European Management Studies

vol. 21, no. 1

problemy
zarządzania
management
issues

2023

Guidelines for Authors available on the website:
https://pz.wz.uw.edu.pl/resources/html/cms/MYMANUSCRIPTS

Table of contents

Longitudinal Family Business Research – Review of the Literature

Judit Csákné Filep

Budapest LAB Office for Entrepreneurship Development,
Budapest Business School, Hungary
https://orcid.org/0000-0002-5902-5195

László Radácsi

Department of Management, Budapest Business School, Hungary
https://orcid.org/0000-0002-2334-9761

Abstract

Purpose: Cross-sectional research methods are not able to grasp the special characteristics and unique operation modes of family businesses. The aim of the study is to map the type of topics examined and methodologies used in longitudinal empirical studies in family business research. The study examines the topics and methodologies covered in the literature and the advantages and challenges of each methodological approach.

Design/methodology/approach: We conducted a literature review and drew conclusions based on a detailed analysis of 99 articles. The paper presents the distribution of topics, the applied methodology, and evaluates quantitative and qualitative methods.

Findings: Within seven topics identified, most studies were published on family business governance, operation, succession, and the internationalization of family firms. The majority of longitudinal family business research is based on quantitative methodologies, but the proportion of studies using qualitative approaches is also gaining momentum, while the use of mixed-method approaches is negligible.

Limitations: We collected the data from the Web of Science database and our study may reflect the limitations of this database. Two of our researchers conducted the article selection process manually and, despite the greatest care, it is possible that valuable articles were left out of the analysis. Due to the applied selection and analysis methods, the comparability of our results with more comprehensive literature reviews on family businesses is limited. The results relate to longitudinal, empirical research papers only. The time span covered by our research is narrow, there are more comprehensive and up-to-date literature reviews available.

Correspondence address: Budapest LAB Office for Entrepreneurship Development, Budapest Business School, H-1087 Budapest, Berzsenyi u. 6, Hungary; Department of Management, Budapest Business School, H-1055 Budapest, Markó u. 29-31, Hungary; e-mails: csaknefilep.judit@uni-bge.hu; radacsi.laszlo@uni-bge.hu.

Badanie podłużne przedsiębiorstw rodzinnych – przegląd literatury

Streszczenie

Cel: przekrojowe metody badawcze nie pozwalają na uchwycenie szczególnych cech i unikalnych sposobów działania przedsiębiorstw rodzinnych. Celem prezentowanego badania jest identyfikacja rodzaju tematów i metodologii stosowanych w longitudinalnych badaniach empirycznych nad firmami rodzinnymi. W artykule przeanalizowano tematy i metodologie omawiane w literaturze oraz zalety i wyzwania każdego z podejść metodologicznych.

Metodologia: wnioski wyciągnięto na podstawie przeprowadzonego przeglądu literatury obejmującego szczegółową analizę 99 artykułów. W artykule przedstawiono rozkład tematów i stosowaną metodologię oraz oceniono metody ilościowe i jakościowe.

Wyniki: w przypadku siedmiu zidentyfikowanych obszarów tematycznych większość opublikowanych badań dotyczyło zarządzania przedsiębiorstwami rodzinnymi, ich działalności, sukcesji i internacjonalizacji. Gros longitudinalnych badań przedsiębiorstw rodzinnych opiera się na metodologiach ilościowych, lecz powiększa się również odsetek badań wykorzystujących jakościowe sposoby podejścia, natomiast stosowanie metod mieszanych jest znikome.

Ograniczenia: dane pochodzą z bazy danych Web of Science i prezentowane badanie może odzwierciedlać jej ograniczenia. Dwóch badaczy przeprowadziło proces wyboru artykułów ręcznie i mimo największej staranności możliwe jest, że w analizie pominięto wartościowe artykuły. Ze względu na zastosowane metody selekcji i analizy porównywalność wyników z bardziej wszechstronnymi przeglądami literatury na temat przedsiębiorstw rodzinnych jest ograniczona. Wyniki odnoszą się wyłącznie do artykułów przedstawiających longitudinalne badania empiryczne. Zakres czasowy badania jest wąski, istnieją bardziej wszechstronne i aktualne przeglądy literatury.

Oryginalność/wartość: artykuł stanowi wkład w longitudinalne badania przedsiębiorstw rodzinnych.

Słowa kluczowe: przedsiębiorstwo rodzinne, podejście longitudinalne, przegląd literatury.

1. Introduction

Several international studies highlighted the high proportion of family businesses within business organizations and their uniqueness (Hernandez-Perlines et al., 2019; Araya-Castillo et al., 2021), nevertheless there are many obstacles to identifying their specific characteristics.

The uniqueness of family firms – especially in areas such as governance and succession – unfolds over time, which is almost impossible to detect through cross-sectional surveys. Longitudinal research methods are better suited to explore the phenomena through change, but studies covering a longer time span with more data have their difficulties too, such as attrition and cost (Ployhart & Vandenberg, 2010). Evert et al. (2015) point to the prevalence of the longitudinal approach based on empirical research in articles on family businesses published between 1988 and 2015.

In our study, we have attempted to map the methodological achievements of longitudinal family business research published in English and indexed on the Web of Science. In our work, we searched for answers to the following research question: what are the examined topics, and what are the methodologies used in longitudinal empirical studies in family business research?

2. Methodology of the Literature Review

In the course of our work, we followed Snyder's (2019) guidelines. A literature review is a systematic way of collecting and synthesizing previous research. Snyder (2019) differentiates three approaches to literature reviews: (1) systematic, (2) semi-systematic, and (3) integrative. To answer our research question, we considered the semi-systematic approach – which Snyder (2019, p. 225) describes with the following question: "What is it and how should it be used?" – to be the most fitting. We were interested in the extent to which the longitudinal approach is used in family business research, which topics are touched on and what methodological lessons can be learned from it. In our analysis, we solely focused on English language articles which present longitudinal empirical research. Although systematic reviews are more accurate and rigorous, they require a narrow research question. As our research question was quite complex, a semi-structured approach seemed more appropriate. With a semi-systematic approach, we conducted a focused literature review (also known as a targeted literature review). This type of literature review concentrates on a few aspects of the previous research, such as methodology (Frederiksen et al., 2018). As part of the data analysis, we applied qualitative and quantitative methods (Czakon et al., 2022).

To create the initial database, we used the Web of Science database. We carried out the research in June 2019 and updated it in November 2022. Based on the guidelines of Paul and Criado (2020), we covered a 10-year period. Table 1 contains a detailed description of the search criteria and conditions. The chosen time frame overlaps with the expansion phase of family business research of Rovelli et al. (2021). The authors labeled the 1988–2009 period as "emergence" when family business research started to attract scholarly attention and the 2010–2020 period as "expansion" when the field consolidated its relevance and gained legitimacy. Our work focuses on the expansion period with the aim to summarize the experience gained so far in applying the longitudinal approach in family business research. The results may contribute to the further development of the field as Rovelli et al. (2021, p. 12) predict that the third phase of family business research will be the "'differentiation' phase (…) where the field can dive much deeper into the detailed exploration of in-depth topics and methods." To achieve the third phase, they highlight the importance of advancing family business

research through methodologies, and among several other suggestions for further research, they mention the exploration of the use of longitudinal case studies as a method that may allow us to capture the evolution of family firms.

Table 1

Search Criteria and Conditions (Empirical and Longitudinal Articles)

Search Aspects	Search Criteria
Boolean operator	TS=(„famil* firm*" OR „famil* business*" OR „famil* entrepr*" OR „familin*" OR „famil* control*" „famil* led*" OR „famil* own*" OR „business* famil*" OR „firm* famil*" OR „entrepr* famil*" OR „famil* sme*") AND TS=(„longitud*" OR „year*")
Search domain	all fields
Database	Web of Science Core Collection (Social Sciences Citation Index (SSCI) and Emerging Sources Citation Index (ESCI)
Date of query	2019.06.24 and updated 2022.11.22
Period	2009–2021
Language	English
Document type	Article

During the first and the updated search, the selection method of the articles was identical. We narrowed the list of primary hits in three steps. As a first step, one of our researchers excluded clearly irrelevant articles (false hits, not related to the research topic, non-empirical research) based on their titles and keywords. Next, two researchers independently reviewed the remaining articles based on their titles, keywords, and abstracts and eliminated papers using the cross-sectional method. Finally, we compared the two lists and examined the debatable items in context. Using this method, we narrowed the original 596 hits down to 94 articles and supplemented the list with 5 previously written studies after reviewing the reference lists, which resulted in a set of 99 articles. We analyzed the full texts of the selected 99 articles in detail using predefined codes (title, author(s), date of publication, journal, topic, keywords, page number, methodology, data collection method, theoretical approach, method of analysis, sample size in each examined period, strengths, weaknesses, research questions, results). Two researchers conducted data analysis following Braun and Clarke's (2006) guidelines in order to ensure investigator triangulation.

3. Findings

3.1. Distribution by Topic Area

We organized the presentation of our findings in line with the analysis of the themes identified, and the methodologies used. After presenting the topics covered by the sampled articles, we discussed the methodologies used and how they relate to the topics.

Literature review articles on family business research often highlight the most frequent and promising research topics. Based on Rovelli et al. (2021), the keywords used most often are: comprehensive study, succession, corporate governance, socioemotional wealth, family ownership, firm performance, familiness, family dynamics and innovation. As future research directions, they indicate the reconsideration of the definition of family, crisis management in family businesses and the shift from cross-sectional to longitudinal case studies. Evert et al. (2016) mention management of the firm, business performance and growth, characteristics and attributes, interpersonal dynamics, governance, and succession as the main research areas. In addition to the most popular research directions, literature review studies map such promising future research topics as trust and reputation in family businesses (Chaudhary et al., 2021), internationalization (Debellis et al., 2021; Alayo et al., 2021; Arregle et al., 2021), leadership styles and leadership behaviors in family businesses (Fries et al., 2021), and conflicts (Kubicek & Machek, 2020).

As part of our research, we grouped the 99 selected longitudinal family business publications by topic. After familiarizing ourselves with the collected database, we generated initial topic codes. We supplemented the initial topic codes and implemented the classification of the articles according to the final topic codes in the analysis process. Table 2 shows the distribution of selected articles by topic areas and methodology.

Table 2
Distribution of Articles by Topic and Methodology (Empirical and Longitudinal Articles)

Topic / Methodology	Quantitative	Qualitative	Mixed	Total
Family business governance	17	10		**27**
Operation	15	7	1	**23**
Succession	6	9		**15**
Internationalization	9	2	1	**12**
Innovation	8	3		**11**
Finance	6			**6**
Identity	2	3		**5**
Total	**63**	**34**	**2**	**99**

Family business governance, operation, succession and internationalization are the most frequently studied topics applying the longitudinal approach which is in line with the article mapping of the field (Rovelli et al., 2021; Evert et al., 2016). Governance and succession are evergreen issues that have been studied since the beginning of family business research, so it is not surprising that there is a high number of related longitudinal studies. Singh & Delois (2017) examined the effect of family ownership on the company growth strategy, while Odehnalová & Pirožek (2018) examined the importance of the board of directors of family businesses. Among the articles classified under the succession topic, papers which explore transgenerational aspects of family firms are particularly interesting (Clinton et al., 2018; Chirico & Nordqvist, 2010). We used in our research the topic area 'operation' as a kind of catch-all category, in which we included diverse issues related to the operation of the business, such as performance (Terlaak et al., 2018), efficiency (Camisón et al., 2016), and social capital (Matzek et al., 2010). This categorization explains the high number of studies included in this group. Among articles categorized under the topic of internationalization, empirical research conducted by Evert et al. (2018) proves the hindering role of family ownership in the initial period of internationalization. This result gives special importance to articles reviewing the literature on the topic (Debellis et al., 2021; Alayo et al., 2021; Arregle et al., 2021).

Not only were the topics covered in the study diverse, but so were the places where the articles were published. The 99 articles included in the study were published in 60 journals. Out of the selected articles, three or more appeared in the Journal of Family Business Strategy (11 articles), Family Business Review (6 articles) and Journal of Business Research (5 articles), Entrepreneurship Theory and Practice (4 articles), Journal of Business Venturing (3 articles).

3.2. Distribution by Applied Methodology

When analyzing the articles in the sample, we also examined their distribution according to the methodology used, which is illustrated in Table 3. In their work, Evert et al. (2016) report the dominance of quantitative approaches in family business research. In contrast, Rovelli et al.'s (2021) more recent work shows that case study, literature review, qualitative research, and content analysis emerge as the most currently used methods and approaches. In our sample, most longitudinal family business research studies were based on quantitative methodology (64%), but the proportion of studies using qualitative approaches (34%) is also significant in perspective, while only two articles (2%) used mixed methodological approaches. The use of mixed methodologies in family business research is still in its infancy; however, Reilly and Jones (2017), in an in-depth article on the topic, point out that mixed methodologies, which are primarily suited to answering 'why' questions, are well suited to family business research, where the researchers

of a phenomenon are not only interested in 'what' happened, but also in 'why' the family and the business behaved in a particular way. We expect qualitative methodologies to gain more ground also in the longitudinal research of family businesses.

Table 3
Distribution of Articles by Methodology

Methodology	Types of methods	Number of articles	Distribution
quantitative	negative binomial regression, logistic regression, Cox regression model, multilevel mixed-effects maximum likelihood model, OLS regression, pyramid analysis, vulnerability-stress adaptation model, panel corrected standard error model, longitudinal regression analysis, factor analysis, principal component analysis, parametric survival models, the general method of moments (GMM), ordinary least squares regression methods	63	64%
qualitative	case study, longitudinal multiple case study methodology, content analysis, action research, narrative method, comparative method, prosopography	34	34%
mixed	triangulation of logistic regression analysis and case study methods, mixture of literature review, its critical analysis and empirical research (survey method, interviews, and case studies)	2	2%
Total		**99**	**100%**

We can conclude that most of the topics can be studied using both quantitative and qualitative tools by looking at the relationship between the topics covered and the methodology used. The exception is the finance topic, which was only examined using a quantitative approach. Mixed methodologies were used to answer questions on operation and internationalization. There is a predominance of articles based on quantitative methodologies among articles on family business governance, operation, internationalization, and innovation, in line with the methodological distribution of all the papers examined. The exception is the succession and identity topic, where 12 out of the 20 articles sampled apply a qualitative approach (Table 2). The importance of the topic of generational transition within family business research may explain the predominance of qualitative methodologies in the longitudinal study of the succession process in family businesses, as shown by the high number of relevant articles. With the development of this topic,

the need for a deeper and more comprehensive study of the phenomena and trends identified naturally arises, and qualitative methodologies are the best way to support this. Moreover, in the case of studies covering a longer time span, the use of qualitative methods (also because of closer links with the enterprises involved in the analysis) reduces the attrition rate in the sample, while the retrospective approach allows the time span to be extended and the phenomena under study to be assessed in a more complex way (Csákné Filep & Radácsi, 2021).

4. Evaluation of Quantitative and Qualitative Methodological Approaches

When examining the articles presenting the results of longitudinal research on family firms, we found that the analyses of family business topics are primarily quantitative and qualitative, and rarely use mixed methodologies. In family business research, the most currently used approaches are the qualitative ones (Rovelli et al., 2021). In our sample which contains longitudinal empirical studies, quantitative research is in the majority. Although the presence of qualitative research is not negligible either, its use is more common than that of the quantitative approach in studies concerning succession. As in family business research in general, in the case of research using a longitudinal approach, we expect qualitative methodologies to gain ground. The advantages and challenges of using each methodology in longitudinal studies is therefore worth considering.

4.1. Quantitative Studies

Large sample sizes used in quantitative studies increase reliability, provide a wide range of possibilities for analyses, and allow for the use of specific statistical methodologies (Chung, 2014; Chung & Dahms, 2018; Sanchez-Ruiz et al., 2018; Singh & Delios, 2017; Wiklund et al., 2013; Xiang et al., 2013; Xiang & Worthington, 2015).

Large sample surveys also provide the opportunity to compare family and non-family businesses (Camisón et al., 2016; Thomas & Graves, 2005; Graves & Thomas, 2004; Graves & Thomas, 2006; Zheng et al., 2018; Kotlar et al., 2013; Diéguez-Soto et al., 2018; Memili et al., 2015; Singal & Gerde, 2015).

One strength of longitudinal quantitative studies is that they can be used to examine groups of firms, i.e., they can take into account that entrepreneurial families rarely have a single firm but operate a group of firms, which are worth investigating comprehensively (Karaevli & Yurtoglu, 2018). Table 4 presents the sample size by methodology.

Table 4

Sample Size by Methodology

Methodology	Number of articles	Average sample item number	Minimum sample item number	Maximum sample item number
quantitative	63	3 886	21	114 837
qualitative	34	18	1	456
mixed	2	821	361	1 280
with reference to all articles	99	2 507	1	114 837

The articles under review provide interesting methodological examples for compiling databases covering periods of several years, which we can use to perform valuable analyses even without primary data collection, relying solely on public data. Karaevli and Yurtoglu (2018) investigated Turkish family business groups using a manually compiled dataset from public databases. Luan et al. (2018) conducted analyses using datasets from the Taiwan Stock Exchange and the Taiwan Economic Journal. Chadwick and Dawson (2018), in their study on the impact of female family business managers on firm performance, supplemented data from S&P's Compustat database with non-financial information from the research firm Sustainalytics, while they obtained data on firm managers from Compustat's ExecComp database. Zheng et al. (2018) compared information retrieved from the Thomson Reuters Eikon database with stock market indices. Wiklund et.al. (2013) created a new database by combining 5 longitudinal databases managed by Statistics Sweden.

Reliable surveys with a solid methodological basis, such as the Australian Bureau of Statistics Business Longitudinal Database, are the basis for a wide range of research and publications (Graves & Thomas, 2004; Graves & Thomas, 2006; Xiang et al., 2013; Barbera & Hasso, 2013; Xiang & Worthington, 2015).

The advantages of quantitative studies include the ability to examine groups of firms and to compare family and non-family businesses. A large sample size, stable data coverage, and a long time span increase the reliability and value of research and provide a wide range of analytical possibilities; nonetheless, valuable analyses can be carried out even without primary data collection, relying only on public data.

In quantitative analyses, databases, even manually compiled ones from historically available data, allow for extremely wide time spans, although the range and quality of the available data are limitations.

Among the weaknesses of longitudinal quantitative studies, we can mention that an insufficient sample size and short time spans reduce the

validity and reliability of research results. However, small sample sizes in qualitative research do not necessarily mean inadequacy. Collecting dense, contextual data about a company in family business research can yield deep and novel findings. The use of templates (Gioa et al., 2013; Köhler et al., 2019) or strategies such as prolonged engagement, observation, thick description, triangulation, development of a coding system and inter-rater reliability, researcher bias, negative case analysis, peer review debriefing, member checking and external audits can guarantee the validity and reliability of qualitative research (Morse, 2015). Attrition is also a problem, as exemplified by the work of Sanchez-Ruiz et al. (2018), where the sample of family businesses was 2,495 in the first survey and only 583 in the survey five years later.

Researchers often use specific sampling criteria (e.g., firms available in certain databases, listed companies, etc.) to ensure data availability and reduce the risk of attrition, and therefore the limitation of the usefulness of the results may be that the results cannot be generalized.

Longitudinal quantitative studies tend to focus on large firms (listed companies) because of the sampling and data collection methodology and often use secondary data sources that include only the largest or otherwise top-performing firms. It is common to conduct analyses without undertaking original research work, making them poorly suited for understanding micro and small firms (Luan et al., 2018; Evert et al., 2018; Chung, 2014; Elosge et al. 2018; Cho et al., 2018; Singh & Delios, 2017; Singh & Gaur, 2013).

A further criticism of longitudinal quantitative studies is that the data collection methodology is firmly embedded in the cultural specificities of the country under study, and the sample selection and data collection are country specific. Most of the surveys cannot be replicated in other country contexts, so while these methods provide valuable results for individual countries, they cannot be used for reliable international comparisons. The database manually compiled by Karaevli and Yurtoglu (2018) for their Turkish Family Business Groups survey cannot be reconstructed in other national contexts, and it would be similarly difficult to replicate Chung's (2014) analysis of the data from the China Credit Information Service database in other countries. The problem typically arises in studies that are not based on original empirical data collection (but rather on the supplementing and secondary analysis of existing databases) (Chung, 2014; Chung & Dahms, 2018; Sanchez-Ruiz et al., 2018; Singh & Delios, 2017; Wiklund et al. 2013; Xiang et al., 2013; Xiang & Worthington, 2015).

4.2. Qualitative Studies

Practical problems in the lives of family businesses can be examined in a complex and in-depth way using a longitudinal approach and qualitative methods, which provide an opportunity to understand certain phenomena and problems more thoroughly and explore the interrelationships within

them. Researchers of entrepreneurship and family business typically argue that in-depth qualitative studies provide an opportunity to understand the contribution of family businesses to social and economic value creation (Anderson et al., 2005; Litz et al., 2012).

Researchers have used qualitative methodologies to make international comparisons, though these methodologies are very focused and can capture cultural specificities. Chirico and Nordqvist (2010) investigated how elements of the family business culture such as paternalism and entrepreneurial orientation influence dynamic capabilities in Swiss and Italian family businesses; they also identified variations arising from the cultural differences in family businesses of the two countries.

The transgenerational view of family business innovation activities sheds light on unfolding innovation patterns such as conserving, persisting and legacy-building through a longer time period (Diaz-Morina et al., 2020).

Perhaps the greatest advantage of longitudinal qualitative studies is that they allow researchers to retrospectively reconstruct the history of a business from its foundation and the most important milestones in the life of the firm and the family. Graves and Thomas (2008) investigated the factors influencing internationalization from the time of foundation to that of the survey of 8 family firms. The interviews conducted as part of the research explored past events and supplemented their findings with company documents, archival press materials and other documents starting from the time of foundation. Chirico and Nordqvist (2010), Sieger et al. (2011) and Marchisio et al. (2010) used a similar methodology, giving a nice arc to their research.

The advantages of longitudinal qualitative studies include the ability to examine practical problems in the operation of family businesses, the possibility to gain a deeper understanding of certain phenomena and problems, to shed light on their interrelationships and to cover a long time span in retrospect.

In qualitative research, triangulation plays a key role in uncovering deeper content and possible contradictions, both in the choice of data sources and in the selection of research participants. Michael-Tsabari et al. (2014) studied the entrepreneurial behavior of an international family business across generations. In their analysis, they concluded that entrepreneurial behavior is determined to a greater extent by reactions to family challenges than by business hardships. In their research, they placed great emphasis on the triangulation of data sources: when collecting their data, they relied on the company website, press articles, mass media coverage, external and internal company documents and interviews. The triangulation of data allowed a broader perspective on the development of the family business portfolio and the role of the family in its development. Dieleman's (2019) work also placed a strong emphasis on data triangulation.

Half of the studies based on qualitative methodology included in the analysis (17 articles) focused on a single-family business. A small sample size may weaken credibility even in the case of qualitative research. To overcome this problem, researchers typically use triangulation, which can refer to data sources but can also be personal triangulation. To improve the reliability of research focusing on a single enterprise, researchers often make use of the possibility of taking a retrospective look at the firm. They do not necessarily go back to the foundation, as did Jones and Le (2017), but may cover a shorter period of time retrospectively (Rautiainen et al., 2012; Wielsma & Brunninge, 2019; Schwab et al., 2017).

A challenge qualitative surveys face in general, is the difficulty of generalization, and this limitation is also evident in family business surveys. In the case of retrospective research, which relies heavily on archival data and documents, even the credibility and adequacy of the data sources may be questioned.

With reference to longitudinal qualitative research, short time spans, small sample sizes as mentioned above (if not handled properly) and the exclusion of key respondents from the interviews can be further factors that reduce its value. An example of this is the research conducted by Wielsma and Brunninge (2019) on individual and family entrepreneurial identity, where it was not possible to interview the brother of the successor, although his opinion would have been very important for a comprehensive study of the topic.

In qualitative studies, researchers face a number of difficulties: in extreme cases, the validity of studies based on a single case may be questioned, it may be difficult to draw generalized conclusions from the results, and if the research is retrospective and relies heavily on archival data and documents, the validity of the data sources may be questioned. A brief time span, a small sample size, and the possible omission of key stakeholders from those interviewed can significantly reduce the value of the research results.

Table 5 summarizes the opportunities and challenges of quantitative and qualitative approaches.

Table 5

Opportunities and Challenges of Quantitative and Qualitative Approaches

Quantitative approach	
Opportunities	Challenges
• suitable for studying groups of firms, it can consider the fact that entrepreneurial families rarely have a single firm but operate a group of firms, • a large sample size allows the use of specific statistical methodologies, • allows comparisons between family and non-family businesses, • interesting methodological examples of supplementing questionnaire surveys with historical, archival data, • reliable surveys based on sound methodological foundations can form the basis for a wide range of research, • large sample sizes, stable data coverage and long periods increase the reliability and value of research and provide a wide range of analytical possibilities, • valuable analyses can be carried out even without primary data collection, using public data.	• the data collection methodology can rely heavily on the cultural specificities of the country under study and there can be difficulties in sample selection and data collection, which is why most surveys cannot be replicated in the context of other countries, • country-specific results, lack of international comparison, • specificities of sample selection often mean that results cannot be generalized, • inadequate sample size and short period reduce the validity and reliability of research results, • attrition, • due to the sample selection and data collection methodology, it tends to focus on large enterprises (listed companies) and is less suitable for micro and small enterprises, • frequent use of secondary data sources, lack of original research.

Qualitative approach	
Opportunities	Challenges
• examines practical problems of family businesses in real life, • provides an opportunity for a better understanding of certain phenomena and problems and their interrelationships, • provides an opportunity for international comparison, • retrospectively, can cover a long period, • templates and strategies to improve validity and reliability offer many possibilities.	• validity and reliability of single case studies are questionable, • generalization of results may be difficult, • if the research is retrospective and relies heavily on archival data and documents, the credibility of the data sources may be questionable, • short period, small sample size (if templates or strategies to improve validity and reliability are not applied), and omission of key stakeholders during interviews may significantly reduce the value of research findings.

5. Conclusions and Limitations

Cross-sectional family business research studies yield interesting outcomes but rarely seem to capture the deep layers of family firms' operation. They only rely on information collected at the moment of data collection, while the situation, due to the changes in family dynamics, may significantly change over time. Future family business research methods should handle the problem raised by Hoy and Pu (2012), according to whom current methods and models have failed to address the variations caused by national context, ethnic, religious, and other external influences. Our study aimed to map the topics examined and the methodologies used in longitudinal studies in family business research. We examined the topics and methodologies covered in the literature and the advantages and challenges of each methodological approach. We concluded that among the seven topics we identified, most studies were published on family business governance, operation, succession, and the internationalization of family firms. Most longitudinal family business research was based on quantitative methodologies, but the proportion of studies using qualitative approaches is also gaining momentum, while the use of mixed-method approaches is negligible.

Looking at the methodological approach of longitudinal studies by topic areas, the quantitative methodology seems to be typical. The exception is the topic of succession, where 9 out of the 15 papers sampled are qualitative. While qualitative methods help to understand a process, the strength of quantitative methods lies in verification. The dominance of qualitative methods in longitudinal family business succession research may suggest that we still need to understand this process and examine its components in more depth. The importance of the topic of generational transition within family business research may also explain the predominance of qualitative methodologies in the longitudinal study of the succession process in family businesses, as indicated by the high number of relevant studies. With the expansion of this topic area, the need for a deeper, more comprehensive study of the phenomena and trends identified naturally arises, and qualitative methodologies are particularly useful in this respect. Van Burg et al. (2020) encourage qualitative approaches in entrepreneurship research. They recommend using different methods, including less conventional ones.

The peculiarity of qualitative research is a smaller sample size compared to quantitative surveys, which carries the risk of attrition (Ployhart & Vandenberg, 2010). Careful sample selection and the involvement of stable companies, the plan to maintain family ownership and leadership in the future, and commitment to scientific endeavors may help to avoid this difficulty in longitudinal research.

Case study-based research is an increasingly accepted and popular method in entrepreneurship research and is also gaining momentum in

family business studies (De Massis & Kammerlander, 2020; Rovelli et al., 2021). In the methodology proposed by De Massis and Kotlar (2014), researchers are encouraged to build case study databases on the examined family businesses, which include interviews with the family members and key non-family employees, company documents collected during the fieldwork, media appearances concerning the business and the owner's family, and financial reports. Examining the data systematically collected over the years with the case study methodology creates an opportunity for in-depth analysis of the development trajectory of family businesses.

We consider that the qualitative longitudinal case study approach is a promising future method in family business research. We hope that our study will contribute to the perspective longitudinal research stream of family businesses.

Our study bears some limitations. We collected our data from the Web of Science database and the limitations of this database may be reflected in our study. Two of our researchers conducted the article selection process manually and, despite the greatest care, it is possible that valuable articles were left out of the analysis. The article selection and analysis process limited the comparability of our results with more comprehensive literature reviews on family businesses. The results relate only to longitudinal, empirical research papers. The period covered by our research is narrow, there are more comprehensive and up-to-date literature reviews available (e.g., Rovelli et al., 2021).

Even with its limitations, our research shows that the longitudinal study of family businesses is an internationally accepted research practice, covering a wide range of topics and using both quantitative and qualitative methodologies.

We hope that despite its limitations, our analysis will provide useful information and inspiration for scholars planning to conduct longitudinal family business research.

Funding

References

Alayo, M., Iturralde, T., Maseda, A., & Aparicio, G. (2021). Mapping family firm internationalization research: Bibliometric and literature review. *Review of Managerial Science*, *15*(6), 1517–1560. https://doi.org/10.1007/s11846-020-00404-1

Anderson, A. R., Jack, S. L., & Drakopoulou Dodd, S. (2005). The role of family members in entrepreneurial networks: Beyond the boundaries of the family firm. *Family Business Review*, *18*(2), 135–154. http://dx.doi.org/10.1111/j.1741-6248.2005.00037.x

Araya-Castillo, L., Hernandez-Perlines, F., Moraga, H., & Ariza-Montes, A. (2021). Scientometric analysis of research on socioemotional wealth. *Sustainability*, *13*(7), 3742. https://doi.org/10.3390/su13073742

Arregle, J.-L., Chirico, F., Kano, L., Kundu, S. K., Majocchi, A., & Schulze, W. S. (2021). Family firm internationalization: Past research and an agenda for the future. *Journal of International Business Studies*, *52*(6), 1159–1198. https://doi.org/10.1057/s41267-021-00425-2

Barbera, F., & Hasso, T. (2013). Do we need to use an accountant? The sales growth and survival benefits to family SMEs. *Family Business Review*, *26*(3), 271–292. http://dx.doi.org/10.1177/0894486513487198

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Camisón, C., Forés, B., & Puig-Denia, A. (2016). Return on capital in Spanish tourism businesses: A comparative analysis of family vs non-family businesses. *European Journal of Management and Business Economics*, *25*(3), 91–110. http://dx.doi.org/10.1016/j.redeen.2016.04.002

Chadwick, I. C., & Dawson, A. (2018). Women leaders and firm performance in family businesses: An examination of financial and non-financial outcomes. *Journal of Family Business Strategy*, *9*(4), 238–249. http://dx.doi.org/10.1016/j.jfbs.2018.10.002

Chaudhary, S., Dhir, A., Ferraris, A., & Bertoldi, B. (2021). Trust and reputation in family businesses: A systematic literature review of past achievements and future promises. *Journal of Business Research*, *137*, 143–161. https://doi.org/10.1016/j.jbusres.2021.07.052

Chirico, F., & Nordqvist, M. (2010). Dynamic capabilities and transgenerational value creation in family firms: The role of organizational culture. *International Small Business Journal: Researching Entrepreneurship*, *28*(5), 487–504. http://dx.doi.org/10.1177/0266242610370402

Cho, J., Miller, D., & Lee, J. (2018). Too much of a good thing: Family involvement and the survival of listed Korean firms. *Journal of Family Business Strategy*, *9*(4), 223–237. http://dx.doi.org/10.1016/j.jfbs.2018.10.001

Chung, H.-M. (2014). The role of family management and ownership on semi-globalization pattern of globalization: The case of family business groups. *International Business Review*, *23*(1), 260–271. http://dx.doi.org/10.1016/j.ibusrev.2013.04.005

Chung, H.-M., & Dahms, S. (2018). Ownership strategy and foreign affiliate performance in multinational family business groups: A double-edged sword. *Journal of International Management*, *24*(4), 303–316. http://dx.doi.org/10.1016/j.intman.2018.03.002

Clinton, E., McAdam, M., & Gamble, J. R. (2018). Transgenerational entrepreneurial family firms: An examination of the business model construct. *Journal of Business Research*, *90*, 269–285. https://doi.org/10.1016/j.jbusres.2018.04.032

Czakon, W., Klimas, P., Tiberius, V., Ferreira, J., Veiga, P. M., & Kraus, S. (2022). Entrepreneurial failure: Structuring a widely overlooked field of research. *Entrepreneurship Research Journal*. https://doi.org/10.1515/erj-2021-0328

De Massis, A., & Kammerlander, N. (Eds.). (2020). *Handbook of qualitative research methods for family business*. Edward Elgar Publishing.

