or a baseline, that is used for comparative purposes. Revenues, expenses, profits, and liquidity are the most frequent areas to be considered. However, the answer to the simple question "*How is a business doing?*" is not easy because of the need for well-established benchmarks. Such analysis will (1) compare the performance of the company over time and (2) help understand how the company's financial performance stacks up against the industry. The former comparison is easy because the data is usually at the analyst's disposal. The latter requires high-quality benchmarks. Moreover, managers use liquidity ratios to ensure business goals (Kochalski & Łuczak-Trąpczyńska, 2017).

Surprisingly, internationally recognized accounting and finance literature concerning liquidity benchmarking is very scant. To my knowledge, there are no prior international research papers investigating the benchmarks for the current ratio. Usually, the articles concentrate on the role or importance of liquidity in asset pricing (Keene & Peterson, 2007), liquidity monitoring (Ruozi & Ferrari, 2013), the liquidity-profitability tradeoff (Eljelly, 2004), and, recently, the uniqueness of liquidity management during the covid-19 pandemic (Almeida, 2021). Liquidity is perceived a one of the factors ensuring sustainable growth (Pera, 2017). On the other hand, I received almost 1 million links to answer the question about the proper value for a Current Ratio asked on google.com. Even a glimpse of this content, not mentioning deep investigation, leads to the conclusion that the appropriate answer to this question arguably does not exist. However, some researchers attempted to do that.

Analysts typically concentrate on five main groups of financial ratios: profitability, liquidity, solvency, efficiency/activity, and capital market-related ratios. Benchmarks for some of them are respectively easy to identify. For example, in the case of profitability ratios (Return on Equity and Re-

turn on Assets), the general logic behind the interpretation is simple: the higher, the better. In the same vein, generally, the lower the Assets Turnover Ratio in days, the better efficiency with which a company uses its assets to produce sales. The real challenge is the benchmark for ratios, which are supposed to vary between the lower and upper limits. Typical examples are the Current Ratio and Debt-to-Equity Ratio. The strengths and weaknesses of the Current Ratio are discussed in detail. However, the Current Ratio considered low does not necessarily indicate liquidity problems; a high ratio does not have to be financially sound (Fleming, 1986).

In this article, I concentrate on benchmarks for liquidity ratios because they focus on a company's ability to meet short-term obligations. Liquidity ratios determine a debtor's ability to pay off current debt obligations without raising external capital. They determine a company's ability to cover short-term obligations and cash flows, while solvency ratios concern a longer-term ability to pay ongoing debts. Failure in the former area is hazardous because it may quickly result in the company's default or bankruptcy. In other words, a company may continue even for several years as a going concern making losses. It is hardly imaginable, however, that creditors would accept a lack of cash flows for so long period. Therefore, they will undoubtedly claim bankruptcy proceedings.

Liquidity ratios include the Current Ratio (CR), Quick Ratio, and Cash Ratio. They are commonly known; however, all of them are defined in the next section of the article.

One of the most distinguished Polish researchers and practitioners argues that the Current Ratio should range from 1.2 to 2.0 according to standards. They also suggest that the Quick Ratio should be close to or above 1 (Sierpińska & Jachna, 2004). But unfortunately, the authors do not provide any reference to literature or the mentioned standards. Therefore, the reader must trust them or start their investigation. Moreover, the international use of the suggested benchmark is doubtful. For instance, the ideal current ratio in India is suggested to be 2 (Chandra, 2008; Pandey, 2010).

In Poland, a helpful hand is given by Maślanka (2019), providing reference to a bunch of articles and monographs on liquidity ratios, specifically on the suggested proper values of CR and QR, respectively. These findings, expanded by other references, are summarized in Table 1.

Table 1. Benchmarks for CR and QR suggested by various authors

Ratio / Author(s)	Suggested value of CR	Suggested value of QR
Czekaj & Dresler (2002) Wędzki (2002)	1.2-2.0	1.0-1.2
Bednarski (1997) Kowalak (2022) Pomykalska & Pomykalski (2007) Sierpińska & Jachna (2006) Waśniewski & Skoczylas (2002)	1.2-2.0	About 1.0
Gołaś & Witczyk (2010)	1.2-2.4	About 1.0
Olzacka & Pałczyńska-Gościniak (2004)	1.3-2.0	–
Bednarski (2007) Michalski (2005) Nowak (2008)	1.5-2.0	Above 1.0
Nowak (2002)	1.5-2.0	1.2-1.5
Rogowski & Lipski (2014)	1.5-2.0	1.0-1.2
Ostaszewski (2013)	1.6-1.9	0.9-1.0
Bień (2018)	About 2.0	–
Świderska (2003)	At least 2.0	–
Kreczmańska-Gigol (2020)	1.0-2.0	0.7-1.5
Gołaszewski *et al.* (2001)	1.0-1.5	Above 1.0

Source: own study based on Maślanka (2019) and the references quoted in the table.

Furthermore, some authors provide benchmarks for the Cash Ratio equal to 0.25 (Kowalak, 2022) or 0.2 (Dębski, 2005; Świderska, 2003).

