INTERNATIONAL ACADEMIC JOURNAL

INTERNATIONAL ACADEMIC JOURNAL

TABLE OF CONTENTS

The combination of circular economy practices and industry 4.0 technologies for achieving Sustainable Development Goals (SDGs): a critical review

Tamara Menichini[1,2,a], Nicoletta Maria Strollo[1,2,*,a]

[1] *Business and Management Engineering, University of Rome "Niccolò Cusano", Via Don Carlo Gnocchi, 3 - 00166 Roma (RM), Italy*
[2]*ATHENA European University Advanced Technology Higher Education Network Alliance*
[*]Corresponding Author: e-mail: nicolettamaria.strollo@unicusano.it

Abstract

Company innovation lies at the heart of any transition to a regenerative industrial system. To this end, the adoption of Industry 4.0 (I4.0) technologies and Circular Economy (CE) practices are widely recognized as key accelerators, although the contribution of I4.0 technologies to improve sustainability from the CE perspective is an underexplored topic. The present paper proposes a critical comparison of the main scientific contributions that systematically investigate the conjoint effect of I4.0 and CE on the achievement of the UN 2030 Agenda for sustainable development. Findings allow knowing those Sustainable Development Goals (SDGs) and Targets mainly affected by sustainability practices and technological changes that arise from new circular business models, innovative technologies and improved consumption and production patterns. The proposed critical review also discusses future research directions for a better understanding of the I4.0-CE combination on SDGs as to enhance its attractiveness to company managers and industrial policy decision-makers who will ensure both business competitiveness and socio-economic development.

Keywords: Circular Economy (CE), Industry 4.0 (I4.0) technologies, Sustainable Development Goals (SDGs), sustainable development, critical review.

1. Introduction

The 2030 Agenda for Sustainable Development was adopted by the United Nations Member States in 2015 (United Nations, 2015) as a shared strategy for ensuring that both people and the environment have a peaceful and prosperous future. The 17 Sustainable Development Goals (SDGs) are the focal point of the Agenda and are an urgent call to action for all nations, regardless of wealth or level of development. The aims recognize that improving healthcare and education, fostering economic growth, and reducing inequality are all necessary to combat poverty and other types of deprivation. Literature shows the importance of adopting the 2030 Agenda and the strategic role that companies can play in achieving the SDGs (Van Zanten & van Tulder, 2021), especially in terms of strategic innovation (Silvestre and Tîrcă, 2019). In this regard, the UNDP Strategic Plan for 2022-2025 has identified strategic innovation and digitization as crucial factors for accelerating and scaling results in achieving the SDGs. (UNDP, 2021). Furthermore, a regenerative industrial system is needed to enable resilience, environmental sustainability, and economic and social well-being, according to the Ellen MacArthur Foundation (2013), and every move to a regenerative industrial system must include company innovation. Indeed, innovation within companies is crucial for achieving a regenerative industrial system, and the adoption of Industry 4.0 technologies and Circular Economy (CE) practices are recognized as important drivers (Dantas et al., 2021). The CE paradigm is based on a regenerative business model that promotes sustainable practices such as sharing, reusing, repairing, and recycling (Morseletto, 2020; Stahel, 2016; Mont & Heiskanen, 2015). Meanwhile, I4.0 involves the integration of advanced technologies (such as Cyber-Physical Systems, Internet of Things, Robotics, Big Data, Cloud Manufacturing and Augmented Reality) into industrial processes to create smart factories and supply chains that are efficient, flexible, and responsive to customers (Dalmarco et al., 2019; Pereira & Romero, 2017).

Despite the adoption of CE practices and I4.0 technologies is widely recognized as a key SDG accelerator, the contribution of I4.0 technologies to improve sustainability and to achieve SDGs from the CE perspective is an underexplored topic.

The aim of the present study is to review the main scientific contributions that addressed the relationship between CE and I4.0, and how it contributes to achieving the SDGs, as well as to identify which SDGs are impacted the most.

---

[a] The authors contributed equally and are listed in alphabetical order.

The paper is structured as follows. The next section explains the methodology used for the research. In Section 3 the results are presented. Finally, Section 4 discusses results and concludes the paper.