De Massis, A., & Kotlar, J. (2014). The case study method in family business research: Guidelines for qualitative scholarship. *Journal of Family Business Strategy*, *5*(1), 15–29. https://doi.org/10.1016/j.jfbs.2014.01.007

Debellis, F., Rondi, E., Plakoyiannaki, E., & De Massis, A. (2021). Riding the waves of family firm internationalization: A systematic literature review, integrative framework, and research agenda. *Journal of World Business*, *56*(1). https://doi.org/10.1016/j.jwb.2020.101144

Diaz-Moriana, V., Clinton, E., Kammerlander, N., Lumpkin, G. T., & Craig, J. B. (2020). Innovation motives in family firms: a transgenerational view. *Entrepreneurship Theory and Practice*, *44*(2), 256–287. https://doi.org/10.1177/1042258718803051

Diéguez-Soto, J., Garrido-Moreno, A., & Manzaneque, M. (2018). Unravelling the link between process innovation inputs and outputs: The moderating role of family management. *Journal of Family Business Strategy*, *9*(2), 114–127. http://dx.doi.org/10.1016/j.jfbs.2017.11.007

Dieleman, M. (2019). Reaping what you sow: The family firm innovation trajectory. *Journal of Family Business Strategy*, *10*(4), 100248. http://dx.doi.org/10.1016/j.jfbs.2018.03.003

Elosge, C., Oesterle, M.-J., Stein, C. M., & Hattula, S. (2018). CEO succession and firms' internationalization processes: Insights from German companies. *International Business Review*, 27(2), 367–379. http://dx.doi.org/10.1016/j.ibusrev.2017.09.004

Evert, R. E., Martin, J. A., McLeod, M. S., & Payne, G. T. (2015). Empirics in family business research. *Family Business Review*, *29*(1), 17–43. http://dx.doi.org/10.1177/0894486515593869

Evert, R. E., Sears, J. B., Martin, J. A., & Payne, G. T. (2018). Family ownership and family involvement as antecedents of strategic action: A longitudinal study of initial international entry. *Journal of Business Research*, *84*, 301–311. http://dx.doi.org/10.1016/j.jbusres.2017.07.019

Frederiksen, L., Phelps, S. F., & Kimmons, R. (2018). *Introduction to literature reviews. Rapid academic writing*. https://edtechbooks.org/rapidwriting/lit_rev_intro

Fries, A., Kammerlander, N., & Leitterstorf, M. (2021). Leadership styles and leadership behaviors in family firms: A systematic literature review. *Journal of Family Business Strategy*, *12*(1). https://doi.org/10.1016/j.jfbs.2020.100374

Gioia, D., Corley, K., & Hamilton, A. (2013). Seeking qualitative rigor in inductive research: A note on the Gioia methodology. *Organizational Research Methods*, *16*, 15–31. https://doi.org/10.1177/1094428112452151

Graves, C., & Thomas, J. (2004). Internationalisation of the family business: a longitudinal perspective. *International Journal of Globalisation and Small Business*, *1*(1), 7. http://dx.doi.org/10.1504/ijgsb.2004.005615

Graves, C., & Thomas, J. (2006). Internationalization of Australian family businesses: A managerial capabilities perspective. *Family Business Review*, *19*(3), 207–224. http://dx.doi.org/10.1111/j.1741-6248.2006.00066.x

Graves, C., & Thomas, J. (2008). Determinants of the internationalization pathways of family firms: An examination of family influence. *Family Business Review*, *21*(2), 151–167. http://dx.doi.org/10.1111/j.1741-6248.2008.00119.x

Hernandez-Perlines, F., Moreno-García, J., & Yanez-Araque, B. (2019). The influence of socio-emotional wealth in the entrepreneurial orientation of family businesses. *International Entrepreneurship and Management Journal*, *15*(2), 523–544. https://doi.org/10.1007/s11365-019-00561-0

Hoy, F., & Pu, H. (2012). Reconsidering models for investigating family firms: Variants from China. *Entrepreneurship Research Journal*, *2*(4). http://dx.doi.org/10.1515/2157-5665.1088

Ingram, T., & Bratnicka-Myśliwiec, K. (2019). Organizational resilience of family businesses. *Problemy Zarządzania*, *2*(82), 186–204. https://doi.org/10.7172/1644-9584.82.10

Jones, O., & Li, H. (2017). Effectual entrepreneuring: sensemaking in a family-based start-up. *Entrepreneurship & Regional Development*, *29*(5–6), 467–499. http://dx.doi.org/10.1080/08985626.2017.1297854

Karaevli, A., & Yurtoglu, B. B. (2018). Founding family effects on business group growth: Longitudinal evidence from Turkey (1925–2012). *Long Range Planning*, *51*(6), 831–864. http://dx.doi.org/10.1016/j.lrp.2017.08.003

Kotlar, J., De Massis, A., Frattini, F., Bianchi, M., & Fang, H. (2013). Technology acquisition in family and nonfamily firms: A longitudinal analysis of Spanish manufacturing firms. *Journal of Product Innovation Management*, *30*(6), 1073–1088. http://dx.doi.org/10.1111/jpim.12046

Köhler, T., Smith, A., & Bhakoo, V. (2019). Feature topic for ORM: "Templates in qualitative research." *Organizational Research Methods*, *22*, 3–5. https://doi.org/10.1177/1094428118805

Kubíček, A., & Machek, O. (2020). Intrafamily conflicts in family businesses: A systematic review of the literature and agenda for future research. *Family Business Review*, *33*(2), 194–227. https://doi.org/10.1177/0894486519899573

Litz, R. A., Pearson, A. W., & Litchfield, S. (2011). Charting the future of family business research. *Family Business Review*, *25*(1), 16–32. http://dx.doi.org/10.1177/0894486511418489

Luan, C.-J., Chen, Y.-Y., Huang, H.-Y., & Wang, K.-S. (2018). CEO succession decision in family businesses – A corporate governance perspective. *Asia Pacific Management Review*, *23*(2), 130–136. http://dx.doi.org/10.1016/j.apmrv.2017.03.003

Marchisio, G., Mazzola, P., Sciascia, S., Miles, M., & Astrachan, J. (2010). Corporate venturing in family business: The effects on the family and its members. *Entrepreneurship & Regional Development*, *22*(3–4), 349–377. http://dx.doi.org/10.1080/08985621003726168

Matzek, A. E., Gudmunson, C. G., & Danes, S. M. (2010). Spousal capital as a resource for couples starting a business. *Family Relations*, *59*(1), 60–73.

Memili, E., Fang, H. C., & Welsh, D. H. B. (2015). Value creation and value appropriation in innovation process in publicly-traded family firms. *Management Decision*, *53*(9), 1921–1952. http://dx.doi.org/10.1108/md-06-2014-0391

Michael-Tsabari, N., Labaki, R., & Zachary, R. K. (2014). Toward the cluster model. *Family Business Review*, *27*(2), 161–185. http://dx.doi.org/10.1177/0894486514525803

Morse J. M. (2015). Critical analysis of strategies for determining rigor in qualitative inquiry. *Qualitative Health Research*, *25*(9), 1212–1222. https://doi.org/10.1177/1049732315588501

Odehnalová, P., & Pirožek, P. (2018). Corporate board composition in family businesses: Evidence from the Czech Republic. *Management: Journal of Contemporary Management Issues*, *23*(2), 155–174. https://doi.org/10.30924/mjcmi/2018.23.2.155

Paul, J., & Criado, A. R. (2020). The art of writing literature review: What do we know and what do we need to know? *International Business Review*, *29*(4), 101717. https://doi.org/10.1016/j.ibusrev.2020.101717

Ployhart, R. E., & Vandenberg, R. J. (2010). Longitudinal research: The theory, design, and analysis of change. *Journal of Management*, *36*(1), 94–120. http://dx.doi.org/10.1177/0149206309352110

Qiu, H., & Freel, M. (2020). Managing family-related conflicts in family businesses: A review and research agenda. *Family Business Review*, *33*(1), 90–113. https://doi.org/10.1177/0894486519893223

Rautiainen, M., Pihkala, T., & Ikävalko, M. (2012). Family business system models – A case study and some implications of open systems perspective. *Journal of Small Business & Entrepreneurship*, *25*(2), 155–168. http://dx.doi.org/10.1080/08276331.2012.10593566

Reilly, T. M., & Jones, R. (2017). Mixed methodology in family business research: Past accomplishments and perspectives for the future. *Journal of Family Business Strategy*, *8*(3), 185–195. http://dx.doi.org/10.1016/j.jfbs.2017.08.003

Rovelli, P., Ferasso, M., De Massis, A., & Kraus, S. (2021). Thirty years of research in family business journals: Status quo and future directions. *Journal of Family Business Strategy*, 100422. https://doi.org/10.1016/j.jfbs.2021.100422

Sanchez-Ruiz, P., Maldonado-Bautista, I., & Rutherford, M. (2018). Business stressors, family-business identity, and divorce in family business: A vulnerability-stress-adaptation (VSA) model. *Journal of Family Business Strategy*, *9*(3), 167–179. https://doi.org/10.1016/j.jfbs.2018.03.005

Schwab, L., Gold, S., Kunz, N., & Reiner, G. (2017). Sustainable business growth: exploring operations decision-making. *Journal of Global Responsibility*, *8*(1), 83–95. http://dx.doi.org/10.1108/jgr-11-2016-0031

Sieger, P., Zellweger, T., Nason, R. S., & Clinton, E. (2011). Portfolio entrepreneurship in family firms: A resource-based perspective. *Strategic Entrepreneurship Journal*, *5*(4), 327–351. http://dx.doi.org/10.1002/sej.120

Singal, M., & Gerde, V. W. (2015). Is diversity management related to financial performance in family firms? *Family Business Review*, *28*(3), 243–259. http://dx.doi.org/10.1177/0894486514566012

Singh, D. A., & Gaur, A. S. (2013). Governance structure, innovation and internationalization: Evidence from India. *Journal of International Management*, *19*(3), 300–309. http://dx.doi.org/10.1016/j.intman.2013.03.006

Singh, D., & Delios, A. (2017). Corporate governance, board networks and growth in domestic and international markets: Evidence from India. *Journal of World Business*, *52*(5), 615–627. http://dx.doi.org/10.1016/j.jwb.2017.02.002

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, *104*, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

Terlaak, A., Kim, S., & Roh, T. (2018). Not good, not bad: The effect of family control on environmental performance disclosure by business group firms. *Journal of Business Ethics*, *153*(4), 977–996. https://doi.org/10.1007/s10551-018-3911-5

Thomas, J., & Graves, C. (2005). Internationalization of the family firm: The contribution of an entrepreneurial orientation. *Journal of Business and Entrepreneurship*, *17*(2), 91–113.

Van Burg, E., Cornelissen, J., Stam, W., & Jack, S. (2020). Advancing qualitative entrepreneurship research: Leveraging methodological plurality for achieving scholarly impact. *Entrepreneurship Theory and Practice*, *46*(1), 3–20. http://dx.doi.org/10.1177/1042258720943051

Wielsma, A. J., & Brunninge, O. (2019). "Who am I? Who are we?" Understanding the impact of family business identity on the development of individual and family identity in business families. *Journal of Family Business Strategy*, *10*(1), 38–48. http://dx.doi.org/10.1016/j.jfbs.2019.01.006

Wiklund, J., Nordqvist, M., Hellerstedt, K., & Bird, M. (2013). Internal versus external ownership transition in family firms: An embeddedness perspective. *Entrepreneurship Theory and Practice*, *37*(6), 1319–1340. http://dx.doi.org/10.1111/etap.12068

Xiang, D., & Worthington, A. (2015). Finance-seeking behaviour and outcomes for small- and medium-sized enterprises. *International Journal of Managerial Finance*, *11*(4), 513–530. http://dx.doi.org/10.1108/ijmf-01-2013-0005

Xiang, D., Worthington, A. C., & Higgs, H. (2013). Family ownership, altruism and agency costs in australian small and medium-sized enterprises. *SSRN Electronic Journal*. http://dx.doi.org/10.2139/ssrn.2216442

Zheng, V., Wan, P., & Gao, H. (2018). Dynamism in adversity: a comparative study of trends in the performance of listed family- and non-family-controlled companies in Hong Kong, 1997–2014. *East Asia*, *35*(4), 359–378. http://dx.doi.org/10.1007/s12140-018-9299-0

Revisiting Balassa-Samuelson Hypothesis for Asia – A Critical Appraisal of Literature

Maryam Ishaq

Department of Economics, The University of Lahore, Pakistan
https://orcid.org/0000-0001-6944-664X

Félix Puime-Guillén

Department of Business, University of A Coruña, A Coruña, Spain
https://orcid.org/0000-0001-7341-9134

Raquel Fernández-González

ECOBAS, ERENEA, Department of Applied Economics, University of Vigo, Vigo, Spain
https://orcid.org/0000-0001-5197-5519

Joanna Duda

AGH University of Krakow, Faculty of Management, Krakow, Poland
https://orcid.org/0000-0002-4349-6179

Abstract

Purpose: The present study is aimed at presenting a critical appraisal of the empirical literature on the Balassa-Samuelson hypothesis for emerging and developing Asian countries.

Design/methodology/approach: A critical appraisal of the relevant studies is carried out across various important dimensions of the empirical estimation of the Balassa-Samuelson hypothesis including the scheme of sectoral division followed, definitions and proxy variables used for constructing real exchange rate and price series, choice of output and employment series and their subsequent transformation, empirical methodology followed and (theoretically) different variants of the hypothesis chosen for empirical estimation.

Findings: Only a handful of studies have investigated the Balassa-Samuelson hypothesis for Asia. Nevertheless, these studies are characterized by a variety of irregularities in dealing with different important features of the theory, which may be of critical importance for yielding consistent empirical estimates.

Correspondence address: Department of Economics, The University of Lahore, H8F5＋W2R, Anarkali Bazaar Lahore, Punjab 54000, Pakistan; Department of Business, University of A Coruña, Rúa da Maestranza 9, 15001 A Coruña, Spain; ECOBAS, ERENEA, Department of Applied Economics, University of Vigo, Lagoas Marcosende s/n, C.P. 36310 Vigo (Pontevedra), Spain; Faculty of Management, AGH University of Krakow, Gramatyka 10, 30-067 Krakow, Poland; e-mail: maryam.ishaq@econ.uol.edu.pk.

In multi-country studies for Asia, serious inconsistencies are observed whilst handling these critical aspects of the hypothesis. Such irregularities may hold serious implications for model estimates since the empirical evidence from Asia is very mixed, and in many cases, not even robust.

Practical implications: The inconsistencies highlighted in this review paper hold strong implications for future research in this area. The selection of price indicators for the construction of real exchange rate series, choice of econometric methodology and the theoretical framework followed are aspects of the empirical verification of the Balassa-Samuelson hypothesis that need to be handled with great caution since they turn out to be most sensitive in relation to yielding intuitively correct and robust model estimates.

Originality: To our knowledge, so far, no study on Asia has presented such an extensive appraisal of literature on the productivity-real exchange rate nexus. The present study is therefore novel in the sense that it critically evaluates studies on Asia against all those features of the Balssa-Samuelson theory which may stand responsible for yielding mixed and even contrasting empirical estimates for Asia.

Keywords: open economies macroeconomics, Balassa-Samuelson hypothesis, real exchange rate, purchasing power parity, emerging and developing Asian economies.

JEL: F11, F14, F41, F43

Weryfikacja hipotezy Balassy-Samuelsona dla Azji – krytyczna ocena literatury

Streszczenie

Cel: celem tego artykułu jest przedstawienie krytycznego przeglądu literatury zawierającego wyniki badań empirycznych na temat hipotezy Balassy-Samuelsona dla wschodzących i rozwijających się krajów azjatyckich.

Metoda: przeprowadzono krytyczną ocenę wyników badań w kluczowych wymiarach empirycznej weryfikacji hipotezy Balassy-Samuelsona, w tym: schematu podziału sektorowego, definicji i zmiennych pośredniczących wykorzystanych do skonstruowania szeregów realnego kursu walutowego i cen, wyboru danych dotyczących produkcji i zatrudnienia oraz ich późniejszą transformację, przyjętej metody badań empirycznych oraz teoretycznych.

Wnioski: w literaturze przedmiotu można zidentyfikować nieliczne badania dotyczące weryfikacji hipotezy Balassy-Samuelsona obejmujące kraje Azji. Dotychczasowe publikacje zawierają wiele niespójności w odniesieniu do kluczowych aspektów tej teorii, co może mieć istotny wpływ dla uzyskania wiarygodnych wyników badań. Takie nieprawidłowości mogą mieć poważne konsekwencje dla estymacji modelu, ponieważ wyniki badań empirycznych przeprowadzonych w Azji są bardzo zróżnicowane, a w wielu przypadkach nie są rzetelne.

Implikacje praktyczne: niespójności, które zidentyfikowano w trakcie prowadzonej oceny i analizy mają istotne implikacje dla przyszłych badań w tym obszarze. Wybór wskaźników cenowych do konstruowania szeregów realnych kursów walutowych, wybór metod ekonometrycznych i przyjęte ramy teoretyczne stanową ważne elementy empirycznej weryfikacji hipotezy Balassy-Samuelsona, które należy traktować z dużą ostrożnością, ponieważ są one bardzo wrażliwe i mają kluczowy wpływ na poprawny i rzetelny wynik estymacji modelu.

Oryginalność: zgodnie z naszą wiedzą, jak dotąd żadne badanie obejmujące kraje Azji nie przedstawiło tak obszernej analizy literatury na temat powiązania produktywności z realnym kursem walutowym. Niniejsze badanie jest nowatorskie w tym znaczeniu, że dokonuje krytycznej oceny badań obejmujących kraje Azji pod względem tych cech teorii Balssy-Samuelsona, które mogą być przyczyną uzyskania mieszanych, a nawet sprzecznych wyników dla Azji.

Słowa kluczowe: makroekonomia gospodarek otwartych, hipoteza Balassy-Samuelsona, realny kurs walutowy, parytet siły nabywczej, wschodzące i rozwijające się gospodarki azjatyckie.

1. Introduction

The phenomenon of Balassa-Samuelson (BS) effect is widely recognized as one of the oldest and the most comprehensive supply-side explanation of real exchange rate trend departures from long-run equilibrium. The hypothesis is extensively tested for almost all the regions of the world; however, only a handful of empirical studies on the subject are produced for Asia, a region with a growing number of emerging economies at present. The region's tremendous efforts towards generating sustainable growth, the modest expansion of regional cooperation agreements and the degree of growth effects trickling down from high- to low-income regional states provide enough ground for revisiting the theory in favor of developing accession countries of the region. The proponents of regional economic integration never took into account the possibility of productivity-led inflation in smaller regional states, a dilemma described by the BS theory as an aftermath of growth progress in transition countries. As a consequence, a significant body of empirical research has been produced since the 1970s on various regions of the world (largely for the European Monetary Union, EMU), initiating a debate on the relative importance of regional growth convergence and the further enlargement of regional economic unions.

However, even today, the imbalanced (sectoral) productivity growth progress and the consequent deviations of the real exchange rate from its long-run Purchasing Power Parity (PPP) based equilibrium are considered to be one of the most exiting phenomena in international macroeconomics. The notion is still rather under-explored for Asia and has always yielded mixed empirical evidence, thus making its valid existence somewhat questionable. The aim of this paper is to provide a detailed insight into the earlier and recent empirical work done on the long-run real exchange rate behavior in the context of the BS hypothesis for the regional member states of ASEAN and SAARC (South Asian Association for Regional Cooperation).

The empirical studies for Asia conducting a multi-country examination of the BS theory are found to be seriously inconsistent in dealing with different features of its empirical exploration. These primarily include the scheme of sectoral division adopted, definitions and proxy variables used for the real exchange rate and prices, inconsistency of output and employment time-series used, and empirical methodology followed. As a consequence, the results obtained from these studies are very mixed, and in many cases, not even robust. The presence of such discrepancies even cast shadow on the authenticity and reliability of explorations conducted in these papers, thus preventing readers to reach some final and agreeable consensus on the subject. In contrast, a sizeable number of studies on the BS hypothesis investigating countries in Europe and OECD are rather insightful as they discuss and verify many of the aspects of the hypothesis which are critically important in yielding reliable estimates. These studies have

carefully considered the issues such as coverage of industries and scheme of industrial classification between tradables and non-tradables (Rother, 2000; Klau & Mihajljek, 2003; Mihajljek et al., 2004; Coricelli & Jazbec, 2004; Egert, 2003, 2005; Gibson, 2008), choice of real exchange rate, price and productivity measures (Canzoneri et al., 1999; Egert et al., 2003; Lee & Tang, 2003), set of empirical estimation methods applied (Chong et al., 2012; Boreo et al., 2015), theoretical specifications of the hypothesis and testing its assumptions (Strauss & Ferris, 1996; Estrada & Lopez-Salido, 2004; MacDonald & Ricci, 2001, 2005; Schmillen, 2013) and revealed how sensitive the empirical estimates of the hypothesis are to correctly addressing these issues.

In light of these considerations, the present review paper lays down the following four criteria to gauge the relative performance of the studies analyzing the BS hypothesis for Asia. The primary objective of establishing these evaluation parameters is to obtain a comprehensive guideline to critically evaluate the existing studies for future reference, so that consistent and robust estimates could be made whilst testing the theory empirically. These four criteria are:

(a) Measurement of the real exchange rate
(b) Scheme of sectoral classification
(c) Empirical estimation techniques
(d) Theoretical foundations of the hypothesis: This is further categorized into:
   (i)   Domestic version of the BS hypothesis
   (ii) Fundamental assumptions of the BS hypothesis
   (iii) Modified version of the BS hypothesis

In the forthcoming sections of this paper, each of these parameters are discussed in detail besides producing a critical review of the different aspects in the context of empirical studies on Asia.

2. Evaluating the Existing Literature Against Established Parameters

2.1. Measurement of the Real Exchange Rate

Empirical verification of the BS hypothesis necessitates a precise measurement of the real exchange rate for obtaining consistent estimates. However, the task is much complicated due to the lack of consensus by researchers on the most reflective real exchange rate proxy that is capable of reflecting the internal transmission channels from domestic prices to the real exchange rate.

In empirical studies on Asia, CPI is found to be the most popular price deflator used to construct the real exchange rate series. Drine and Rault (2002) use CPI-based effective real exchange rates of six Asian economies

to test the BS hypothesis. Wang and Dunne (2003) verify the BS effect for a group of seven East Asian countries using CPI-based bilateral real exchange rates on quarterly data. Choudhri and Khan (2005) explain long-run behavior of CPI-based bilateral real exchange rates for a panel data set of 16 developing countries from East and South Asia, the Western Hemisphere, and Africa. Tsen (2011), Dumrongrittikul (2012), Kakkar and Yan (2012), Ricci et al. (2013) and Wang et al. (2016) also verify the BS hypothesis by using CPI-deflated bilateral real exchange rates for emerging Asia, in addition to former Asian developing and developed countries.

CPI represents the overall cost (weighted average) of a fixed basket of goods and services bought by a typical consumer relative to the price of the same basket in a base year. By including a broad range of goods and services (dominantly non-tradables like housing, consumer services, public administration, defense, medical care, etc.) in the fixed basket, CPI can provide an accurate estimate of the cost of living. It is important to remember that CPI is not a dollar value like GDP; it is an index number which captures the overall change in the price level from the base year. A change in this index over time should reflect the position of non-traded sectors over time. However, the index is not without its limitations. Firstly, CPI is highly exposed to price controls, subsidies and indirect taxes which may distort the role of market forces in determining prices (see Hinkel & Nsengiyumva, 1999). Secondly, CPI may have a fairly large number of imported items in its basket, thus preventing it to be a true representative of domestic production. The index contains some traded goods in its basket. If the proportion of traded goods in the basket is high, it might not be the ideal indicator for comparison. Thirdly, the degree of weights involved in the construction of CPI across countries can vary quite a bit. This causes a hindrance in cross-country comparisons of cost effectiveness and competitiveness. In such a situation, a rise in price of a certain commodity can be misleading with respect to improvement or deterioration of relative competitiveness between countries. The problem is more visible in developing countries which seriously lack a representative sample of goods and services in their CPI. Thus, despite its wide popularity as a measure of non-tradable prices, the measure holds some important caveats.

Some important studies analyze the BS hypothesis for Asia using the national output deflator (GDP or GNP) based real exchange rate (Bahmani-Oskooee & Rhee, 1996; Ito et al., 1999; Chinn, 2000; Bahmani-Oskooee & Nasir, 2004; Thomas & King, 2008, Ishaq et al., 2022). The GDP deflator is considered superior to CPI as a price measure in this case since it covers a broader range of commodities and services that are non-traded. In addition, the GDP deflator is highly proficient in capturing the effects of productivity shocks on the real exchange rate, provided the component of regulated prices of two types of industries that constitute the lion share of consumption expenditures (food and services in particular) is controlled for

(Jazbec, 2002; Egert et al., 2003). Nevertheless, the GDP deflator as the national price index is not the most perfect measure, either, and has its own caveats. This measure has been criticized in literature since GDP deflators do not necessarily correspond to the officially published inflation indices, which are normally represented by CPI, PPI or WPI rather than output deflators. Moreover, for modeling relative price movements between two countries, a base-weighted price index is preferred over a current-weighted price index (Goldstein et al., 1980).

2.2. Scheme of Sectoral Classification

Tradability (non-tradability) of goods and services is a much debated feature of the real economy. Although researchers suggest a few of methods for distinguishing between traded and non-traded sectors, these methods are not widely acknowledged as they are ad hoc in nature. A majority of studies on the BS hypothesis distinguish between traded and non-traded sectors arbitrarily (see Canzoneri et al., 1999; Chinn, 2000; Egert et al., 2003). Some studies rely on earlier studies (analyzing a similar set of countries) for differentiating between tradable and non-tradable sectors. For example, Kakkar (2002, 2003) follows the sectoral division of real economy into tradables and non-tradables as suggested by De Gregorio et al. (1994) and Stockman and Tesar (1995). Similarly, Thomas and King (2008) empirically test the BS hypothesis for Asia-Pacific countries by adopting Chinn's (2000) sectoral classification that tests the hypothesis for the same region.

The correct distinction between traded and non-traded sectors of an economy is of crucial importance for obtaining precise and robust empirical estimates for the BS hypothesis. Nevertheless, there is a serious lack of consensus on recognizing sectors as tradables or non-tradables owing to the disagreement at the conceptual level for measuring tradability (non-tradability) of an industry. The problem is further aggravated when the level of aggregation of the existing data may be too high to permit a clear classification of industries into one sector or the other. This concern goes largely unaddressed in the existing empirical literature on Asia. A vast majority of studies analyzing countries in Asia classify sectors in a rather subjective manner. Such a practice casts shadow over the reliability of their empirical estimates.

Ito et al. (1999) examine the BS hypothesis for Asia Pacific Economic Cooperation (APEC) member states and the Western Hemisphere and Oceania regions. The real economy of each country is classified into traded and non-traded sectors by assuming the manufacturing sector as tradable and services as non-tradable. The distinction is made completely arbitrarily under the assumption that East Asian productivity growth is substantially driven by those countries' high value-added manufactured goods exports (e.g. machine exports). Another important deficiency of their study is that the coverage of sectors is highly aggregated, which may result in biased

estimates of sectoral productivity growth due to relative price movements. A number of prominent studies on the BS hypothesis for Europe and other non-Asian regions recognize the importance of more formal methods of sectoral division and better industry coverage for obtaining reliable estimates (see Rother, 2000; Mihajljek et al., 2003, 2004; Coricelli & Jazbec, 2004; Egert, 2004).

Choudhri and Khan (2005) cover a set of sixteen developing countries of Asia, Africa and the West with considerably varying economic structures. However, each of them is subject to a standard sectoral division with agriculture and manufacturing as tradable sectors and the rest of the economy as non-tradables. For empirical verification of the BS hypothesis, the sectoral output and price data are sourced from the World Development Bank Indicators (WDI) database. The database contains sectoral value-added and price deflator time-series but not with a fine sectoral classification. Each country is disaggregated into four distinct sectors – agriculture, manufacturing, industry and services – and these sectors are too broad to capture the internal transmission mechanism proposed theoretically. Using such highly aggregated data may result in forced (and even wrong) assignment of certain industries as non-tradables, whereas the industries should actually be classified as tradables (or at least partly tradables) for being exposed to foreign competition. Classic examples are the air and ship transportation services, the distribution sector and the utilities industries which are normally treated as non-tradables (see MacDonald & Ricci, 2005; Thomas & King, 2008).

In addition to the studies discussed above, a vast majority of Asian studies distinguish between traded and non-traded sectors arbitrarily (Bahmani-Oskooee & Rhee, 1996; Chinn, 2000; Wang & Dunne, 2003; Bahmani-Oskooee & Nasir, 2004; Drine & Rault, 2004; Olson, 2009; Chowdhury, 2012). Some studies rely on earlier studies (analyzing a similar or even dissimilar set of countries) for deciding between tradability (non-tradability) of sectors. For example, Thomas and King (2008) empirically test the Balassa-Samuelson hypothesis for Asia-Pacific countries by following Chinn's (2000) sectoral classification testing the hypothesis for the same region. Similarly, Kakkar (2012) analyzes six East Asian countries following the sectoral division suggested by De Gregorio et al. (1994) and OECD countries following Stockman and Tesar (1995). Similarly, Ricci et al. (2013) follow De Gregorio et al.'s (1994) sectoral classification for empirically investigating the augmented version of the BS hypothesis for a set of 48 industrial and emerging economies (including East and South Asian regions). In practice, adopting the sectoral division of earlier studies is acceptable provided (a) the base study covers a similar set of countries (or at least countries with reasonably similar economic structures), and (b) the base study categorizes sectors using some formal and well-recognized method of sectoral division rather than distinguishing sectors in a purely subjective way.

The only study on Asia that stands out in the literature in the context of precise sectoral classification was done by Dumrongrittikul (2012). It is distinct since the author uses a combination of two approaches for sectoral division. The study tests the BS hypothesis empirically for a set of 33 developed and developing economies (including 14 countries from East and South Asia). The sectors are divided at a sufficiently disaggregated level into seven distinct industries. The study is distinctive in the sense that the author employs the Engle-Granger (1987) single-equation error correction model in addition to the traditional method of calculating the tradability ratio. The method allows for country-specific heterogeneity of each industry and changes in classification along the period. The underlying belief behind this methodology of sector division is that tradable commodities across countries are likely to satisfy the law of one price (LOOP) and purchasing power parity (PPP). The author suggests estimating the 2-step Engle-Granger error correction model by regressing the domestic price level of each sector on the corresponding sector's price in the U.S., the reference country in his analysis. Rejection of the null hypothesis at a desirable significance level displays the potency of the domestic sectoral price series to co-move with the international market prices establishing PPP. This allows for the distinction between tradable and non-tradable sectors.

A recent study produced by Jangam and Rath (2020) uses industry-level output (Gross Value Added – GVA) and employment data with a very fine degree of disaggregation while studying the BS hypothesis for a set of 38 developed and developing countries from Europe, East Asia and Pacific regions. Using 35 industry-level disaggregated data sets, the paper makes a very precise and more disaggregated classification of economic sectors into tradabales and non-tradables, ensuring sufficient coverage of industries for empirical analysis of the BS hypothesis. Unlike many other studies, the authors follow a popular and well-defined approach towards industry classification, i.e. the measure of tradability ratio, first proposed by De Gregorio (1994). Industries are classified as tradables and non-tradables by calculating the export to GVA ratio for each of the 35 sample industries. If the average export to GVA percentage turns out to be greater than 10%, the specific industry is classified as a tradable sector, otherwise, the industry is treated as non-tradable.

2.3. Empirical Estimation Techniques

Estimates of the BS hypothesis are quite sensitive to alternative empirical estimation techniques (Chinn, 2000; Wang & Dunne, 2003; Tintin, 2009; Kakkar & Yan, 2012). In the studies investigating the BS hypothesis empirically, the long-run model is estimated using either the EG two-step single-equation cointegration procedure or some form of generalized one-step error correction method (see Canzoneri et al., 1999; Chinn, 2000; Lommatzsch & Tober, 2004; Bogoev et al., 2008; Thomas & King, 2008;

Tsen, 2011; Findreng, 2014). On the other hand, the maximum likelihood-based rank test, proposed by Johansen (1988, 1991) and Johansen and Juselius (1990), is also popular amongst researchers. Though less widely used than residual-based cointegration tests, a number of studies on the BS effect use the multivariate cointegration model to explore the plausible long-run association between productivity and the real exchange rate (see Faruqee, 1995; Loko & Tuladhar, 2005; Konopczak & Torój, 2010; Jabeen et al., 2011; Boreo et al., 2015). Researchers have used both time-series empirical methods as well as pooled data estimation techniques to test the hypothesis (see MacDonald & Ricci, 2001; Drine & Rault, 2002; Lojschová, 2003; Blaszkiewicz et al, 2004; Choudhari & Khan, 2005; Lee & Tang; 2003; Dumrongrittikul, 2012; Kakkar & Yan, 2012).

In the BS literature on Asia, there is a mix of evidence on the use of time-series or pooled data estimation methods. Bahmani-Oskooee and Nasir (2004) conduct an individual country-by-country study to test the BS hypothesis for a set of 44 countries (including six from East Asia). The study employs the bound testing approach for cointegration (ARDL model) to estimate the long-run effect of productivity on the real exchange rate. A model based on the unrestricted (unconstrained) error correction test is proposed by Pesaran and Shin (1999) and Pesaran et al. (2001) to model the long-run and short-run relationship between system variables simultaneously. Choudhari and Khan (2005) conduct a panel study on the BS hypothesis and examine two individual panels of low-income and high-income countries comprising East Asian, African and Western Hemisphere states. Using Panel Dynamic Ordinary Least Squares (PDOLS) tests for cointegration, the study establishes the long-run Balassa-Samuelson effect for two groups of countries by assuming homogenous cointegrating vectors within the group. Thomas and King (2008) investigate a set of nine East Asian countries using a single-equation residual-based error correction model. The model was originally proposed by Zivot (1994). The existence (inexistence) of a valid cointegrating relationship between model variables is decided through an error correction process.

More recent studies from Asia use pooled data estimation techniques to investigate the Balassa-Samuelson hypothesis. Dumrongrittikul (2012) applies panel data estimation techniques to examine the BS hypothesis for a set 33 developing and developed countries. Using the group-mean panel dynamic ordinary least squares estimator suggested by Pedroni (2004), the test allows for greater flexibility in the presence of heterogeneity of cointegrating vectors since the panel includes countries from different regions. Ricci et al. (2013) analyze an augmented version of the BS hypothesis for two individuals sets of countries: advanced economies and newly industrialized emerging markets. Their sample includes 12 Asian countries. The estimation of an equilibrium long-run cointegrating relationship between the real exchange rate and its proposed determinants is undertaken using the panel dynamic ordinary least

squares estimator developed by Stock and Watson (1993). The estimated relationship is further explored through the panel error correction model to gauge the speed of convergence of the real exchange rate towards its long-run equilibrium. Wang et al. (2016) base their study of the BS effect on a panel data set of 40 countries. Their sample includes 9 countries from Asia. The BS hypothesis is tested by employing an extended version of panel cointegration techniques, proposed by Bai and Carrion-i-Silvestre (2013), allowing for structural breaks and cross-sectional dependence. In their study, the long-run BS effect is estimated using the group-mean panel cointegration estimator and the results suggest significant absence of the BS effect for the set of developing countries (only).

There are only a few studies on Asia that investigate the BS hypothesis by employing alternative estimation methods. Interestingly, their findings yield quite conflicting results when the same log-run model is tested against two different empirical tests. Chinn (2000) observes valid existence of the BS effect, but of varying degree when the long-run model is tested through time-series estimations methods and the pooled data estimator. When conducting individual country analysis, the study employs the single-equation residual-based error correction model of Phillips and Loretan (1991). Assuming that the model regressors are weakly exogenous, the author tests the BS hypothesis using non-linear least squares (NLS) regressions for nine East Asian states. The time-series analysis provides some evidence in support of valid existence of the BS effect. For only three out of nine countries, the real exchange rate and productivity trend movements are found to comply with the theoretical predictions of the BS hypothesis. On the contrary, panel data estimation results are rather encouraging. Using the panel NLS error correction model, the author confirms the valid existence of the BS effect for the panel countries. He finds significant mean reversion in errors and convergence of the real exchange rate towards its long-run equilibrium. Kakkar and Yan (2012) report considerable variation in their results when testing the BS hypothesis for six East Asian countries using alternative specifications of Kao and Pedroni panel cointegration tests. Though the two tests significantly favor the existence of the BS effect, the magnitude of effect is found to be highly varying under different circumstances. When the condition of homogenous cointegration vectors is imposed, the long-run BS coefficient is found to be 0.64 (approximately). Allowing for heterogeneous cointegrating vectors, the individual long-run coefficient estimates are found to vary widely between 0.13 and 0.90.