Table 1 shows that generally accepted benchmarks for CR do not exist. The standard for CR ranges from 1.0 to 2.4, with the most frequent range from 1.2 to 2.0. Similarly, benchmarks for QR range from 0.7 to 1.5, with the mode above 1.0. Furthermore, the authors often quote one another, so the reader cannot be sure whether the benchmarks are based on sample data or represent the authors' beliefs and professional experience. Next, an interesting conclusion can be drawn from the comparison of Table 1 with the U.S.-based benchmark. In the latter case, a CR of 1.5 to 3 is often considered good (BusinessInsider, 2022) but with no generally accepted upper and lower limits. Likely there is no one perfect benchmark (Sierpińska & Jachna, 2004). Therefore, the "good" value for one firm is not necessarily good for the other, and industry benchmarks must be considered. Last but not least, when evaluating a company's liquidity, the Current Ratio alone doesn't determine whether it's a good investment or not. It is, therefore, essential to consider other financial ratios in the analysis.

There are many factors shaping the economic behavior of both individuals and organizations. The impact of formal (e.g., tax law, interest rates, financial market supervision) and informal (e.g., religion, culture) institutions may establish entirely different economic conditions and risk factors. Furthermore, the impact of culture is conditional on the level of regulation and monitoring in a country (Kanagaretnam *et al.*, 2011). For that reason, the existence of international benchmarks, even for a specific industry, is hardly possible. To shed light on the expected between-country differences, I compare the distribution of the CR in Poland versus the U.S.

The distribution of yearly values of financial ratios by industry is analyzed since 2002 by the Financial Analysis Committee of the Scientific Council of the Accountants Association in Poland (Komisja ds. Analizy Finansowej Rady Naukowej Stowarzyszenia Księgowych w Polsce). The Committee publishes its findings through publicly available reports (Rachunkowość, 2022a). The sample selection process is straightforward. The company included must (Dudycz & Skoczylas, 2021):

− prepare financial statements in line with Polish Accounting Act,
− provide financial statements for two consecutive years for comparison,
− have a fiscal year equal to 12 months,
− have a nonnegative value of owner's equity.

For that reason, the sample comprises a considerable number of companies. For example, the 2019 sample consisted of 157 022 companies (Dudycz & Skoczylas, 2021), ranging from small sole proprietorships to blue chips listed on the Warsaw Stock Exchange. Furthermore, the number of companies included increases year by year. In 2012, the sample consisted of only 37 624 companies (Dudycz & Skoczylas, 2014). The usefulness of these reports for practitioners and researchers in Poland is certainly high. However, the diversity of the sample may result in some limitations of the results. The size of the business and its legal form result in different institutional conditions, so finally, firms are exposed to various risks influencing the ratios. The breakdown by industry follows the Classification of Business Activities in Poland (Polska Klasyfikacja Działalności – PKD); hence an international comparison of these ratios is hardly possible. However, intra-industry trend analysis and between-industry comparison remain feasible.

An investigation of the contents of huge tables published by the Committee shows that the average and median values of the ratios vary greatly. Table 2 shows selected examples. Means are much higher than medians; hence, the distributions are asymmetric, with substantial outliers. Furthermore, there are material differences between industries' ratios.

A comparison of the results presented in Table 1 and Table 2 suggests that the authors quoted in Table 1 built their suggestions on medians. Table 2 shows respectively high medians, suggesting that the most frequent range for CR 1.2-2.0 may not work in practice. The same issue refers to QR; however, medians for the *10 – Production of food* and *47 – Retail (cars excluded)* are very close to the benchmark. Presumably, the most surprising are medians for CHR, which are much higher than the suggested value equal to or just above 0.2.

I conjecture that in the Polish context, the benchmarks for liquidity ratios are different than the ones suggested in the literature. Furthermore, benchmarks may vary over time because they reflect changing risk of business activity and vary between industries. Finally, the average value of liquidity ratios is different from the median.

Table 2. Arithmetic means and medians for liquidity ratios in selected industries in 2019

Ratio / Industry	Current Ratio CR	Quick Ratio QR	Cash Ratio CHR
01 – Agriculture production livestock and animal specialties			
Arithmetic Mean	5.50	3.57	1.55
Median	3.30	2.01	0.59
03 – Fishing			
Arithmetic Mean	5.18	4.25	2.41
Median	3.80	2.36	1.19
10 – Production of food			
Arithmetic Mean	2.19	1.63	0.60
Median	1.64	1.16	0.25
49 – Land transportation and pipelines			
Arithmetic Mean	1.92	1.77	0.51
Median	1.54	1.44	0.27
47 – Retail (cars excluded)			
Arithmetic Mean	2.28	1.30	0.66
Median	1.76	0.99	0.37

Source: (Dudycz & Skoczylas, 2021).

The hypotheses address these issues as follows:

H1: Mean value of CR differs from the median;

H2: Mean value of CR differs from benchmarks most commonly provided in the literature;

H3: Median of CR differs from benchmarks most commonly provided in the literature;

H4: Mean values and medians of CR vary yearly;

H5: Mean values and medians of CR differ between industries;

H6: Mean values and medians of CR differ between Poland and the U.S.