2. Research process and method

This section outlines the process of the systematic literature review of the nexus of CE and I4.0 enabling technologies on the SDGs. The review process is structured according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement by Moher et al. (2009), which includes the following stages: identification, screening, eligibility, and inclusion. Figure 1 shows the flow of information through the different stages of the systematic review according to the PRISMA statement.
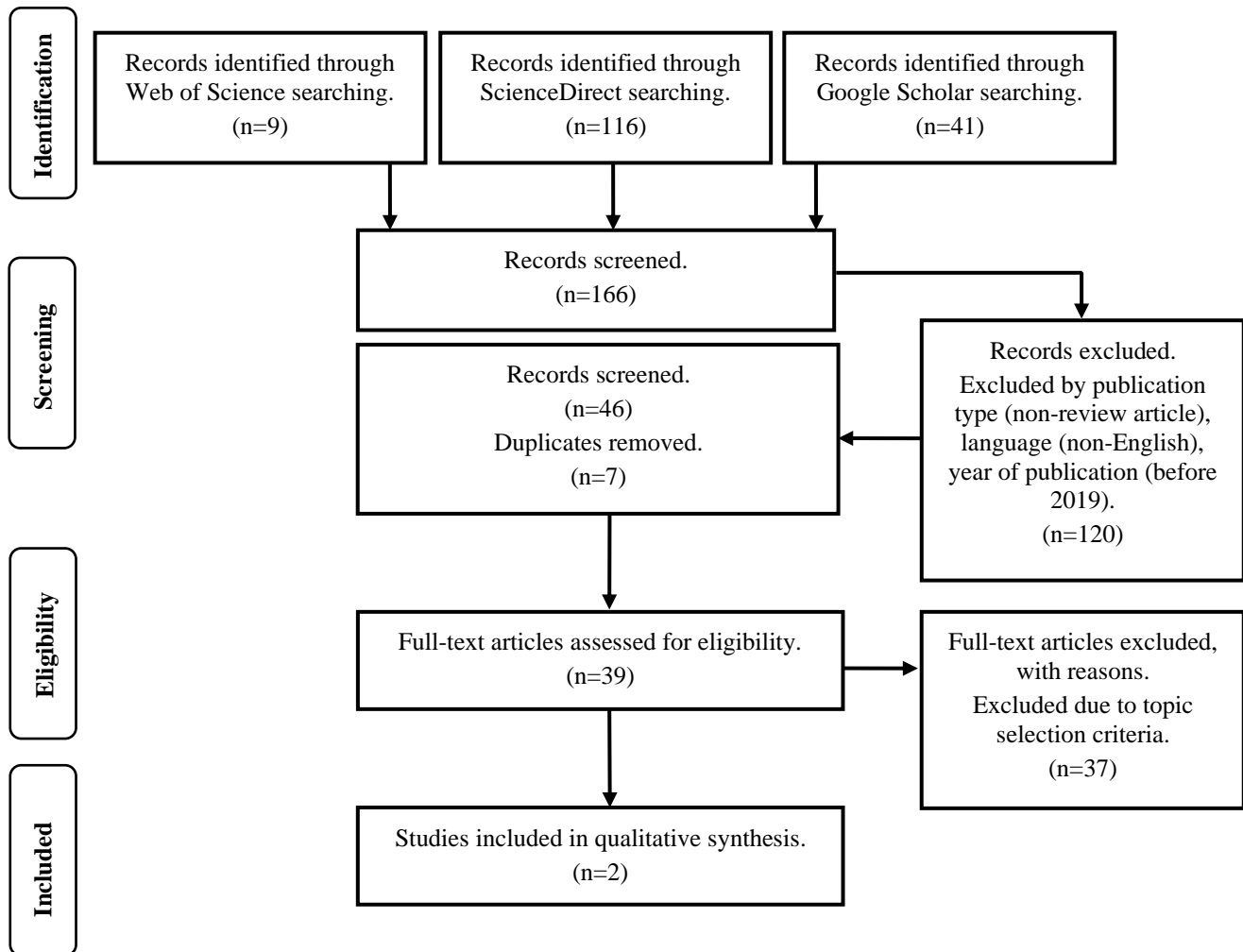
Figure 1. Paper selection process.

In the first stage, to identify and analyze the existing systematic literature review on the impact of the nexus of CE and I4.0 enabling technologies on the SDGs, the research question (RQ) was defined as follows:
RQ: "Which SDGs are the most affected by the nexus of CE and I4.0 enabling technologies?"
Three databases were selected in this study: Web of Science, ScienceDirect and Google Scholar. The search was conducted using the following keywords, identified according to the RQ: "Industry 4.0," "Circular Economy," "Sustainable Development Goals," and "Systematic Literature Review."
During the identification step, different search strategies were employed in each database. Indeed, the search on Web of Science was carried out by looking for the keywords in all areas of the text. Excluding the references, the search in ScienceDirect was conducted in all fields. For Google Scholar, the search was conducted by searching for the keywords in the article titles, including two additional keywords, "Sustainability" and "Sustainable Development," to avoid excluding relevant results. Additionally, patents and citations were excluded from the search results in Google Scholar. These strategies were designed to ensure that the search was

comprehensive and that all relevant articles were included in the screening process. The search strings were determined as shown in Table 1. A total of 166 articles from the databases were retrieved.

Table 1. Searches in databases.

Database	Search string
Web of Science	(((ALL=(Industry 4.0)) AND ALL=(Circular Economy)) AND ALL=(Sustainable Development Goals)) AND ALL=(Systematic Literature Review)
ScienceDirect	"Industry 4.0" AND "Circular Economy" AND "Sustainable Development Goals" AND "Systematic Literature Review"
Google Scholar	allintitle: "Industry 4.0" AND "Circular Economy" AND "Systematic Literature Review"
	allintitle: "Industry 4.0" AND "Circular Economy" AND "Sustainable Development Goals"
	allintitle: "Industry 4.0" AND "Circular Economy" AND "Sustainability"
	allintitle: "Industry 4.0" AND "Circular Economy" AND "Sustainable Development"

During the screening phase, filterable search criteria (i.e., "publication type", "language", "year of publication") were used in the database to include or exclude articles for the next phase of PRISMA. Indeed, the search was limited to scientific articles (i.e., "review articles") in the English language published from 2019 to present (the publication period was set from January 1, 2019, to March 5, 2023). In the second step of the screening stage, articles were excluded if they were duplicates using Excel. As a result, a total of 39 articles were retrieved. The next stage is called eligibility, during which articles were selected to determine their relevance to the research question based on the topic selection criteria, given below:

- Articles must be Systematic Literature Review (C1).
- Articles must focus on the nexus of CE and I4.0 enabling technologies (C2).
- Articles must discuss the impact of CE and I4.0 on the SDGs (C3).

The articles were analyzed in detail, by full-text reading. A research article was excluded if it did not meet one or more of the eligibility criteria (Table 2).

Table 2. Eligibility criteria analysis.