2.4. Theoretical Foundations of the Hypothesis

(a) Domestic Version of the Balassa-Samuelson Hypothesis

While testing the BS theory empirically, researchers have distinguished between the internal and external transmission mechanisms of the hypothesis. The internal mechanism of the hypothesis proposes that the

sectoral productivity gap in a country may drive internal relative prices of non-tradables. A faster productivity growth in the traded sector of the county may cause its relative price of non-tradables to rise. This effect is known in the literature as the Baumol-Bowen effect. Baumol and Bowen (1966) argued that within a country, there is a broad tendency for the prices of service-intensive goods (education, health care, banking, etc.) to rise over time as, historically, productivity growth in these activities has tended to be slower than in more capital-intensive manufacturing industries. A sizeable number of non-Asian studies have tested the domestic version of the Balassa-Samuelson hypothesis (see Canzoneri et al., 1999; Egert, 2002, 2005; Lojschova, 2003; Mihaljek & Klau, 2004; Lee & Tang, 2003; Funda et al., 2008). These studies indicate that the domestic version of the hypothesis is the key driver of the standard BS mechanism.

However, there is a serious dearth of studies investing the domestic version of the BS theory for Asia. To our knowledge, the only credible work conducting a multi-country analysis of Asia for the internal version of the BS hypothesis was done by Thomas and King (2008). The study investigates the long-run relationship between internal relative sectoral productivities and internal sectoral price ratios (augmented with a number of domestic demand side control variables like government consumption spending, GDP per capita, oil prices and terms of trade) for a set of nine East Asian countries and the U.S. In their study, seven out of ten countries reject the null hypothesis of no cointegration between model variables at a ten percent or better significance level. However, when a general to specific approach is applied, i.e., clearly insignificant variables are dropped out of model, the parsimonious version of the model yields even more encouraging results. In the case of nine out of ten countries, with Korea being the only exception, the null hypothesis of no cointegration is rejected.

The assumed value of relative labor intensities of non-traded sector plays an important role in testing the domestic version of the BS hypothesis. If a non-traded sector is relatively more labor-intensive, then even a balanced (proportionate) sectoral productivity growth may lead to an appreciation of relative prices of non-tradables (Froot & Rogoff, 1985). While testing the hypothesis empirically, Thomas and King (2008) assume an equi-proportionate relationship between biased sectoral productivity and relative sectoral prices, i.e., labor intensity is equal across sectors. However, individual country estimates reveal that none of the studied economies meet this assumption. Almost always, the relative productivity bias in tradables appear to bear a disproportionate relationship with the internal price ratio. This approach is consistent with the empirical findings of some earlier studies confirming the validity of a domestic BS effect but with disproportionate effects of productivity differentials on the internal real exchange rate (Mihaljik & Klau, 2004; Egert, 2005; Lee & Tang, 2003; Funda et al., 2008).

(b) Controlling for the Assumptions of the Hypothesis

The BS hypothesis is widely criticized in recent empirical studies for its assumptions. Long-run PPP between inter-country traded sector prices (see Canzoneri et al., 1999; Egert, 2002b; Egert et al., 2003; Kovacs, 2003; Lojschová, 2003; Blaszkiewicz et al., 2004; MacDonald & Ricci, 2005; Lee & Tang, 2007; Garcia-Solanes et al., 2008) and inter-sectoral equalized wages (see Strauss & Ferris, 1996; Strauss, 1997, 1998; Nenovsky & Dimitrova, 2002; Lee, 2005) are two of the core assumptions of the theory that are most widely tested in literature and are largely found to be inexistent. In this section of the paper, we focus on the validity (invalidity) of the assumption that presumed long-run PPP between tradables prices across countries. The testing of this assumption is rather under-explored for Asia.

Few studies test the hypothesis by relaxing the PPP assumption and find quite different results. Ito et al. (1999) investigate countries in Asia, Western Hemisphere and Oceania countries for the BS hypothesis and find sustained departures in traded sector prices vis-a-vis the U.S. Through simple regressions, they find that ten out of eleven countries reportedly experience trend deviations in their relative prices of tradables against the U.S. The only exception was Korea, which seems to be consistent with the assumption of PPP. This finding casts shadow over one of the fundamental assumptions behind the BS hypothesis, i.e. trend deviations in the real exchange rate are contributed only from appreciation of non-traded sector prices. Similarly, for a set of nine East Asian countries, Thomas and King (2008) investigate the equi-proportionate relationship between home tradables prices and the corresponding U.S. prices as proposed by the BS hypothesis. Using single-equation error correction models, their findings reveal a valid long-run co-movement amongst model variables, but only for half of the sample countries. Kakkar and Yan (2012) examine the assumption of tradable sector PPP for East Asia and find mixed evidence. Their empirical analysis provides some support for PPP between inter-country traded sector prices when the restriction of homogeneity on cointegration vectors is imposed. However, the evidence is generally weaker when heterogeneous vectors are considered. Imai (2018) investigates the sharp appreciation of the Chinese real exchange rate vis-à-vis the U.S. dollar under the theoretical predictions of the Balassa-Samuelson theory. The study evidently reveals that for China the magnitude of Balassa-Samuelson effect is modest and finds appreciation in traded sector prices responsible for inducing long-run trend appreciation in the country's real exchange rate against the U.S. dollar. Ishaq et al. (2022) empirically examine a new (relaxed) variant of the BS hypothesis for East and South Asian emerging economies. They test the validity underlying the theoretical assumption around PPP, strongly presumed to hold for traded sector prices under the international version of the model. The assumption, when empirically tested, does not always

hold valid, since seven out of nine sample countries demonstrate a price difference in tradables against the world (U.S.), a potential driver of their trend in real exchange rate deviations (appreciation).

(c) Modified Version of the BS Hypothesis

A couple of recent studies re-examine the BS hypothesis from a new perspective, using a modified version of the theory. The motivation behind estimating the modified variant of the BS theory is certainly to obtain more realistic and convincing empirical estimates. By controlling for the over-idealist assumptions of the hypothesis or by giving a (due) theoretical representation to inherent macroeconomic features of the sample countries, these papers attempt to depict the most honest picture of the productivity-real exchange rate linkage, which otherwise would be compromised.

While studying the price-income relationship in the context of structural transformation of developed and developing economies of Europe, Africa, Middle East, Asia and Pacific, Hassan (2016) modifies the BS hypothesis by connecting the price level to the process of structural change. Using Total Factor Productivity (TFP) as representative of sectoral (tradables and non-tradables) productivity, the sectoral TFPs of agriculture, manufacturing and services are weighted by their relative employment shares, so that the price index reflects the stage of structural transformation a country is currently experiencing. After taking into account structural shifts in driving the price-income relationship, the study reveals some fascinating and intuitively compelling insights about the BS mechanism. The agriculture sector TFP tends to increase across the sample countries at the initial stage of growth. As a consequence, a country's overall price level tends to fall given the high relative employment share of agriculture in its economy. Such a trend pattern of a country's general price level contradicts the prescribed mechanisms of BS theory. However, at advanced stages of structural transformation, the employment share of the agricultural sector is surpassed by that of the manufacturing sector, resulting in the overall contribution of agriculture to the country's total employment being very small or even negligible. Hence, in the long run, the relative TFP in manufacturing emerges as the main driver of cross-country inter-sectoral price differentials, a pattern confirming the theoretical predictions of the BS hypothesis.

Heterogeneity in regional prices (inflation) has been frequently analyzed in the theoretical framework of the PPP (Cassel, 1918), suggesting a bias in regional prices. Thus, economic determinants (transaction costs, tariff and non-tariff barriers, etc.) contributing to the violation of the PPP have been considered amongst the most convincing explanations for heterogeneous regional prices or inflation (Dumas, 1992). Similarly, distance has been evidently reported to be a reason for heterogeneous inter-country inflation (Chen, 2004; Kano et al., 2013; Ikeno, 2014). In this context, Nagayasu (2020)

revisits the BS hypothesis for Japan by considering the regional location of the country as the key model determinant. To analyze the role of distance in determining the BS effect, the study employs a spatial econometric model which is absolutely consistent with the theoretical specifications of the BS mechanism. Assuming perfect labor mobility across sectors (tradables and non-tradables), but restriction on labor mobility across intra-country regions (urban and rural), the productivity growth bias across regions is captured by considering the productivity gap of neighboring regions. This bias is estimated empirically using a spatial econometric model. The results from the study hold important policy implications for countries (such as Japan) where there is sharp demarcation (in terms of productivity growth bias) between urban and rural regions. Moreover, the study finds a high correlation in regional inflation patterns and observes a rising trend of urbanization in the country due to abrupt demographic changes.

Ishaq et al. (2022) revisit the BS hypothesis for a set of nine East and South Asian states and establish a relaxed version of the hypothesis. The BS hypothesis is often criticized for one of its underlying but highly idealistic assumptions: assuming that Purchasing Power Parity (PPP) holds for tradables prices across countries. The study empirically tests the plausible existence of PPP amongst cross-country tradables against the world (U.S.), while considering the failure of the Law of One Price (LOP) to hold in the long run. For Japan, Korea, Pakistan, the Philippines, and Thailand, the results indicate the absence of any valid existence of PPP with the U.S. Singapore, Hong Kong, and Sri Lanka, however, yielded mixed results. Indonesia and Malaysia were the only two countries that provided strong substantiation for PPP, their traded-sector prices significantly co-moving with their U.S. counterparts. Furthermore, their prices showed evidence of an equi-proportionate long-run relationship with those of the U.S., indicating the presence of PPP in its absolute version. The inexistence of PPP (to a large extent) for tradables can be considered as a suggestion that a tradables price gap against the U.S. is a plausible determinant of long-run real exchange rate appreciation in the respective economies. The assumption of tradables PPP is therefore relaxed, and the theory is empirically tested in its relaxed version using a variety of single-equation and multivariate time-series and pooled data econometric tests. In addition to the inter-country sectoral productivity differential, tradables prices in the home country and the U.S. were allowed to deviate from their PPP equilibrium, displaying the potential to induce trend movements in the real exchange rate based on non-tradable prices in home economies. Nevertheless, this effort proved fruitless. Allowing for the divergence of tradables prices from PPP did not bring us any closer to finding substantial support for the BS hypothesis. Of all the countries, only Pakistan and the Philippines showed any evidence of a valid BS effect, although even here the evidence was mixed, with supporting evidence coming only from the single-equation time-series

cointegration models. Nevertheless, these estimates are strongly rejected by pooled data estimators, since the panel estimators yield a negative and statistically significant long-run BS coefficient. This is inconsistent with the theoretical prediction of the BS hypothesis, which therefore can be interpreted as strong evidence against the reliable existence of the BS hypothesis. Finally, in the context of long-run PPP between inter-country tradables prices, long-run elasticities suggest a significant contribution of traded-sector prices to deviations of the (non-tradables-based) real exchange rate from its long-run equilibrium. Thus, the lack of PPP between tradables in the home country and the U.S. was found to significantly induce trend departures in the Asian countries' real exchange rate.

The table presented below provides a summary of the existing literature examining the BS hypothesis for East Asia and South Asia. It offers readers a quick view of each study highlighting the sample countries, a scheme of sectoral division, measures of the real exchange rate, verification of the underlying assumptions and final conclusions about the existence of the BS effect.

3. Conclusion

This review paper is aimed at critically analyzing the earlier literature on the BS hypothesis for Asia with a special emphasis on various important dimensions associated with its empirical estimation. It is believed that careful handling of these critical aspects are of vital significance for yielding reliable empirical estimates. Therefore, the present paper serves as a critical commentary on major inconsistencies commonly found, including an incomparable scheme of sectoral division followed, deficiently reflective definitions and proxy variables for the real exchange rate and prices, choice of output and employment series used and their subsequent transformation, empirical methodology and (theoretically) different variants of the hypothesis chosen for estimation. The empirical evidence on the BS hypothesis for emerging Asian states is very mixed, and in many cases, not robust. Such a state of indeterminacy on the valid existence of the BS effect for Asia can largely be attributed to data and irregularities, the econometric estimates being highly sensitive to the choice of price and productivity measures involved in the empirical estimation of the BS model.

Table 1

Summary of Critical Features of Prominent BS Studies on Asia

Critical Features of the Study	Bahmani-Oskooee and Rhee (1996)	Ito et al. (1999)	Chinn (2000)
(a) Sample Countries	Korea	18 APEC countries (11 from Asia, 4 from Western Hemisphere and 3 from Oceania)	China, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand
(b) Sample Data Set	Quarterly 1979–93	Annual 1973–93. Start and end dates vary from country to country	Annual 1970–92. Start date varies from country to country
(c) Scheme of Sectoral Division	–	Highly aggregated, T = Manufacturing, NT = Services	T = LDCs: Manufacturing, U.S. & Japan: Industry, mining, transportation & agriculture NT = LDCs: Services, construction, mining and transportation, US & Japan: Services, construction, government
(d) Measure(s) of RER	GNP deflator-based RER	GDP deflator-based RER	GDP deflator-based RER
(e) Domestic or/and International Version of the Hypothesis	International version of the hypothesis is tested only.	International version of the hypothesis is tested only	International version of the hypothesis is tested only
(f) Controlling for the Idealist Assumptions of the Theory	No	The countries' exchange rates are allowed to deviate from PPP	Demand-side factors are allowed to explain real exchange rate movements
(g) Empirical Estimation Methodology	Johansen-Juselius maximum likelihood cointegration test	Simple OLS regression model	Time-series and panel error correction regressions
(h) Conclusion	Valid existence of BS effect is found.	Mixed support is found in favor of BS hypothesis	Valid existence of BS effect is confirmed more robustly through panel data estimation methods

Table 1 – continued

Critical Features of the Study	Drine and Rault (2002)	Wang Dunne (2003)	Bahmani-Oskooee and Nasir (2004)
(a) Sample Countries	India, Indonesia, Korea, Philippines, Singapore and Thailand	Indonesia, Japan, Korea, Malaysia, Philippines, Singapore and Thailand	A set of 44 developed, developing and less developed countries including six countries from East and South Asia
(b) Sample Study Period	Annual 1983–98	Quarterly 1973–96. Start date varies for some countries	Annual 1960–90
(c) Scheme of Sectoral Division	T = Manufacturing sector and agriculture, hunting, forestry and fishing. NT = Services	Inter-country tradable sector productivity gap is taken into account only. The tradable sector is represented by manufacturing sector of each country and for those countries where manufacturing output data is not available, real GDP is used as an alternative measure	–
(d) Measure(s) of RER	CPI-based effective RER	CPI-based bilateral RER	GDP deflator-based RER
(e) Domestic or/and International Version of the Hypothesis	International version of the hypothesis is tested only	International version of the hypothesis is tested only	International version of the hypothesis is tested only
(f) Controlling for the Idealist Assumptions of the Theory	The countries' exchange rates are allowed to deviate from PPP	No	No
(g) Empirical Estimation Methodology	Multivariate (Johansen) and panel (Pedroni) cointegration tests	Johansen-Juselius ML cointegration method and generalized variance decomposition test	Autoregressive Distributed Lag (ARDL) bound testing for cointegration and error correction model
(h) Conclusion	BS effect is invalidated for the sample countries	Except Singapore, very little evidence is obtained in support of BS effect for other sample countries	For Asia, 4 out of 6 countries display the valid existence of BS effect

Table 1 – continued

Critical Features of the Study	Choudhri and Khan (2005)	Thomas and King (2008)	Olson (2009)
(a) Sample Countries	The study includes 14 Asian, African and South American countries at high-, low- and medium-income levels	China, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand	China, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Taiwan, and Thailand
(b) Sample Study Period	Annual 1976–94	Annual 1960–2004. Start date varies from country to country	Annual 1970–2007
(c) Scheme of Sectoral Division	T = Manufacturing and agriculture NT = All other sectors	T = Manufacturing NT = Services, construction and utilities	–
(d) Measure(s) of RER	CPI-based RER	GDP deflator-based RER	CPI-based RER
(e) Domestic or/and International Version of the Hypothesis	International version of the hypothesis is tested only	Both domestic and international versions of the hypothesis are tested	International version of the hypothesis is tested only
(f) Controlling for the Idealist Assumptions of the Theory	No	i. Long run co-movement between cross-country tradables prices (PPP) is investigated. ii. Non-tradable price component in tradable prices is taken into account.	No
(g) Empirical Estimation Methodology	Two residual-based Pedroni tests and panel DOLS estimator	Time-series error correction regressions	Single-equation cointegration model and impulse response function
(h) Conclusion	The results strongly suggest that the BS hypothesis is in operation	Authors obtain significantly stronger support in favor of valid existence of BS effect	The model augmented with demand-side shocks supports the valid existence of BS effect for studied countries

Table 1 – continued

Critical Features of the Study	Tsen (2011)	Dumrongrittikul (2012)	Chowdhury (2012)
(a) Sample Countries	Japan, Korea, and Hong Kong	33 countries in total. 17 developing countries and 16 developed countries. Fourteen countries in the sample are from Asia	Seven low-income SAARC economies (Bangladesh, Bhutan, Nepal, India, Maldives, Pakistan and Sri Lanka)
(b) Sample Study Period	Quarterly 1960–2009. Start date varies from country to country	Annual 1970–2008	Annual 1950–2007. Start date varies from country to country.
(c) Scheme of Sectoral Division	–	Each country's real economy is divided into seven distinct sectors. T and NT sectors vary from country to country	–
(d) Measure(s) of RER	CPI-based bilateral RER	CPI-based RER	GDP deflator-based RER
(e) Domestic or/and International Version of the Hypothesis	International version of the hypothesis is tested only.	International version of the hypothesis is tested only	International version of the hypothesis is tested only
(f) Controlling for the Idealist Assumptions of the Theory	No	No	No
(g) Empirical Estimation Methodology	Engle-Granger residual-based test for cointegration, Johansen (1988) cointegration method and the SL cointegration method and the generalized forecast error variance decomposition	Four residual-based Pedroni tests and group-mean panel DOLS and time-series DOLS estimators	Autoregressive Distributed Lag (ARDL) bound testing cointegration approach and error correction model
(h) Conclusion	Considerable amount of support is yielded for hypothesis	For the set of developing countries (only), strong evidence in support of the BS effect is found	Dominant inexistence of BS effect is found

Table 1 − continued

Critical Features of the Study	Kakkar and Yan (2012)	Ricci et al. (2013)	Ishaq et al. (2022)
(a) Sample Period	Hong Kong, Indonesia, Korea, Malaysia, Singapore, and Thailand	The sample set comprises a mix of industrial economies and emerging market. 11 countries are selected from Asia	The sample set comprises nine emerging economies of Asia
(b) Sample Study Period	Annual 1980–2001	Annual 1980–2004	Annual 1970s and 1980s to 2018
(c) Scheme of Sectoral Division	T = manufacturing; mining & quarrying; ocean and air transport; wholesale & retail trade; and financing, insurance & business services NT = utilities; construction; real estate; community, social, and personal services; land transport and communication; and restaurants	T = agriculture, hunting, forestry, and fishing; mining, manufacturing, and utilities; and transport, storage, and communication NT = construction; wholesale and retail trade; and other services	Each economy is disaggregated into seven sectors: (i) agriculture, (ii) manufacturing, (iii) mining and utilities, (iv) construction, (v) wholesale, retail trade and hospitality, (vi) transport and (vii) communication and other activities. Tradable and non-tradable sectors vary from country to country
(d) Measure(s) of RER	CPI-based RER	CPI-based effective RER	GDP deflator-based RER
(e) Domestic or/and International Version of the Hypothesis	International version of the hypothesis is tested only	International version of the hypothesis is tested only	International version of the hypothesis is tested only
(f) Controlling for the Idealist Assumptions of the Theory	Long-run co-movement between cross-country tradable prices (PPP) is investigated	Demand-side determinants are also modeled against RER	The assumption of PPP for tradables is relaxed

Table 1 − continued

Critical Features of the Study	Kakkar and Yan (2012)	Ricci et al. (2013)	Ishaq et al. (2022)
(g) Empirical Estimation Methodology	Kao and Pedroni cointegration tests for detecting plausible long-run association. The long-run elasticities are calculated through panel DOLS estimator	Panel DOLS and panel error correction model	Engle-Granger test of cointegration, error correction testing, Pedroni panel cointegration tests, time-series and panel single-equation cointegration regression tests
(h) Conclusion	Valid BS effect is found	Valid BS effect is found but with small magnitude (particularly for industrialized countries)	Valid BS effect is found but with small magnitude (particularly for industrialized countries)

References

Bahmani-Oskooee, M., & Rhee, H. J. (1996). Time-series support for Balassa's productivity-bias hypothesis: Evidence from Korea. *Review of International Economics*, *4*(3), 364–370.

Bahmani-Oskooee, M., & Nasir, A. (2004). ARDL approach to test the productivity bias hypothesis. *Review of Development Economics*, *8*(3), 483–488. https://doi.org/10.1111/j.1467-9361.2004.00247.x

Bai, J., & Carrion-i-Silvestre, J. L. (2013). Testing panel cointegration with unobservable dynamic common factors that are correlated with the regressors. *The Econometrics Journal*, *16*(2), 222–249. https://doi.org/10.1111/ectj.12002

Baumol, W. J., & Bowen, W. G. (1966). *Performing arts – The economic dilemma: A study of problems common to theatre, opera, music and dance*. MIT Press.

Blaszkiewicz, M., Kowalski, P. A., Rawdanowicz, L., & Wozniak, P. (2004). Harrod-Balassa-Samuelson effect in selected countries of Central and Eastern Europe. *CASE Network Reports*, (57). http://doi.org/10.2139/ssrn.1414893

Boero, G., Mavromatis, K., & Taylor, M. P. (2015). Real exchange rates and transition economies. *Journal of International Money and Finance*, *56*, 23–35. https://doi.org/10.1016/j.jimonfin.2015.04.002

Bogoev, J., Bojceva Terzijan, S., Égert, B., & Petrovska, M. (2008). Real exchange rate dynamics in Macedonia: Old wisdoms and new insights. *Economics: The Open-Access, Open-Assessment E-Journal*, *2*. https://doi.org/10.5018/economics-ejournal.ja.2008-18

Canzoneri, M. B., Cumby, R. E., & Diba, B. (1999). Relative labor productivity and the real exchange rate in the long-run: Evidence for a panel of OECD countries. *Journal of International Economics*, *47*(2), 245–266.

Cassel, G. (1918). Abnormal deviations in international exchanges. *The Economic Journal*, *28*(112), 413–415.

Chen, N. (2004). The behaviour of relative prices in the European Union: A sectoral analysis. *European Economic Review*, *48*(6), 1257–1286. https://doi.org/10.1016/S0014-2921(03)00055-2

Chinn, M. D. (2000). The usual suspects? Productivity and demand shocks and Asia–Pacific real exchange rates. *Review of International Economics*, *8*(1), 20–43. https://doi.org/10.1111/1467-9396.00203

Choudhri, E. U., & Khan, M. S. (2005). Real exchange rates in developing countries: Are Balassa-Samuelson effects present? *IMF Staff Papers*, *52*(3), 387–409.

Chowdhury, K. (2012). The real exchange rate and the Balassa–Samuelson hypothesis in SAARC countries: An appraisal. *Journal of the Asia Pacific Economy*, *17*(1), 52–73. http://doi.org/10.1080/13547860.2012.640000

Chong, Y., Jordà, Ò., & Taylor, A. M. (2012). The Harrod–Balassa–Samuelson hypothesis: Real exchange rates and their long-run equilibrium. *International Economic Review*, *53*(2), 609–634. https://doi.org/10.1111/j.1468-2354.2012.00694.x

Coricelli, F., & Jazbec, B. (2004). Real exchange rate dynamics in transition economies. *Structural Change and Economic Dynamics*, *15*(1), 83–100. https://doi.org/10.1016/S0954-349X(03)00005-5

De Gregorio, J., Giovannini, A., & Wolf, H. C. (1994). International evidence on tradables and nontradables inflation. *European Economic Review*, *38*(6), 1225–1244.

De Gregorio, J., & Wolf, H. C. (1994). *Terms of trade, productivity, and the real exchange rate*. National Bureau of Economic Research.

Drine, I., & Rault, C. (2002). Does the Balassa-Samuleson hypothesis hold for Asian countries? An empirical investigation. *Applied Econometrics and International Development*, *4*, 59–84.

Dumas, B. (1992). Dynamic equilibrium and the real exchange rate in a spatially separated world. *The Review of Financial Studies*, *5*(2), 153–180.

Dumrongrittikul, T. (2012). Real exchange rate movements in developed and developing economies: A reinterpretation of the Balassa-Samuelson hypothesis. *Economic Record*, *88*(283), 537–553. https://doi.org/10.1111/j.1475-4932.2012.00830.x

Égert, B. (2003). Nominal and real convergence in Estonia: The Balassa-Samuelson (dis) connection. Tradable goods, regulated prices and other culprits. *Working Papers of Eesti Pank*, (4). http://dx.doi.org/10.2139/ssrn.392261

Égert, B. (2005). Balassa-Samuelson meets South Eastern Europe, the CIS and Turkey: A close encounter of the third kind? *William Davidson Institute Working Paper*, 796. http://doi.org/10.2139/ssrn.904368

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: Journal of the Econometric Society*, *55*(2), 251–276.

Estrada, A., & López-Salido, J. D. (2004). Sectoral and aggregate technology growth in Spain. *Spanish Economic Review*, *6*(1), 3–27. https://doi.org/10.2307/1913236

Faruqee, H. (1994). Long-run determinants of the real exchange rate: A stock-flow perspective. *Staff Papers (International Monetary Fund)*, 42(1), 80–107. https://doi.org/10.2307/3867341

Findreng, J. H. (2014). Relative purchasing power parity and the European monetary union: Evidence from Eastern Europe. *Economics & Sociology*, *7*(1), 22–38. https://doi.org/10.14254/2071-789X.2014/7-1/3

Froot, K., & Rogoff, K. (1985). Perspectives on PPP and long-run real exchange rates. In R. Jones & P. Kenen (Eds.), *Handbook of international economics* (Vol. 3). Elsevier.

Funda, J., & Lukinić, G. (2008). Assessment of the Balassa-Samuelson effect in Croatia. *Financial Theory and Practice*, *31*(4), 321–351.

Gibson, H. D., & Malley, J. (2008). The contribution of sectoral productivity differentials to inflation in Greece. *Open Economies Review*, *19*(5), 629–650. https://doi.org/10.1007/s11079-007-9071-3

Goldstein, M., Khan, M. S., & Officer, L. H. (1980). Prices of tradable and nontradable goods in the demand for total imports. *The Review of economics and Statistics*, 190–199.

Hassan, F. (2016). The price of development: The Penn–Balassa–Samuelson effect revisited. *Journal of International Economics*, *102*, 291–309. https://doi.org/10.1016/j.jinteco.2016.07.009

Hinkle, L. E., & Nsengiyumva, F. (1999). External Real Exchange Rates: Purchasing Power Parity, the Mundell-Fleming Model, and Competitiveness in Traded Goods. In L. E. Hinkle, P. J. Montiel (Eds.), *Exchange Rate Misalignment* (pp. 41–104). University Press/World Bank.

Ikeno, H. (2014). Pairwise tests of convergence of Japanese local price levels. *International Review of Economics & Finance*, *31*, 232–248. https://doi.org/10.1016/j.iref.2014.01.019

Ishaq, M., Ghouse, G., & Bhatti, M. I. (2022). Another prospective on real exchange rate and the traded goods prices: Revisiting Balassa–Samuelson hypothesis. *Sustainability*, *14*(13), 7529. https://doi.org/10.3390/su14137529

Ito, T., Isard, P., & Symansky, S. (1999). Economic growth and real exchange rate: An overview of the Balassa-Samuelson hypothesis in Asia. In *Changes in exchange rates in rapidly developing countries: Theory, practice, and policy issues* (NBER-EASE Vol. 7, pp. 109–132). University of Chicago Press.

Jabeen, S., Malik, W. S., & Haider, A. (2011). Testing the Harrod Balassa Sameulson hypothesis: The case of Pakistan. *The Pakistan Development Review*, 379–398.

Jangam, B. P., & Rath, B. N. (2020). Does productivity drive the real exchange rate movements? A re-examination of the Balassa–Samuelson hypothesis. *Journal of Economic Studies*, *47*(5), 1093–1118. https://doi.org/10.30541/v50i4IIpp.379-399

Jazbec, B. (2002). Balassa-Samuelson effect in transition economies: The case of Slovenia. *William Davidson Institute Working Papers Series*, (507). https://doi.org/10.2139/ssrn.346502

Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control*, *12*(2), 231–254.

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—With applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, *52*(2), 169–210.

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica: Journal of the Econometric Society*, *59*(6), 1551–1580.

Kano, K., Kano, T., & Takechi, K. (2013). Exaggerated death of distance: Revisiting distance effects on regional price dispersions. *Journal of International Economics*, *90*(2), 403–413. https://doi.org/10.1016/j.jinteco.2013.02.002

Kakkar, V. (2002). Capital–labor ratios and total factor productivity in the Balassa–Samuelson model. *Review of International Economics*, *10*(1), 166–176. https://doi.org/10.1111/1467-9396.00325

Kakkar, V. (2003). The relative price of nontraded goods and sectoral total factor productivity: An empirical investigation. *Review of Economics and Statistics*, *85*(2), 444–452. https://doi.org/10.1162/003465303765299927

Kakkar, V., & Yan, I. (2012). Real exchange rates and productivity: Evidence from Asia. *Journal of Money, Credit and Banking*, *44*(2–3), 301–322. https://doi.org/10.1111/j.1538-4616.2011.00488.x

Klau, M., & Mihaljek, D. (2003). The Balassa-Samuelson effect in central Europe: A disaggregated analysis. *BIS Working Paper*, (143). http://dx.doi.org/10.2139/ssrn.901206

Konopczak, K., & Torój, A. (2010). Estimating the Baumol-Bowen and Balassa-Samuelson effects in the Polish economy – A disaggregated approach. *Central European Journal of Economic Modelling and Econometrics*, *2*(2), 117–150. https://doi.org/10.24425/cejeme.2010.119324

Lee, M. J., & Tang, M.-K. (2003). Does productivity growth lead to appreciation of the real exchange rate? *International Monetary Fund Working Paper*, (03/154).

Lojschová, A. (2003). *Estimating the impact of the Balassa-Samuelson effect in transition economies*. Institut für Hohere Studien (IHS).

Loko, B., & Tuladhar, A. (2005). Labor productivity and real exchange rate: The Balassa-Samuelson disconnect in the Former Yugoslav Republic of Macedonia. *International Monetary Fund Working Papers*, (113). https://doi.org/10.5089/9781451861327.001

Lommatzsch, K., & Tober, S. (2004). What is behind the real appreciation of the accession countries' currencies? An investigation of the PPI-based real exchange rate. *Economic Systems*, *28*(4), 383–403. https://doi.org/10.1016/j.ecosys.2004.11.001

MacDonald, R., & Ricci, L. A. (2001). PPP and the Balassa Samuelson effect: The role of the distribution sector. *CESifo Working Paper Series* (442). http://dx.doi.org/10.2139/ssrn.268969

MacDonald, R., & Ricci, L. A. (2005). The real exchange rate and the Balassa–Samuelson effect: The role of the distribution sector. *Pacific Economic Review*, *10*(1), 29–48. https://doi.org/10.1111/j.1468-0106.2005.00259.x

Mihaljek, D., & Klau, M. (2004). The Balassa-Samuelson effect in central Europe: A disaggregated analysis. *Comparative Economic Studies, 46*(1), 63–95.

Nagayasu, J. (2017). Regional inflation, spatial locations and the Balassa-Samuelson effect: Evidence from Japan. *Urban Studies*, *54*(6), 1482–1499. https://doi.org/10.1177/0042098016629915

Olson, O. (2009). Productivity demand shocks and Asia-Pacific real exchange rates. *International Business & Economics Research Journal (IBER)*, *8*(2). https://doi.org/10.19030/iber.v8i2.3101

Pedroni, P. (2004). Panel cointegration: Asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis. *Econometric Theory*, *20*(03), 597–625. https://doi.org/10.1017/S0266466604203073

Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association*, *94*(446), 621–634.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, *16*(3), 289–326.

Phillips, P. C., & Loretan, M. (1991). Estimating long-run economic equilibria. *The Review of Economic Studies*, *58*(3), 407–436.

Ricci, L. A., Milesi-Ferretti, G., & Lee, J. (2013). Real exchange rates and fundamentals: A cross-country perspective. *Journal of Money, Credit and Banking*, *45*(5), 845–865.

Rother, C. P. (2000). The impact of productivity differentials on inflation and the real exchange rate: an estimation of the Balassa-Samuelson effect in Slovenia. In *IMF country report. Republic of Slovenia: Selected Issues* (pp. 26–39).

Schmillen, A. (2013). Are wages equal across sectors of production? *Economics of Transition*, *21*(4), 655–682. https://doi.org/10.1111/ecot.12025

Stockman, A. C., & Tesar, L. L. (1990). *Tastes and technology in a two-country model of the business cycle: Explaining international comovements*. National Bureau of Economic Research.

Stock, J. H., & Watson, M. W. (1993). A simple estimator of cointegrating vectors in higher order integrated systems. *Econometrica: Journal of the Econometric Society*, *61*(4), 783–820.

Strauss, J., & Ferris, M. E. (1996). The role of nontraded and traded wages in the productivity differential model. *Southern Economic Journal*, *63*, 327–338.

Tintin, C. (2009). *Testing the Balassa-Samuelson hypothesis: Evidence from 10 OECD countries*. School of Economics and Management Department of Economics. Lund University. https://core.ac.uk/download/pdf/289935691.pdf

Thomas, A., & King, A. (2008). The Balassa–Samuelson hypothesis in the Asia-Pacific region revisited. *Review of International Economics*, *16*(1), 127–141. https://doi.org/10.1111/j.1467-9396.2007.00730.x

Tsen, W. H. (2011). The real exchange rate determination: An empirical investigation. *International Review of Economics & Finance*, *20*(4), 800–811. https://doi.org/10.1016/j.iref.2011.02.002

Wang, P., & Dunne, P. (2003). Real exchange rate fluctuations in East Asia: Generalized impulse-response analysis. *Asian Economic Journal*, *17*(2), 185–203. https://doi.org/10.1111/1467-8381.00167

Wang, W., Xue, J., & Du, C. (2016). The Balassa–Samuelson hypothesis in the developed and developing countries revisited. *Economics Letters*, *146*, 33–38. https://doi.org/10.1016/j.econlet.2016.07.020

Zivot, E. (1994). Single equation conditional error correction model based tests for cointegration. *Discussion Papers in Economics at the University of Washington*, (94–12).