RESEARCH METHODOLOGY

The size of the business and its legal form result in different institutional conditions. For instance, a sole proprietorship does not have a separate legal existence from its owner, so it does not pay income tax. Instead, the owner of the business pays personal income tax. However, unlike a sole proprietorship, a corporation is legally separate and distinct from the owner(s). A separate legal entity means a corporation is responsible for its acts and debts, including corporate income tax.

Moreover, following Polish Accounting Act, an external audit of sole proprietorships' financial statements is usually not mandatory, while financial statements of joint-stock companies must be audited. The list of differences may be expanded. Hence, firms act in different institutional conditions and are exposed to various risks influencing the ratios. Wanting to limit the variety of factors influencing liquidity ratios, in my analysis, I concentrate on companies listed on the Warsaw Stock Exchange (WSE).

I concentrate on the period 2005-2021. The reason for including 2005 as a first sample period is twofold. First, International Financial Reporting Standards have been mandatory in consolidated financial reporting since the beginning of this year. Hence, despite rare substantial changes in the IFRS[1], all financial statements in the sample are prepared according to the same methodological basis (71% of the sample) or at least under indirect influence of this basis (29% of the sample). Second, data availability in the database was highly limited in the pre-2005 period. The reason for including the year 2021 as the last in the sample period is also twofold. An extended period is necessary to test hypothesis H4. Moreover, 2021 is the first fiscal year after the Covid-19 pandemic season. I conjecture that the pandemic, a unique risk factor, heavily influenced liquidity ratios.

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[1] For example, IFRS 16 *Leases* superseded IAS 17 *Leases*. The influence of IFRS 16 on assets, liabilities, leverage on assets and leverage on equity is confirmed in the literature (Górowski *et al.*, 2022).

I retrieve data from Worldscope Database via Refinitiv Eikon, including SIC codes. The sample consists of only domestic, going concern, non-financial firms. In line with many other studies, I exclude firms rendering financial services because they face different regulations and are monitored additionally by specialized national supervisory authorities. I exclude firms with incomplete data and firms with negative owner's equity. Standard Industrial Classification (SIC) codes are four-digit numerical codes assigned to business establishments to identify the primary business of the establishment (SIC, 2022)[2]. The so-called primary SIC code indicates a company's primary line of business. What determines a company's SIC code is the code definition that generates the highest revenue for that company at a specific location in the past year. The use of SIC codes is determined by data availability and the need for international comparison of the results.

Regarding SIC classification, firms assigned to Division H: *Finance, Insurance, and Real Estate* are excluded from the analysis. Division J: *Public Administration* was not represented at all.

My final sample consists of 5 148 firm-year observations. The population of firms listed on the WSE from 2005 to 2021 varies yearly due to newly listed firms, delisted firms, and rare bankruptcies. Therefore, the sample's number of observations per year varies. Table 3 shows the number of observations per year and the division of SIC classification.

Definition of the Current Ratio (CR) and related fields in the Worldscope Database are the following:

$$CR = \frac{TCA}{TCL} \qquad (1)$$

where:

TCA - Total Current Assets, Worldscope field 2201;

TCL **-** Total Current Liabilities, Worldscope field 3101.

I do not use other liquidity ratios in my analysis; however, I include their definitions for clarity:

1. Quick Ratio QR

$$QR = \frac{TCA - TI - PE}{TCL} \qquad (2)$$

where:

TI - Total Inventories, Worldscope field 2101;

PE **-** Prepaid Expenses, Worldscope field 2140.

2. Cash Ratio CHR

$$CHR = \frac{CH + STI}{TCL} \qquad (3)$$

where:

$CH + STI$ **-** cash and short-term investments, Worldscope field 2001.

Methods used in the analysis include descriptive statistics, parametric and nonparametric ANOVA, confidence intervals, and linear and parabolic trend analysis.

RESULTS AND DISCUSSION

Table 4 shows descriptive statistics of the Current Ratio (CR) per year for the total sample. Figure 1 shows the histogram for CR for the sample. The distribution of CR is highly asymmetric[3], with an arithmetic mean of 2.8 and a median of 1.5. In the sample, the skewness of 17.0 says that the distribution is heavily skewed to the right. Figure 1 shows that the distribution has a very long right tail. Kurtosis is a measure of the heaviness of the tails of a distribution[4]. In the sample, Kurtosis of 408.1 signals extremely tailed distribution. Even the lowest annual values of skewness (4.1) and kurtosis

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[2] The SIC system arrays the economy into 10 divisions, that are divided into 83 2-digit major industry groups, that are further subdivided into 416 3-digit industry groups, and finally disaggregated into 1,005 4-digit industries. For instance, Division D: 20-39 Manufacturing; Major Industry Group 25 Furniture and Fixtures; Industry Group 252 Office Furniture; Industry 2521 Wood Office Furniture.

[3] A symmetric distribution has a skewness of 0.

[4] A normal distribution has a kurtosis of 3.