	References	Eligibility criteria		
		C1	C2	C3
1	Abdelmeguid et al. (2022)	✓		
2	Acerbi and Taisch (2020)	✓		
3	Ahmed et al. (2022)			
4	Aravindaraj and Chinna (2022)	✓		
5	Atif at al. (2021)	✓	✓	
6	Aydin and Tirkolaee (2022)	✓		
7	Bai and Satir (2022)	✓		
8	Blunck et al. (2019)		✓	
9	Charef (2022)	✓		
10	Čuden (2022)			
11	Dantas et al. (2021)	✓	✓	✓
12	de Oliveira Neto et al. (2022)		✓	
13	Dwivedi et al. (2022)		✓	
14	Facchini et al. (2022)	✓		
15	Ghobakhloo et al. (2021)	✓		
16	Hallioui et al. (2022)	✓	✓	
17	Isensee et al. (2020)	✓		
18	Kar et al. (2022)	✓		
19	Khan et al. (2021)	✓	✓	
20	Kim et al. (2022)	non-English		
21	Leng et al. (2020)			
22	Maria et al. (2021)			
23	Mora-Contreras et al. (2022)	✓		
24	Mutezo and Mulopo (2021)			

25	Okorie et al. (2021)	✓		
26	Omran and Baek (2022)			
27	Pan et al. (2022)			
28	Patyal et al. (2022)	✓	✓	✓
29	Rejeb et al. (2022)	✓		
30	Rosa et al. (2020)	✓	✓	
31	Serrano-Bedia and Perez-Perez (2022)	✓		
32	Silva (2022)	✓		
33	Simonetto et al. (2022)	✓		
34	Suppipat and Hu (2022)			
35	Turzo et al. (2022)	✓		
36	Wijewickrama et al. (2021)	✓		
37	Yadav et al. (2022)			
38	Yang et al. (2022)			
39	Zailan et al. (2021)			

After excluding 37 non-conforming articles, a total of 2 articles were retrieved. The 20th item was excluded because it had title and abstract in English but not the full text.

These two studies, Dantas et al. (2021) and Patyal et al. (2022), were analyzed to obtain a qualitative synthesis to address the research question. To this aim, four groups of qualitative criteria were determined: "General", "SLR methodological", "Systematic analysis" and "Outcomes". The "General" group of criteria concerns the general information of the articles, such as the year of publication (a), the journal in which they were published (b) and keywords (c). The criteria "SLR methodological" were used to compare the general methodological approach followed by the two articles such as databases, exclusion criteria. While the comparison criteria within "Systematic analysis" were used to analyze the specific aspects of the SLR approaches such as CE and I4.0 technological pillars, and research questions. Finally, the "Outcome" group of criteria was considered to critically compare results, findings, and implications of the two studies. In particular, the criterion "Managerial implications" (x) was identified to compare the practical suggestions to operatively guide companies and other decision makers to reach SDGs through CE-I4.0 nexus.

3. Results

Based on the qualitative criteria, the following tables show results. Among the General (Table 3), it is possible to observe that the keywords (c) provided for each contribution are the same, except for "Sustainability" and "Sustainable operations". This is because the first contribution focuses more on the issue of sustainability in general as synonymous with sustainable development, while the second adopts a more operative perspective for the analysis of sustainability.

Table 3. General criteria.

		References	
		Dantas et al. (2021)	**Patyal et al. (2022)**
(a)	**Publishing year**	2021	2022
(b)	**Journal**	Sustainable Production and Consumption	Journal of Enterprise Information Management
(c)	**Keywords**	Sustainable development goals; Sustainability; Circular economy; Industry 4.0	Industry 4.0; Circular economy; Sustainable development goals; Sustainable operations

According to the SLR criteria (Table 4), in both papers the authors claim systematic literature review as a methodological approach (d); the paper by Patyal et al. (2022) references two sources outlining the steps (g) for conducting a mapping review as the basis for its methodology (Ahmad et al., 2018 and Kitchenham et al., 2011). Dantas et al. (2021) uses Scopus and Web of Science as electronic database, while Patyal et al. (2022) uses Scopus only (e), in fact they claim the possibility to extend the search to multiple databases such as Web of Science, Proquest, EbscoHost or Google Scholar. Both articles research scientific papers published up to 2020 (f) in English (h). Although the reference period on which the analysis was conducted is the same, and the fact that for the second review only one database was used for the collection of articles while two databases were used in the first, the size of the second portfolio is greater than in the first (k): reasonably this is due to the different string used to conduct the search and for the exclusion criteria. Next, it is possible to observe that the search strings and keywords used are significantly different (l): in the second paper the search was conducted using a greater number of keywords than in the first paper (keywords referring to the areas I4.0, CE, and SDGs). On

the other hand, in the study by Dantas et al. (2021), an interesting aspect must be highlighted: although among the search criteria there was only a selection of English contributions, among the keywords there is a term in Iberian languages (i.e., ODS, the abbreviated translation for SDG in Spanish, Catalan and Portuguese) and German (i.e., Industrie 4.0). In terms of references (m) in Patyal et al. (2022), a distinction is made between primary, secondary, and further reading sources, unlike in Dantas et al. (2021). Additionally, the study by Patyal et al. (2022) shares 35 sources in common with the research conducted by Dantas et al. (2021).

Table 4. SRL Methodological criteria.