Does the Perceived Authentic Leadership Have a Mediating Role in the Relationship Between Employees' Emotional Intelligence and Self-Compassion?*

Osman Yalap

Department of Emergency Aid and Disaster Management,
Artvin Çoruh University Faculty of Health Sciences, Artvin, Turkiye.
https://orcid.org/0000-0003-1058-2457

Emre Gençay

Department of Transportation Services, Kırsehir Ahi Evran University
Mucur Vocational School, Kırsehir, Türkiye.
https://orcid.org/0000-0001-5159-5401

Abstract

Purpose: The main purpose of this study is to evaluate whether perceived authentic leadership has a mediating role in the relationship between employees' emotional intelligence levels and their self--compassion perceptions.

Design/methodology/approach: All data in the research were obtained from 175 employees in 12 different tea factories. In the study, in which the descriptive and cross-sectional method was followed, the analysis of the data was made with Hayes' (2013) simple mediation analysis approach within the scope of structural equation modeling.

Findings: The results of the analysis show that authentic leadership perceptions of employees are positively related to their emotional intelligence levels and self-compassion perceptions, and that perceived authentic leadership plays a mediating role in this relationship.

---

*   This study is an extended version of the paper presented at the International Symposium of Scientific Research and Innovative Studies held on 22–25 February 2021.

Correspondence address: Department of Emergency Aid and Disaster Management, Artvin Çoruh University Faculty of Health Sciences, Artvin Çoruh Üniversitesi, Merkez Yerleşke, 08000, Merkez, Artvin, Turkiye; Department of Transportation Services, Kırsehir Ahi Evran University Mucur Vocational School, Bağbaşı Mah. Sahir Kurutluoğlu Cad. No: 100 Merkez, Kırsehir, Türkiye; e-mails: osman.yalap@artvin.edu.tr; emre.gencay@ahievran.edu.tr.

Research limitations/implications: The research has some limitations. First, the findings obtained in the course of the analyses are not generalized to the whole population, as they are collected from a specific sample. It should be mentioned that the results were obtained from different institutions.

It can be said that the perceived authentic leadership approach plays a role in the relationship between individual-oriented positive attitudes such as emotional intelligence and self-compassion. Therefore, it is anticipated that the results obtained from the study contribute to the literature. In addition, handling the statistical aspect of the research only with the mediation analysis approach constitutes a separate limitation. Different statistical approaches can be adopted for future studies.

Originality/value: This study presents a fragment of the results of structural equation modeling conducted for tea industry employees in Turkey on the topic of authentic leadership.

Keywords: perceived authentic leadership, employees' emotional intelligence, self-compassion, tea industry employees.

JEL: L20, M12, M21

Czy subiektywnie postrzegane autentyczne przywództwo pełni funkcję mediatora w zależności między inteligencją emocjonalną pracowników a ich samowspółczuciem?

Streszczenie

Cel: głównym celem badania jest ocena czy subiektywnie postrzegane autentyczne przywództwo pełni funkcję mediatora w zależności między poziomem inteligencji emocjonalnej pracowników a ich percepcją samowspółczucia.

Metodologia: wszystkie dane wykorzystane w badaniu pochodzą od 175 pracowników z 12 różnych fabryk herbaty. W badaniu, którego podstawę stanowiła metoda opisowa i przekrojowa, analizę danych przeprowadzono z zastosowaniem prostej analizy mediacji Hayesa (2013) w ramach modelowania równań strukturalnych.

Wyniki: wyniki analizy wskazują, że postrzegane przez pracowników autentyczne przywództwo wykazuje pozytywny związek z poziomem inteligencji emocjonalnej i percepcją samowspółczucia pracowników, a przywództwo to jest w tej zależności mediatorem.

Ograniczenia/implikacje badawcze: badanie ma pewne ograniczenia. Po pierwsze, wyniki analiz nie są uogólnione na całą populację, ponieważ ich podstawą jest specyficzna próba. Należy wspomnieć, że bazują one na danych pozyskanych z różnych instytucji. Można stwierdzić, że podejście oparte na subiektywnie postrzeganym autentycznym przywództwie odgrywa pewną rolę w zależności między indywidualnymi pozytywnymi postawami, takimi jak inteligencja emocjonalna i samowspółczucie. Z tego względu przewiduje się, iż wyniki badania wniosą wkład w literaturę przedmiotu. Ponadto ograniczeniem jest koncentracja na aspekcie statystycznym badania wyłącznie przy zastosowaniu analizy mediacji. W przyszłych badaniach można przyjąć inne metody statystyczne.

Oryginalność/wartość: w artykule zaprezentowano fragment wyników modelowania równań strukturalnych przeprowadzonego wśród pracowników branży herbaciarskiej w Turcji w zakresie autentycznego przywództwa.

Słowa kluczowe: subiektywnie postrzegane autentyczne przywództwo, inteligencja emocjonalna pracowników, samowspółczucie, pracownicy branży herbaciarskiej.

1. Introduction

Organizational behavior, which aims to examine the emotions, thoughts, attitudes, and behaviors of employees in the organizational environment in a scientific and systematic sense, is one of the fields within social sciences (Chandra, 2020). Emotional intelligence, self-compassion and authentic leadership are also discussed in this context. Emotional intelligence is a concept coined in the name of education, psychology, and management studies. The roots of the concept are based on understanding one's own emotions, helping oneself in directing emotional responses, and labeling the experiences of different emotions and helping others to understand and channel their emotions (Landy, 2005; Mayer & Chobb, 2000).

Emotions are handled through three groups that activate individuals against any situation they may encounter in the future, direct their behavior in the later part of their life, and contribute to the control of some of their relations with other people (Scherer, 1993). In other words, emotions are the effort, planning and control needed to give the organizationally expected emotion during organized reactions, interpersonal transactions (Feldman, 1996). Intelligence, on the other hand, is expressed as the ability to add new information to human memory and to abstract and criticize this added information. Intelligence is also defined as the ability of a person to continue their life in harmony with their environment (Clayton, 1983).

Self-compassion consists of three main factors: self-compassion, common humanity, and awareness. While self-compassion requires being empathetic and self-respecting, especially after pain or failure, common humanity is about appreciating that one's successes and failures or thoughts and feelings can be experienced universally. Finally, awareness includes the recognition and awareness of cognitions and emotions without over-identification (Barczak & Eklund, 2020). Authentic leadership makes a positive contribution to managerial effects to improve the positive psychological state of the members of the organization and to create a leadership style that promotes a positive working environment in the organization. It enables them to use their self-awareness, morality, balanced information processing and relational transparency (Liao & Shaw, 2020).

Customers of the service sector, whose main factor is human, are increasingly interested in the level and standards of interaction they enter with the service sector personnel as well as the internal service they receive. Accordingly, this suggests that emotions are very important for the service sector personnel, and a significant part of their efforts is focused on expressing emotions determined by the organization (Morris & Feldman, 1996). According to current theoretical and experimental studies, positive attitudes such as understanding their emotions, putting themselves in customers' shoes (empathy), and self-esteem are related to the relationships that employees in the service sector have with their customers to ensure

customer satisfaction (Kim et al., 2021; Kim & Kim, 2021; Torres & Kline, 2013). In the same vein, it is also thought that workers in the service sector are thus better and more motivated. In the research, it is observed that these feelings are based on the experiences of the personnel and are perceived as valuable by themselves, their colleagues, and the organization. In addition, with the perception of authentic leadership, the emotional states, attitudes, and behaviors of service sector employees are monitored by their leaders, revealing that their personnel act consciously regarding what to do and how to do it. This study aims to examine the mediating role of perceived authentic leadership in the relationship between emotional intelligence and self-compassion by measuring the levels of employees' emotional intelligence, self-compassion perception, and authentic leadership perception.

2. Literature Review

2.1. Emotional Intelligence and Self-Compassion

Emotional intelligence refers to the ability to use emotions effectively, manage them, and form positive relationships with others (Goleman, 2000). Directing the emotions of the employees is effective in establishing productive relationships and reaching the goal effectively (Patton, 1998). Therefore, emotional intelligence has a positive effect on employee performance (Boyatzis, 1999). Self-compassion, on the other hand, is more associated with positive self-esteem (Cast & Burke, 2002; Coopersmith, 1959) and self-efficacy (Maddux, 1995; Bandura & Adams, 1977). As a result of this relationship, an individual becomes more resistant to negative events, and moreover, they can maintain a higher level of emotional intelligence (Wilson et al., 2020).

Studies show that there is a positive relationship between compassion and emotional intelligence levels, which includes the perception of an individual's emotions and the utilization of the information obtained from them while guiding their ideas, actions, and professional practices (Fabio & Saklofske, 2021; Shennar-Golan & Walter, 2020; Casthillo et al., 2017; Şenyuva et al., 2014; Neff, 2011; Heffernan, et al., 2010; Neff, 2003). In this context, the level of self-compassion of an individual can be considered in relation to the effective use of emotions. Therefore, we put forward the following hypothesis:

H_1: *Emotional intelligence is positively related to self-compassion.*

2.2. Emotional Intelligence and Perceived Authentic Leadership

Since authentic leadership focuses on positive emotions such as subjective well-being, optimism, emotional intelligence, and hope, it is recognized in the leadership theories as positive organizational behavior (Luthans et al., 2001; Luthans, 2002; Yammarino, 2013). Therefore, it is stated that leaders with

a high level of emotional perceptions are good at understanding the emotions of others (Mayer et al., 2016). The ability to understand the emotions of others stems from the ability of authentic leaders to empathize with their followers (Miao et al., 2018; Duncan, 2017; Gardner et al., 2009; Humphrey et al., 2008). Furthermore, authentic leadership, according to the Conservation of Resources Theory (Braun & Peus, 2018), makes employees feel that their personal resources (e.g., self-esteem and self-efficacy) and conditional resources (empowerment and status) are protected, which increases employees' psychological capital and reduces work stress and anxiety (Wang et al., 2020). Some experimental research also shows that the leader's authenticity is associated with negative psychological conditions such as anxiety, stress, and depression, as well as positive psychological conditions such as psychological well-being, self-esteem, and self-compassion. In this context, an employee may feel anxious or apprehensive about a given task (Horton, 2017; Rahimnia & Sharifirad, 2015; Tondock, 2013). In this context, it may be claimed that conditions created by authentic leaders' attitudes and behaviors toward their employees when they are stressed, upset, and anxious have the potential to mitigate negative situations.

The basic condition in authentic leadership is to be reliable and act ethically (Cooper et al., 2005). Also, emotional awareness, which includes being conscious of one's own emotions, is one of the basic elements of emotional intelligence, which is a factor in ethical leaders (Avolio & Luthans, 2003). Moreover, literature identifies some characteristic features of an authentic leader. These generally ensue from the relationship between an authentic leader and their followers, positive attitudes such as self-awareness, sense of purpose, balanced and objective decision making, desire to make difference in the world, strong values/ethics (Johnson, 2019). For example, self-awareness entails not merely being aware of one's flaws but also admitting them. Identifying and overcoming one's own flaws may be a challenging task that requires a significant amount of time and personal commitment. Authentic leaders are self-aware in the sense that they are conscious of their own life's goal (Shamir & Eilam, 2005). Self-awareness may be the first step toward true leadership. One cannot fully lead authentically until they understand themselves (Johnson, 2019). From this point of view, it can be stated that it is an important indicator for leaders to consider both their own feelings and the feelings of others in the development of an authentic leader. The leader's ability to perceive emotions is evaluated in the balanced process dimension of authentic leadership. Emotionally intelligent leaders can follow an active and balanced process in expressing their own emotions and directing the emotions of others (Miao et al. 2018; Mayer et al., 2016).

When literature studies are examined, it is seen that authentic leaders with high emotional intelligence have a vast capacity to understand the emotional states of their followers towards their organizations and their

works (Miao et al., 2018; Duncan et al., 2017; Rodriguez, 2016; Kotzé et al., 2015; Berardi, 2015). Leaders who can direct their emotions can use their emotional intelligence to show the antecedents, consequences and meanings of emotions expressed by others (Mayeret al., 2016). Emotionally intelligent leaders can reflect their values and visions to their followers because they can interpret their followers' emotions accurately and effectively and reveal the reasons for their emotions (Miao et al., 2017; Walumbwa et al., 2008). Therefore, leaders who can establish high-quality relationships with their followers based on the principles of social interaction are more likely to be perceived as authentic leaders (Walumbwa et al., 2008). On the other hand, when examining studies on authentic leadership from both theoretical and empirical perspectives, the focus is generally on determining the authenticity of managers with leadership credentials and assessing whether followers perceive any authenticity in their leaders (Walumbwa et al., 2010; Walumbwa et al., 2008). As a result, this study explores employees' attitudes and challenges the perception of authenticity in their leaders. In this context, it was aimed at looking into the sample's perceived authentic leadership level.

In the light of these findings, the following hypothesis was developed:

H_2: *Emotional intelligence is positively related to perceived authentic leadership.*

2.3. Perceived Authentic Leadership and Self-Compassion

According to the self-determination theory, authenticity is externalized when people's actions reflect their true or core self (Ryan & Deci, 2002). Authentic leaders demonstrate self-determination and function autonomously. They are open to stimulating any experience without defense against or fear of exploring it. From this perspective, through emotional sharing, authentic leaders help foster self-compassion for followers while reinforcing themselves in understanding why they suffer (Dutton et al., 2014). In some studies (Banker & Bhal, 2020; Rynes et al., 2012), it is mentioned that it is the responsibility of the leaders to embed moral values in the organization and harmonize them in the behavior of the employees. Therefore, the leader has very important roles in reflecting a high level of self-compassion and an institutionalized organizational culture (Oliveira et al., 2021).

Although the perception of self-compassion stems from the individual's own psychological dynamics, it has no meaning on its own. Therefore, authentic leaders are of great importance in promoting self-compassion in general, both individually and organizationally. Authentic leaders who have strong empathy for employees can create a successful and effective work environment by fostering ethical and moral virtues in employees (Banker & Bhal, 2020). At the same time, this situation establishes a strong bond between the leader and their followers and provides benefits in the formation of a stronger organizational climate (Dutton et al., 2014). In this way, we developed the following hypothesis:

H_3: *Perceived authentic leadership is positively related to self-compassion.*

Studies on emotional intelligence have recently been associated with individuals' self-compassion levels (Fabio & Saklofske, 2021; Shennar-Golan & Walter, 2020) and authentic leadership (Miao et al., 2018; Duncan et al., 2017), which are two construct that are known to positively impact organizations where ethical and moral virtues are common. In addition, theoretical propositions and research suggest that an authentic leader may influence self-compassion by shaping interpersonal and organizational relationships (Tondcok, 2017).

On the other hand, there has been no research investigating either direct or indirect effect of emotional intelligence on self-compassion by the mediation of authentic leadership. Therefore, this study was conducted to explore the nature of the association between emotional intelligence and self-compassion and whether authentic leadership mediates this possible relationship in a causally related way. Accordingly, we put forward the following hypothesis and structural model:

H_4: *Perceived authentic leadership has a mediating role in the relationship between emotional intelligence and self-compassion.*

The structural model of the research is presented in Figure 1.

Figure 1
Structural Model of Study
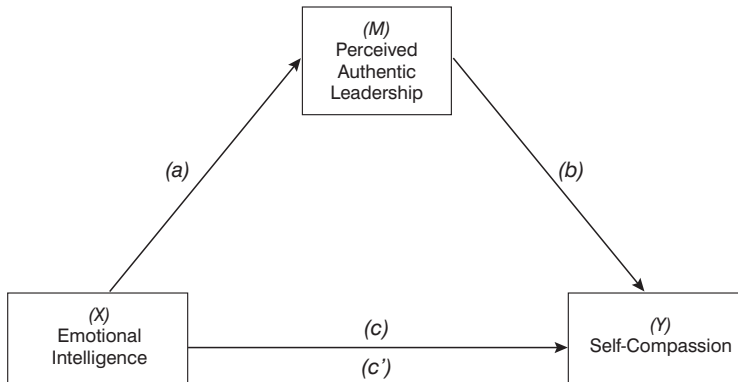
Note. $c = X \rightarrow Y$ (H_1); $a = X \rightarrow M$ (H_2); $b = M \rightarrow Y$ (H_3); $c' =$ Indirect effect $- a.b$ (H_4).

3. Methodology and Procedure

In this study, a methodological and quantitative research method was adopted and a questionnaire technique was used to reach a large sample group. It was aimed at delivering more generalizable results by considering the data obtained from the sample with a deductive approach and conducting statistical analyses on the data in question (Erdemir, 2018). In addition, since the instrument used in the research was a reflection of the variable to be tested in order to measure the attitudes and behaviors of the employees, the data obtained from the sample were collected in a particular timeframe. Therefore, this study contains a cross-sectional element (Yılmaz et al., 2021).

The Simple Mediation Analysis (Model 4) developed by Hayes (2013) was used to test the hypotheses developed within the scope and theoretical model of the research. The data were subjected to mediation analysis with the resampling technique. In this section, information about the design of the study, participants, scales and the research process is given.

3.1. Study Design and Participants

In this study, a descriptive method was used to analyze the theoretically structured model and data were collected by the survey technique. The cross-sectional survey was conducted in the Rize Province, Turkey. On the other hand, with the convenience sampling method (Taherdoost, 2020), the sample of employees working in the tea sector was selected. 200 employees from 12 different tea companies were reached by the convenience sampling method. Questionnaires were distributed to each of the participants and a total of 175 responses (return rate: 87.5%) were collected. The data of the study were collected in January 2021. The ethics committee approval required for the collection of the research data was obtained under number E-18457941-050.01.04-2431 from Artvin Coruh University in Turkey.

In the sample with a mean age of 37.13, 62.3% of the participants were male (n = 109). In addition, in terms of marital status, 65.7% of them were married (n = 115), and most of the participants were university graduates – this percentage was 73.7% (n = 129). The results regarding the demographic characteristics of the participants are presented in Table 1.

Table 1

Demographic Characteristics of the Participants

	Frequency	Percentage	Mean	Standard Deviation	Skewness	Kurtosis
Age	175	100%	37.13	9.07	0.489	-0.401
Gender[a]			1.62	0.48	-0.511	-1.759
Female	66	37.7%				
Male	109	62.3%				
Marital Status[b]			1.34	0.47	0.668	-1.572
Married	115	65.7%				
Single	60	34.3%				
Education[c]			2.83	0.53	-0.797	1.845
Primary school	3	1.7%				
High school	33	18.9%				
Undergraduate	129	73.7%				
Postgraduate	10	5.7%				

Note. n = 175; a = (1 = Female, 2 = Male); b = (1 = Married, 2 = Single); c = (1 = Primary school, 2 = High school, 3 = Undergraduate, 4 = Postgraduate).

3.2. Instruments

3.2.1. Emotional Intelligence (EI)

The 33-item "*Emotional Intelligence Scale*" developed by Schutte et al. (1998), abbreviated by Chan (2006), with 12 items was used (e.g., "*I am aware of emotions as experienced.*"). It has four sub-dimensions. These are: emotional appraisal (3 items), positive regulation (3 items), empathic sensitivity (3 items) and positive utilization (3 items). Each item is scored on a five-point Likert scale (1 – strongly disagree to 5 – strongly agree). It proved to be internally consistent (Cronbach's alpha ranging from .87 to .90) in the original form. It was observed that the scale had been used in many studies in the Turkish culture and the reliability coefficient values are .60 and above (Polatcı & Özyer, 2015; Aslan, 2008). In the presented study, Cronbach's alpha was calculated as .75.

3.2.2. Self-Compassion Short Form (SCS-SF)

The "*Self-Compassion Scale Short Form (SCS-SF)*" with 12 items developed by Raes et al. (2011) was used to measure the participants' self-compassion perceptions (e.g., "*When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.*"). Each item was rated from 1 (strongly disagree) to 5 (strongly agree). The SCS-SF has good reliability (α ≥ 0.86 in all tested samples). The short form of the self-compassion scale was validated in the Turkish culture

by Yıldırım and Sarı (2018), and it was preferred to measure the self-compassion perception level of the sample in this study. In this study, the Cronbach's alpha coefficient was 0.82.

3.2.3. Perceived Authentic Leadership (PAL)

To measure the authentic leadership perception levels of the participants, Walumbwa et al.'s (2008) "*Measure of Authentic Leadership*" scale with 16 items was preferred. As an example, the following item in the measurement tool can be given: "*Solicits views that challenge his or her deeply held positions.*". It is a 5-point Likert-type rating (1 – strongly disagree, 5 – strongly agree). The validation study of the measure in the Turkish culture was carried out by Tabak et al. (2012). Moreover, to measure the perceived authentic leadership levels of the employees, the scale suitable for Turkish culture was preferred. In this study, the reliability coefficient was 0.87.

4. Data Analysis

The data obtained from the sample were subjected to preliminary analysis, and descriptive statistics, correlation analysis, reliability analysis, confirmatory factor analysis and mediation analysis within the scope of Hayes' (2013) *Simple Mediation Approach* were applied to the variables. In addition, the common method error variance of the instruments was calculated, and all processes were carried out using IBM SPSS 24.

To test the construct validity of the measurement tools, confirmatory factor analysis was applied, and this analysis was carried out within the framework of the LISREL 8 statistical package program. Model goodness of fit values related to measurement tools, chi-square statistic (χ^2/df), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), comparative fit index (CFI), normed fit index (NFI), and the root mean square error of approximation (RMSEA) is preferred as it is supported in the literature (Bentler, 1995; Hu & Bentler, 1999; Hallberg & Schaufeli, 2006).

Model 4 of Hayes' (2013) SPSS macro-PROCESS for assessing the mediation effect was used to investigate the mediating function of perceived authentic leadership and to verify the hypotheses, following the approach outlined in Preacher et al. (2007) and Hayes (2013). (2018). The SPSS macro-PROCESS produces unstandardized coefficients and biased adjusted confidence intervals (CIs) in a single step using bootstrapping (n = 5000). Finally, age, gender, marital status, and education were included as control variables.

5. Results

5.1. Common Method Bias

Detection of common method bias, which is seen as a potential concern in the research, and robustness checks are of great importance. To check for this, we applied Harman's single factor test. Therefore, we applied exploratory factor analysis to all measurement intervals of all variables. We investigated whether the variables had explanationable variances from a single-factor or multidimensional analysis (Podsakoff et al., 2003). According to the results of the exploratory factor analysis, it was observed that there was a structure in a few factors and none of the factors had the covariance of more than 50% (the highest covariance was a single-factor structure with 41.26%).

5.2. Construct Validity and Confirmatory Factor Analysis

In the presented study, CR and Croanbach's alpha values were calculated for the composite reliability of the measurement tools used in the structural measurement model, and AVE values were calculated for the construct validity. The results are presented in Table 2. It was determined that AVE scores were higher than 0.50, CR scores were higher than 0.70 and AVE scores, and the square root values of AVE scores were higher than the intercorrelation coefficients. In this context, it is shown that the measurement tools can successfully measure their own latent structures, unlike other latent structures (Hu & Bentler, 1999; Henseler et al., 2015).

After testing the construct validity of the measurement tools, confirmatory factor analysis was conducted for the validity of the structural model developed in line with the purpose of the research. It was observed that the best structural model goodness of fit values with one-factor structure were statistically significant (χ^2/df = 998.45/489; RMSEA= 0.077; GFI = 0.91; CFI= 0.92; AGFI= 0.90; NFI= 0.91) (Bentler, 1995; Hu & Bentler, 1999; Hallberg & Schaufeli, 2006).

5.3. Descriptive Statistical Analysis and Correlation Analysis of Variables

The means, standard deviations, and intercorrelations for all variables of this study are presented in Table 2.

As shown in Table 2, only emotional intelligence was found to have statistically significant relationships with some control variables. According to this, emotional intelligence is strongly correlated with age ($r = -0.18$; $p < .05$), gender ($r = -0.17$; $p < 0.05$), and marital status ($r = -0.16$; $p < 0.05$). But no intercorrelation was proved between emotional intelligence and education. On the other hand, there are no statistically significant relationships between control variables and authentic leadership and self-compassion.

Table 2
Means, SDs, Intercorrelations, SWs, KRTs, CRs and AVEs

	Mean	SD[a]	SW[b]	KRT[c]	1	2	3	4	5	6	7	CR	AVE
Control variables													
1 – Age	37.13	9.07	0.113	-0.858									
2 – Gender	1.62	0.48	-2.059	2.265	0.16*								
3 – Marital Status	1.34	0.47	1.304	-0.365	0.30*	-0.10							
4 – Education	2.83	0.53	-0.071	-1.161	-0.10	-0.02	-0.02						
Independent variable													
5 – Emotional intelligence	3.25	0.66	-0.419	0.508	-0.18*	-0.17*	0.16*	-0.04	(0.76)			0.93	0.59
Mediator variable													
6 – Perceived authentic leadership	3.79	0.52	-0.291	-0.509	-0.02	-0.03	-0.08	-0.01	0.32*	(0.73)		0.92	0.54
Dependent variable													
7 – Self-compassion	3.32	0.51	-0.187	0.780	-0.03	0.06	0.03	-0.03	0.26*	0.27*	(0.78)	0.94	0.62

Note. N = 175; a = Standard deviation; b = Skewness; c = Kurtosis; * $p < 0.05$; the values in parentheses are the square root of AVE.

Emotional intelligence was strongly and positively correlated with authentic leadership ($r = 0.32$; $p < 0.05$) and self-compassion ($r = 0.16$; $p < 0.05$). Lastly, authentic leadership as a mediator variable was strongly and positively correlated with self-compassion ($r = 0.18$; $p < 0.05$).

5.4. Test of Hypotheses

In this study, we examined the effect of emotional intelligence on self-compassion, outcome variable, via authentic leadership, which was tested by dividing it into direct and indirect effect. To test the hypotheses, we used Model 4 of Hayes' (2013) SPSS macro-PROCESS for estimating the mediation effect. The results are presented in Table 3.

Table 3
Results From the Mediation Model (Model 4)

Independent and mediator variables		Mediator variable		Dependent variable	
		M (PAL)		Y (SCF-SF)	
		b	SH	b	SH
X (EI)	a	0.24*	0.05	c'	0.15*	0.05
M (PAL)	–	–	–	b	0.18*	0.07
Constant	-M	3.00	0.18	-Y	2.19	0.30
		R²= 0.10		R²= 0.09	
		F (1; 173) = 20.0311; p <0.001		F (2; 172) = 9.0316; p <0.001	
Indirect Effect		a.b = 0.04*, 95% CI [0.006, 0.098]			

Note. N = 175; EI (*X*) = Emotional intelligence; PAL (*M*) = Perceived authentic leadership; SCF-SF (*Y*)= Self-compassion; β represents unstandardized regression coefficients with the ordinary least squares (OLS) regression method. * p < 0.001.

First, we tested Hypothesis 1, which predicts that emotional intelligence is positively related to self-compassion. As shown in Table 3, the results demonstrate that emotional intelligence has a significant and positive effect on self-compassion ($\beta = 0.15$; $p < 0.001$). Thus, Hypothesis 1 is supported. Hypothesis 2 states that emotional intelligence is positively related to authentic leadership. As seen in Table 3, the results indicate that emotional intelligence has a significant and positive effect on authentic leadership ($\beta = 0.24$; $p < 0.001$). Thus, Hypothesis 2 is supported. Hypothesis 3 predicted that authentic leadership is positively related to self-compassion. As can be seen in Table 3, the result demonstrate that authentic leadership has a significant and positive effect on self-compassion ($\beta = 0.18$; $p<0.001$). Through this result, Hypothesis 3 is supported.

Finally, according to the results in Table 3, a 95% bias-corrected confidence interval based on 5000 bootstrap resamples indicates that the indirect effect of emotional intelligence on self-compassion ($\beta = 0.04$; 95% boot CI: lower = 0.006, upper = 0.098) is significantly different from zero. Hence, the indirect effect of emotional intelligence on the outcome variable is significant. In other words, our analyses suggest that authentic leadership completely mediates the relationship between emotional intelligence and self-compassion. Thus, Hypothesis 4 is supported.

6. Discussion, Theoretical and Practical Contribution

The purpose of this study was to examine the relationship between emotional intelligence and self-compassion. As expected, we have found that employees with higher emotional intelligence reported higher levels of self-compassion. This is line with the previous studies which revealed a positive relationship between emotional intelligence and self-compassion (Hashemi, 2019; Adıgüzel & Kuloğlu, 2019; Neff, 2013; Heffernan et al., 2010).

Although there are studies examining the relationship between emotional intelligence and self-compassion, especially in the organizational behavior literature, no study has been found in which perceived authentic leadership is considered as a mediating variable (Di Fabio & Saklofske, 2021; Şenyuva et al., 2014; Heffernan et al., 2010). Therefore, this study has its own peculiarity. In this context, the main objective of the research was to determine the mediating role of perceived authentic leadership in the association of emotional intelligence with self-compassion. According to the results of the tested developed hypothesis, we found that perceived authentic leadership has a mediating role in the relationship between emotional intelligence and self-compassion.

Hypothesis 1 was tested and a positive relationship was found between employees› emotional intelligence levels and their self-compassion perceptions. Although there are studies in the literature that support this finding (Di Fabio & Saklofske, 2021; Shennaar-Golan & Walter, 2020), it can be suggested that the concept of self-compassion, which is considered a positive personality trait and has been the subject of recent research, should also be considered as an organizational result rather than a psychological outcome. Employees who are empathetic and compassionate towards their co-workers, for example, can be studied in respect of relationships with job satisfaction, performance, workforce turnover, and organizational commitment.

Hypothesis 2 was supported, demonstrating a positive relationship between the sample's emotional intelligence level and their perceived authenticity of their leader. Much research reinforces our findings by examining authentic leadership and emotional intelligence jointly (Miao et al., 2018; Kotzé & Nel, 2015). Employees' levels of emotional intelligence rise among leaders

and followers in mutual social engagement, as does their level of authenticity toward their leaders. Studies analyzing both employee views and attitudes as well as emotional intelligence, which demonstrates the authentic direction of leaders, can add to the literature on authentic leadership.

Hypothesis 3 is related to the authentic leadership perception and self-compassion relationship of the sample. The findings show that there is a positive and significant relationship between the participants' perception of authentic leadership and their self-compassion levels. It is observed that there are a limited number of studies examining the concept of self-compassion (Hu et al., 2018; Tondock, 2013), which has been discussed in the organizational behavior literature, and authentic leadership, which is one of the leadership types of research. Although there are studies supporting the result we have obtained, it can be suggested that the concepts of authentic leadership and self-compassion can be used together, especially in future studies. This is because the ability to establish strong relationships and give importance to values and commitment to ethics and morality, which are characteristic features of authentic leadership, can be considered together with self-compassion (Johnson, 2019).

Finally, Hypothesis 4 in the structural model of the research was tested as to whether perceived authentic leadership had a mediating role. When the concept of authentic leader, which is considered as a mediator variable in this study, is mentioned, the main element used by an authentic leader in influencing their followers is the leader's reliability. In other words, authentic leaders are accepted as reliable leaders by their followers because they act transparently in their decisions and practices, depending on ethical values (Kernis, 2003). On the other hand, when authentic leadership is evaluated as a process, it combines positive leadership capability with the concept of advanced organization (Avolio & Luthans, 2003). In this context, it can play an active role in directing the emotions of employees and using their emotional intelligence.

The results of those theoretical studies on authentic leadership show that the number of people trying to know and understand authentic leaders is increasing. In addition, those who feel psychologically strong, like authentic leaders, have more ownership of their work (Qiu, 2019; Horton, 2017; Tondock, 2013; Walumbwa et al., 2010).

7. Limitations and Future Research

Although useful results were obtained in this study to contribute to the literature, it is obvious that there are some limitations regarding future studies. They regard the fact that the participants' own self-reports were used in the data collection tools. Thus, although the participants provided their self-reports, they may have given socially desirable responses. Research on self-reported performance, however, suggests that self-report data are

comparable to ratings from other sources (Facteau & Craig, 2001). On the other hand, obtaining the research data horizontally and collecting them from a single sample is not sufficient to report diverse results. Therefore, longitudinal studies with different research designs can be adopted for future research. In this way, authentic leadership perceptions of employees can be compared with data obtained in different time periods.

Second, while we did conduct data analyses, the results from a single sample might lead to a probable common method variance. In future research, it is advised that employees' authentic leadership perception levels be tackled using the categories of moral principles, discipline, and self-efficacy, which are typical characteristics of authenticity. Also, the present study suggests that the mediating role of perceived authentic leadership is useful in understanding the effects of emotional intelligence on self-compassion. For this reason, the future research directions should explore other possible mediators (e.g., charismatic leadership, paternalistic leadership) of this relationship. In this respect, it can be examined whether different leadership concepts have mediator or moderator roles in directing emotional intelligence of employees.

The results of this study have several important practical implications. First, organizations may increase employees' emotional intelligence and self-compassion by boosting the perceived authentic leadership qualities of managers. As the results from the presented study suggest, emotional intelligence and self-compassion are positively affected by authentic leadership. Second, this study suggests that clearly there is a role for various types of leaders. Third, top management of organizations should acknowledge the value of being authentic.

With all these limitations of the study, new suggestions can be made for future research. Especially for quantitative studies, new directions can be set to minimize the limitations. New and current approaches proposed for mediation analysis can be tested. Approaches such as adopted by Baron and Kenny (1986) and Hayes (2017) can be evaluated separately within the scope of future research and discussed statistically. The elimination of statistical errors and new directions in quantitative research are among the issues that should not be ignored for further studies (Shlomo, 2018).

8. Conclusion

Our study looks at the relationship between the emotional intelligence levels of service sector employees and their self-compassion perceptions. It has been questioned whether service sector employees' perceptions of authenticity toward their leaders have a moderating effect. Finally, there are significant relationships between emotional intelligence, self-compassion, and the feeling of authentic leadership. It has been established that employees' level of authenticity toward their leaders serves as a gateway between

emotional intelligence and self-compassion. Also, by controlling emotions and ascribe meaning to employees' attitudes and behaviors, authentic leaders enable their followers to be more compassionate.

Funding

References

Adıgüzel, Z., & Kuloğlu, E. (2019). Examination of the effects of emotional intelligence and authentic leadership on the employees in the organizations. *International Journal of Organizational Leadership*, *8*, 13–30. https://doi.org/10.33844/ijol.2019.60412

Aslan, Ş. (2008). Duygusal zekâ ve tükenmişlik arasındaki ilişkilerin araştırılması: sağlık çalışanları örneği. *Journal of Erciyes University Faculty of Economics and Administrative Sciences*, *30*(1), 77–97.

Avolio, B. J., & Luthans, F. (2003). Authentic leadership: A positive development approach. In K.S. Cameron, J.E. Dutton, & R.E. Quinn (Eds.), *Positive organizational scholarship* (pp. 241–261)*.* Barrett-Koehler.