(25.0) in 2006 indicate high asymmetry. The maximum value in the sample is 247.0. Mode, not tabulated in Table 4, is located in bar 1.2-1.4.
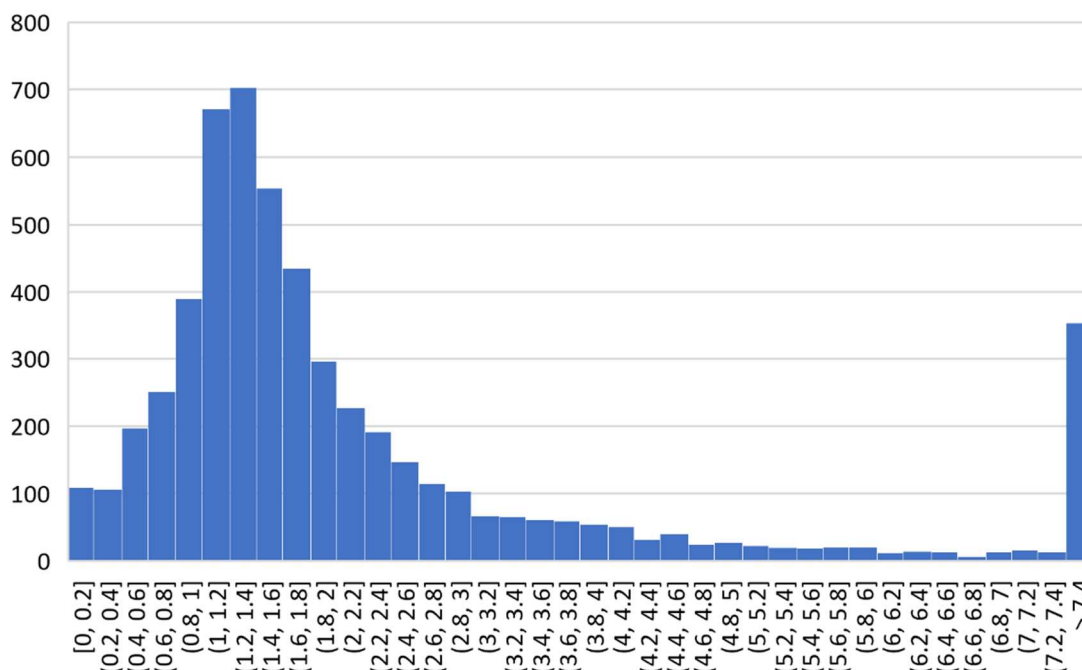

Figure 1. Histogram for Current Ratio (CR) for the total sample
Source: own elaboration based on current ratio calculation.

There are many firm-years with a value of CR above 7.4. The threshold of 7.4 (Figure 1) is chosen because the 95th percentile equals 7.444444. Hence, for about 5% of the sample observations, the CR is above 7.4. There are many possible reasons for such a situation; however, disentangling the puzzle is out of my interest in this article. On the other hand, a considerable number of managers of listed companies run their operations with CR far from the benchmarks suggested in the literature. An analyst may expect that managers are rational decision-makers. Hence, the apparently excessive current ratio may result from sound decisions.

The interpretation of the interquartile range (Table 4) is especially interesting. The range for the sample says that 50% of firm-years have a value of CR ranging from 1.1 to 2.3, with a median of 1.5. Knowing that firms included in the sample are going concern units, we may interpret this range as empirical verification of the benchmarks presented in Table 1. Both the first (25%) and the third (75%) quartiles are reasonably close to the theoretical value of the benchmark. Moreover, the first quartile seems to be respectively stable over time, but the third quartile increases slowly in 2005-2019 and grows substantially in 2020 and 2021. Therefore, I fit trend lines to the first and the second quartile values to verify my temporary conclusions. Figure 2 shows the yearly median, first and third quartiles of CR, and regression results.

The intercept for the first quartile linear model (Figure 2) says that its estimated value in 2004 was 1.19 and is decreasing yearly by 0.009 on average. On the other hand, the intercept for the third quartile linear model says its estimated value in 2004 was 2.06 and is increasing annually respectively quickly, by 0.029 on average. In other words, on average, the quartile range is becoming wider and wider year by year. Not surprisingly, the value of 1 is fairly stable over time because it is a reasonable minimum ratio of current assets to current liabilities. Both R^2 coefficients are high, so linear models fit the data. I conjecture that the increase in CR is due to the increased risk of business activity, especially its abrupt jump in the Covid-19 pandemic season. The median is stable over time, with an average sample value of 1.5 (Table 4), because it is, per se, robust to new observations. The linear trend model does not fit yearly median data; R^2 for this model equals 0.03 (not tabulated). In the case of CR, the

median heaves gently up and down around 1.5 value. There is an increase in the 2020-2021 (Covid-19 pandemic) and 2007-2010 (sup-prime crisis).

Table 3. Number of observations per year and the division of SIC classification

Year / Division	A: Agriculture, Forestry, and Fishing	B: Mining	C: Construction	D: Manufacturing	E: Transportation, Communications, Electric, Gas, and Sanitary Services	F: Wholesale Trade	G: Retail Trade	H: Finance, Insurance, and Real Estate	I: Services	J: Public Administration	Total
2005	2	2	18	64	10	16	8	–	25	–	145
2006	1	1	18	73	12	15	10	–	28	–	158
2007	3	3	22	83	14	17	10	–	34	–	186
2008	3	4	25	91	20	19	11	–	42	–	215
2009	3	5	27	98	23	21	10	–	50	–	237
2010	3	5	30	105	26	23	12	–	56	–	260
2011	3	5	34	111	30	24	12	–	66	–	285
2012	4	5	38	116	29	23	12	–	73	–	300
2013	4	5	38	116	29	25	17	–	72	–	306
2014	5	5	43	123	31	24	16	–	83	–	330
2015	5	5	45	130	33	24	19	–	96	–	357
2016	5	5	46	136	33	26	20	–	104	–	375
2017	3	5	44	130	33	26	21	–	110	–	372
2018	4	5	50	139	35	26	21	–	123	–	403
2019	4	5	48	146	33	25	24	–	133	–	418
2020	4	5	50	140	33	27	25	–	130	–	414
2021	2	4	47	128	28	22	24	–	132	–	387
Total sample	58	74	623	1929	452	383	272	–	1357	–	5148

Source: own calculations in Stata.