		References	
		Dantas et al. (2021)	**Patyal et al. (2022)**
(d)	**Methodological approach declared**	SLR Systematic Literature Review	SLR Systematic Literature Review
(e)	**Scientific Database**	Scopus, WoS	Scopus
(f)	**Time span**	Declared: no time delimitation was set for this review - The search includes all articles published until June 2020 Emerging from results: 2016 - 2020	January 2010- December2020
(g)	**SLR steps**	Topic definition Portfolio definition Descriptive analysis Content analysis Results	Planning Conducting Reporting
(h)	**Database Selection Criteria**	No time delimitation Only scientific papers Only papers published in English	Only journal articles and literature Only papers published in English
(i)	**Exclusion criteria**	(1) Duplicates (with Endnote software) (2) Studies not addressed to the research question "The Filtering happened by reading the title, abstract, introduction, results, and conclusion of all articles."	"(1) duplicate articles, (2) not written in English, (3) studies not specifically focused on I-4.0, CE and SDGs and (4) non-peer-reviewed articles." "Exclusion criteria on the basis of: 1)title, 2) abstract, 3) introduction and conclusions"
(j)	**Exclusion rate**	Initial portfolio: 141 publications Exclusions: 59 duplicates 32 non-conforming articles	Primary study selection: 121 Excluded:45
(k)	**N° articles reviewed (Final portfolio)**	50	76
(l)	**Search string**	"ODS" OR "SGD" OR "sustainable development goals") AND ("industry 4.0" OR "smart manufacturing" OR "industrie 4.0" OR "circular economy") ("circular economy" OR "CE") AND ("sustainability" OR "sustainable development") AND ("industry 4.0" OR "industrie 4.0" OR "internet of things" OR "iot" OR "smart manufacturing" OR "smart industry")	The Researchers report that "a search string is developed based on the scope of the study which is confined to I-4.0, CE and SDGs. The search string presented in Table 3 is developed around the "or" and "and" operators." Reasonably, the search string used is as follows. ("Industry 4.0" OR "Internet of things" OR "IoT" OR "Additive manufacturing" OR "Smart manufacturing" OR "Cyber-Physical System" OR "augmented reality" OR "3D printing" OR "Knowledge based system" OR "Communication system" OR "Smart Factory") AND ("circular economy" OR "Circular business model" OR "Remanufacturing" OR "Resource Recovery" OR "Recycling" OR "Reuse" OR "Environmental sustainability" OR

			"Sustainable supply chain" OR "Green Logistics") AND ("UN Sustainable Development Goals" OR "SDGs" OR "No poverty" OR "Zero hunger" OR "Good health and well-being" OR "Quality education" OR "Gender equality" OR "Clean water and sanitation" OR "Affordable and clean energy" OR "Decent work and economic growth" OR "Industry, innovation and infrastructure" OR "Reduced inequalities" OR "Sustainable cities and communities" OR "Responsible consumption and production" OR "Climate action" OR "Life below water" OR "Life on land" OR "Peace, justice and strong institutions" OR "Partnerships for the goals")
(m)	**References**	140 The most recent:2020 The least recent:2009	Primary sources: 76 Secondary sources: 119 Further reading: 1 The most recent:2021 The least recent:2009 References in common with Dantas et al. (2021): 35

The criteria related to the systematic analysis are given below in Table 5, which shows the aim of the two papers (n), the research questions they seek to answer (o), and the technological pillars of I4.0 (p) considered or identified during the review process, as well as the pillars of the CE (r). The comparison between the research questions (o) proposed by Dantas et al. (2021) and Patyal et al. (2022) reveals a striking similarity between their respective areas of inquiry, as both studies seek to investigate the role of CE practices and I4.0 technologies in contributing to the achievement of select SDGs. Dantas et al. (2021) specifically inquire about how the combination of CE practices and I4.0 technologies can contribute to SDG achievement. Instead, Patyal et al. (2022) consider the technologies enabling I4.0 to support the strategies of the ReSOLVE framework proposed by the Ellen MacArthur Foundation; these strategies (i.e., Regenerate, Share, Optimise, Loop, Virtualise and Exchange) are implementable through sustainable operations, which make it possible to achieve the CE which directly influence some SDGs. In this regard, they develop the ISOCES framework, analysis of the links between I4.0, Sustainable Operations, CE, and SDGs. Both papers consider the technological pillars of I4.0 (p) and the CE practices (r) that are most recurrent in the literature they reviewed (q, s). The level of detail on the SDG (t) is different between the two studies: Dantas et al. (2021) provide the SDGs and targets directly influenced by the CE-I4.0 nexus, while Patyal et al. (2022) indicate mainly the SDGs related to I4.0, sustainable operation and CE although the SDGs targets are referred to in the text (i.e., Targets 7.3, 9.4, 12.2, and 13.1). The analysis of the two papers to evaluate the contribution of the nexus between CE and I4.0 towards achieving the SDGs is conducted at the level of both SDGs and targets in the case of Dantas et al. (2021), and at the level of SDGs only in the case of Patyal et al. (2022) although there is reference to specific targets in the text of the paper.

Table 5. Systematic analysis.

		References	
		Dantas et al. (2021)	**Patyal et al. (2022)**
(n)	**Aim**	"[…] to identify how the CE-I4.0 nexus, the combination of CE practices and I4.0 technologies, could contribute to achieving the SDG" "[…] to perform a literature review in order to identify the main SDG and targets addressed by the combination of I4.0 and CE, as well as to understand how the CE-I4.0 nexus contributes to them."	"[…] to map the links between Industry 4.0 (I-4.0) technologies and circular economy (CE) for sustainable operations and their role to achieving the selected number of sustainable development goals (SDGs)"
(o)	**Research Question**	"How the combination of CE practices and I4.0 technologies contribute to the achievement of the SDG?".	"(1) How will I-4.0 technologies help organizations to achieve sustainable operations? (2) How will sustainable operations lead to CE practices?