Bandura, A., & Adams, N. E. (1977). Analysis of self-efficacy theory of behavioral change. *Cognitive Therapy and Research*, *1*(4), 287–310. https://doi.org/10.1037/0003-066X.37.2.122

Banker, D. V., & Bhal, K. T. (2020). Understanding compassion from practicing managers' perspective: Vicious and virtuous forces in business organizations. *Global Business Review*, *21*(1), 262–278. https://doi.org/10.1177/0972150917749279

Barczak, N., & Eklund, R. C. (2020). The moderating effect of self-compassion on relationships between performance and subsequent coping and motivation. *International Journal of Sport and Exercise Psychology*, *18*(2), 256–268. https://doi.org/10.1080/1612197X.2018.1511620

Bentler, P. M. (1995). *Eqs structural equations program manual*. Multivariate Software.

Berardi, P. D. (2015). *The relationship between emotional intelligence and authentic leadership in naval special warfare leadership* [Unpublished doctoral dissertation]. Capella University.

Boyatzis, R. E. (1999). *Self-directed change and learning as a necessary metacompetency for success and effectiveness in the 21st century*. In R. Sims & J. G. Veres (Eds.), *Keys to employee success in the coming decades* (pp. 15–32). Greenwood.

Braun, S., & Peus, C. (2018). Crossover of work–life balance perceptions: Does authentic leadership matter? *Journal of Business Ethics*, *149*, 875–893.

Cast, A. D., & Burke, P. J. (2002). A theory of self-esteem. *Social Forces*, *80*(3), 1041–1068.

Castilho, P., Carvalho, S. A., Marques, S., & Pinto-Gouveia, J. (2017). Self-compassion and emotional intelligence in adolescence: A multigroup mediational study of the impact of shame memories on depressive symptoms. *Journal of Child and Family Studies*, *26*(3), 759–768. https://doi.org/10.1007/s10826-016-0613-4

Clayton, V. (1983). Wisdom and intelligence: The nature and function of knowledge in the later years. *The International Journal of Aging and Human Development*, *15*(4), 315–321.

Chandra, Y. (2020). Online education during COVID-19: Perception of academic stress and emotional intelligence coping strategies among college students. *Asian Education and Development Studies*, *10*(2), 2046–3162. https://doi.org/10.1108/AEDS-05-2020-0097

Coopersmith, S. (1959). A method for determining types of self-esteem. *The Journal of Abnormal and Social Psychology*, *59*(1), 87.

Cooper, C. D., Scandura, T. A., & Schriesheim, C. A. (2005). Looking forward but learning from our past: Potential challenges to developing authentic leadership theory and authentic leaders. *The Leadership Quarterly*, *16*(3), 475–493.

Di Fabio, A., & Saklofske, D. H. (2021). The relationship of compassion and self-compassion with personality and emotional intelligence. *Personality and İndividual Differences*, *169*, Article 110109. https://doi.org/10.1016/j.paid.2020.110109

Duncan, P., Green, M., Gergen, E., & Ecung, W. (2017). Authentic leadership – Is it more than emotional intelligence? *Administrative Issues Journal*, *7*(2), 11–22. https://doi.org/ 10.5929/2017.7.2.2

Dutton, J. E., Workman, K. M., & Hardin, A. E. (2014). Compassion at work. *Annual Review of Organizational Psychology and Organizational Behavior*, *1*(1), 277–304.

Erdemir, E. (2018). Yönetim araştırmalarında ölçek kullanımı. *Journal of Management and Organization Studies*, *3*(2), 5–32.

Facteau, J. D., & Craig, S. B. (2001). Are performance appraisal ratings from different rating sources comparable? *Journal of Applied Psychology*, *86*(2), 215. https://doi.org/10.1037//0-21-9010.86.2.215

Gardner, W. L., Fischer, D., & Hunt, J. G. J. (2009). Emotional labor and leadership: A threat to authenticity? *The Leadership Quarterly*, *20*(3), 466–482. https://doi.org/ http://dx.doi.org/10.1016/j.leaqua.2009.03.011

Goleman, D. (2000). *Emotional intelligence: Why emotional ıntelligence higher than IQ*. Gramedia Pustaka Utama.

Hallberg, U. E., & Schaufeli, W. B. (2006). "Same Same" but different? Can work engagement be discriminated from job involvement and organizational commitment? *European Psychologist*, *11*(2), 119–127. https://psycnet.apa.org/doi/10.1027/1016-9040.11.2.119

Hashemi, S. E. (2019). *The relationship between authentic leadership and emotional intelligence with the moderation ımpact of resiliency* [Doctoral dissertation, The Chicago School of Professional Psychology].

Hayes, A. F. (2013), *Mediation, moderation, and conditional process analysis. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*, The Guilford Press.

Heffernan, M., Quinn Griffin, M. T., McNulty, S. R., & Fitzpatrick, J. J. (2010). Self-compassion and emotional intelligence in nurses. *International Journal of Nursing Practice*, *16*(4), 366–373. https://doi.org/ 10.1111/j.1440-172X.2010.01853.x

Horton, N. L. (2017). *Does leadership style predict higher levels of self-compassion, subjective well-being, and job satisfaction?* [Doctoral dissertation, The Chicago School of Professional Psychology].

Hu, Y., Wu, X., Zong, Z., Xiao, Y., Maguire, P., Qu, F., Wei, J., & Wang, D. (2018). Authentic leadership and proactive behavior: the role of psychological capital and compassion at work. *Frontiers in Psychology*, 9(1), Article 2470.

Hu, L., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Humphrey, R. H., Pollack, J. M., & Hawver, T. (2008). Leading with emotional labor. *Journal of Managerial Psychology*. *23*(2), 151–168.

Johnson, S. L. (2019). Authentic leadership theory and practical applications in nuclear medicine. *Journal of Nuclear Medicine Technology*, *47*(3), 181–188.

Landy, F. J. (2005). Some historical and scientific issues related to research on emotional intelligence. *Journal of Organizational Behavior*, *26*(4), 411–424.

Luthans, F., Luthans, K. W., Hodgetts, R. M., & Luthans, B. C. (2001). Positive approach to leadership (PAL) implications for today's organizations. *Journal of Leadership Studies*, *8*(2), 3–20.

Luthans, F. (2002). Positive organizational behavior: Developing and managing Psychological strengths. *Academy of Management Executive*, *16*(1), 57–72. https://doi.org/10.5465/ame.2002.6640181

Kernis, M. H. (2003). Toward a conceptualization of optimal self-esteem. *Psychological Inquiry*, *14*(1), 1–26. https://doi.org/10.1207/S15327965PLI1401_01

Kim, M., & Kim, J. (2021). Corporate social responsibility, employee engagement, well-being and the task performance of frontline employees. *Management Decision*, *59*(8), 2040–2056.

Kim, J. S., Milliman, J. F., & Lucas, A. F. (2021). Effects of CSR on affective organizational commitment via organizational justice and organization-based self-esteem. *International Journal of Hospitality Management*, *92*, Article 102691.

Kotzé, M., & Nel, P. (2017). Personal factor effects on authentic leadership. *Journal of Psychology in Africa*, *27*(1), 47–53. https://doi.org/10.1080/14330237.2016.126829

Jöreskog, K. G., & Sörbom, D. (2006). LISREL 8.80. *Lincolnwood, IL: Scientific Software International Inc*.

Maddux, J. E. (1995). Self-efficacy theory. In *Self-efficacy, adaptation, and adjustment* (pp. 3–33). Springer.

Mayer, J. D., Caruso, D. R., & Salovey, P. (2016). The ability model of emotional intelligence: Principles and updates. *Emotion Review*, *8*(4), 290–300. https://doi.org/10.1177/1754073916639667

Mayer, J. D., & Cobb, C. D. (2000). Educational policy on emotional intelligence: Does it make sense? *Educational Psychology Review*, *12*, 163–183.

Miao, C., Humphrey, R. H., & Qian, S. (2018). Emotional intelligence and authentic leadership: A meta-analysis. *Leadership & Organization Development Journal*, *39*(5), 679–690. https://doi.org/ 10.1108/LODJ-02-2018-0066

Morris, J. A., & Feldman, D. C. (1996). The dimensions, antecedents, and consequences of emotional labor. *Academy of Management Review*, *21*(4), 986–1010.

Neff, K. D. (2011). Self-compassion, self-esteem, and well-being. *Social and Personality Psychology Compass*, *5*(1), 1–12. https://doi.org/ 10.1111/j.1751-9004.2010.00330.x

Neff, K. D. (2003). The development and validation of a scale to measure self-compassion. *Self and Identity*, *2*(3), 223–250.

Oliveira, M., Lopes, J. M., Santos, T. C. S. D. M. D., Gomes, S., & Sousa, M. (2021). Authentic leadership and its interactions with the compassion and humility of employees. *Academy of Strategic Management Journal*, *20(1)*, 1–11.

Patton, P. (1998). *EQ Platform for achieving personal success and career*. PT Mitra Media.

Preacher, K., Rucker, D., & Hayes, A. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, *42*(1), 185–227.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879. https://doi.org/10.1037/0021-9010. 88.5.879

Polatcı, S., & Özyer, K. (2015). Duygusal emek stratejilerinin duygusal zekanın tükenmişliğe etkisindeki aracılık rolü. *Bolu Abant İzzet Baysal University Journal of Social Sciences Institute*, *15*(3), 131–156.

Qiu, S., Alizadeh, A., Dooley, L. M., & Zhang, R. (2019). The effects of authentic leadership on trust in leaders, organizational citizenship behavior, and service quality in the Chinese hospitality industry. *Journal of Hospitality and Tourism Management*, *40*, 77–87. https://doi.org/10.1016/j.jhtm.2019.06.004

Rahimnia, F., & Sharifirad, M. S. (2015). Authentic leadership and employee well-being: The mediating role of attachment insecurity. *Journal of Business Ethics*, *132*, 363–377.

Rodriguez, J. (2016). *Emotional intelligence and authentic leadership: An empirical exploration of two emerging theoretical constructs*. Our Lady of the Lake University.

Shamir B, & Eilam G. (2005). "What's your story?" A life-stories approach to authentic leadership development. *The Leadership Quaterly, 16*(1), 395–417.

Shenaar-Golan, V., & Walter, O. (2020). Do emotional ıntelligence and self-compassion affect disordered eating perceptions? *American Journal of Health Behavior*, *44*(4), 384–391. https://doi.org/10.5993/AJHB.44.4.2

Şenyuva, E., Kaya, H., Işik, B., & Bodur, G. (2014). Relationship between self-compassion and emotional intelligence in nursing students. *International Journal of Nursing Practice*, *20*(6), 588–596. https://doi.org/10.1111/ijn.12204

Scherer, K. R. (1993). Studying the emotion-antecedent appraisal process: An expert system approach. *Cognition & Emotion*, *7*(3–4), 325–355.

Shaw, K. H., Tang, N., & Liao, H. Y. (2020). Authoritarian-benevolent leadership, moral disengagement, and follower unethical pro-organizational behavior: An investigation of the effects of ambidextrous leadership. *Frontiers in Psychology*, *11*(590), 1–11. https://doi.org/10.3389/fpsyg.2020.00590

Shennar-Golan, V., & Walter, O. (2018). Physical activity intensity among adolescents and association with parent–adolescent relationship and well-being. *American Journal of Men's Health*, *12*(5), 1530–1540. https://doi.org/10.1177/1557988318768600

Shlomo, N. (2018). Statistical disclosure limitation: New directions and challenges. *Journal of Privacy and Confidentiality*, *8*(1), 1–17.

Tabak, A., Polat, M., Coşar, S., & Türköz, T. (2012). Otantik liderlik ölçeği: güvenirlik ve geçerlik çalışması. *ISGUC The Journal of Industrial Relations and Human Resources*, *14*(4), 89–106.

Tondock, B. (2013). *Does self-compassion ıncrease the authenticity of a leader? How self-compassion can enhance authentic leadership development* [Unpublished master's thesis]. University of Westminster, London, UK.

Torres, E. N, & Kline, S. (2013). From customer satisfaction to customer delight: Creating a new standard of service for the hotel industry. *International Journal of Contemporary Hospitality Management*, *25*(5), 642–659.

Walumbwa, F. O., Peterson, S. J., Avolio, B. J., & Hartnell, C. A. (2010). An investigation of the relationships among leader and follower psychological capital, service climate, and job performance. *Personnel Psychology*, *63*(4), 937–963.

Walumbwa, F.O., Avolio, B.J., Gardner, W., Wernsing, T. & Peterson, S. (2008). Authentic leadership: Development and validation of a theory-based measure. *Journal of Management, 34*(1), 89–126. https://doi.org/10.1177/0149206307308913

Wang, D., Kan, W., Qin, S., Zhao, C., Sun, Y., Mao, W., Bian, X., Ou, Y., Zhao, Z., & Hu, Y. (2021). How authentic leadership impacts on job insecurity: The multiple mediating role of psychological empowerment and psychological capital. *Stress and Health*, 37(1), 60–71.

Wilson, J. M., Weiss, A., & Shook, N. J. (2020). Mindfulness, self-compassion, and savoring: Factors that explain the relation between perceived social support and well-being. *Personality and Individual Differences*, *152*, Article 109568. https://doi.org/10.1016/j.paid.2019.109568

Yammarino, F. (2013). Leadership: Past, present, and future. *Journal of Leadership & Organizational Studies*, *20*(2), 149–155. https://doi.org/10.1177/1548051812471559.

Yılmaz, Y., Sizer, L., & Aslan, S. (2021). *Sosyal bilimlerde güncel araştırmalar*. Astana Publications.

Yıldırım, M., & Sarı, T. (2018). Öz-şefkat ölçeği kısa formu'nun Türkçe uyarlaması: geçerlik ve güvenirlik çalışması. *Journal of Abant İzzet Baysal University Education Faculty*, *18*(4), 2502–2517.

The Effects of Employee Performance Appraisal on the Company Performance Results: The Mediating Role of HRM Outcomes With an Innovative Application of the Efficiency Index

Marzena Stor

Wroclaw University of Economics and Business, Poland
https://orcid.org/0000-0002-3744-791X

Abstract

Purpose: The main goal of the article, identified with the main research problem, is to determine the mediating role of HRM outcomes in the relationships between employee performance appraisal (EPA) and company performance results and to establish whether there are any identifiable regularities in this scope in four specific contexts, i.e. the pre-pandemic and pandemic periods of COVID-19 in the HQs and foreign subsidiaries of MNCs.

Design/methodology/approach: The empirical research included 200 MNCs headquartered in Central Europe. To capture the actual relations between the variables under study, the raw data in the variables were adjusted with the efficiency index (EI), which is a novelty in this type of research. The Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to verify the research hypotheses and assess the mediating effects.

Findings: EPA had a positive effect on results in HRM, finance, innovativeness and quality, both in the pre-pandemic and pandemic periods, although this effect was not always statistically significant. Furthermore, the company's performance results in HRM mediate positively the relationships between EPA and the other three categories of company performance results, regardless of the organizational level (HQs' or subsidiaries') and time period under consideration. Additionally, during the pandemic, the company's performance results in HRM mediate the relationships between EPA and the company's performance results in innovativeness stronger than in the pre-pandemic time, both at the HQs and local subsidiaries. This suggests that the EPA used such solutions in conjunction with other HRM subfunctions that stimulated entrepreneurial, creative and innovative behavior of employees in such a way that organizations could achieve better innovation results during the crisis than before it.

Research limitations/implications: The study has some limitations, including the research sample's structure, not fully representing the general population. Only HQs respondents were asked about perfor-

Correspondence address: Wroclaw University of Economics and Business, Komandorska 118/120, 53-345 Wrocław, Poland; e-mail: marzena.stor@ue.wroc.pl.

mance results in foreign subsidiaries, excluding local informants. The qualitative benchmarking method used is problematic, relying on comparisons instead of objective measures. Furthermore, the analysis did not consider potential differences in economic, legal, or social conditions among the various countries where foreign subsidiaries were located.

Originality/value: In addition to confirming the results of some other studies, the article also provides new knowledge. It determines the mediating role of HRM outcomes in the relationship between EPA and company performance results in finance, innovativeness, and quality. Moreover, it identifies certain regularities in the four studied contexts, which is a novelty in this type of research. It also uses an innovative approach to including employee KPIs as the efficiency index in analyzing the relationships between the variables under study.

Keywords: employee performance appraisal, MNC, HRM, performance, finance, innovativeness, quality.

JEL: M12, L25, M16

Wpływ oceny pracowniczej na wyniki przedsiębiorstwa – mediacyjna rola rezultatów ZZL przy nowatorskim zastosowaniu wskaźnika efektywności

Streszczenie

Cel: głównym celem artykułu, utożsamianym z głównym problemem badawczym, jest określenie mediacyjnej roli rezultatów ZZL w relacjach między oceną pracowniczą (OP) a wynikami przedsiębiorstwa oraz ustalenie czy występują w tym zakresie identyfikowalne prawidłowości w czterech specyficznych kontekstach, tj. w okresie przedpandemicznym i pandemicznym COVID-19 oraz w centralach i jednostkach przedsiębiorstw międzynarodowych.

Metodologia: badanie empiryczne objęło 200 przedsiębiorstw międzynarodowych z siedzibą w Europie Środkowej. Aby uchwycić faktyczne relacje między badanymi zmiennymi, surowe dane w zmiennych skorygowano o wskaźnik efektywności (EI), który jest nowością w tego typu badaniach. Do weryfikacji hipotez badawczych i oceny efektów pośredniczących wykorzystano modelowanie równań strukturalnych metodą cząstkowych najmniejszych kwadratów (PLS-SEM).

Wyniki: OP pozytywnie wpłynęła na wyniki w zakresie ZZL, finansów, innowacyjności i jakości, zarówno w okresie przedpandemicznym, jak i pandemicznym, choć efekt ten nie zawsze był istotny statystycznie. Co więcej, wyniki firmy w zakresie ZZL pozytywnie pośredniczą w relacjach między OP a pozostałymi trzema kategoriami wyników przedsiębiorstwa, niezależnie od poziomu organizacyjnego (centrali lub jednostki zagranicznej) i rozważanego okresu czasu. Dodatkowo w czasie pandemii wyniki w ZZL pośredniczą w relacjach między OP a wynikami przedsiębiorstwa w innowacyjności silniejszej niż przed pandemią, zarówno w centrali, jak i jednostkach zagranicznych. Sugeruje to, że w OP stosowano takie rozwiązania w połączeniu z innymi subfunkcjami ZZL, które stymulowały przedsiębiorcze, kreatywne i innowacyjne zachowania pracowników w taki sposób, że organizacje mogły osiągać lepsze wyniki innowacyjne w czasie kryzysu niż przed nim.

Ograniczenia/implikacje badawcze: badanie ma pewne ograniczenia, w tym strukturę próby badawczej, która nie w pełni reprezentuje populację ogólną. Tylko respondenci centrali zostali zapytani o wyniki w zagranicznych spółkach zależnych, z wyłączeniem lokalnych informatorów. Zastosowana jakościowa metoda benchmarkingu opiera się na porównaniach, a nie na obiektywnych pomiarach. Ponadto w analizie nie uwzględniono potencjalnych różnic w warunkach ekonomicznych, prawnych czy społecznych pomiędzy różnymi krajami, w których zlokalizowane były jednostki zagraniczne.

Oryginalność/wartość: oprócz potwierdzenia wyników kilku innych badań, artykuł dostarcza również nowej wiedzy. Określa pośredniczącą rolę wyników ZZL w relacji między OP a wynikami organizacji

w zakresie finansów, innowacyjności i jakości. Ponadto identyfikuje pewne prawidłowości w czterech badanych kontekstach, co jest nowością w tego typu badaniach. Wykorzystuje również nowatorskie podejście do uwzględnienia KPI pracowników jako wskaźnika efektywności w analizie zależności pomiędzy badanymi zmiennymi.

Słowa kluczowe: ocena pracownicza, przedsiębiorstwo międzynarodowe, ZZL, wyniki przedsiębiorstwa, finanse, innowacyjność, jakość.

1. Introduction

The relationship between company performance and human resources management (HRM) practices has attracted ongoing research interest for several decades (see, e.g., Becker & Gerhart, 1996; Stor, 2023), which has led to the confirmation of many positive relationships between these variables (Cascio et al., 2019). A characteristic feature of this type of research is, above all, the adoption by researchers of various concepts regarding the cause-and-effect relationships between various categories of organizational performance and HRM activities (Pattnaik & Sahoo, 2020). Moreover, some studies consider the overall synergistic impact of the HRM function on these categories, while others focus on the individual types of HRM activities (Boon et al., 2019; Wood, 2021), also called HRM subfunctions.

In recent years, however, more and more importance has been attached to the contextualization of conducted research, as this enables a more accurate interpretation of its results (Garengo et al., 2022). In addition to a broader, context-centric analysis of the relationship between HRM and company performance (Farndale & Paauwe, 2018), in multinational companies (MNCs), a specific distinction is postulated between the context of the headquarters (HQs) and its foreign subsidiaries (Meyer et al., 2011). A review of the literature on contextual research also leads to the conclusion that the context of the crisis is rarely of interest, and if it is recognized, it usually concerns the cases of individual companies and their own stories or circumstances, and there are few studies devoted to the context of a more global nature of the crisis (Cooke et al., 2021) in which both the HQs of MNCs and their foreign subsidiaries are included. Therefore, it can be said that this is a specific **research gap**.

In response to the identified research gap, the article focuses on the effect of employee performance appraisal (EPA) as one of HRM subfunctions on the company's performance results. This effect is considered in four types of contexts, i.e. in the HQs of MNCs in the pre-pandemic and pandemic periods of COVID-19 and in foreign subsidiaries of these MNCs also in the pre-pandemic and pandemic periods. Hence, **the main goal of the article**, identified with **the main research problem**, is to determine the mediating role of HRM outcomes in the relationships between EPA and company performance results and to establish whether there are any identifiable

regularities in this scope in the pre-pandemic and pandemic periods of COVID-19 in the HQs and foreign subsidiaries of MNCs.

To solve this problem, **empirical research** was carried out in MNCs headquartered in Central Europe, **the main goal** of which was to identify, analyze and diagnose the relationship between the above-mentioned variables. The value of the research findings is multidimensional. On the one hand, they confirm the results of other studies, but on the other hand, they also bring new added value. Namely, they determine the mediating role of HRM outcomes in the relationship between EPA and company performance results in finance, innovativeness, and quality. Moreover, they identify certain regularities in the four studied contexts, which constitutes a novelty that this research brings to the discipline and practice of management. In addition, the data analysis used an innovative approach to taking into account employee key performance indicators (KPIs) as the efficiency index in the analysis of the relationships between the variables under study. From a practical point of view, it can be concluded that a properly constructed employee performance appraisal appropriately linked to other HRM subfunctions may contribute to stimulating entrepreneurial behaviors of employees, supporting the organization in difficult times of crisis. In the presented research, it was particularly visible in the field of innovation.

The structure of this article is as follows. At the beginning, the main theoretical assumptions are outlined, based on a concise review of the literature. Then, the methodics of the conducted empirical research and its findings are presented. The last part summarizes the research results and discusses the most important implications for management science and practice.

2. The Theoretical Framework for the Study

In the literature on the subject, EPA is defined in various ways. Some authors treat this as an element of performance management (Curzi et al., 2020). In this view, EPA relies only on annual appraisal, while performance management is defined as a continuous process of identifying, measuring and developing the performance of individuals and teams and aligning their performance with the organization's goals throughout the year (Aguinis, 2013). However, other scholars define EPA in a way that includes a broader set of activities. In this approach, EPA is defined as a system by which an organization provides feedback to employees on their performance and which is necessary to improve individual performance (Garengo et al., 2022). In this view, it is assumed that the system itself is a set of specific elements as well as relationships and connections between these elements. This set can include such elements as precisely determined goals of EPA, its participants (appraisees and appraisers), objects of appraisal, its methods, techniques, instruments, criteria, frequency, and both procedure of conduct and appealing

(grievance) as well as consequences (relations with other HRM elements, i.e. compensation, training, promotion) (Stor, 2012b). At the same time, it is emphasized that each EPA system may have different dimensions and determinants in particular organizations (Bayo-Moriones et al., 2020) and its effectiveness can be contingent on the management's intended purpose connected with other subfunctions of HRM (Neher & Maley, 2019) or other organizational utility needs (Iqbal et al., 2019) in which EPA may be a formal element of the management control system (Kochalski & Łuczak-Trąpczyńśka, 2017). In this article, it is assumed that EPA covers activities based on specific procedures that aim for collecting, comparing, transferring, updating, and utilizing the information received from employees and about employees to determine their qualities and work results, as well as their potential abilities and capabilities which are useful in the organization and are currently identifiable or will be developed in a certain future (Stor, 2012b).

The research results so far prove that EPA can affect organizational performance (Guest et al., 2003; DeNisi et al., 2017; Houldsworth et al., 2021) and can be even treated as a predictor of this performance (Williams & O'Boyle, 2008; Ringle et al., 2020). At this point, it is worth explaining that company performance can be considered in various areas of its operation, e.g. quality of products and services (Trąpczyński et al., 2016), market value, profitability (Pattnaik & Sahoo, 2020), innovation (Brzozowski & Cucculelli, 2016; Curzi et al., 2020; Saraf et al., 2022), and separately in HRM (Garengo et al., 2022). This article adopts a four-category division of the company performance results, i.e. in the field of HRM, finance, innovativeness, and quality. Furthermore, it should be clarified that the concept of performance result is used intentionally and is not synonymous with performance. It is based on the assumption that performance result means the final outcome to which certain activities lead, whereas performance alone is the act of executing certain activities (Stor, 2023, p. 43). Therefore, this article focuses not so much on activities, but on the ultimate measure of the results of activities at a certain point in time.

Taking all this into account, one main hypothesis and four auxiliary hypotheses have been formulated to describe the relationships between EPA and company performance results as follows:

– H1: EPA may impact directly and positively on the company's performance results.
  ▪ H_{1A} – EPA may impact directly and positively on the company's performance results in HRM (HRM outcomes).
  ▪ H_{1B} – EPA may impact directly and positively on the company's performance results in finance.
  ▪ H_{1C} – EPA may impact directly and positively on the company's performance results in innovativeness.
  ▪ H_{1D} – EPA may impact directly and positively on the company's performance results in quality.

As mentioned earlier, the article assumes that EPA is one of the HRM subfunctions, and therefore it does not function in a vacuum, but in conjunction with other HRM subfunctions (Stor, 2012b; Matookchund & Steyn, 2020). This means that it can also affect the company's performance results indirectly through HRM outcomes (Garengo et al., 2022). It is worth mentioning that for the sake of terminological consistency, HRM outcomes in this context are considered equivalent to the company's performance results in HRM. However, when HRM acts as a mediator, the term outcomes is used instead of results. Concerning this indirect impact, there has been a common consensus in the strategic HRM literature over the past three decades that the focus should be on HRM systems rather than individual practices or subfunctions, as the effects of HRM practices may depend on other HRM practices (Cappelli & Conyon, 2018; Boon et al., 2019).

Against the background of the above literature findings, one main hypothesis and three auxiliary hypotheses have been formulated describing the mediating role of the HRM outcomes in the relationship between EPA and company performance results as follows:

– H2: The company's performance results in HRM may mediate positively the relationships between EPA and the company's performance results.
  - H_{2A} – The company's performance results in HRM (HRM outcomes) may mediate positively the relationships between EPA and the company's performance results in finance.
  - H_{2B} – The company's performance results in HRM (HRM outcomes) may mediate positively the relationships between EPA and the company's performance results in innovativeness.
  - H_{2C} – The company's performance results in HRM (HRM outcomes) may mediate positively the relationships between EPA and the company's performance results in quality.

As announced in the introduction, the main research problem concerns the relationship between the selected variables in four specific contexts, i.e. the HQs of MNCs, their foreign subsidiaries, and in both cases in the pre-pandemic and pandemic periods. When it comes to MNCs, the results of many studies led to the conclusion that conditions related to the different markets, legal and institutional environment (Mellahi et al., 2016), geographical business environment (Pawęta, 2013), national (Claus, Hand, 2009) and organizational culture (Brown et al., 2019) or the broader national context (Edwards et al., 2016) as well as other environmental factors determine their functioning and performance. All of this also has implications for EPA practices. In addition, centralization or standardization practices of HQs which are experienced or not by their foreign subsidiaries (Ratković & Orlić, 2015; Houldsworth et al., 2021) may play an important role. However, the empirical findings to date indicate that effective performance appraisals are critical to the correct implementation of corporate strategy, but there

is no "best practice" standard that applies to all MNCs (Shen, 2005). The general conclusion is even that MNCs need to pay more attention to the context of the performance appraisal results, the reactions of the ratees and the motivation of the rater, and many other issues because they are an integral part of effective EPA (DeNisi et al., 2021). From the perspective of this article, all of this justifies looking at the EPA's practices in MNCs in the context of their HQs and foreign subsidiaries.

The article also assumes that EPA practices may have had different impacts on company performance results before and during the pandemic. The pandemic created specific conditions for the operation of organizations, which can be called crisis ones and which in themselves were characterized by high volatility and often unpredictability (Stor, 2022). This was a different situation from the one the companies experienced during the Great Recession in 2007–2010. Of course, in both cases, companies had to reduce employment due to, e.g., falling demand for their products and services (Stor, 2011; Kim & Ployhart, 2014; Trąpczyński et al., 2016; Brzozowski & Cucculelli, 2016); the COVID-19 pandemic forced organizations to adapt to a completely different mode of work, including greater use of new technologies. (Battisti et al., 2022). This was a serious challenge for EPA, if only because direct relationships with employees, their clients or managers were very limited (Tziner & Rabenu, 2021). The adaptation of employees to the new working conditions, while ensuring the organization's continuous functioning, required entrepreneurial, creative and innovative behaviors from employees, which only to some extent resembles the years of the Great Recession (Brzozowski & Cucculelli, 2016). As research shows, during the pandemic, a special role was played by the managerial staff, whose appropriate behavior contributed to increasing the productivity of subordinate employees, often even exceeding organizational expectations (Minbaeva & Navrbjerg, 2023). The positive impact on employees took place in many ways, not only by evaluating their work, but also by using various tools related to other HRM functions (Bieńkowska et al., 2022). The pandemic has shown in a special way that in addition to financial incentives (Campello et al., 2020), organizations had to make special efforts to maintain employee well-being, which had a direct, statistically significant impact on employees' behavior by increasing their motivation to work, satisfaction and commitment to the organization. This, in turn, improved their work efficiency, transferring to the better performance of the organization (Hamouche, 2021; Bieńkowska et al., 2022). However, these kinds of situations require a more agile (Trost, 2017) and contextual approach to EPA (Aguinis & Burgi-Tian, 2021b). In general, it can be said that organizations were more employee-centric in the pandemic compared to the pre-pandemic period, and their EPA systems had to be applied in a more flexible way in order to properly adapt to new circumstances.

All of this means that interactions between the EPA and other HRM subfunctions should be more intensive during the pandemic than before it, as it is expected to influence faster and stronger company performance results through employee performance. It is because HRM mediation in the relationship between EPA and company performance results is expected to increase the ability to respond more flexibly to emerging circumstances in the internal and external environment of the organization. For this reason, one main hypothesis and three auxiliary hypotheses have been formulated to describe the expected differences in the mediating role of the HRM in the pre-pandemic and pandemic periods as follows:

– H3: During the pandemic, the company's performance results in HRM mediate the relationships between EPA and the company's performance results stronger than in the pre-pandemic time.

  ▪ H_{3A} – During the pandemic, the company's performance results in HRM mediate the relationships between EPA and the company's performance results in finance stronger than in the pre-pandemic time.

  ▪ H_{3B} – During the pandemic, the company's performance results in HRM mediate the relationships between EPA and the company's performance results in innovativeness stronger than in the pre-pandemic time.

  ▪ H_{3C} – During the pandemic, the company's performance results in HRM mediate the relationships between EPA and the company's performance results in quality stronger than in the pre-pandemic time.

3. Research Methods

3.1. The Research Sample, Measures and Data Collection Method

To solve the main research problem, the following activities were undertaken, which make up the research methodics (not to be confused with methodology – see more: Stor, 2023, p. 27).

The empirical research was conducted at the end of the first quarter of 2022 and included 200 nonfinancial business entities that possessed foreign subsidiaries (hereinafter referred to as MNCs). All MNCs were headquartered in a Central European country (Poland). Based on the official data from the Statistics Poland, it can be said the research sample accounted for about 11% of the general population and in about 80% constituted its representative sample (Statistics Poland, 2022). Its structure (see Table 1), according to the type of business activity in line with NACE (the Statistical Classification of Economic Activities in the European Community), company size and type of direct foreign investment (FDI), to a large extent corresponded to the general population. When it comes to detailed data, the surveyed MNCs employed a total of 76,740 employees worldwide and had 416 foreign subsidiaries localized in 26 countries.

Table 1

The Research Sample Structure by Business Activity, Company Size, and Type of FDI

	Characteristics of companies	The HQs of MNCs (in %)	Foreign subsidiaries (in %)
Type of business activity	Manufacturing	87.0	55.0
	Wholesale and retail trade, repair of motor vehicles and motorcycles	7.5	39.5
	Construction	3.0	3.0
	Transport and storage	1.5	1.5
	Professional, scientific and technical activities	0.5	0.5
	In electricity, gas, steam and air conditioning supply	0.0	0.5
	Agriculture, forestry and fishing	0.5	0.0
Size of company in numbers of employed	Micro (≤ 9)	0.0	9.0
	Small (10–49)	2.0	57.5
	Medium-sized (50–249)	28.0	31.0
	Large (≥250)	70.0	2.5
Type of FDI	Greenfield investments	–	94.0
	Brownfields investments	–	5.5

The sample was of purposive character. In addition to the criteria listed above, two other important requirements were applied in its selection. One was that both the HQs and their foreign subsidiaries had to be predominantly owned by the Polish capital. The aim was to increase the comparability between HQs and local subsidiaries within a relatively unified ownership capital, the size of which, as research shows, determines management actions. Such a research solution implies a similar perception of the context and the same understanding of the measures used by the HQs to assess the performance of their subsidiaries in different countries (cf. Farndale et al., 2010; Schlägel & Sarstedt, 2016). This is important in comparative and benchmarking research, and this is exactly what is used in this article. The second requirement for inclusion in the research sample was a minimum four-year functioning of the organization, both the HQs and the local subsidiaries, on the market. It was assumed that this was a sufficient, though necessary, time interval to identify casual relationships between variables in the pre-pandemic and pandemic periods.

The CATI (computer aided telephone interview) method based on a structured questionnaire was used to obtain the research data. Except for a few questions about the demographics of the surveyed organizations (size, location, mode of establishment), the questionnaire consisted of single-choice questions where respondents rated selected topics on a specified scale.