The yearly mean CR is much higher than the median due to the sensitivity of the former to outliers. The mean calculated after the rejection of observations greater than the 95th percentile equals 1.8 and is much lower than the mean for the entire sample, equal to 2.8. On the other hand, it is significantly higher than the median of 1.5. To sum up, hypothesis H1 should not be rejected. When looking for a benchmark, an analyst must decide whether to use the mean or median. Furthermore, the benchmarks suggested in the literature (Table 1) likely involve medians.

To strengthen the tests of hypotheses H2 and H3, I calculate confidence intervals for mean and median with a confidence level of 0.95; 0.99; and 0.999. The last confidence level is beyond the traditional testing approach. Still, I want to construct a confidence interval with a 0.999 confidence level to be confident that 99.9 out of 100 times, virtually *always*, the estimate falls between the upper and lower bounds. Table 5 shows the results.

Table 5 shows that the higher the confidence level, the wider the confidence level. However, rejection of the 95th percentile results in very narrow intervals close to mean and median, respectively. In other words, these intervals may be useless for an analyst because they do not convey any new information. On the other hand, confidence intervals for the total sample lead to the following conclusions. First, intervals for mean and median differ significantly, so hypothesis H1 definitely should not be rejected. Second, literature benchmarks indeed rely on medians. Third, the most common benchmark for CR, 1.2-2.0, is very close to the interval for the confidence level of 99.9% ranging from 1.07 to 1.93. In summary, hypothesis H2 should not be rejected. On the contrary, H3 may be rejected for the total sample. Essentially, the sample median sticks to the benchmark.

Table 4. Descriptive statistics of Current Ratio (CR) per year

Year / Parameter	No. of Obs	Mean	Std. Dev.	Min	25%	Median	75%	Max	Skewness	Kurtosis
2005	145	1.9	1.9	0.2	1.2	1.4	2.0	20.0	6.4	55.2
2006	158	2.0	1.9	0.4	1.2	1.5	2.2	16.0	4.1	25.0
2007	186	2.2	2.2	0.3	1.2	1.6	2.2	21.3	4.8	34.2
2008	215	2.3	3.1	0.2	1.1	1.5	2.3	29.2	5.7	41.6
2009	237	2.5	6.2	0.1	1.1	1.6	2.2	91.7	12.8	183.3
2010	260	2.6	6.4	0.0	1.2	1.6	2.3	74.3	9.9	107.4
2011	285	2.5	5.9	0.0	1.1	1.5	2.3	94.4	13.7	211.3
2012	300	2.4	3.7	0.1	1.1	1.5	2.2	42.9	6.7	61.4
2013	306	2.5	5.7	0.0	1.1	1.5	2.2	92.5	13.1	202.5
2014	330	3.4	16.4	0.0	1.1	1.5	2.4	247.0	13.0	178.2
2015	357	2.8	4.6	0.0	1.1	1.5	2.2	40.0	4.6	27.1
2016	375	2.8	5.7	0.0	1.1	1.5	2.4	82.8	8.7	107.5
2017	372	2.8	5.5	0.0	1.1	1.5	2.4	66.8	7.4	71.0
2018	403	2.7	5.7	0.1	1.0	1.4	2.4	80.2	10.1	125.3
2019	418	2.7	5.6	0.0	1.0	1.4	2.4	66.2	7.7	74.4
2020	414	3.4	9.9	0.0	1.0	1.5	2.6	143.0	10.1	125.2
2021	387	3.6	11.7	0.0	1.1	1.6	2.7	193.6	12.5	189.2
Total sample	5148	2.8	7.5	0.0	1.1	1.5	2.3	247.0	17.0	408.1