			(3) How integration of the three verticals of review, namely I-4.0-sustainable operations-CE helps in achieving select SDGs through an ISOCES framework?"
(p)	**Industry 4.0 technological pillars considered**	Industrial Internet of Things; Additive Manufacturing; Cybersecurity; Big Data & Analytics; Augmented Reality; Cloud Computing; Autonomous Robots; Simulation; Sytems Integration	Internet of Things; cyber-physical systems; cloud computing; cloud manufacturing; additive manufacturing; big data analytics; simulation; artificial intelligence; autonomous robots; augmented reality, radio frequency identification; blockchain; high-performance microchips and Nanotechnology
(q)	**Reference for Industry 4.0 technological pillars**	"The applications presented in the paper were screened according to the I4.0 pillars proposed by Rüssmann et al. (2015)" "Table 3 compiles the […] I4.0 technologies correlated to each publication analyzed in the literature review."	"This study refers to the most frequently cited literature to identify the most relevant technologies for I-4.0." The Industry 4.0 technological pillars were selected from the literature according to the Citation sources of Table 1.
(r)	**CE pillars considered**	Redesign, reduce, recover/recovery, recycle/recycling, upcycling, reuse, repair, remanufacture/remanufacturing, repair, composting, waste to energy, waste prevention, industrial symbiosis, nutrient cycling, circular business models, circular design, sharing economy, product as service, reverse logistics, renewable energy, digitalization.	Redesign, reduce, recover, recycle, reuse, waste to energy, industrial Symbiosis, regenerate, share, Loop, virtualize, exchange, circular business models, remanufacturing, resource efficiency, life cycle management, disassembly, digital transformation, smart services, reverse logistics, renewable energy, rethink, refuse, repair, refurbish and repurpose.
(s)	**Reference for CE pillars**	"Table 3 compiles the CE practices […] correlated to each publication analyzed in the literature review." "Regarding the CE practices funded, the investigated processes were separated focused on their relation to the "R's", as this approach is vastly defended by many authors as mechanisms presented in the core of CE. Other activities or techniques strongly linked to CE and broadly disseminated in the scientific community were also applied a screening criteria in Table 3. Examples are industrial symbiosis, waste-to-energy, and composting. The majority of publications relates to the technological cycles of CE, rather than the biological cycles."	Reference to principles and practices evinced in the literature actions and practices like "reuse, recycle, repair, eco-design, refurbishment, remanufacturing, recover product sharing for sustainable production and consumption. MacArthur (2015b) asserts that CE is based on three fundamental principles, namely "preserve and enhance natural capital," "optimize resource yields" and "foster systems effectiveness."
(t)	**Level of detail on the SDGs**	SDGs	SDGs + Related Targets

Table 6 presents the outcomes of the analysis. Dantes et al. (2021) provided a framework (u) that explicitly illustrates the effects of the CE-I4.0 nexus on the SDGs, focusing on the targets associated with SDGs 7, 8, 9, 11, 12, and 13 (v). The affected targets are then reported (i.e., Targets 7.1, 7.2, 7.B; 8.2, 8.4, 8.5, 8.6; 9.1, 9.2, 9.4; 11.6, 11.B; 12.2, 12.3, 12.5, 12.A, and 13.2). Additionally, CE and I4.0 are indirectly related to the 17th SDG. On the other hand, Patyal et al. 's (2022) propose a conceptual framework (u) based on the intersection of I4.0, sustainable operations, and CE practices to achieve SDGs 6, 7, 9, 12, and 13 (v).

Regarding the structure of the paper, Dantas et al. (2021) do not present a section dedicated to the paper's contributions (w), however, the authors state that the research represents the first contribution linking the SDGs to EC and I4.0 and that the research serves as a guide for decision and policy makers. In contrast, the structure of the article by Patyal et al. (2022) has a section devoted to contributions, which are divided into 4 points regarding a) the original conceptualization, b) the sustainable operations resulting in CE practices, c) an integrated framework for linking the practices of CE practices to select SDGs, and d) implications related to re-aligning an organization's management practices.

The two documents did not provide managerial indications and guidelines for operationally directing companies towards direct contributions (x). However, Dantas et al. (2021) state that their contribution serves as a guide for decision makers and policy makers to try to develop laws and incentives aimed at supporting the positive effects of the CE-I4.0 nexus. According to Patyal et al. (2022), realigning an organization's management practices with the suggested framework can have good effects on the resultant sustainable operations, enabling the achievement of some SDGs.

Both contributions identify multiple avenues to take for future developments and implementations of their work (y), such as case studies, research on I4.0 technologies in CE-based systems, economic feasibility studies, government policies, incentives, systematic reviews, and broadening the scope of data collection, keyword analysis, surveys, and in-depth analysis of specific aspects and links between CE and the SDGs.

Table 6. Outcomes.

		References	
		Dantas et al. (2021)	**Patyal et al. (2022)**
(u)	**Approach to analyze CE- I4.0 link and SDGs**	A Framework that explicitly links the effects of the CE-I4.0 nexus and the SDGs and SDGs targets. The framework is shown in Table 4.	"This study proposes a unique framework depicting a strong linkage among I-4.0, CE practices through sustainable operations and select SDGs."
(v)	**Findings and Results**	"The SDG that are more strongly and directly affected by the new CE-I4.0 nexus are 7, 8, 9, 11, 12, and 13. Also, the CE-I4.0 nexus may improve the current global contexts tackled by SDG 1, SDG 2, and SDG 10. The CE-I4.0 nexus is also indirectly related to the 17 SDG, as both topics depend on the intersectoral agreements and engagement to power the crossing to a sustainability-driven and highly technological society." "SDG 7- Affordable and clean energy 7.1 – Promote global access to affordable and reliable energy. 7.2 – Expand the proportion of renewable energy in the global energy mix. 7. B – Enhance technology and infrastructure to provide modern energy services for all, especially developing and least developed countries, following with their respective programs of support. SDG 8 - Decent work and economic growth 8.2 – Secure higher levels of economic productivity through technological upgrading, innovation, diversification, and the inclusion of labor-intensive sectors. 8.4 – Improve worldwide resource efficiency in consumption and production, and seek to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programs, with developed countries taking the lead. 8.5 – Secure decent employment and equal pay for work of equal value for all, including persons with disabilities and young people. 8.6 – Substantially reduce youth unemployment and increase education and training. SDG 9 - Industry, innovation and infrastructure	"The findings of the study bridge the gap in the literature at the intersection between I-4.0 and sustainable operations in line with the regenerate, share, optimize, loop, virtualize and exchange (ReSOLVE) framework leading to CE practices. Further, the study also depicts the CE practices leading to the select SDGs ("SDG 6: Clean Water and Sanitation," "SDG 7: Affordable and Clean Energy," "SDG 9: Industry, Innovation and Infrastructure," "SDG 12: Responsible Consumption and Production" and "SDG 13: Climate Action"). The study proposes a conceptual framework based on the linkages above, which can help organizations to realign their management practices, thereby achieving specific SDGs."