Considering what the subject of the research is, the selection of respondents was also purposive. The underlying assumption was that measuring performance requires an understanding of the relationship between measures (Richard et al., 2009). Therefore, the respondents had to be people with knowledge of both the area of HRM and the results of the organization. For this reason, the respondents were: business owners (1%), managing directors/CEOs (2%), HR directors (51%), HR managers (47%), and HR business partners (1%). The respondents provided information on two periods: 1) the pre-pandemic one of 2018–2019 and 2) the pandemic time from the beginning of 2020 to the end of the first quarter of 2022, in which the interview was conducted.

Four major variables were included in the study: company performance results, the advancement level of EPA, the significance level of EPA to the company performance results and the efficiency of employees' performance. As for their measurement, the following solutions were used. The company's performance results (meaning the results of the HQs and the selected biggest local subsidiary) were evaluated by the respondents in four categories: finance, innovativeness, quality and HRM. The variable of employee performance appraisal was understood as the advancement level of EPA and was also evaluated both at the HQs' and subsidiary's level. Both variables were evaluated by the respondents in a benchmarking process: the first one by comparison to the companies of similar business profiles, and the second one by comparison to the best market practices. The self-assessment-based subjective benchmarking method was used for two primary reasons. Firstly, in cases where evaluating the performance of MNCs' subsidiaries lacks accessible objective accounting or financial market data, employing benchmarking methods based on tangible measurements becomes challenging, especially when conducting cross-country comparisons. Therefore, reliance on the subjective estimations provided by the management is often utilized instead (Schlägel & Sarstedt, 2016). Secondly, in comparison to objective metrics, these subjective measures enable key informants to have a solid understanding of the contextual dimensions of interest, enabling them to evaluate performance scores in relation to multiple factors and past performance (Richard et al., 2009).

The significance level of EPA meant how important the activities and processes within the scope of EPA were for the company performance and was evaluated at the two above-mentioned organizational levels. The efficiency of employees' performance was understood as employees' work outcomes and was assessed against the established standards in the HQs

of particular MNCs and their subsidiaries in the meaning of KPIs (key performance indicators). A 5-point scale was used for each of the variables. The scales are presented in the lower part of Table 2.

3.2. The Formulas Applied for Data Conversion and Statistical Methods of Data Analysis

Before analyzing the collected research data, they were converted using special formulas created for the research purposes. The idea for such a conversion emerged as a result of deeper reflections on the essence of the studied phenomena. Namely, while various studies prove the impact of HRM practices on employee performance results, which then directly contribute to company performance results (Cascio et al., 2019; Garengo et al., 2022), there are also studies that allow to observe sometimes very surprising phenomena. For example, even though employees achieve high KPIs and the company is very productive, simultaneously the same company can be unprofitable. The reason for this may be strong market competition, a decrease in consumer demand, legal and hygienic restrictions, etc., which could be observed during the Great Recession or the COVID-19 pandemic (Kim & Ployhart, 2014; Blustein et al., 2020). Of course, greater productivity means effective use of human capital resources, thanks to which the company gains the ability to generate above-average returns, but external factors may limit the possibility of using them. Nevertheless, growing productivity is an important way to develop slack resources. These resources can then be used to expand business activities, explore opportunities for new product innovations, and acquire new customers. Thus, a more efficient workforce enables the company to seek additional profit-generating opportunities (Kim & Ployhart, 2014; Cascio et al., 2019). Therefore, from the economic and managerial perspective, a greater emphasis on the effectiveness and efficiency of the actions taken and the results achieved seems to play an important role in empirical research. However, there is a difference between efficiency and effectiveness. Effectiveness is a goal-oriented measure (Ostroff & Schmitt, 1993), it concerns the extent or degree to which intended goals are achieved (Stor, 2012a), whereas efficiency refers to rates of resource usage in achieving objectives (Rogers & Wright, 1998), it is the ratio of output to input (Stor, 2012a).

The above considerations have raised some doubts as to how to capture the actual relationships between the variables studied, since there are various possibilities of creating and using slack HRM practices and slack human capital resources to generate positive results of the organization's operations. In response, the author of this article proposes an innovative solution. Namely, in order to take into account in the analytical process the actual relationships of employee performance outcomes with HRM activities and the organization's performance results, the raw data in the variables were adjusted by the efficiency index (EI). Hence, **the adjusted values of the**

EPA variable were calculated using the following formula (1) expressing the ratio of the advancement level of EPA to the efficiency of employees measured by the employee key performance indicator used in companies:

Formula (1).
$$EI\_EPA = \frac{AL\_EPA}{EKPIs}$$

Where:
EI_EPA – Efficiency index of employee performance appraisal
AL_EPA – Advancement level of employee performance appraisal
EKPI – Employee key performance indicators

The adjusted values of the company performance results were calculated according to the formula below (2) which includes the ratio of the company performance results to the efficiency of employees measured by the employee key performance indicator used in companies:

Formula (2).
$$EISCPR \text{ in } (x) = \frac{CPR \text{ in } (x)}{EKPIs}$$

Where:
EISCPR – Efficiency index of company performance results
(x) – one of the four categories of the company performance results, respectively in: human resources management (HRM), finance (F), innovativeness (I), and quality (Q).
CPR – Company performance results
EKPI – Employee key performance indicators

Hence, the formulas for **adjusting the value of individual categories** (2_A – 2_D) of the **company performance results** are as follows:

Formula (2_A).
$$(EIHRM = \frac{HRM}{EKPIs})$$

Where:
EIHRM – Efficiency index of company performance results in HRM
HRM – Company performance results in HRM
EKPI – Employee key performance indicators

Formula (2_B).
$$(EIF = \frac{F}{EKPIs})$$

Where:
EIHRM – Efficiency index of company performance results in finance
F – Company performance results in finance
EKPI – Employee key performance indicators

Formula (2$_C$). $\qquad\qquad$ $(EII = \dfrac{I}{EKPIs})$

Where:
EIHRM – Efficiency index of company performance results in innovativeness
I – Company performance results in innovativeness
EKPI – Employee key performance indicators

Formula (2$_D$). $\qquad\qquad$ $(EIQ = \dfrac{Q}{EKPIs})$

Where:
EIHRM – Efficiency index of company performance results in quality
Q – Company performance results in quality
EKPI – Employee key performance indicators

The collected data were analyzed using descriptive, correlational and mediation statistical methods. Firstly, the normality tests of Kolmogorov–Smirnov (with Lilliefors correction) and of Shapiro-Wilk were applied. Then, the relationships between the variables were examined using Spearman's rank coefficient. And finally, to verify the research hypotheses and assess the mediating effects, the Partial Least Squares Structural Equation Modeling (PLS-SEM) in R environment with lavaan package v. 0.6-12 (Rosseel, 2012; Savalei & Rosseel, 2022) software was applied. The choice of PLS-SEM is mainly caused by the fact that it works for non-normal distribution of variables and is the preferred method when the research goal is to develop a theory and explain variance (Hair et al., 2022), which are both cases in this study. In addition, PLS-SEM allows for analyzing the differences between the coefficient paths of different sets of variables (Picón-Berjoyo et al., 2016) and has become a widely used method to study the impact of HRM practices on organizational performance (Ringle et al., 2020). Finally, it must be reminded that the correlation and path analyses were conducted on the values of the variables which were adjusted by the EI.

4. The Empirical Research Findings

4.1. The Descriptive and Correlational Statistics

As shown in Table 2, both in MNCs' HQs and their local subsidiaries, the results obtained in the four categories of company performance were comparable to enterprises with similar business profiles both before and during the pandemic. At the same time, in both types of organizations, the performance results in HRM, finance and quality were slightly higher before the pandemic, and the results in innovativeness better during the pandemic.

As for the EPA, its significance to the performance results of HQs was slightly greater before the pandemic ($\bar{x} = 3.60$) than during it ($\bar{x} = 3.59$).

It was also slightly more important to the performance results of local subsidiaries before the pandemic ($\bar{x} = 3.49$) than during it ($\bar{x} = 3.43$). The same applies to the advancement level of EPA. Both in the HQs and local subsidiaries, it was slightly higher before the pandemic ($\bar{x} = 3.47$; $\bar{x} = 3.40$ respectively) than during it ($\bar{x} = 3.36$; $\bar{x} = 3.37$ respectively). In this context, it is somewhat surprising that the employee performance was slightly better during the pandemic, both in HQs ($\bar{x} = 3.24$) and local subsidiaries ($\bar{x} = 3.19$) than before the pandemic ($\bar{x} = 3.00$; $\bar{x} = 3.05$ respectively). Based on the descriptive statistics, it can be said that similar regularities are observable in both types of organizations.

In turn, the correlation analysis presented in Table 3 leads to the conclusion that all variables in both types of organization and in each of the analyzed periods are positively correlated with each other. With regard to EPA, it is worth noting that in the HQs it is slightly more strongly correlated with the results in innovation before the pandemic ($r = .53$; $p < .001$) than during it ($r = .52$; $p < .001$), whereas during the pandemic, its links are slightly stronger with results in finance ($r = .65$; $p < .001$), quality ($r = .53$; $p < .001$) and HRM ($r = .63$; $p < .001$) than before the pandemic ($r = .61$; $p < .001$; $r = .50$; $p < .001$; $r = .62$; $p < .001$ respectively). In the case of foreign subsidiaries, during the pandemic, all EPA correlations with the company's performance, i.e. in finance ($r = .61$; $p < .001$), quality ($r = .59$; $p < .001$), innovation ($r = .55$; $p < .001$) and HRM ($r = .65$; $p < .001$), are stronger than before it ($r = .57$; $p < .001$; $r = .44$; $p < .001$; $r = .36$; $p < .001$; $r = .52$; $p < .001$ respectively).

Table 2
Descriptive Statistics for the Major Variables

Variables	HQS IN THE PRE-PANDEMIC TIME					Variables	HQS IN THE PANDEMIC TIME				
	Valid N	Mean	Min.	Max.	Std.Dev.		Valid N	Mean	Min.	Max.	Std.Dev.
Results in HRM	200	3.98	3.0	5.0	0.38	Results in HRM	200	3.92	3.0	5.0	0.37
Results in finance	200	4.03	3.0	5.0	0.32	Results in finance	200	3.92	3.0	5.0	0.36
Results in innovativeness	200	3.77	2.0	5.0	0.57	Results in innovativeness	200	3.82	2.0	5.0	0.54
Results in quality	200	3.85	3.0	5.0	0.60	Results in quality	200	3.77	2.0	5.0	0.58
Employee performance in KPIs	200	3.00	2.0	4.0	0.49	Employee performance in KPIs	200	3.24	2.0	4.0	0.53
Advancement level of EPA	200	3.47	2.0	4.0	0.57	Advancement level of EPA	200	3.36	2.0	4.0	0.59
Significance level of EPA	200	3.61	2.0	5.0	0.58	Significance level of EPA	200	3.50	2.0	5.0	0.60

Scales:
- Company performance results in HRM, finance, innovativeness, quality à benchmarked to the companies of similar business profiles: 1 – poor, 2 – below average, 3 – similar to others, 4 – above average, 5 – very good;
- Employee performance in KPIs: 1 – significantly below standards, 2 – rather below standards, 3 – exactly with the standards, 4 – rather higher than standards, 5 – significantly higher than standards;
- Advancement level of EPA à benchmarked to the best market practices: 1 – significantly lower, 2 – lower, 3 – similar to others, 4 – higher, 5 – significantly higher;
- Significance level of EPA to the company's performance results: 1 – not important, 2 – slightly important, 3 – important, 4 – very important, 5 – of critical significance.

Table 2 – continued

Variables	FOREIGN SUBSIDIARIES IN THE PRE-PANDEMIC TIME					FOREIGN SUBSIDIARIES IN THE PANDEMIC TIME				
	Valid N	Mean	Min.	Max.	Std.Dev.	Valid N	Mean	Min.	Max.	Std.Dev.
Results in HRM	200	3.98	3.0	5.0	0.31	200	3.92	3.0	5.0	0.34
Results in finance	200	3.99	3.0	5.0	0.24	200	3.93	3.0	5.0	0.37
Results in innovativeness	200	3.81	2.0	5.0	0.56	200	3.90	3.0	5.0	0.50
Results in quality	200	3.81	2.0	5.0	0.57	200	3.77	3.0	5.0	0.54
Employee performance in KPIs	200	3.05	2.0	4.0	0.39	200	3.19	2.0	4.0	0.51
Advancement level of EPA	200	3.40	2.0	5.0	0.56	200	3.37	2.0	4.0	0.57
Significance level of EPA	200	3.49	2.0	5.0	0.63	200	3.43	2.0	5.0	0.64

Scales:
- Company performance results in HRM, finance, innovativeness, quality à benchmarked to the companies of similar business profiles: 1 – poor, 2 – below average, 3 – similar to others, 4 – above average, 5 – very good;
- Employee performance in KPIs: 1 – significantly below standards, 2 – rather below standards, 3 – exactly with the standards, 4 – rather higher than standards, 5 – significantly higher than standards;
- Advancement level of EPA à benchmarked to the best market practices: 1 – significantly lower, 2 – lower, 3 – similar to others, 4 – higher, 5 – significantly higher;
- Significance level of EPA to the company's performance results: 1 – not important, 2 – slightly important, 3 – important, 4 – very important, 5 – of critical significance.

Table 3
Correlation Matrix for the Major Variables Modified by the Efficiency Ratio (Employee KPIs)

HQS IN THE PRE-PANDEMIC TIME

Variables	1. $\left(\frac{F}{EKPIs}\right)$	2. $\left(\frac{Q}{EKPIs}\right)$	3. $\left(\frac{I}{EKPIs}\right)$	4. $\left(\frac{HRM}{EKPIs}\right)$	5. $\left(\frac{AL\_EPA}{EKPIs}\right)$
Results in finance	1.00	0.70***	0.77***	0.91***	0.61***
Results in quality	0.70***	1.00	0.57***	0.69***	0.50***
Results in innovativeness	0.77***	0.57***	1.00	0.76***	0.53***
Results in HRM	0.91***	0.69***	0.76***	1.00	0.62***
Advancement level of EPA	0.61***	0.50***	0.53***	0.62***	1.00

HQS IN THE PANDEMIC TIME

Variables	1. $\left(\frac{F}{EKPIs}\right)$	2. $\left(\frac{Q}{EKPIs}\right)$	3. $\left(\frac{I}{EKPIs}\right)$	4. $\left(\frac{HRM}{EKPIs}\right)$	5. $\left(\frac{AL\_EPA}{EKPIs}\right)$
Results in finance	1.00	0.67***	0.75***	0.89***	0.65***
Results in quality	0.67***	1.00	0.63***	0.65***	0.53***
Results in innovativeness	0.75***	0.63***	1.00	0.80***	0.52***
Results in HRM	0.89***	0.65***	0.80***	1.00	0.63***
Advancement level of EPA	0.65***	0.53***	0.52***	0.63***	1.00

FOREIGN SUBSIDIARIES IN THE PRE-PANDEMIC TIME

Variables	1. $\left(\frac{F}{EKPIs}\right)$	2. $\left(\frac{Q}{EKPIs}\right)$	3. $\left(\frac{I}{EKPIs}\right)$	4. $\left(\frac{HRM}{EKPIs}\right)$	5. $\left(\frac{AL\_EPA}{EKPIs}\right)$
Results in finance	1.00	0.62***	0.65***	0.90***	0.57***
Results in quality	0.62***	1.00	0.47***	0.61***	0.44***
Results in innovativeness	0.65***	0.47***	1.00	0.68***	0.36***
Results in HRM	0.90***	0.61***	0.68***	1.00	0.52***
Advancement level of EPA	0.57***	0.44***	0.36***	0.52***	1.00

FOREIGN SUBSIDIARIES IN THE PANDEMIC TIME

Variables	1. $\left(\frac{F}{EKPIs}\right)$	2. $\left(\frac{Q}{EKPIs}\right)$	3. $\left(\frac{I}{EKPIs}\right)$	4. $\left(\frac{HRM}{EKPIs}\right)$	5. $\left(\frac{AL\_EPA}{EKPIs}\right)$
Results in finance	1.00	0.69***	0.79***	0.87***	0.61***
Results in quality	0.69***	1.00	0.61***	0.64***	0.59***
Results in innovativeness	0.79***	0.61***	1.00	0.84***	0.55***
Results in HRM	0.87***	0.64***	0.84***	1.00	0.65***
Advancement level of EPA	0.61***	0.59***	0.55***	0.65***	1.00

Notes: * Correlations significant at p < .05; ** Correlations significant at p < .01; *** Correlations significant at p < .001.

4.2. Mediation Statistics Based on PLS-SEM

The conducted path analysis leads to the conclusion that EPA directly and positively affects the company performance results in HRM (see Tables 4–6), which confirms auxiliary hypothesis H_{1A}. Moreover, both in the HQs ($\beta = 0.63$; $p < 0.001$) and local subsidiaries ($\beta = 0.65$; $p < 0.001$), this effect is stronger before the pandemic than during the pandemic (in HQs $\beta = 0.62$; $p < 0.001$; in local subsidiaries $\beta = 0.52$; $p < 0.001$).

Auxiliary hypothesis H_{1B} can also be considered confirmed because EPA has a direct and positive effect on the company performance results in finance (see Table 3). However, in the case of HQs, this effect is stronger during the pandemic ($\beta = 0.14$; $p < 0.01$) than before the pandemic ($\beta = 0.08$; $p < 0.05$). In foreign subsidiaries, it is the opposite, it is greater before the pandemic ($\beta = 0.14$; $p < 0.001$) than during it ($\beta = 0.08$; although at $p>0.05$ being not statistically significant).

As for auxiliary hypothesis H_{1C}, it can be accepted to some extent. The point is that although it is possible to identify the positive direct effect of EPA on the company performance results in innovativeness, it is not statistically significant in any of the considered cases (see Table 4). Furthermore, in the HQs, it is slightly greater in the pre-pandemic period ($\beta = 0.10$; $p>0.05$) compared to the pandemic period ($\beta = 0.03$; $p>0.05$), whereas in foreign subsidiaries, it remains the same in both periods ($\beta = 0.01$; $p>0.05$).

With a certain reservation, auxiliary hypothesis H_{1D} can be considered confirmed. Namely, as presented in Table 5, EPA directly and positively affects the company performance results in quality; however, in the case of the HQs before the pandemic, this effect is not statistically significant. Anyway, in general, both in the HQs ($\beta = 0.20$; $p < 0.01$) and local subsidiaries ($\beta = 0.30$; $p < 0.001$), this effect is stronger during the pandemic than before the pandemic (in HQs $\beta = 0.12$; $p > 0.05$; in local subsidiaries $\beta = 0.17$; $p < 0.05$).

As a result of the performed analyses, it can therefore be concluded that the main hypothesis H1 is confirmed because EPA appears to have a positive effect on results in HRM, finance, innovativeness and quality, both in the pre-pandemic and pandemic periods, although this effect is not always statistically significant.

Table 4
Path Analysis Summary in PLS-SEM for EPA and Company Performance Results in Finance

HQS IN THE PRE-PANDEMIC TIME				
Variables in paths	**β**	**Z**	**p**	**95%CI**
EPA → Finance	0.08	2.01	< 0.05	[0.00; 0.17]
EPA → HRM (α)	0.62	10.05	< 0.001	[0.50; 0.74]
HRM → Finance	0.85	15.45	< 0.001	[0.74; 0.96]
Mediation effect of HRM (αβ)	0.53	7.57	< 0.001	[0.39; 0.66]

FOREIGN SUBSIDIARIES IN THE PRE-PANDEMIC TIME				
Variables in paths	**β**	**Z**	**p**	**95%CI**
EPA → Finance	0.14	3.63	< 0.001	[0.07; 0.22]
EPA → HRM (α)	0.52	6.21	< 0.001	[0.36; 0.68]
HRM → Finance	0.83	12.84	< 0.001	[0.70; 0.95]
Mediation effect of HRM (αβ)	0.43	5.55	< 0.001	[0.28; 0.58]

HQS IN THE PANDEMIC TIME				
Variables in paths	**β**	**Z**	**p**	**95%CI**
EPA → Finance	0.14	2.76	< 0.01	[0.04; 0.24]
EPA → HRM (α)	0.63	11.53	< 0.001	[0.52; 0.74]
HRM → Finance	0.80	13.51	< 0.001	[0.69; 0.92]
Mediation effect of HRM (αβ)	0.51	8.08	< 0.001	[0.38; 0.63]

FOREIGN SUBSIDIARIES IN THE PANDEMIC TIME				
Variables in paths	**β**	**Z**	**p**	**95%CI**
EPA → Finance	0.08	1.46	> 0.05	–
EPA → HRM (α)	0.65	10.08	< 0.001	[0.52; 0.77]
HRM → Finance	0.82	13.16	< 0.001	[0.70; 0.94]
Mediation effect of HRM (αβ)	0.53	8.27	< 0.001	[0.41; 0.66]

Note: All variables modified by the efficiency ratio (employee KPIs).

Table 5
Path Analysis Summary in PLS-SEM for EPA and Company Performance Results in Innovativeness

HQS IN THE PRE-PANDEMIC TIME				
Variables in paths	**β**	**Z**	**p**	**95%CI**
EPA → Innovativeness	0.10	1.47	> 0.05	–
EPA → HRM (α)	0.62	10.05	< 0.001	[0.50; 0.74]
HRM → Innovativeness	0.70	10.06	< 0.001	[0.56; 0.84]
Mediation effect of HRM (αβ)	0.43	6.79	< 0.001	[0.31; 0.56]

HQS IN THE PANDEMIC TIME				
Variables in paths	**β**	**Z**	**p**	**95%CI**
EPA → Innovativeness	0.03	0.60	> 0.05	–
EPA → HRM (α)	0.63	11.53	< 0.001	[0.52; 0.74]
HRM → Innovativeness	0.78	11.65	< 0.001	[0.65; 0.91]
Mediation effect of HRM (αβ)	0.49	8.24	< 0.001	[0.37; 0.61]

FOREIGN SUBSIDIARIES IN THE PRE-PANDEMIC TIME				
Variables in paths	**β**	**Z**	**p**	**95%CI**
EPA → Innovativeness	0.01	0.15	> 0.05	–
EPA → HRM (α)	0.52	6.21	< 0.001	[0.36; 0.68]
HRM → Innovativeness	0.67	8.91	< 0.001	[0.52; 0.82]
Mediation effect of HRM (αβ)	0.35	5.18	< 0.001	[0.22; 0.48]

FOREIGN SUBSIDIARIES IN THE PANDEMIC TIME				
Variables in paths	**β**	**Z**	**p**	**95%CI**
EPA → Innovativeness	0.01	0.19	> 0.05	–
EPA → HRM (α)	0.65	10.08	< 0.001	[0.52; 0.77]
HRM → Innovativeness	0.83	13.92	< 0.001	[0.71; 0.95]
Mediation effect of HRM (αβ)	0.54	7.34	< 0.001	[0.40; 0.68]

Note: All variables modified by the efficiency ratio (employee KPIs).

Table 6
*Path Analysis Summary in PLS-SEM for EPA and Company Performance Results in quality*

HQS IN THE PRE-PANDEMIC TIME				
Variables in paths	**β**	**Z**	**p**	**95%CI**
EPA → Quality	2.16	1.55	> 0.05	–
EPA → HRM (α)	6.21	10.05	< 0.001	[0.50; 0.74]
HRM → Quality	5.53	6.99	< 0.001	[0.44; 0.79]
Mediation effect of HRM (αβ)	4.78	5.13	< 0.001	[0.23; 0.53]
FOREIGN SUBSIDIARIES IN THE PRE-PANDEMIC TIME				
Variables in paths	**β**	**Z**	**p**	**95%CI**
EPA → Quality	0.17	2.16	< 0.05	[0.02; 0.32]
EPA → HRM (α)	0.52	6.21	< 0.001	[0.36; 0.68]
HRM → Quality	0.52	5.53	< 0.001	[0.34; 0.71]
Mediation effect of HRM (αβ)	0.27	4.78	< 0.001	[0.16; 0.38]

HQS IN THE PANDEMIC TIME				
Variables in paths	**β**	**Z**	**p**	**95%CI**
EPA → Quality	2.16	2.80	< 0.01	[0.06; 0.34]
EPA → HRM (α)	6.21	11.53	< 0.001	[0.52; 0.74]
HRM → Quality	5.53	5.80	< 0.001	[0.35; 0.70]
Mediation effect of HRM (αβ)	4.78	5.17	< 0.001	[0.20; 0.45]
FOREIGN SUBSIDIARIES IN THE PANDEMIC TIME				
Variables in paths	**β**	**Z**	**p**	**95%CI**
EPA → Quality	0.30	4.02	< 0.001	[0.15; 0.45]
EPA → HRM (α)	0.65	10.08	< 0.001	[0.52; 0.77]
HRM → Quality	0.44	4.95	< 0.001	[0.27; 0.62]
Mediation effect of HRM (αβ)	0.29	4.95	< 0.001	[0.17; 0.40]

Note: All variables modified by the efficiency ratio (employee KPIs).

Further mediation analyses reveal that the company's performance results in HRM mediate positively the relationships between EPA and the company's performance results in finance (H_{2A}) in the HQs both in the pre-pandemic ($\beta = 0.85$; $p < 0.001$) and pandemic period ($\beta = 0.80$; $p < 0.001$), and the indirect mediation effect is slightly stronger (H_{3A}) in the pre-pandemic ($\alpha\beta = 0.53$; $p < 0.001$) than in the pandemic time ($\alpha\beta = 0.51$; $p < 0.001$). The relationships between EPA and the company's performance results in finance are also positively mediated by the results in HRM in foreign subsidiaries (H_{2A}), and again, both in the pre-pandemic ($\beta = 0.83$; $p < 0.001$) and pandemic period ($\beta = 0.53$; $p < 0.001$); however, here the indirect mediation effect is stronger (H_{3A}) in the pandemic ($\alpha\beta = 0.53$; $p < 0.001$) than pre-pandemic time ($\alpha\beta = 0.43$; $p < 0.001$). This means that auxiliary hypothesis H_{2A} can be accepted in its entirety, but auxiliary hypothesis H_{3A} only partially, i.e. in relation to foreign subsidiaries. The discussed phenomena are graphically presented in Figure 1.
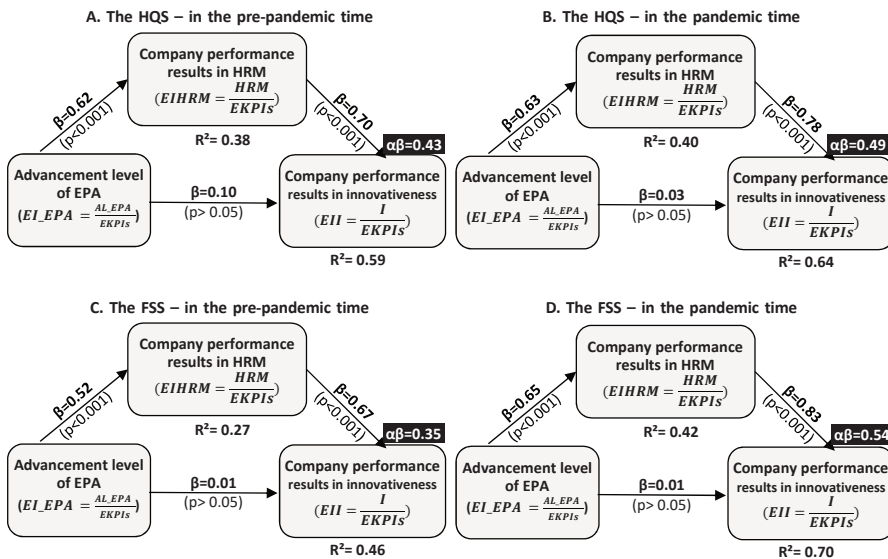
Figure 1

The HRM Mediation Model of the Relationships Between EPA and Company Performance Results in Finance
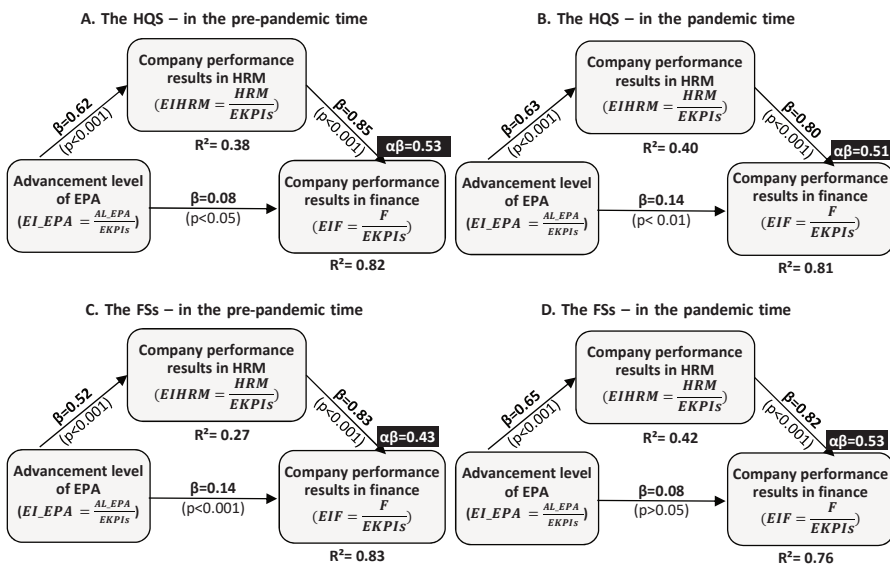
The company's performance results in HRM also mediate positively the relationships between EPA and the company's performance results in innovativeness (H_{2B}), both in the HQs in the pre-pandemic ($\beta = 0.70$; $p < 0.001$) and pandemic period ($\beta = 0.78$; $p < 0.001$), and the indirect mediation effect is stronger (H_{3B}) in the pandemic ($\alpha\beta = 0.49$; $p < 0.001$)

than pre-pandemic time ($\alpha\beta = 0.43$; $p < 0.001$). The relationships between EPA and the company's performance results in innovativeness are also positively mediated by the results in HRM in foreign subsidiaries (H_{2B}), and again, both in the pre-pandemic ($\beta = 0.67$; $p < 0.001$) and pandemic period ($\beta = 0.54$; $p < 0.001$), and the indirect mediation effect is significantly stronger (H_{3B}) in the pandemic ($\alpha\beta = 0.54$; $p < 0.001$) than pre-pandemic time ($\alpha\beta = 0.35$; $p < 0.001$). Thus, both auxiliary hypotheses H_{2B} and H_{3B} are confirmed. The discussed relationships are graphically presented in Figure 2.

Figure 2
The HRM Mediation Model of the Relationships Between EPA and Company Performance Results in Innovativeness

Furthermore, the company's performance results in HRM mediate positively the relationships between EPA and the company's performance results in quality (H_{2C}) in the HQs both in the pre-pandemic ($\beta = 0.62$; $p < 0.001$) and pandemic period ($\beta = 0.52$; $p < 0.001$), and the indirect mediation effect is slightly stronger (H_{3C}) in the pre-pandemic ($\alpha\beta = 0.38$; $p < 0.001$) than in the pandemic time ($\alpha\beta = 0.33$; $p < 0.001$). The relationships between EPA and the company's performance results in quality are also positively mediated by the results in HRM in the foreign subsidiaries (H_{2C}), and again, both in the pre-pandemic ($\beta = 0.52$; $p < 0.001$) and pandemic period ($\beta = 0.44$; $p < 0.001$); however, here the indirect mediation effect is stronger (H_{3C}) in the pandemic ($\alpha\beta = 0.29$; $p < 0.001$) than pre-

pandemic time ($\alpha\beta = 0.27$; $p < 0.001$). This leads to the confirmation of auxiliary hypothesis H_{2C} in full, but auxiliary hypothesis H_{3C} only partially, i.e. with regard to foreign subsidiaries. The discussed phenomena are graphically presented in Figure 3.

Figure 3
The HRM Mediation Model of the Relationships Between EPA and Company Performance Results in Quality
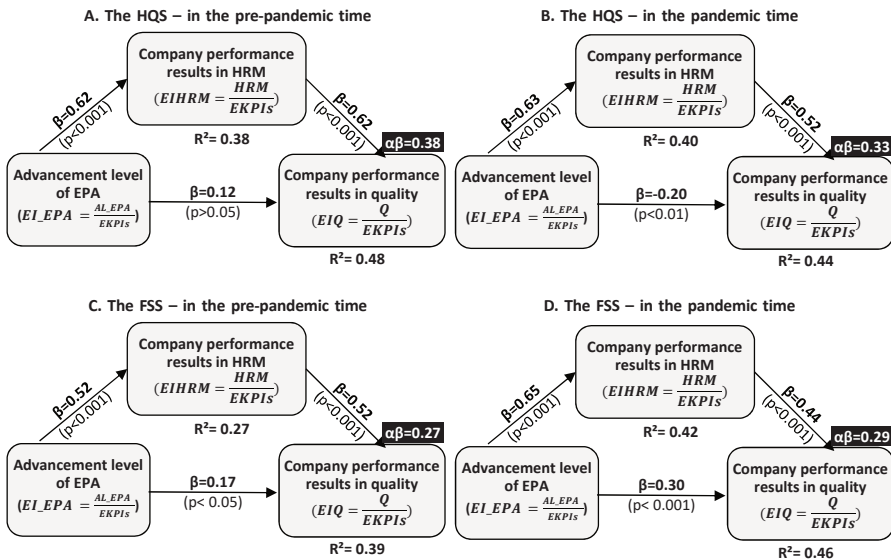
Summing up the results of the mediation analyses, it can be concluded that they allowed for a positive verification of the main hypothesis H2. Namely, it turns out that the company's performance results in HRM positively mediate the relationship between EPA and the other three categories of company performance, regardless of the type of the organization (HQs or foreign subsidiaries) and the time period considered. This hypothesis confirmation is based on the confirmation of three auxiliary hypotheses, i.e. H_{2A}, H_{2B}, and H_{2C}. As for the main hypothesis H3, it can be considered only partially confirmed. This is due to the fact that while auxiliary hypothesis H_{3B} was positively verified in terms of the studied phenomena both for the HQs and foreign subsidiaries, hypotheses H_{3A} and H_{3C} are true only for foreign entities.

The explanatory capability of all the models is presented in Table 7. Generally speaking, the amount of variance explained in the company performance results ranges from moderate to strong (Ringle et al., 2020; Hair et al., 2022). In the HQs of MNCs, the results in finance ($R^2 = 0.82$)

and quality (R^2 = 0.48) are slightly better explained in the pre-pandemic time than in the pandemic period, whereas the results in HRM (R^2 = 0.40) and innovativeness (R^2 = 0.64) are better explained in the pandemic. It looks a bit different in the case of their foreign subsidiaries. Of the four categories of company performance results, only financial results are better explained in the pre-pandemic times (R^2 = 0.83), while the others, i.e. results in HRM (R^2 = 0.42), innovativeness (R^2 = 0.70), and quality (R^2 = 0.46), are better explained in the pandemic times.