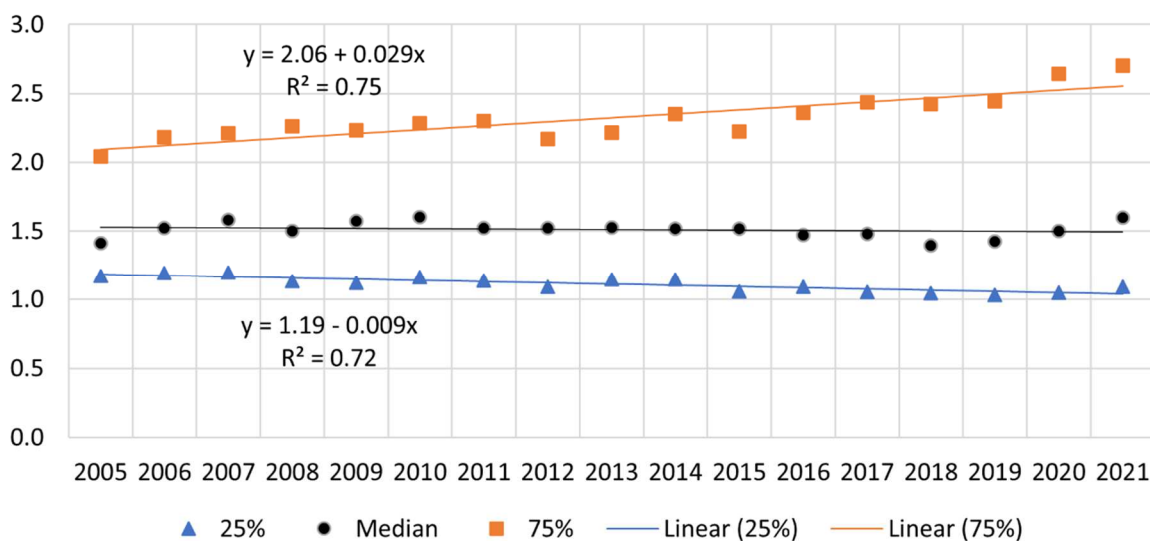Source: own calculations in Stata.

Figure 2. Median, first (25%), and third (75%) quartile of CR per year
Source: own elaboration based on current ratio calculation.

Table 5. Confidence intervals (CI) for mean and median for CR

Parameter / Conf. interval	Total sample – 5148 observations						95th percentile rejected – 4890 observations					
	Mean			Median			Mean			Median		
CI level of	*0.95*	*0.99*	*0.999*	*0.95*	*0.99*	*0.999*	*0.95*	*0.99*	*0.999*	*0.95*	*0.99*	*0.999*
CI Left bound	2.56	2.49	2.42	1.25	1.17	1.07	1.78	1.76	1.75	1.41	1.40	1.38
CI Right bound	2.97	3.03	3.11	1.76	1.84	1.93	1.84	1.86	1.87	1.50	1.51	1.53

Source: own calculations in Stata.

I build the above conclusions on a fair calculation; however, I must raise one more issue. The median confidence interval for 2020-2021, the confidence level of 0.999, ranges from 0.0 to 3.1. In that period, both boundaries differ substantially from the benchmarks. The difference is likely the result of

the confidence interval calculation formula, i.e., the increase of standard error due to the decrease in the number of observations. However, it may also stem from the substantial change in the CR in the pandemic period. In my opinion, the last conclusion weakens the power of literature benchmarks.

I run ANOVA to verify whether there were any statistically significant differences between the yearly means and medians of the CR ratio. The p-value is 0.5127, and the null hypothesis (all means are equal) should not be rejected. The exclusion of outliers greater than the 95th percentile does not change the result, p=0.6077. Unfortunately, CR is not normally distributed, and the p-value in Bartlett's test for equal variances is p<0.0001, so the ANOVA assumptions are broken. To verify my results, I run the nonparametric Kruskal-Wallis ANOVA. The hypotheses for the test are:

H0: Population medians are equal.

H1: Population medians are not equal.

In that case, the p-value equals 0.7825. Statistic tests show that CR medians do not vary yearly, so hypothesis H4 should be rejected.

The above results of the ANOVA tests must be interpreted with caution because there is a considerable difference between statistical significance and substantive significance. Table 4 and Figure 2 show that CR varies over time. Moreover, the third quartile slowly increases yearly.

Table 6 shows descriptive statistics of the CR per division of SIC. Means and medians differ significantly. For each division, the distribution is skewed to the right (Skewness 1.8 or more), and tails are heavy (kurtosis 6.2 or more). Means are much higher than medians due to their sensitivity to outliers; hence hypothesis H1 is supported.

Two divisions, D (Manufacturing) and I (Services), contribute almost 64% of the observations. On the contrary, divisions A (Agriculture, Forestry, and Fishing) and B (Mining) are narrowly represented. The over-representation of divisions D and I biases the descriptive statistics for the sample towards parameters for these divisions. In other words, an investigation by division is necessary.

Table 6. Descriptive statistics of Current Ratio (CR) per SIC division

Division / Parameter	A	B	C	D	E	F	G	I
No. of Obs	58	74	623	1 929	452	383	272	1 357
Mean	2.3	1.4	2.3	2.4	2.0	1.9	1.6	4.3
Std. Dev.	1.6	0.9	3.3	6.7	4.5	1.7	2.6	11.4
Min	0.6	0.3	0.0	0.0	0.0	0.3	0.0	0.0
25%	1.1	1.0	1.2	1.2	1.0	1.1	0.7	1.1
Median	2.0	1.2	1.6	1.5	1.3	1.3	1.1	1.7
75%	2.6	1.7	2.2	2.2	2.0	1.9	1.6	3.6
Max	8.2	5.7	40.0	193.6	82.8	12.4	27.0	247.0
Skewness	1.8	2.3	7.1	18.4	14.4	3.5	7.2	12.0
Kurtosis	6.2	10.4	63.8	424.3	240.4	17.7	64.5	204.8

Source: own calculations in Stata.