		9.1 – Establish quality, reliable, and resilient infrastructure to support economic development and human well-being, with a focus on affordable and equitable access for all. 9.2 – In accordance with national circumstances, promote inclusive industrialization by increasing industrial employment share and gross domestic product, and double its share in developing countries. 9.4 – In consonance with national capabilities, promote sustainable industrial infrastructure sustainable, focusing on resource-use efficiency and environmentally clean technologies and processes. SDG 11 – Sustainable cities and communities 11.6 – Reduce the urban negative environmental impact, especially regarding air pollution and waste management. 11. B – Increase the number of cities communities that adopt and implement integrated policies and action plans regarding inclusion, resource efficiency, climate change mitigation and adaption, and develop comprehensive disaster risk management at all levels. SDG 12 – Responsible consumption and production 12.2 – Achieve the sustainable management and efficient use of natural resources. 12.3 – Halve the per capita global food waste throughout supply chains, including post-harvest losses. 12.5 – Minimize waste generation through recycling, reuse, reduction and waste prevention. 12. A – Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production). SDG 13 - Climate action 13.2 – Introduce climate change initiatives and actions into policies, strategies and planning."	
(w)	**Contributions of the study**	This research is the first one to simultaneously link the SDG to CE and I4.0.	"(1) Creating an original conceptualization of strong linkages between the adoption of I-4.0 technologies and sustainable operations. This study highlights the role of AM, IoT, real-time monitoring in advancing their business operations in multiple ways. This can help management to identify and re-examine the suitable technologies under I-4.0 to implement the CE practices within their organizations. (2) Developing a theoretical understanding of sustainable operations, resulting in CE practices. The systematic literature review has helped in the identification of strong linkage

			between the adoption of select technologies under I-4.0 and CE's sustainable operations and practices, depicting a vital role in adopting I-4.0 in the context to CE's sustainable operations environment. (3) Deriving an integrated framework for linking the practices of CE practices to select SDGs, namely "SDG 6: clean water and sanitation," "SDG 7: affordable and clean energy," "SDG 9: industry, innovation and infrastructure," "SDG 12: responsible consumption and production," and "SDG 13: climate action." It is in line with the guidelines of SDGs suggested by the UN Developmental Program. (4) It identifies that there are implications related to re-aligning an organization's management practices with the proposed framework may contribute positively to the resultant sustainable operations, thereby achieving the select SDGs."
(x)	**Managerial implications**	"[…] this research serves as a guide to decision and policymakers".	"It identifies that there are implications related to re-aligning an organization's management practices with the proposed framework may contribute positively to the resultant sustainable operations, thereby achieving the select SDGs."
(y)	**Future development**	"Further investigations could focus on case studies of systems inserted in the CE-4.0 nexus to access its impact regarding greenhouse gas emission, job creation and reallocation, production models etc. Although the combination of these two topics is growing in the industrial sector, we identified the need for further research and implementation of I4.0 tech in circular system connected to urban environments and the public sectors. Furthermore, as the economic pillar is often referred to as the decisive factor in sustainability dialogues, economic feasibility studies focused on the CE-I4.0 nexus are essential. Future investigation regarding policymaking and the governmental incentives to boost combination of this sustainability-driven model alongside with the current rising high-technological revolution is recommended. Lastly, as the three main areas addressed by this research are emerging topics, future systematic reviews with similar goals could point out the SDG responses to the further development of the CE-I4.0 nexus."	"[…] future studies may collect data from other databases […] or individual search engines like Google Scholar to analyze more studies leading to different conceptualizations." "Future research may use different keywords and studies published in other languages for more comprehensive results." "[…] there is a need for substantial empirical work through a large-scale survey or a case study for statistical validation of the proposed framework. Future studies could test the propositions to validate their linkage. Additionally, the future research may include in-depth analysis of specific aspects of and linkage between CE and the SDGs while selecting more or all SDGs to extend and build on this exploratory review."

4. Discussion and conclusions

Results show that there is a rising interest in the practical applications of both CE and I4.0 as pathways to achieve sustainable solutions (da Silva & Sehnem, 2022). The gaps present in the literature have highlighted the need to further explore the relationship

between CE practices and I4.0 technologies (Dantas et al., 2021). To address this gap, a SLR of relevant contributions was carried out, selecting from an initial set of 166 articles, two articles (i.e., Dantas et al., 2021; Patyal et al., 2022) for comparison based on selected criteria for identifying, screening, eligibility, and inclusion of relevant literature. The research question of which SDGs are most affected by the link between the two phenomena examined was addressed. Results show those SDGs and targets mainly affected by sustainability practices and technological changes that arise from new circular business models, innovative technologies and improved consumption and production patterns. Results have identified "SDG 6 - Clean Water and Sanitation," "SDG 7- Affordable and Clean Energy," "SDG 8 - Decent Work and Economic Growth," "SDG 9 - Industry, Innovation and Infrastructure," "SDG 11 - Sustainable Cities and Communities," "SDG 12 - Responsible Consumption and Production," "SDG 13 - Climate Action," and "SDG 17 - Partnership for the Goals" as the SDGs most impacted by the nexus between CE and I4.0, although there are still no studies that consider the impact of the indirect effects of this link.

Although both articles aim to identify how the CE-I4.0 nexus could contribute to achieve the SDGs, they differed in multiple aspects: for example, Patyal et al. (2022) introduce the ISOCES framework, based on the ReSOLVE framework proposed by the Ellen MacArthur Foundation, which considers sustainable operations as its crucial element; instead, Dantas et al. (2021) highlight the effects of the CE-I4.0 nexus. Both the studies highlight the impact of CE-I4.0 nexus on the SDGs 7, 9, 12, and 13.