Table 7
The Explanatory Capabilities of the HRM Mediation Models of the Relationships Between EPA and Company Performance Results

HQS IN THE PRE-PANDEMIC TIME		HQS IN THE PANDEMIC TIME	
Variables in models	R^2	Variable in models	R^2
Results in HRM	0.38	Results in HRM	0.40
Results in finance	0.82	Results in finance	0.81
Results in innovativeness	0.59	Results in innovativeness	0.64
Results in Quality	0.48	Results in Quality	0.44
FOREIGN SUBSIDIARIES IN THE PRE-PANDEMIC TIME		FOREIGN SUBSIDIARIES IN THE PANDEMIC TIME	
Variable in models	R^2	Variable in models	R^2
Results in HRM	0.27	Results in HRM	0.42
Results in finance	0.83	Results in finance	0.76
Results in Innovativeness	0.46	Results in Innovativeness	0.70
Results in Quality	0.39	Results in Quality	0.46

Interpretation:
R^2 – the amount of variance explained in the construct (very weak ≥ 0.1, weak ≥ 0.19; moderate ≥ 0.33, substantial ≥ 0.67, strong ≥ 0.75).

5. Research Summary and Final Conclusions

The main goal of the article, identified with **the main research problem,** was to determine the mediating role of HRM outcomes in the relationships between EPA and company performance results and to establish whether there are any identifiable regularities in this scope in the pre-pandemic and pandemic periods of COVID-19 in the HQs and foreign subsidiaries of MNCs. The research results presented in the article allow for concluding that this goal can be considered achieved.

In conclusion, we can say that some similar and some different regularities have been observed in the HQs and their local subsidiaries. When it comes to similar regularities, compared to the pre-pandemic period, the company performance results in innovativeness in both types of organizations were

slightly higher during the pandemic and were accompanied by slightly better results in employee performance than before the pandemic. Considering the structure of the research sample, the identification of this phenomenon brings a certain novelty to management science. The explanation for this situation may be the special impact of the managerial staff on subordinate employees, as the former had a flexible approach to employee appraisal and at the same time – as other studies show – tried to properly adapt the methods of influencing subordinates to the new pandemic conditions, and thanks to this, the results obtained by employees often exceeded the assumed expectations in this regard (Minbaeva & Navrbjerg, 2023). This was particularly evident in innovation, which in these difficult circumstances requires various types of entrepreneurial behavior to ensure the smooth functioning of the organization (cf. Curzi et al., 2019). Additionally, mutual trust between evaluators and evaluated individuals could have played a significant role, accompanying the flexibility in the appraisal process. This means that in crisis situations, such as the COVID-19 pandemic, fulfilling assigned tasks sometimes requires increased empowerment and employee autonomy. This, in turn, suggests that there must be trust that employees will not only carry out their work with due diligence but will also seek innovative solutions for organizational functioning. The importance of trust in shaping the relationship between employee performance appraisal (EPA) and organizational outcomes is also supported by other studies, albeit not specifically focused on crisis situations. Therefore, it seems that an important regularity has been identified here (Baird et al., 2020).

In general, during the pandemic, the relationships between the advancement level of EPA and the results in HRM, finance, innovativeness, and quality were also stronger during the pandemic. A certain exception here is the relationship with the results in innovativeness at the HQs, which was slightly stronger before the pandemic, but this is not a significant difference. As for other regularities, it should be noted that during the pandemic, both in HQs and local subsidiaries, HRM outcomes mediated more strongly the relationship between EPA and company performance in innovativeness. This may suggest more employee-centric activities undertaken by the organizations and their managerial staff in the pandemic time to improve the effectiveness of employee performance management and this demanded better configuration of EPA with other HRM subfunctions (cf. Iqbal et al., 2019; Neher & Maley, 2019).

Research from other authors shows that during the COVID-19 crisis, many organizations reduced or discontinued employee performance appraisal (EPA) practices. However, this study demonstrates the critical importance of continuing to measure performance, particularly in uncertain times when employees depend on leaders for guidance. Performance management plays a vital role in communicating the company's strategic direction, gathering valuable data, delivering feedback, managing legal risks, and retaining top

talent (cf. Aguinis & Burgi-Tian, 2021a), although, as evident, it requires certain connections with other HRM subfunctions to achieve the intended outcome.

As for different regularities, in the HQs, HRM outcomes more strongly mediated the relationship between EPA and financial results and quality results in the pre-pandemic period and in local foreign subsidiaries during the pandemic. In other words, during the pandemic, in the case of foreign subsidiaries, HRM outcomes always more strongly mediated the relationships between EPA in all categories of company performance, and in the case of HQs, such stronger mediation appears only in relation to performance results in innovation. This leads to the conclusion that in order to manage employees as effective strategic assets, an organization should use EPA to align HRM with company values and strategic objectives. Thus, EPA should be configured as an organic system that can evolve and adapt to the changing business environment through adaptation and adjustment processes (cf. Garengo et al., 2022).

In addition, it is worth noting that respondents declared that the significance of EPA for the company's performance results was slightly greater in the HQs than in their local subsidiaries, both in the pre-pandemic and pandemic period. However, the advancement level of EPA before the pandemic was higher in the HQs than in local subsidiaries, and during the pandemic it was the other way around. Despite this, employee performance before the pandemic was better in local subsidiaries, and during the pandemic in the HQs. This, therefore, confirms the results of other studies which indicate that the analysis of the effectiveness of EPA must always take into account a specific context (cf. Claus & Hand, 2009). It can therefore be said that the research results presented in this article confirm the need to consider separately the context of the HQs and their foreign subsidiaries (cf. Edwards et al., 2016) as well as the specific contextual conditions distinguishing the period of crisis (here the pandemic) from the non-crisis period (here before the pandemic) (cf. Kim & Ployhart, 2014; Brzozowski & Cucculelli, 2016), which allows for a better understanding of various phenomena related to EPA (DeNisi et al., 2021).

To sum up, it can be stated that the presented research results make a certain contribution to the management science. On the one hand, they confirm the results of other studies on the positive impact of HRM on organizational performance results and the need for a holistic approach to this impact of HRM, and not its individual subfunctions, as the effects of HRM practices are likely to depend on other practices within the HRM system (cf. Boon et al., 2019). Moreover, they also prove that effective EPA is critical in implementing business strategy correctly, but there is no "best practice" standard that applies to all MNCs (cf. Shen, 2005). On the other hand, the presented research findings also bring new added value. Namely, they determine the mediating role of HRM outcomes in the relationship between EPA and company performance results in finance,

innovativeness, and quality. Moreover, they identify certain regularities in the four studied contexts, which constitutes a novelty that this research brings to the discipline and practice of management. In terms of research methodics, it can be said that the applied self-benchmarking method of an organization can be successfully used in comparative studies, especially when the research involves economic entities from a large number of countries. Regarding the methodics, it is also worth noting that the data analysis used an innovative approach to taking into account employee key performance indicators (KPIs) as the efficiency index in the analysis of the relationships between the variables under study. This, in turn, allowed capturing the actual relations between the variables under study.

The conducted study has some limitations. They include the structure of the research sample, which does not fully reflect the general population, as mentioned in the section on research methodics. Another drawback is certainly the fact that only respondents from the HQs were asked about the performance results in foreign subsidiaries, and not informants from their local subsidiaries. Certainly, the method of qualitative benchmarking used in the survey is also a problem. Instead of hard measures to assess the organization's performance results and the advancement level of EPA, the respondents were only asked to make this assessment by comparison with other businesses on the market. In addition, it should be noted that while all the HQs of MNCs were located in one Central European country, which means that they operated in similar economic, legal or social conditions, their foreign subsidiaries were located in several dozen countries, and when analyzing these data, potential differences were not taken into account.

Finally, from a practical point of view, it can be said that the conducted research also has a certain practical value. Its findings show that a correctly constructed employee appraisal properly linked to other HRM subfunctions can contribute to stimulating entrepreneurial behavior of employees (cf. Curzi et al., 2019), supporting the organization in difficult times of crisis. In the presented research, it was particularly visible in the area of innovation. Management practitioners can benefit from the research findings in other ways. First, the study highlights the importance of measuring employee performance, especially during uncertain or crisis times, for strategic communication, data gathering, feedback delivery, risk management, and talent retention. Second, effective implementation of EPA can improve company performance. Third, focusing on improving HRM performance indirectly enhances finance, innovativeness, and quality. Practitioners can reinforce the significance of performance appraisal, enhance EPA effectiveness, adapt approaches during crises, align HRM outcomes with EPA objectives, prioritize trust-building, and maintain performance management practices in challenging circumstances. These findings provide valuable guidance for enhancing organizational performance in uncertain business environments.

Funding

References

Aguinis, H. (2013). *Performance management*. Pearson Education.

Aguinis, H., & Burgi-Tian, J. (2021a). Measuring performance during crises and beyond: The performance promoter score. *Business Horizons*, *64*(1), 149–160. https://doi.org/10.1016/j.bushor.2020.09.001

Aguinis, H., & Burgi-Tian, J. (2021b). Talent management challenges during COVID-19 and beyond: Performance management to the rescue. *Business Research Quarterly*, *24*, 233–240. https://doi.org/10.1177/23409444211009528

Baird, K., Tung, A. & Su, S. (2020). Employee empowerment, performance appraisal quality and performance. *Journal of Management Control*, *31*, 451–474. https://doi.org/10.1007/s00187-020-00307-y

Battisti, E., Alfiero, S., & Leonidou, E. (2022). Remote working and digital transformation during the COVID-19 pandemic: Economic-financial impacts and psychological drivers for employees. *Journal of Business Research*, *150*, 38–50. https://doi.org/10.1016/j.jbusres.2022.06.010

Bayo-Moriones, A., Galdon-Sanchez, J. E., & Martinez-de-Morentin, S. (2020) Performance appraisal: Dimensions and determinants. *The International Journal of Human Resource Management*, *31*(15), 1984–2015. https://doi.org/10.1080/09585192.2018.1500387

Becker B., & Gerhart B. (1996). The impact of human resource management on organizational performance: Progress and prospects. *Academy of Management Journal*, *39*(4), 779–801.

Bieńkowska, A., Koszela, A., Sałamacha, A., & Tworek, K. (2022). COVID-19 oriented HRM strategies influence on job and organizational performance through job-related attitudes. *PLoS ONE*, *17*(4). https://doi.org/10.1371/journal.pone.0266364

Blustein, D. L., Duffy, R., Ferreira, J. A., Cohen-Scali, V., Cinamon, R. G., & Allan, B. A. (2020). Unemployment in the time of COVID-19: A research agenda [Editorial]. *Journal of Vocational Behavior*, *119*. https://doi.org/10.1016/j.jvb.2020.103436

Boon, C., Den Hartog, D. N., & Lepak, D. P. (2019). A systematic review of human resource management systems and their measurement. *Journal of Management*, *45*(6), 2498–2537. https://doi.org/10.1177/0149206318818718

Brown, T. C., O'Kane, P., Mazumdar, B., & McCracken, M. (2019). Performance management: A scoping review of the literature and an agenda for future research. *Human Resource Development Review*, *18*(1), 47–82. https://doi.org/10.1177/1534484318798533

Brzozowski, J., & Cucculelli, M. (2016). Proactive and reactive attitude to crisis: Evidence from European firms. *Entrepreneurial Business and Economics Review*, *4*(1), 181–191. http://dx.doi.org/10.15678/EBER.2016.040111

Campello, M., Kankanhalli, G., & Muthukrishnan, P. (2020, May). *Corporate hiring under COVID-19: Labor market concentration, downskilling, and income inequality* (NBER Working Paper 27208). National Bureau of Economic Research.

Cappelli, P., & Conyon, M. J. (2018). What do performance appraisals do? *ILR Review*, *71*(1), 88–116. https://www.jstor.org/stable/26956064

Cascio, W. F., Boudreau J. W., & Fink, A. A. (2019). *Investing in people: Financial impact of human resource initiatives*. Society for Human Resource Management.

Claus, L., & Hand, M. L. (2009). Customization decisions regarding performance management systems of multinational companies: An empirical view of Eastern European firms. *International Journal of Cross Cultural Management*, *9*(2), 237–258. https://doi.org/10.1177/1470595809335726

Cooke, F. L., Dickmann, M., & Parry, E. (2021) IJHRM after 30 years: Taking stock in times of COVID-19 and looking towards the future of HR research. *The International Journal of Human Resource Management*, *32*(1), 1–23. https://doi.org/10.1080/09585192.2020.1833070

Curzi, Y., Fabbri, T., & Pistoresi, B. (2020). Performance appraisal criteria and innovative work behaviour: The mediating role of employees' appraisal satisfaction. In T. Addabbo, E. Ales, Y. Curzi, T. Fabbri, O. Rymkevich, & I. Senatori (Eds.), *Performance appraisal in modern employment relations* (Chapter 2, pp. 11–34). Palgrave Macmillan, Springer International Publishing.

Curzi, Y., Fabbri, T., Scapolan, A. C., & Boscolo, S. (2019) Performance appraisal and innovative behavior in the digital era. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.01659

DeNisi, A., Murphy, K., Varma, A., & Budhwar, P. (2021). Performance management systems and multinational enterprises: Where we are and where we should go. *Human Resource Management*, *60*(5), 707–713. https://doi.org/10.1002/hrm.22080

Edwards, T., Sánchez-Mangas, R., Jalette, P., Lavelle, J., & Minbaeva, D. (2016). Global standardization or national differentiation of HRM practices in multinational companies? A comparison of multinationals in five countries. *Journal of International Business Studies*, *47*(8), 997–1021. http://www.jstor.org/stable/26169981

Farndale, E., & Paauwe, J. (2018). SHRM and context: Why firms want to be as different as legitimately possible. *Journal of Organizational Effectiveness: People and Performance*, *5*(3), 202–210. https://doi.org/10.1108/JOEPP-04-2018-0021

Farndale, E., Scullion, H., & Sparrow, P. (2010). The role of the corporate HR function in global talent management. *Journal of World Business*, *45*, 161–168. https://doi.org/10.1016/j.jwb.2009.09.012

Garengo, P., Sardi, A., & Nudurupati, S.S. (2022). Human resource management (HRM) in the performance measurement and management (PMM) domain: A bibliometric review. *International Journal of Productivity and Performance Management*, *71*(7), 3056–3077. https://doi.org/10.1108/IJPPM-04-2020-0177

Guest, D. E., Michie, J., Conway, N. and Sheehan, M. (2003). Human resource management and corporate performance in the UK. *British Journal of Industrial Relations*, *41*, 291–314. https://doi.org/10.1111/1467-8543.00273

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). Sage.

Hamouche, S. (2021). Human resource management and the COVID-19 crisis: Implications, challenges, opportunities, and future organizational directions. *Journal of Management & Organization*, 1–16. https://doi.org/10.1017/jmo.2021.15

Houldsworth, E., Marra, M., Brewster, C., Brookes, M., & Wood, G. (2021). Performance appraisal and MNEs: The impact of different capitalist archetypes. *International Business Review*, *30*(5). Elsevier. https://doi.org/10.1016/j.ibusrev.2021.101826

Iqbal, M. Z., Akbar, S., Budhwar, P., & Shah, S. Z. A. (2019). Effectiveness of performance appraisal: Evidence on the utilization criteria. *Journal of Business Research*, *101*(C), 285–299. Elsevier. https://doi.org/10.1016/j.jbusres.2019.04.035

Kim, Y., & Ployhart, R. E. (2014). The effects of staffing and training on firm productivity and profit growth before, during, and after the Great Recession. *The Journal of Applied Psychology*, *99*(3), 361–389. https://doi.org/10.1037/a0035408

Kochalski, C., & Łuczak-Trąpczyńska, M. (2017). Determinants of controlling in foreign subsidiaries of MNEs: On the explanatory potential of the institutional perspective. *Entrepreneurial Business and Economics Review*, *5*(3), 79–94. http://doi.org/10.15678/EBER.2017.050304

Matookchund, N. G., & Steyn, R. (2020). The significance of performance appraisal for innovation, in selected South African organisations. *South African Journal of Economic and Management Sciences*, *23*(1), 1–11. https://doi.org/10.4102/sajems.v23i1.3272

Mellahi, K., Frynas, J. G., & Collings, D. G. (2016). Performance management practices within emerging market multinational enterprises: The case of Brazilian multinationals. *The International Journal of Human Resource Management*, *27*(8), 876–905. https://doi.org/10.1080/09585192.2015.1042900

Meyer, K. E., Mudambi, R., & Narula, R. (2011). Multinational enterprises and local contexts: The opportunities and challenges of multiple embeddedness. *Journal of Management Studies*, *48*(2), 235–52. https://doi.org/10.1111/J.1467-6486.2010.00968.X

Minbaeva, D. B., & Navrbjerg, S. E. (2023). Strategic human resource management in the context of environmental crises: A COVID-19 test. *Human Resource Management*, 1–22. https://doi.org/10.1002/hrm.22162

Neher, A., & Maley, J. (2019). Improving the effectiveness of the employee performance management process: A managerial values approach. *International Journal of Productivity and Performance Management*, *69*(6), 1129–1152. https://doi.org/10.1108/IJPPM-04-2019-0201

Ostroff, C., & Schmitt, N. (1993). Configurations of organizational effectiveness and efficiency. *Academy of Management Journal*, *36*, 1345–1361. https://doi.org/10.5465/256814

Pattnaik, S. C., & Sahoo, R. (2020). Human resource practices as predictors of organizational performance: A structural equation modeling approach. *Global Business Review*, *21*(4), 1087–1112. https://doi.org/10.1177/0972150918779286

Pawęta, E. (2013). The determinants of born global companies emergence in Central European countries. *Entrepreneurial Business and Economics Review*, *1*(2), 41–50. https://doi.org/10.15678/EBER.2013.010204

Picón-Berjoyo, A., Ruiz-Moreno, C., & Castro, I. (2016). A mediating and multigroup analysis of customer loyalty. *European Management Journal*, *34*, 701–713. https://doi.org/10.1016/j.emj.2016.07.006

Ratković, T., & Orlić, R. (2015). Transfer of performance appraisal practices from MNC parent to subsidiaries in Serbia. *Economic Annals*, *60*(204), 105–126. https://doi.org/10.2298/EKA1504105R

Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring organizational performance: Towards methodological best practice. *Journal of Management*, *35*(3), 718–804. https://doi.org/10.1177/0149206308330560

Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring organizational performance: Towards methodological best practice. *Journal of Management*, *35*(3), 718–804. https://doi.org/10.1177/0149206308330560

Ringle, C. M., Sarstedt, M., Mitchell, R., & Gudergan, S. P. (2020). Partial least squares structural equation modeling in HRM research. *The International Journal of Human Resource Management*, *31*(12), 1617–1643. https://doi.org/10.1080/09585192.2017.1416655

Rogers, E. W., & Wright, P. M. (1998). Measuring organizational performance in strategic human resource management: Problems, prospects and performance information markets. *Human Resource Management Review*, *8*(3), 311–331. https://doi.org/10.1016/S1053-4822(98)90007-9

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*(2), 1–36. https://doi.org/10.18637/jss.v048.i02

Saraf, N., Dasgupta, S., & Blettner, D. P. (2022). How do managerial perceptions of performance feedback affect innovation? *Strategic Organization*, *20*(3), 451–480. https://doi.org/10.1177/14761270211019484

Savalei, V., & Rosseel, Y. (2022). Computational options for standard errors and test statistics with incomplete normal and nonnormal data in SEM, structural equation modeling. *A Multidisciplinary Journal*, *29*(2), 163–181. https://doi.org/10.1080/10705511.2021.1877548

Schlägel, C., & Sarstedt, M. (2016). Assessing the measurement invariance of the four-dimensional cultural intelligence scale across countries: A composite model approach. *European Management Journal*, *34*(6), 633–649. https://doi.org/10.1016/j.emj.2016.06.002

Shen, J. (2005). Effective international performance appraisals: Easily said, hard to do. *Compensation & Benefits Review*, *37*(4), 70–79. https://doi.org/10.1177/0886368705277656

Statistics Poland. (2022). *Activity of enterprises having foreign entities in 2020*. Statistics Poland.

Stor, M. (2011). Niedowartościowane obszary ZZL w korporacjach międzynarodowych w Polsce na tle innych organizacji w czasie ogólnoświatowego kryzysu gospodarczego – wyniki badań empirycznych. In Z. Janowska (Ed.), *Dysfunkcje i patologie w sferze zarządzania zasobami ludzkimi* (Vol. 4, pp. 187–215). Wydawnictwo Uniwersytetu Łódzkiego.

Stor, M. (2012a). Continental frameworks for HRM effectiveness and efficiency in MNCs: European, American, Asian, and African perspectives. *Human Resources Management*, *6*(89), 9–35.

Stor, M. (2012b). Międzykulturowe uwarunkowania elastyczności systemu oceniania pracowników w korporacjach międzynarodowych. In T. Listwan, M. Stor (Eds.), *Sukces w zarządzaniu kadrami. Elastyczność w zarządzaniu kapitałem ludzkim*: *Vol. 1. Problemy zarządczo-ekonomiczne. Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, (248), 423–437. Publishing House of Wroclaw University of Economics and Business.

Stor, M. (2022). Preface. In M. Stor (Ed.), *Human capital management in the wandering context of events – Challenges for the managerial staff* (pp. 8–10). Publishing House of Wroclaw University of Economics and Business.

Stor, M. (2023). *Human resources management in multinational companies: A Central European perspective*. Routledge, Taylor & Francis Group. https://doi.org/10.4324/9781003357087

Trąpczyński, P., Jankowska, B., Dzikowska, M., & Gorynia, M. (2016). Identification of linkages between the competitive potential and competitive position of SMEs related to their internationalization patterns shortly after the economic crisis. *Entrepreneurial Business and Economics Review*, *4*(4), 29–50. http://dx.doi.org/10.15678/EBER.2016.040403

Trost, A. (2017). *The end of performance appraisal. A practitioners' guide to alternatives in agile organisations*. Springer.

Tziner, A., & Rabenu, E. (2021). The COVID-19 pandemic: A challenge to performance appraisal. *Industrial and Organizational Psychology*, *14*(1–2), 173–177. https://doi.org/10.1017/iop.2021.24

Williams, L. J., & O'Boyle, E. H. (2008). Measurement models for linking latent variables and indicators: A review of human resource management research using parcels. *Human Resource Management Review*, *18*, 233–242. https://doi.org/10.1016/j.hrmr.2008.07.002

Wood, S. (2021). Developments in the HRM–Performance Research stream: The mediation studies. *German Journal of Human Resource Management*, *35*(1), 83–113. https://doi.org/10.1177/2397002220986943

E-Commerce as a Game Changer for Logistics in a Sustainable Context

Arkadiusz Kawa

Łukasiewicz Research Network – Poznan Institute of Technology
& Poznan School of Logistics, Poland
https://orcid.org/0000-0003-0697-8838

Abstract

Purpose: The purpose of the study is to identify the areas of e-commerce that can lead to sustainable logistics.

Design/methodology/approach: The research methodology includes a theoretical analysis. It is based on various data collection techniques such as document review, direct observation and archival records from secondary sources such as reports, studies, statistics and internet sources.

Findings: E-commerce is not yet a game changer for sustainable logistics. However, it seems to be a matter of time, and it will grow in importance and influence. For this reason, companies that want to maintain a competitive edge need to be aware of the changes and the expectations of customers, who are increasingly paying attention to sustainable development.

Research limitations/implications: The research is mainly based on secondary sources. Empirical research is needed to confirm the hypotheses.

Originality/value: The sustainability of e-commerce is a critical issue that needs to be addressed. Despite the increasing attention paid to sustainable logistics in e-commerce research, the literature available is still in its infancy and requires further development. This paper fills this research gap.

Keywords: e-commerce, sustainable development, game changer.

JEL: L81, Q01, R41

Correspondence address: Łukasiewicz Research Network – Poznan Institute of Technology & Poznan School of Logistics, Ewarysta Estkowskiego 6, 61-755 Poznań, Poland; e-mail: arkadiusz.kawa@pit.lukasiewicz.gov.pl.

Handel elektroniczny jako czynnik zmieniający reguły gry dla logistyki w zrównoważonym kontekście

Streszczenie

Cel: celem badania jest identyfikacja obszarów e-commerce, które mogą prowadzić do zrównoważonej logistyki.

Metodologia: metodologia badania obejmuje analizę teoretyczną. Opiera się na różnych technikach gromadzenia danych, takich jak przegląd dokumentów, bezpośrednia obserwacja i zapisy archiwalne ze źródeł wtórnych, takich jak raporty, badania, statystyki i źródła internetowe.

Wyniki: handel elektroniczny nie jest jeszcze przełomem w zrównoważonej logistyce. Wydaje się jednak, że jest to kwestia czasu, a jego znaczenie i wpływ będą rosły. Z tego powodu firmy, które chcą utrzymać przewagę konkurencyjną, muszą być świadome zmian i oczekiwań klientów, którzy coraz częściej zwracają uwagę na zrównoważony rozwój.

Ograniczenia/implikacje badawcze: badania bazuje głównie na źródłach wtórnych. Potrzebne jest przeprowadzenie badań empirycznych w celu potwierdzenia hipotez.

Oryginalność/wartość: zrównoważony rozwój handlu elektronicznego jest kluczową kwestią, którą należy się zająć. Pomimo coraz większej uwagi poświęcanej zrównoważonej logistyce w badaniach nad handlem elektronicznym, dostępna literatura jest wciąż niewystarczająca i wymaga dalszego rozwoju. Niniejszy artykuł wypełnia tę lukę badawczą.

Słowa kluczowe: e-handel, zrównoważony rozwój, zmieniacz gry.

1. Introduction

With the dynamic development of e-commerce, the scale of challenges for logistics is growing. In 2021, customers generated approximately 159 billion packages (Boukarroum, 2022). 2022 was forecast at USD 170 billion (Statista, 2023). These numbers translate into shipments being driven billions of kilometers and millions of tons of packaging material being used. Each product must be completed, packed and shipped or handed over for collection by the customer. Although online shopping is very convenient for customers, it has an impact on the environment and society. For this reason, it is claimed that the rapid and continuous growth of e-commerce cannot be discussed without talking about its sustainability (Oláh et al., 2019; Fedorko et al., 2017). Given that e-commerce is ubiquitous, it is important to ensure that its activities do not threaten the world (Dabija, 2022). It should be organized to protect the environment, avoid its destruction and ensure the continuation of humanity (Oláh et al., 2019).

Online shoppers are more and more interested in a sustainable approach. Not only do they expect social responsibility from companies, but they also want to take initiatives that are related to ecology. According to the "Green Generation" report of the Mobile Institute (2021), many e-customers are willing to wait longer for the delivery if the e-store cares for a greener delivery and to pay extra for foil-free packaging. However, there are still many customers who have the opposite attitude. The report also shows

that almost two thirds of the respondents surveyed do not know what "ecological" means, and one third believe that the global climate is not getting warmer. The problem with the development of ecological attitudes is, above all, convenience. A large part of consumers still treat the pro-ecological approach as an additional effort in which they do not see direct benefits. A similar dichotomy is shown by the results of McKinsey's (2019) study. Some clients are able to pay up to 5% more if a green product meets the same requirements and expectations as the non-green alternative. However, there are customers who do not want to pay extra for sustainable solutions. This is indicative of the still low awareness and relatively low commitment of the public to sustainability, even though they have increasing expectations in this field.

Although sustainability in e-commerce has been attracting more attention (Abukhader & Jönson, 2003; Mangiaracina et al., 2015), the available research is still in its infancy and requires a deeper insight. E-commerce research is dominated by a large number of articles referring to the study of marketing (Allen & Fjermestad, 2001; Fedorko et al., 2017), IT (Ghobakhloo, 2011), logistics (Ramanathan et al., 2014; Rao et al., 2011). Moreover, there is also a debate in the literature on whether the rapid growth of e-commerce has a positive or negative impact on sustainable development, particularly on the environment (Carrillo et al., 2014; Godfrey, 2017). This is because online shopping eliminates the trip to the store and back – this is done more efficiently by logistics companies. However, delivery can be inefficient when the customer is not at home (Haryanti & Subriadi, 2021). On top of that, there are returns. Moreover, there are additional packaging materials in e-commerce (Mangiaracina et al., 2015). However, most research findings show that the positives of e-commerce outweigh its negatives (Oláh et al., 2019). Of interest are the results of Rai et al. (2021), which show that non-financial incentives drive more sustainable choices during e-shopping. It is therefore important to make customers aware of this and encourage them to adopt pro-environmental attitudes (Rai et al., 2021).

Undoubtedly, the dynamic development of e-commerce has brought about many changes – not only in the area of retail structure, but especially in the area of logistics and its sustainability. It has triggered additional activities and made companies and customers realize that they can influence the future of the environment and social conditions. With the new approach, companies can gain competitive advantages and attract more customers (Lumpkin et al., 2002). For these reasons, it can be treated as a game changer. Therefore, the aim of this article is to identify areas of e-commerce that are a game changer for sustainable logistics.

The research methodology of this article includes a theoretical analysis. It is based on various data collection techniques such as document review, direct observation and archival records from secondary sources such as reports, studies, statistics and internet sources. However, the most important

source of data was publications contained in the databases: Emerald, ScienceDirect, and Taylor & Francis. The search criteria in these databases were the keywords: 'sustainability' and 'logistics' and 'e-commerce'. Inclusive criteria were adopted: (1) search criteria should be included in the abstract, title or keywords of the analyzed papers; (2) publications should be classified in the area of management studies; (3) only papers in the form of scientific articles published in journals, scientific articles published in conference proceedings and chapters in scientific monographs were analyzed; (4) only papers available in full version and in English were considered. In addition, the snowball method was applied, i.e. if there were references to other scientific papers on the search keywords, these were also taken into account. The main reason for choosing this methodological approach was the need to discern the popularity of the topic under study in the research conducted so far.

2. E-Commerce Sector

The advent of the internet has not just revolutionized communication, but also altered commerce by providing customers with greater opportunities to purchase products. Customers now have access to a wider range of products at better prices. Additionally, they can now purchase products that were previously unavailable due to factors such as distance, lack of time, or a different lifestyle. This includes products from other countries that were previously difficult to obtain (Doligalski, 2009).

Online shops have been opened by both new operators (pure players) and owners of traditional counterparts (brick-and-mortar players), for whom the internet has provided an additional sales channel. This has given customers access to products round the clock, in addition to a wider selection of products than traditional shops could offer, easy product comparisons, and the ability to monitor customer behavior. Consequently, e-commerce has evolved into a new sales and marketing tool, providing a platform for businesses to offer their products and services to a larger audience (Kawa, 2017).

E-commerce has been one of the fastest growing sectors in recent years, both nationally and globally. The pandemic and the resulting restrictions at stationary shops have contributed to its dynamic development (Tran, 2021). On the one hand, e-commerce has enabled many people to access products and function relatively normally during this difficult period, but on the other hand, the internet has become a place where it is easy and quick to buy something without a lot of thought – almost like with impulse products at the checkout in a shop (Lavuri, 2021). As experts predict, the e-commerce growth achieved during the pandemic is likely to be a lasting achievement and will be the basis for its further development (Yuan et al., 2021; Elrhim & Elsayed, 2020). However, the dynamics of this development

has recently been somewhat limited by the high level of inflation, which reduces the purchasing power of consumers.

Today, 5.16 billion (64.4%) people around the world use the internet and spend 6h 37m on average daily using the internet (Datareportal, 2023). 76% of them buy online (Kemp, 2022). According to eMarketer, global e-commerce turnover increased by 12.2% in 2022, when its value reached USD 5.54 trillion. This represented around 20.3% of the total retail sales. In 2023, it is anticipated to reach USD 6.15 trillion (up by 11%), and in 2025 it is expected to amount to USD 7.39 trillion, thus accounting for 23.6% of the total trade (eMarketer, 2022). In Poland, the internet penetration stood at 88.4% percent. People spend 6h 42m on average in the internet. 97% of the population have smartphones (Datareportal, 2023). E-commerce is developing as dynamically as it is globally. Already 87% of internet users buy products online and 61% of them make their purchase online 2–5 times a week (eIzba, 2022). It is estimated that in 2022 the value of online sales amounted to about PLN 109 billion. Thus, the share of e-commerce in total trade in Poland will be about 12%. In 2023, e-commerce is expected to be worth PLN 124 billion (PwC, 2022).

As buying online involves getting the ordered product to the customer, i.e. delivery, and before that preparing it for shipping, packing and handling any returns, logistics is a very important part of e-commerce. The next section is devoted to this.

3. E-Commerce Logistics

In many companies, logistics is still treated peripherally, as an instrument to support other areas of the business and a source of costs. However, the role of logistics has changed in e-commerce. It is safe to argue that without logistics and its solutions, e-commerce would not exist at all or would function in a very limited way (Ramanathan et al., 2014).

In e-commerce, some of the logistics processes are similar to those in traditional commerce and some are different. The main difference concerns the access to and receipt of goods. In conventional trade, customers are required to physically visit the store to purchase products and then transport them to their desired location. In contrast, e-commerce replaces this process with electronic ordering and the option of having the product delivered to a location chosen by the customer or made available for collection at a brick-and-mortar store. This entails selecting the items, packing them, and arranging the shipment. Additionally, a returns process exists due to regulations concerning distance purchases. In the European Union, consumers have the right to return online purchases within 14 calendar days without providing a reason, as long as they submit a notice of withdrawal (Kawa, 2017).

In terms of the number of transactions (but not their value), e-commerce is dominated by the B2C (business to customer) segment, where goods are ordered by individual customers. Dealing with such customers is much more difficult and requires implementation of special procedures. E-customers often make one-off purchases. There is, therefore, high fragmentation of orders, which involves frequent shipments of small batches of products. E-tailers have a wide assortment of a relatively small number of items and tend to send single items (Kawa, 2017).

Logistics allows e-tailers to deal with the time and cost of fulfillment and delivery, the quality of delivery and the handling of returns. Moreover, efficient and customized logistics is a source of competitive advantages. On the one hand, the availability of goods, various forms of delivery and low shipping costs attract new customers. On the other hand, timeliness and conformity of the goods with the order help to retain existing customers, as satisfied ones repeat purchases. It helps to build trust and loyalty among customers and minimize the costs of storage and transportation.

E-commerce has also significantly affected supply chains. The advent of the internet has cut out middlemen in the supply chain and opened up new avenues for sales and distribution. The focus is now on the end consumer, who can place orders from anywhere at any time. With the beginning of online sales, customers have become an integral part of the logistics process, and in many cases have become involved with logistics services for the first time (Kawa, 2020).

A very important element of e-commerce logistics is sustainability. More and more attention is being paid to it, so more and more studies are being developed on the subject, more and more conferences, articles and initiatives are being launched around it.