I rerun ANOVA to verify whether there were any statistically significant differences between the means of the CR by SIC division. For p<0.0001, the null hypothesis is rejected. To verify my results, I rerun the nonparametric Kruskal-Wallis ANOVA; the p=0.0001. Statistic tests show that CR means and medians vary between divisions (industries), so hypothesis H5 should not be rejected. This result leads to a crucial conclusion: there is no benchmark for the economy. A useful benchmark may be built for industry only, whereas an economy-based benchmark may be useless.

The last conclusion is the premise for an in-depth analysis of the CR for a division. Table 7 shows the structure of division D (industry groups) and descriptive statistics for CR. Means and medians per major industry group differ, but there are two exceptions, industry groups 26 and 32 - the positive and close to zero skewness signals symmetry of the distribution. Kurtosis less than three is a signal of light right tail. Hence, CR varies substantially between groups, p=0.0001 for ANOVA and Kruskal-Wallis ANOVA. The results support hypotheses H1 and H5.

The first and third quartiles differ between 2-digit major industry groups (Table 7). Moreover, they are close to the typical benchmark for CR, 1.2-2.0, only for four major groups[5] (24; 34; 35; 37), out of nineteen. On the other hand, the highest interquartile range has boundaries of 1.5 to 4.3 for group 38[6]. In general, sample-based means and medians differ from the literature benchmark, and hypotheses H2 and H3 should not be rejected.

Tests for hypothesis H4 (yearly variability) require enough annual data, while the number of observations per group decreases for detailed analyses. Accordingly, I verify H4 only for the major groups 20; 28; and 34; contributing over 200 observations each in the sample period. For these groups in parametric and nonparametric ANOVA, the p-value is 0.5 or higher. Undoubtedly, H4 should not be rejected. However, even statistically not significant differences may be material for an analyst.

Table 7. Descriptive statistics of Current Ratio (CR) per SIC 2-digit major industry group in division D: Manufacturing

Industry group / Parameter	No. of Obs	Mean	Std. Dev.	Min	25%	Median	75%	Max	Skewness	Kurtosis
20	201	1.6	1.2	0.3	1.0	1.3	1.7	7.7	2.7	11.8
22	65	2.4	1.2	0.7	1.5	2.1	2.6	6.2	1.5	4.8
23	60	3.1	4.0	0.5	1.2	1.5	2.2	17.8	2.4	7.5
24	62	1.7	0.5	1.1	1.3	1.5	1.9	3.5	1.6	5.3
25	39	1.4	1.0	0.0	0.7	1.4	1.8	3.4	0.5	2.6
26	64	1.2	0.4	0.4	0.9	1.2	1.4	2.1	0.0	2.8
27	75	6.0	24.9	0.2	1.0	1.5	2.4	193.6	6.6	47.1
28	278	3.5	10.7	0.1	1.0	1.4	2.2	94.4	7.4	59.0
29	62	2.0	0.9	0.8	1.4	1.7	2.3	5.0	1.8	5.4
30	58	1.5	0.5	0.9	1.2	1.4	1.6	3.7	2.5	11.5
31	23	2.7	1.2	1.1	1.8	2.3	3.3	5.7	1.0	2.9
32	32	1.5	0.6	0.4	1.1	1.4	1.8	2.8	0.2	2.7
33	100	1.5	0.5	0.3	1.2	1.5	1.8	3.4	0.4	3.9
34	254	2.0	1.5	0.2	1.2	1.6	2.1	12.3	2.4	3.6
35	200	1.8	1.4	0.0	1.1	1.5	2.1	13.0	3.7	27.3
36	146	2.5	2.5	0.8	1.3	1.6	3.1	28.1	7.2	71.4
37	73	1.7	0.7	0.7	1.3	1.5	2.0	4.2	1.5	5.1
38	127	4.0	5.0	0.8	1.5	2.3	4.3	42.9	4.6	31.9
39	24	3.2	3.4	0.0	1.5	2.0	3.2	13.1	1.8	5.3

Source: own calculations in Stata.

Table 8. Mean and Median of Current Ratio, Poland v.s. the U.S.

Year / Parameter	2016	2017	2018	2019	2020	2021
Mean, Poland	2.82	2.81	2.67	2.72	3.45	3.64
Mean, the U.S.	26.89	21.79	66.06	30.14	95.14	54.29
Median, Poland	1.49	1.49	1.41	1.42	1.51	1.59
Median, the U.S.	1.53	1.56	1.58	1.69	1.94	2.03

Source: for Poland, own calculations in Stata; for the U.S., (ReadyRatios, 2022).

To test hypothesis H6, I retrieve ready-made ratios[7] from Internet resources (ReadyRatios, 2022). They provide two measures of position for industry financial ratios for the U.S. listed companies: mean and median. Table 8 shows these measures for Poland and the U.S. I compare the period 2016-2021 because of the limited availability of the U.S. data.

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[5] 24 Lumber And Wood Products, Except Furniture; 34 Fabricated Metal Products, Except Machinery and Transportation Equipment; 35 Industrial and Commercial Machinery and Computer Equipment; 37 Transportation Equipment.

[6] 38 Measuring, Analyzing, and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks.