However, none of the studies provide practical suggestions to operatively guide companies and other decision makers to reach SDGs through CE-I4.0 nexus while monitoring the implementation process. This aspect highlights the need for future studies that explore the importance of providing operational tools for companies to guide them in the implementation of CE-I4.0 innovation practices and in the related reporting of the obtained performances. Indeed, sustainability reporting can be a valuable means to communicate to stakeholders the company's commitment towards SDGs measuring to what extent their actions are aligned with the global sustainability agenda (Costa et al., 2022). With this regard, the Global Reporting Initiative (GRI) guidelines could be a useful tool and the investigation of their use by companies should be explored.

Funding

References

Abdelmeguid, A., Afy-Shararah, M., & Salonitis, K. (2022). Investigating the challenges of applying the principles of the circular economy in the fashion industry: A systematic review. Sustainable Production and Consumption.

Acerbi, F., & Taisch, M. (2020). A literature review on circular economy adoption in the manufacturing sector. Journal of Cleaner Production, 273, 123086.

Ahmad, M. O., Dennehy, D., Conboy, K., & Oivo, M. (2018). Kanban in software engineering: A systematic mapping study. *Journal of Systems and Software*, *137*, 96-113.

Ahmed, Z., Mahmud, S., & Acet, H. (2022). Circular economy model for developing countries: evidence from Bangladesh. Heliyon, e09530.

Aravindaraj, K., & Chinna, P. R. (2022). A systematic literature review of integration of industry 4.0 and warehouse management to achieve Sustainable Development Goals (SDGs). Cleaner logistics and supply chain, 100072.

Atif, S., Ahmed, S., Wasim, M., Zeb, B., Pervez, Z., & Quinn, L. (2021). Towards a conceptual development of Industry 4.0, servitisation, and circular economy: A systematic literature review. Sustainability, 13(11), 6501.

Aydin, N. S., & Tirkolaee, E. B. (2022). A systematic review of aggregate production planning literature with an outlook for sustainability and circularity. Environment, Development and Sustainability, 1-42.

Bai, C., & Satir, A. (2022). A critical content-analysis of sustainable supplier development literature and future research directions. Journal of Cleaner Production, 132443.

Blunck, E., Salah, Z., & Kim, J. (2019, September). Industry 4.0 Ai and circular economy-opportunities and challenges for a sustainable development. In Proc. Dubrovnik Int. Econ. Meeting (DIEM) (pp. 17-42).

Charef, R. (2022). Supporting construction stakeholders with the circular economy: A trans-scaler framework to understand the holistic approach. Cleaner Engineering and Technology, 100454.

Costa, R., Menichini, T., & Salierno, G. (2022). Do SDGs really matter for business? Using GRI sustainability reporting to answer the question. *European Journal of Sustainable Development*, *11*(1), 113-113.

Čuden, A. P. Knitting towards sustainability, circular economy and Industry 4.0. Applied Research.

Dalmarco, G., Ramalho, F. R., Barros, A. C., & Soares, A. L. (2019). Providing industry 4.0 technologies: The case of a production technology cluster. The journal of high technology management research, 30(2), 100355.

Dantas, T. E. T., de-Souza, E. D., Destro, I. R., Hammes, G., Rodriguez, C. M. T., & Soares, S. R. (2021). How the combination of Circular Economy and Industry 4.0 can contribute towards achieving the Sustainable Development Goals. Sustainable Production and Consumption, 26, 213-227.

da Silva, T. H. H., & Sehnem, S. (2022). The circular economy and Industry 4.0: Synergies and challenges. Revista de Gestão, 29(3), 300-313.

de Oliveira Neto, G. C. da Conceição Silva, A., & Filho, M. G. (2022). How can Industry 4.0 technologies and circular economy help companies and researchers collaborate and accelerate the transition to strong sustainability? A bibliometric review and a systematic literature review. International Journal of Environmental Science and Technology, 1-38.

Dwivedi, A., Moktadir, M. A., Jabbour, C. J. C., & de Carvalho, D. E. (2022). Integrating the circular economy and industry 4.0 for sustainable development: Implications for responsible footwear production in a big data-driven world. Technological Forecasting and Social Change, 175, 121335.

Facchini, F., Silvestri, B., Digiesi, S., & Lucchese, A. (2022). Agri-food loss and waste management: Win-win strategies for edible discarded fruits and vegetables sustainable reuse. Innovative Food Science & Emerging Technologies, 103235.

Ghobakhloo, M., Fathi, M., Iranmanesh, M., Maroufkhani, P., & Morales, M. E. (2021). Industry 4.0 ten years on: A bibliometric and systematic review of concepts, sustainability value drivers, and success determinants. Journal of Cleaner Production, 302, 127052.

Global Reporting Initiative (GRI), 2015. SDG Compass: the Guide for Business Action on the SDGs [WWW Document]. URL. https://sdgcompass.org/wp-content/uploads/2016/05/019104_SDG_Compass_Guide_2015_v29.pdf.

Hallioui, A., Herrou, B., Santos, R. S., Katina, P. F., & Egbue, O. (2022). Systems-based approach to contemporary business management: An enabler of business sustainability in a context of industry 4.0, circular economy, competitiveness and diverse stakeholders. Journal of Cleaner Production, 133819.

Isensee, C., Teuteberg, F., Griese, K. M., & Topi, C. (2020). The relationship between organizational culture, sustainability, and digitalization in SMEs: A systematic review. Journal of Cleaner Production, 275, 122944.

Kar, A. K., Choudhary, S. K., & Singh, V. K. (2022). How can artificial intelligence impact sustainability: A systematic literature review. Journal of Cleaner Production, 134120.

Khan, I. S., Ahmad, M. O., & Majava, J. (2021). Industry 4.0 and sustainable development: A systematic mapping of triple bottom line, Circular Economy and Sustainable Business Models perspectives. Journal of Cleaner Production, 297, 126655.