4. Sustainable Development and Sustainable Logistics

Although the concepts of sustainability and sustainable development have been used in the literature for many years, there is still no clearly defined approach. It is understood and interpreted in different ways, with different scopes and actors. According to Giddings et al. (2002) and Hopwood et al. (2005), it is a contested concept. Barkemeyer et al. (2014) adds that the multiplicity of definitions does not contribute and that they are "mutually exclusive."

The most well-adopted and most often quoted definition of sustainable development was formulated by the United Nations (known as WCED's Brundtland report). It sounds as follows: "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 37). This definition focuses on the needs of both present and future generations. The problem with this definition is that it is not known what the future will look like, much

less what the needs of future generations will be. In addition, it does not refer to any specific group of actors and therefore organizations often have difficulty determining their individual role in this bigger, macroeconomic picture (Carter et al., 2008; Shrivastava, 1995).

More concrete in terms of who is affected is the definition of Starik and Rands (1995, p. 909): "the ability of one or more entities, either individually or collectively, to exist and flourish (either unchanged or in evolved terms) for lengthy timeframes, in such a manner that the existence and flourishing of other collectivities of entities is permitted at related levels and in related systems." In this case, however, it is not clear what is meant by lengthy timeframes and what are related levels and systems.

According to Brittanica, it "is an approach to economic planning that attempts to foster economic growth while preserving the quality of the environment for future generations" ("Sustainable development," n.d.) This definition focuses on economic things including the environment, it does not consider social issues. This is because initially, the consideration of sustainable development focused on reducing the negative impact of human activity on the environment. Over time, the concept has been expanded to include social cohesion, environmental protection and economic growth (Basri & Siam, 2019; Hart & Milstein, 2003). Those three dimensions have to go hand in hand (Pei et al., 2010). Integration of these three elements allow for achieving long-term economic viability (Carter et al., 2008).

There is also a similar range of different definitions and approaches to sustainability in the case of sustainable logistics. Wichaisri and Sopadang (2013) relate sustainable development to a logistics system. According to them, "a sustainable logistics system focuses on logistics operations (i.e., supplier selection, procurement, manufacturing, warehousing, and delivery) in order to reduce a company's costs, lessen its environmental impact, and address the impact it has on society" (Wichaisri & Sopadang, 2013, p. 1019). A slightly broader reference to supply chains, and not just logistics, is made by Carter et al. (2008, p. 368) stating that it is "the strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key interorganizational business processes for improving the long-term economic performance of the individual company and its supply chains."

The analysis of the literature on sustainability allows the formulation of a definition of sustainable logistics in e-commerce. This definition was developed based on the definition of Seuring and Müller (2008). Namely, sustainable logistics is the management of physical products and information flows as well as cooperation among companies and consumers while taking goals from three dimensions of sustainable development, i.e. economic, environmental and social, into account which are derived from customer and stakeholder requirements.

A lot is being said about sustainability in the context of products and, more often than not, of manufacturing itself. In commerce, we deal with the finished product and thus with its marketing. In the case of e-commerce, there is a fairly strong relationship with the customer, who is increasingly paying attention to how and in what form products are delivered, in addition to how they are returned.

5. Sustainable Logistics Dimensions

Sustainable logistics in e-commerce is a concept that focuses on balancing the economic, environmental and social aspects of logistics operations. It is worth explaining the three dimensions.

Environmental sustainability focuses on the protection and preservation of natural resources, including air, water, and soil, as well as biodiversity. It relates to the e-commerce impact in the form of emission of greenhouse gasses, air pollution, noise pollution and congestion (Demir et al., 2015). It also includes reducing waste and pollution and managing energy and natural resources responsibly. Pollution is mostly generated by transport (Seebauer et al., 2016) and packaging (Freitag & Kotzab, 2020; Ignat & Chankov, 2020). Some authors add the energy that is used for e-commerce maintenance (servers, computers and other electrical devices). It turns out that a badly designed website which takes a long time to load and overloads the internet network affects the additional life of energy (Godfrey, 2017).

By making it easier for customers to access products and services, e-commerce can help to reduce the carbon footprint of retail, as customers are less likely to need to travel long distances to make a purchase.

Social sustainability refers to human needs and cultural development (Elkington & Rowlands, 1999). It includes employment (working conditions, wages, benefits, etc.) (Shishiteva, 2017) as well as gender empowerment, a decrease in poverty, fair labor practices, community engagement, and human rights. Thanks to digitization, many customer service processes are automated. Thus, e-commerce is usually less labor-intensive than selling in traditional shops. On the other hand, e-commerce continues to grow, so there is a need for new employees, but with different competences. This is changing the labor supply of the market, which is prompting retailers to look again at e-commerce. It needs human resources, especially their qualifications and skills exactly adjusted to the dynamically changing environment. Not only qualified labor, high managerial skills, but also knowledge about national and overseas markets, understanding different consuming habits, quick learning about new technologies and business models, and being innovative are the most important challenges. They require an appropriate education, training system, labor mobility, and policy facilities (Chen, 2017).

Some authors even point to more specific factors, such as the strain on public infrastructure and traffic that delivery causes (Ducarme, 2019; Ignat & Chankov, 2020; Laghaei et al., 2016), and even fraud and complaint (Haryanti & Subriadi, 2021).

E-commerce can greatly improve access to products and services, particularly for those in rural or remote areas.

In turn, **economic sustainability** concerns cost, time, quality and other major goals for business and economy (Basri & Siam, 2019). It takes into account the environmental and social dimensions while focusing on economic gains and generating profits and revenue. Cost is of great importance to customers, who consider it to be the most important deciding factor in choosing a product, delivery service, etc. It can therefore have a negative impact on other aspects of sustainability. The concept of sustainability has to be considered as trade-offs in the environment, society and economy that will result in greater benefits (Oláh et al., 2019).

To ensure the economic sustainability of e-commerce, it is important that policymakers and businesses work together to create an environment in which e-commerce can flourish. This includes ensuring that e-commerce companies pay their fair share of taxes, that there is a level playing field for all companies, and that the digital economy is regulated in a way that protects the interests of consumers, workers and the environment.

One of the main benefits of e-commerce is the ability of businesses to reach a global market and generate sales from a wider range of customers. E-commerce also enables businesses to reduce their operating costs and improve their competitiveness, which can lead to lower prices for consumers and increased consumer welfare. However, the growth of e-commerce also poses a number of challenges to economic sustainability. One such challenge is the uneven distribution of economic benefits among different groups, with some countries and regions being left behind.

6. Key Sustainable Logistics Game Changers in E-Commerce Delivery

Due to the lack of geographical restrictions in e-commerce, goods are sometimes shipped from very far away to the customer. Regardless of that, many studies show that e-commerce is the most effective choice for delivery, even for long distances, because it allows to avoid using private transport to shopping malls and enables better consolidation and routes optimization (Escursell et al., 2021; Rai et al., 2021). However, one of the biggest challenges of e-commerce is the last stage in the process of delivering the shipment to the recipient which is known as the last mile delivery (Mangiaracina et al., 2015). It is a critical link in the entire supply chain – while logistics at earlier

stages is automated and optimally designed, the quality of service at the last stage is determined by humans (Yuen et al., 2018).

According to Frost and Sullivan (2018), global spending on logistics was projected to reach USD 10.6 trillion in 2020. The transportation sector accounts for 70% of this expenditure, with the last mile making up 40% of that amount. In addition to the very high financial costs, there are many social costs associated with urban supplies – traffic jams, noise, pollution, etc. The problem, therefore, is the limited possibility to choose the place from which the shipment will be sent while shopping online and the lack of possibility to consolidate shipments during the ordering process on the shopping platform.

Deliveries are fragmented (there are no systemic mechanisms to mitigate this) and past industry practice shows that the speed of delivery is more important than minimizing its carbon footprint. An additional challenge is the increasing demand for fast delivery (Radonjic & Tompa, 2018). Recently, there has been a growing trend of q-commerce which relies on ultra-fast deliveries – even within 15 minutes of placing an order. Such deliveries are direct from point to point and there is not much room for optimization.

With the rapid growth of e-commerce, the number of packages whose recipients are private individuals has increased. During the couriers' working hours, most of these people are usually at work, school or elsewhere. The range of delivery hours is in fact quite wide and it is difficult for customers to predict the moment of arrival of the courier, who usually does not even inform about an approximate time of the delivery. This has been a very big challenge for courier companies. A solution to this problem has been found in OOH (out-of-home) deliveries, which are now a game changer in the sustainable logistics of e-commerce. They involve the delivery to parcel lockers and PUDO (pick up drop off) points (Mangiaracina et al., 2015), which are indicated by the customer at the time of the purchase. Such packages can be picked up along the customer's commuting route, e.g. home, to work or school, at a time convenient for the customer, within a time frame of up to several days. OOH makes it possible to consolidate and deliver multiple packages to one location, which increases delivery efficiency. Resources (cars, couriers) and processes are reduced (delivering more shipments to the same location reduces the number of stops and eliminates failed deliveries due to the recipient being absent). In addition, both delivery costs and average delivery times are significantly reduced. OOH delivery, however, involves the customer in the last mile process. Customers have to do some of the work that is normally done by the courier, i.e. they have to go to the OOH point and collect their parcels themselves. In addition to convenience, the environmental benefits are also important. According to the World Economic Forum, delivery costs can be cut by 2% to 12% and at the same time road congestion can be reduced by 5% to 18% (WEF, 2018).

Out-of-home (OOH) delivery overcomes the challenges of finding the right address or not having the recipient at home. It is a straightforward delivery method where the customer selects a convenient pick-up location when making an online purchase. The proximity of the location to the customer's home or workplace is a key consideration, making the density and distribution of OOH outlets important.

By consolidating parcels, OOH delivery is less expensive than door-to-door courier services and reduces the number of undelivered parcels due to absence. It also results in fewer queries from recipients as they receive automatic updates on the status of their parcel. Moreover, OOH delivery is effective for returns, allowing recipients to return products easily and cheaply, sometimes even free of charge, depending on the retailer's policy.

The last mile problem can also be tackled with solutions related to social aspects. In logistics, there is increasing interest in applying the concept of the sharing economy. A prime example of this is crowdsourcing, which involves individuals picking up and delivering shipments in urban areas (Kiba-Janiak et al., 2021; Ignat & Chankov, 2020; Mangiaracina et al., 2015). There is also more and more attention being paid to horizontal cooperation in which e-tailers and/or logistics companies work together and thus can make better use of their resources and capabilities (Fichter, 2002). Today, mobile internet applications are most often associated with the sharing economy in transport. Its example is Uber for urban deliveries. The functionality is similar to that of transport exchanges in that they allow the selection of a carrier for a specific transport task. For individual customers, business models that involve the public and their resources to provide services are very popular.

Packaging

A big challenge related to the dynamic development of e-commerce is the growing amount of packaging waste (Escursell et al., 2021). Researchers from the MIT Real Estate Innovation Lab (2021) published interesting data. Well, the biggest "polluter" in e-commerce is not the last mile, but the packaging. 45% of all e-commerce greenhouse gas emissions are related to packaging and packaging materials. The opposite proportions are shown in the Olivier Wayman (2021) report, where packaging generates 14% of CO_2, with the greatest impact on the last mile (26%). The results of the two studies show large discrepancies which are probably due to different research methodologies. Regardless, packaging has a significant impact on sustainable logistics, in particular ecology.

Packaging serves as a means of storing and securing goods and plays a critical role in the technology used to load and transport shipments. In e-commerce, where shipments go through multiple operations, the design and functionality of the packaging is even more critical. The packaging should be easy and intuitive to open without damaging the goods and

robust enough to withstand reshipment if returned. It should also have an informative function, conveying information about the contents, protecting the goods from mishandling during transport and enabling identification of the shipment on delivery. Packaging also has a marketing function as it is often the first physical contact the customer has with the product. The act of opening the packaging evokes strong emotions in many customers, similar to the excitement of opening a gift. Therefore, the packaging should be aesthetically pleasing, act as an incentive for future purchases and as an advertisement for the online retailer (Kawa, 2017).

The packaging of goods is also part of the larger system in which products function. They are closely linked to transport, and therefore also to the last mile (Lu et al., 2020; Monnot et al., 2019). Orders placed with several e-tailers do not only require delivery to the customer each time but also individual packaging. Products are often placed in oversized packaging, which leads to less efficiency and at the same time increases the carbon footprint, because it requires additional protective materials and more transport means. Packaging loses value after use and becomes waste, although in many cases it could be reused. In addition, products are often over-packaged and consumers do not know what to do with the packaging that accumulates in their homes – where to store and dispose of it, how to segregate it properly. Different types of packaging are used, with a significant proportion of materials that cannot be recycled (Mangiaracina et al., 2015; Oláh et al., 2019), e.g. plastic fillers, foil packs, tapes that are difficult to remove from a paper carton, etc. The way in which goods are packaged varies greatly, as individual manufacturers and retailers are responsible for this. This results in a situation where the problem of packaging waste is not only a social or environmental problem but also an individual problem for consumers, as it is an impediment to their daily lives (Trivedi et al., 2018). Retailers and manufacturers often lack knowledge and environmental sensitivity – as a result, the packaging they use does not meet standards of sustainability. In addition, the cost of packaging significantly influences retailers' choice of individual solutions and ecological solutions tend to be more expensive, which means that they are used less frequently. This makes it very difficult to develop a uniform product packaging system.

Customers are paying increasing attention to reusable packaging, which is likely to be a game changer for sustainable logistics. It will allow for solving the problems associated with packaging and, above all, its negative impact on the environment. Returning goods will be made easier, delivery costs will be reduced, it will be easier to protect goods and, above all, minimize the carbon footprint.

Returns

Another very important area related to sustainable e-commerce are returns (Park & Regan, 2004), which significantly influence CO_2 emissions (Ghezzi et al., 2012; Wiese et al., 2012). Internet shopping, in contrast to traditional trade, is connected with convenience, but also with the impossibility to check goods before buying them. Customers cannot check them organoleptically, so returns at online shops are more frequent than in stationary shops. Customers in many countries (e.g. in the EU) have the right to return goods bought online without giving a reason. This is the so-called consumer return (XiaoYan et al., 2012). However, it is a more complicated process than fulfilling the order and sending the product to the customer (Bernon et al., 2016). It requires checking the quality of the product and deciding on the further fate of the production. Some are disposed of, some are repaired or reused. Returns generate additional transport to distribution warehouses, fulfillment centers or other places (Wiese et al., 2012) and ensue packing them with the aforementioned materials if the goods are not delivered in return packaging (Sallnäs & Björklund, 2020). The negative impact of returns is reduced by reusable packaging (e.g. RePack, ePack), but also by using OOH as a shipping method. Online retailers also take care of proper presentation and accurate description of their products.

Returning goods can be an unpleasant experience for customers, as it can take extra time and often involves additional costs. For some people, especially those who are new to the process, it can be a stressful situation. They may not know how to declare a return, how to prepare and pack the package, how to order a courier or where to send the package. It is important to make the returns process easier for the customer, as the decision to return a product is often due to problems with the product itself rather than the salesperson. If the return process is difficult, it can add to customer frustration. A straightforward return process can create a positive experience that encourages customers to return to the same retailer. To achieve this, it is important to have an interactive returns form and easy communication channels such as email or phone. Unfortunately, many sellers still have unfriendly return forms in the PDF format that can be cumbersome to complete (Kawa, 2019).

The delivery process in e-commerce returns logistics is a significant challenge and cost. For low-value products, some customers choose not to exercise their right of withdrawal, especially if they have to pay for the return. If shops covered all return costs, this could potentially encourage customers to order more frequently. Unfortunately, many shops view returns as an additional expense, as they not only have to cover the cost of delivering the product to the customer but also have to carry out other activities such as quality control checks, refunds, sales documentation and other processes similar to receiving goods from a supplier (Bernon

et al., 2016). However, studies (Kawa, 2019) have shown that returns can increase customer satisfaction and loyalty in e-commerce. When customers pay more attention to return policies, they tend to be more satisfied with their purchases, leading to increased loyalty and spending. This can give sellers and suppliers a competitive advantage over their rivals. The right approach to returns can be a game changer for online retailers.

Re-commerce

E-commerce also opens up opportunities to develop new activities or to apply those that are well known in traditional sales. One of these is re-commerce, which refers to the buying and selling of second-hand or pre-owned items. It is a portmanteau of "recycling" and "commerce". This is done in line with the concept of a closed loop economy, or production and consumption, which involves sharing, borrowing, reusing, repairing, refurbishing and recycling existing materials and products for as long as possible. In this way, the life cycle of products is extended. This gives products such as electronics, clothing, toys, etc. a so-called second life. Such goods can be bought and sold on marketplaces such as Poshmark, ThredUp, and The RealReal, Vinted, OLX. Recently, second-hand goods are also traded by retail chains. Examples include H&M, Decathlon, Auchan and Carrefour (Kakowska-Mehring, 2021).

Re-commerce platforms allow individuals and businesses to sell items they no longer need to other people who are interested in buying them. These platforms are often a more sustainable alternative to traditional retail, extending the life cycle of products and reducing waste.

Second-hand goods have become increasingly popular in recent years. This has been driven by a growing awareness of the environmental impact of consumption and a desire to live more sustainably. By buying and selling second-hand goods, individuals can reduce the amount of waste sent to landfill and conserve resources that would otherwise be used to produce new items (Santos et al., 2021).

One of the challenges of re-commerce logistics is reverse logistics, or the process of handling returns and exchanges (Augustine & Fulghum, 2018). Re-commerce platforms need to have processes in place to accept returns, inspect items and issue refunds or exchanges. This process can be more complicated than in traditional retail, as items may have varying degrees of wear and tear or damage, and may not always be in their original packaging.

One of the most significant ways in which re-commerce is a game changer is its potential to reduce waste and promote sustainability. By extending the life cycle of products and reducing the need for new production, re-commerce can encourage consumers to adopt more conscious and responsible purchasing habits and help reduce the environmental impact of consumption. This can lead to a shift away from disposable and fast fashion, and towards more sustainable and durable products.

7. Conclusions

The exponential growth of online shopping in recent years has led to a growing awareness of the negative environmental impacts of e-commerce, including increased carbon emissions from transport and packaging waste. As a result, consumers are becoming more aware of the impact of their purchasing decisions and are looking for ways to make more sustainable choices. This has led to the growth of sustainable e-commerce, which is changing the way online shopping is done and perceived.

The article also showed that e-commerce can have a positive impact on sustainable logistics. This is exemplified by the lower financial outlay for the escrow of goods and thus a lower negative impact on the environment compared to traditional trade. Transport for e-commerce also compares favorably in many cases.

The rise of sustainable e-commerce is a response to growing concerns about the environmental impact of online shopping and consumers' desire to make greener purchasing decisions. By offering sustainable products and delivery options, e-commerce companies can appeal to a growing number of environmentally conscious consumers while reducing waste and improving the efficiency of their operations.

E-commerce is not yet a game changer for sustainable logistics comparable to the advent of the internet or mobile phones. However, it seems to be a matter of time, and it will grow in importance and influence. For this reason, companies that want to maintain a competitive edge need to be aware of the changes and the expectations of customers, who are increasingly paying attention to sustainable development.

In conclusion, e-commerce has the potential to contribute to sustainable development, but it is important to carefully manage and mitigate its negative impacts. This can be achieved through the development and implementation of sustainable e-commerce practices and policies, as well as through increased awareness and education about the environmental and social impacts of e-commerce.

References

Abukhader, S. M., & Jönson, G. (2003). The environmental implications of electronic commerce: A critical review and framework for future investigation. *Management of Environmental Quality: An International Journal*, *14*(4), 460–476. https://doi.org/10.1108/147778303104886685

Allen, E., & Fjermestad, J. (2001). E-commerce marketing strategies: An integrated framework and case analysis. *Logistics Information Management*, *14*(1/2), 14–23. https://doi.org/10.1108/09576050110360106

Augustine, A., & Fulghum, S. (2018). Reverse logistics: No longer the cost of doing business. *Journal of Supply Chain Management, Logistics and Procurement*, *1*(4), 326–333.

Barkemeyer, R., Holt, D., Preuss, L., & Tsang, S. (2014). What happened to the 'development' in sustainable development? Business guidelines two decades after Brundtland. *Sustainable Development*, *22*(1), 15–32. https://doi.org/10.1002/sd.521

Basri, W. S. M., & Siam, M. R. (2019). Social media and corporate communication antecedents of SME sustainability performance: A conceptual framework for SMEs of Arab world. *Journal of Economic and Administrative Science*s, *35*(3), 172–182. https://doi.org/10.1108/JEAS-01-2018-0011

Bernon, M., Cullen, J., & Gorst, J. (2016). Online retail returns management: Integration within an omni-channel distribution context. *International Journal of Physical Distribution & Logistics Management*, *46*(6/7), 584–605. https://doi.org/10.1108/IJPDLM-01-2015-0010

Boukarroum, A. (2022). *Charts: Global parcel shipping volume, transit times*. https://www.practicalecommerce.com/charts-global-parcel-shipping-volume-transit-times

Carrillo, J. E, Vakharia, A. J., & Wang, R. (2014). Environmental implications for online retailing. *European Journal of Operational Research, 239*, 744–755. https://doi.org/10.1016/j.ejor.2014.05.038

Carter, C. R., & Rogers, D. S. (2008). A framework of sustainable supply chain management: Moving toward new theory. *International Journal of Physical Distribution and Logistics Management*, *38*(5), 360–387. https://doi.org/10.1108/09600030810882816

Chen, L. (2017). *Developing Asia in the era of cross-border e-commerce* [ERIA discussion paper]. http://www.eria.org/ERIA-DP-2017-11.pdf

Dabija, D. C., Pop, N. A., & Postelnicu, C. (2016). Ethics of the garment retail within the context of globalization and sustainable development. *Industria Textilă*, *67*(4), 270–279.

Datareportal. (2023). *Digital 2023: Poland*. https://datareportal.com/reports/digital-2023-poland

Demir, E., Huang, Y., Scholts, S., & Van Woensel, T. (2015). A selected review on the negative externalities of the freight transportation: Modeling and pricing. *Transportation Research Part E: Logistics and Transportation Review*, *77*, 95–114. https://doi.org/10.1016/j.tre.2015.02.020

Doligalski, T. (2009). Budowa wartości klienta z wykorzystaniem Internetu. In B. Dobiegała-Korona & T. Doligalski (Eds.), *Zarządzanie wartością klienta*. Poltext.

Ducarme, D. (2019). *Sustainable solutions for "last mile " deliveries in the parcel industry: A qualitative analysis using insights from third-party logistics service providers and public mobility experts*. Louvain School of Management, Universite catholique de Louvain.

eIzba. (2022). *Omni-commerce. Kupuję wygodnie*. Polska Izba Gospodarki Elektronicznej.

Elkington, J., & Rowlands, I. H. (1999). Cannibals with forks: The triple bottom line of 21st century business. *Alternatives Journal*, *25*(4), 42.

Elrhim, M. A., & Elsayed, A. (2020). *The effect of COVID-19 spread on the e-commerce market: The case of the 5 largest e-commerce companies in the world*. http://dx.doi.org/10.2139/ssrn.3621166

eMarketer. (2022). *Global ecommerce forecast*. https://www.insiderintelligence.com/content/global-ecommerce-forecast-2022

Escursell, S., Llorach, P., & Roncero, M. B. (2020). Sustainability in e-commerce packaging: A review. *Journal of Cleaner Production*, *280*(1). https://doi.org/10.1016/j.jclepro.2020.124314

Fedorko, R., Bacik, R., & Kerulova, V. (2017). The analysis on the importance of the reputation management in relation to e-commerce subjects. *Polish Journal of Management Studies*, *15*. https://doi.org/10.17512/pjms.2017.15.1.05

Fichter, K. (2002). E-commerce: Sorting out the environmental consequences. *Journal of Industrial Ecology*, *6*(2), 25–41. https://doi.org/10.1162/108819802763471762

Freitag, M., & Kotzab, H. (2020). A concept for a consumer-centered sustainable last mile logistics In *Proceedings of International Conference on Dynamics in Logistics* (pp. 196–203). Springer. https://doi.org/10.1007/978-3-030-44783-0_19

Frost & Sullivan (2018). *Urban logistics opportunities-last-mile innovation*. https://ww2.frost.com/news/press-releases/last-mile-delivery-models-revolutionize-space-urban-logistics-2025/

Ghezzi, A., Mangiaracina, R. and Perego, A. (2012), "Shaping the e-commerce logistics strategy: a decision framework", *International Journal of Engineering Business Management*, *4*(13), 1–13. https://doi.org/10.5772/5164

Ghobakhloo, M., Arias-Aranda, D., & Benitez-Amado, J. (2011). Adoption of e-commerce applications in SMEs. *Industrial Management & Data Systems*, *111*(8), 1238–1269. https://doi.org/10.1108/02635571111170785

Giddings, B., Hopwood, B., & O'Brien, G. (2002). Environment, economy and society: Fitting them together into sustainable development. *Sustainable Development*, *10*(4), 187–196. https://doi.org/10.1002/sd.199

Godfrey, J. (2017). *Sustainable e-commerce: Improving eco-efficiency in e-commerce*. https://www.researchgate.net/publication/325245766_Sustainable_E-commerce_Improving_Eco-Efficiency_in_E-Commerce

Hart, S. L., & Milstein, M. B. (2003). Creating sustainable value. *Academy of Management Executive*, *17*(2), 56–67. https://doi.org/10.5465/ame.2003.10025194

Haryanti, T., & Subriadi, A. P. (2021). E-commerce acceptance in the dimension of sustainability. *Journal of Modelling in Management*, *17*(2), 715–745. https://doi.org/10.1108/JM2-05-2020-0141

Hopwood, B., Mellor, M., & O'Brien, G. (2005). Sustainable development: Mapping different approaches. *Sustainable Development*, *13*(1), 38–52. https://doi.org/10.1002/sd.244

Ignat, B., & Chankov, S. (2020). Do e-commerce customers change their preferred last-mile delivery based on its sustainability impact? *The International Journal of Logistics Management*, *31*(3), 521–548.

Kawa, A. (2017). Logistyka jako instrument kreowania wartości dla klienta w handlu elektronicznym. *Przedsiębiorczość i Zarządzanie*, *18*(4.2), 357–372.

Kawa, A. (2019). *Returns in e-commerce as a value for customers from different perspectives* [Paper presentation]. 19th International Scientific Conference: Business Logistics in Modern Management.

Kawa, A. (2020). Improving logistics connectivity of e-commerce in the ASEAN region. In L. Chen & F. Kimura (Eds.), *E-commerce connectivity in ASEAN* (pp. 51–77). Economic Research Institute for ASEAN and East Asia.

Kemp, S. (2021). *Digital 2021: Global overview report*. https://datareportal.com/reports/digital-2021-global-overview-report

Kiba-Janiak, M., Marcinkowski, J., Jagoda, A., & Skowrońska, A. (2021). Sustainable last mile delivery on e-commerce market in cities from the perspective of various stakeholders. Literature review. *Sustainable Cities and Society*, *71*. ttps://doi.org/10.1016/j.scs.2021.102984

Laghaei, J., Faghri, A., & Li, M. (2016). Impacts of home shopping on vehicle operations and greenhouse gas emissions: Multi-year regional study. *The International Journal of Sustainable Development and World Ecology*, *23*, 381–391. https://doi.org/10.1080/13504509.2015.1124471

Lavuri, R. (2021). Intrinsic factors affecting online impulsive shopping during the COVID-19 in emerging markets. *International Journal of Emerging Markets*, *18*(4), 958–977. https://doi.org/10.1108/IJOEM-12-2020-1530

Lu, S., Yang, L., Liu, W., & Jia, L. (2020). User preference for electronic commerce overpackaging solutions: Implications for cleaner production. *Journal of Cleaner Production*, *258*. https://doi.org/10.1016/j.jclepro.2020.120936

Lumpkin, G. T., Droege, S. B., & Dess, G. G. (2002). E-commerce strategies: Achieving sustainable competitive advantage and avoiding pitfalls. *Organizational Dynamics*, *30*(4), 325–340. https://doi.org/10.1016/S0090-2616(02)00065-7

Mangiaracina, R., Marchet, G., Perotti, S., & Tumino, A. (2015). A review of the environmental implications of B2C e-commerce: A logistics perspective. *International Journal of Physical Distribution & Logistics Management*, *45*(6), 565–591. https://doi.org/10.1108/IJPDLM-06-2014-0133

McKinsey. (2019). *Five ways that ESG creates value*. https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/five-ways-that-esg-creates-value

MIT Real Estate Innovation Lab. (2021). https://realestateinnovationlab.mit.edu/

Mobile Institute. (2021). *Green generation 2021*. https://mobileinstitute.eu/green

Monnot, E., Reniou, F., Parguel, B., & Elgaaied-Gambier, L. (2019). "Thinking outside the packaging box": should brands consider store shelf context when eliminating overpackaging? *Journal of Business Ethics*, *154*(2), 355–370. https://doi.org/10.1007/s10551-017-3439-0

Oláh, J., Kitukutha, N., Haddad, H., Pakurár, M., Máté, D., & Popp, J. (2019). Achieving sustainable e-commerce in environmental, social and economic dimensions by taking possible trade-offs. *Sustainability*, *11*(1), 89. https://doi.org/10.3390/su11010089

Oliver Wyman. (2021). *Is e-commerce good for Europe? Economic and environmental impact study*. https://www.oliverwyman.com/our-expertise/insights/2021/apr/is-e-commerce-good-for-europe.html

Park, M., & Regan, A. (2004). *Issues in home delivery operations*. University of California, Transportation Center.

Pei, Y., Amekudzi, A., Meyer, M., Barrella, E., & Ross, C. (2010). Performance measurement frameworks and development of effective sustainable transport strategies and indicators transportation research record. *Journal of the Transportation Research Board*, (2163), 73–80. https://doi.org/10.3141/2163-08

PwC. (2022). *Perspektywy rozwoju rynku e-commerce w Polsce 2018–2027*. PwC.

Radonjic, G., & Tompa, S. (2018). Carbon footprint calculation in telecommunications companies–The importance and relevance of scope 3 greenhouse gases emissions. *Renewable and Sustainable Energy Reviews*, *98*, 361–375. https://doi.org/10.1016/j.rser.2018.09.018

Rai, H. B., Broekaert, C., Verlinde, S., & Macharis, C. (2021). Sharing is caring: How non-financial incentives drive sustainable e-commerce delivery. *Transportation Research Part D: Transport and Environment*, *93*. https://doi.org/10.1016/j.trd.2021.102794

Ramanathan, R., George, J., & Ramanathan, U. (2014). The role of logistics in e-commerce transactions: An exploratory study of customer feedback and risk. In *Supply chain strategies, issues and models* (pp. 221–233). Springer. https://doi.org/10.1007/978-1-4471-5352-8_10

Rao, S., Goldsby, T. J., Griffis, S. E., & Iyengar, D. (2011). Electronic logistics service quality (e-LSQ): Its impact on the customer's purchase satisfaction and retention. *Journal of Business Logistics*, *32*(2), 167–179. https://doi.org/10.1111/j.2158-1592.2011.01014.x

Sallnäs, U., & Björklund, M. (2020). Consumers' influence on the greening of distribution–Exploring the communication between logistics service providers, e-tailers and consumers. *International Journal of Retail & Distribution Management*, *48*(11), 1177–1193. https://doi.org/10.1108/IJRDM-07-2019-0213

Santos, A. C., Cavalcante, C. A., & Ribeiro, L. F. (2021). The use of second-hand items based on delay time modelling. *Process Safety and Environmental Protection*, *146*, 118–125. https://doi.org/10.1016/j.psep.2020.08.041

Seebauer, S., Kulmer, V., Bruckner, M., & Winkler, E. (2016). Carbon emissions of retail channels: The limits of available policy instruments to achieve absolute reductions. *Journal of Cleaner Production*, *132*, 192–203. https://doi.org/10.1016/j.jclepro.2015.02.028Get

Seuring, S., & Müller, M. (2008). From a literature review to a conceptual framework for sustainable supply chain management. *Journal of Cleaner Production*, *16*(15), 1699–1710. https://doi.org/10.1016/j.jclepro.2008.04.020

Shishiteva, P. (2017). *Is parcel delivery becoming more sustainable? A comparison between delivery companies and traditional couriers*.

Shrivastava, P. (1995). The role of corporations in achieving ecological sustainability. *Academy of Management Review*, *20*(4), 936–960.

Starik, M., & Rands, G. P. (1995). Weaving an integrated web: Multilevel and multisystem perspectives of ecologically sustainable organizations. *Academy of Management Review*, *20*(4), 908–935.

Statista. (2023). *Global parcel shipping volume between 2013 and 2027 (in billion parcels)*. https://www.statista.com/statistics/1139910/parcel-shipping-volume-worldwide/

Sustainable development. (n.d.). In *Brittanica*. https://www.britannica.com/topic/environmental-law/Sustainable-development

Tran, L. T. T. (2021). Managing the effectiveness of e-commerce platforms in a pandemic. *Journal of Retailing and Consumer Services*, *58*. https://doi.org/10.1016/j.jretconser.2020.102287

Trivedi, R. H., Patel, J. D., & Acharya, N. (2018). Causality analysis of media influence on environmental attitude, intention and behaviors leading to green purchasing. *Journal of Cleaner Production*, *196*, 11–22. https://doi.org/10.1016/j.jclepro.2018.06.024

WCED. (1987). *World Commission on Environment and Development. Our common future*. Oxford University Press.

WEF. (2020). *The future of the last-mile ecosystem*. World Economic Forum. http://www3.weforum.org/docs/WEF_Future_of_the_last_mile_ecosystem.pdf

Wichaisri, S., & Sopadang, A. (2013). Sustainable logistics system: A framework and case study. In *Proceedings of 2013 IEEE International Conference on Industrial Engineering and Engineering Management* (pp. 1017–1021). https://doi/org/10.1109/IEEM.2013.6962564

Wiese, A., Toporowsky, W., & Zielke, S. (2012). Transport-related CO2 effects of online and brick-and-mortar shopping: A comparison and sensitivity analysis of clothing retailing. *Transportation Research Part D*, *17*(6), 473–477. https://doi.org/10.1016/j.trd.2012.05.007

XiaoYan, Q., Yong, H., Qinli, D., & Stokes, P. (2012). Reverse logistics network design model based on e-commerce. *International Journal of Organizational Analysis*, *20*(2), 251–261. https://doi.org/10.1109/AIMSEC.2011.6010526

Yuan, Y., Guan, M., Zhou, Z., Kim, S., Cha, M., Jin, D., & Li, Y. (2021). Disruption in Chinese e-commerce during COVID-19. *Frontiers in Computer Science*, *3*, 19. https://doi.org/10.3389/fcomp.2021.668711

Yuen, K. F., Wang, X., Ng, L. T. W., & Wong, Y. D. (2018). An investigation of customers' intention to use self-collection services for last-mile delivery. *Transport Policy*, *66*, 1–8. https://doi.org/10.1016/j.tranpol.2018.03.001