[7] The current ratio is calculated in line with the following formula: Current Assets / Current Liabilities. The amounts are retrieved form the balance sheet (statement of financial position) prepared in line with IFRS or US GAAP, respectively (ReadyRatios, 2022).

Table 8 leads to some critical conclusions. First, the U.S. means are more than ten times higher than their Polish counterparts. Without a detailed distribution analysis, I cannot tell the reason for such a situation. As a rule of thumb, high mean values are useless for an analyst or investor. Furthermore, the high variability of means makes trend analysis impossible. Second, medians also differ, but the difference is moderate. In the respectively short period 2016-2021, medians increase, and they do substantially during the pandemic season, especially in the U.S.

Figure 3 shows the yearly median for both countries and the quadratic trend functions. The general shape of parabolas is the same, so yearly medians in both countries increase faster than proportionally year by year. The R^2 coefficients are very high, so the quadratic trend fits the data well. Not surprisingly, the observed abrupt jump in CR during the Covid-19 pandemic season remains visible. It is especially high in the U.S.; hence the medians of CR differ between the two analyzed countries.

Covid was a global risk factor, impacting the world economy. However, a particular economy's reaction depends on many variables. Undoubtedly a global factor affecting all economies results in a similar answer pattern but of a different magnitude. These findings corroborate my hypothesis H6, and their practical consequence for an analyst is the following. Even using industry benchmarks, they should be sensitive to the country and period chosen for comparison.
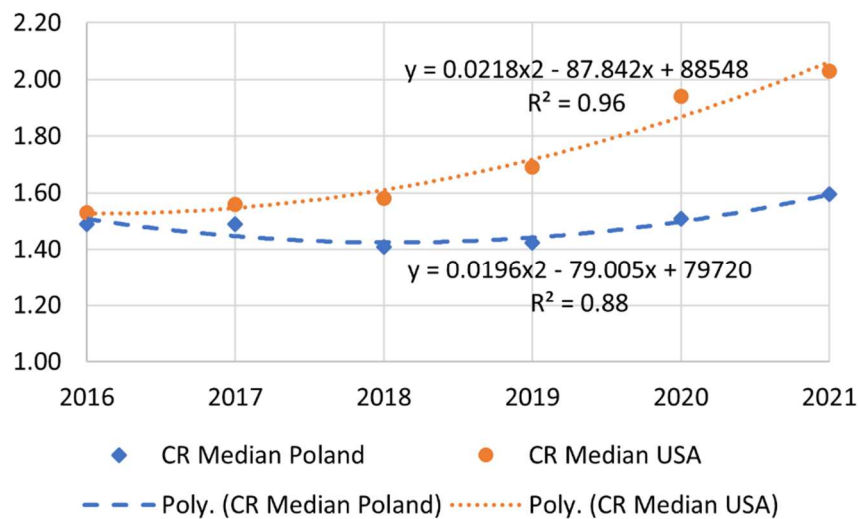

Figure 3. Medians of CR per year, Poland vs. the U.S.
Source: own elaboration based on own CR calculation and (ReadyRatios, 2022).

CONCLUSIONS

The main objective of the article was to test the values of the benchmark for the current ratio, the commonly used liquidity ratio. The minor objective was to arrange a research methodology permitting answers about the benchmark. The tests show that identifying a benchmark for the current ratio is problematic. Concerning this ratio, there is no simple answer to the question – How is a business doing? Benchmarks vary between countries and industries. The benchmark commonly suggested in Poland, 1.2-2.0 (Table 1), may be used only as a very rough evaluation of the desired value. The findings indicate that the acceptable range for CR is much broader, from 1.1 (the first quartile) to 2.3 (the third quartile) for the total sample. Moreover, the SIC division's quartiles vary from 0.7 to 1.2 (the first) and from 1.6 to 3.6 (the third).

Statistical tests indicate that benchmarks do not vary annually; however, a lack of statistically significant difference does not imply a lack of substantive difference. The latter may be material for an analyst, even in the absence of the former.

The total sample median and the third quartile vary slowly over time towards higher values. The Covid-19 pandemic resulted in a substantial increase. On the contrary, the first quartile of about 1

remains relatively stable over time, indicating the reasonable lower bound for CR. In other words, neither the U.S.-based rough benchmark (1.5 to 3) nor its Polish counterpart reflects the current state of the art. Therefore, an analyst must very carefully choose the benchmark for comparison.

The arithmetic mean of the distribution is very sensitive to outliers; hence, it is useless as an estimator of the benchmark. In the case of point estimation, an analyst may rely only on the quartiles, especially the median. Interval estimation seems to be a helpful technique; however, for median only. Outlier bias confidence interval for the mean. Trend analysis permits the identification of the pattern and magnitude of the change in the benchmark. Arguably, linear trend fits empirical data in the long run. However, in the short run, especially after a pandemic, the parabolic trend works better, indicating a substantial increase in the benchmark.

Some limitations of the study provide an opportunity for future research. First, despite international elements, I provide a single-country analysis. Hence, further research should investigate, by industry, the difference between country benchmarks in detail. Second, the benchmarks for the quick ratio and the cash ratio should be analyzed. Third, the question of techniques useful in benchmark identification remains open, despite the usefulness of the methods used.

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