Kim, V. N. P., de Melo Conti, D., Gonzalez, E. D. S., & da Silva, L. F. (2022). THE INTERRELATION BETWEEN INDUSTRY 4.0 AND CIRCULAR ECONOMY: SYSTEMATIC LITERATURE REVIEW. *Revista Gestão & Tecnologia*, 22(4), 277-303.

Kitchenham, B. A., Budgen, D., & Brereton, O. P. (2011). Using mapping studies as the basis for further research–a participant-observer case study. *Information and Software Technology*, *53*(6), 638-651.

Leng, J., Ruan, G., Jiang, P., Xu, K., Liu, Q., Zhou, X., & Liu, C. (2020). Blockchain-empowered sustainable manufacturing and product lifecycle management in industry 4.0: A survey. Renewable and sustainable energy reviews, 132, 110112.

MacArthur, E. (2013). Towards the circular economy, economic and business rationale for an accelerated transition. Ellen MacArthur Foundation: Cowes, UK, 21-34.

Maria, G. M., DRUTA, R. M., BIRGOVAN, A. L., BACALI, L., & LUNGU, F. (2021). INDUSTRY 4.0 AND THE CIRCULAR ECONOMY: A SYSTEMATIC REVIEW OF THE LITERATURE. ACTA TECHNICA NAPOCENSIS-Series: APPLIED MATHEMATICS, MECHANICS, and ENGINEERING, 64(4s).

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group*, T. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. Annals of internal medicine, 151(4), 264-269.

Mont, O., & Heiskanen, E. (2015). Breaking the stalemate of sustainable consumption with industrial ecology and a circular economy. In Handbook of research on sustainable consumption (pp. 33-48). Edward Elgar Publishing.

Mora-Contreras, R., Torres-Guevara, L. E., Mejia-Villa, A., Ormazabal, M., & Prieto-Sandoval, V. (2022). Unraveling the effect of circular economy practices on companies' sustainability performance: Evidence from a literature review. Sustainable Production and Consumption.

Morseletto, P. (2020). Restorative and regenerative: Exploring the concepts in the circular economy. Journal of Industrial Ecology, 24(4), 763-773.

Mutezo, G., & Mulopo, J. (2021). A review of Africa's transition from fossil fuels to renewable energy using circular economy principles. Renewable and Sustainable Energy Reviews, 137, 110609.

Okorie, O., Obi, M., Russell, J., Charnley, F., & Salonitis, K. (2021). A triple bottom line examination of product cannibalization and remanufacturing: A review and research agenda. Sustainable Production and Consumption, 27, 958-974.

Omran, B. A., & Baek, K. H. (2022). Valorization of agro-industrial biowaste to green nanomaterials for wastewater treatment: Approaching green chemistry and circular economy principles. Journal of Environmental Management, 311, 114806.

Pan, X., Wong, C. W., & Li, C. (2022). Circular economy practices in the waste electrical and electronic equipment (WEEE) industry: A systematic review and future research agendas. Journal of Cleaner Production, 132671.

Patyal, V. S., Sarma, P. R. S., Modgil, S., Nag, T., & Dennehy, D. (2022). Mapping the links between Industry 4.0, circular economy and sustainability: A systematic literature review. Journal of Enterprise Information Management.

Pereira, A. C., & Romero, F. (2017). A review of the meanings and the implications of the Industry 4.0 concept. Procedia Manufacturing, 13, 1206-1214.

Rejeb, A., Appolloni, A., Rejeb, K., Treiblmaier, H., Iranmanesh, M., & Keogh, J. G. (2022). The role of blockchain technology in

the transition toward the circular economy: Findings from a systematic literature review. Resources, Conservation & Recycling Advances, 200126.

Rosa, P., Sassanelli, C., Urbinati, A., Chiaroni, D., & Terzi, S. (2020). Assessing relations between Circular Economy and Industry 4.0: a systematic literature review. International Journal of Production Research, 58(6), 1662-1687.

Serrano-Bedia, A. M., & Perez-Perez, M. (2022). Transition towards a circular economy: A review of the role of higher education as a key supporting stakeholder in Web of Science. Sustainable Production and Consumption.

Silva, J. A. (2022). Implementation and Integration of Sustainability in the Water Industry: A Systematic Literature Review. Sustainability, 14(23), 15919.

Silvestre, B. S., & Ţîrcă, D. M. (2019). Innovations for sustainable development: Moving toward a sustainable future. *Journal of cleaner production*, *208*, 325-332.

Simonetto, M., Sgarbossa, F., Battini, D., & Govindan, K. (2022). Closed loop supply chains 4.0: From risks to benefits through advanced technologies. A literature review and research agenda. International Journal of Production Economics, 108582.

Stahel, W. R. (2016). The circular economy. Nature, 531(7595), 435-438

Suppipat, S., & Hu, A. H. (2022). A scoping review of design for circularity in the electrical and electronics industry. Resources, Conservation & Recycling Advances, 200064.

Turzo, T., Marzi, G., Favino, C., & Terzani, S. (2022). Non-financial reporting research and practice: Lessons from the last decade. Journal of Cleaner Production, 131154.

United Nations (UN). (2015). Transforming our world: the 2030 agenda for sustainable development. Resolution A/RES/70/1.

United Nations Development Programme (UNDP) (2021) UNDP Strategic Plan, 2022–2025. http://undocs.org/DP/2021.

Van Zanten, J. A., & van Tulder, R. (2021). Improving companies' impacts on sustainable development: A nexus approach to the SDGS. Business Strategy and the Environment, 30(8), 3703-3720.

Wijewickrama, M. K. C. S., Rameezdeen, R., & Chileshe, N. (2021). Information brokerage for circular economy in the construction industry: A systematic literature review. Journal of Cleaner Production, 313, 127938.

Yadav, V. S., Singh, A. R., Gunasekaran, A., Raut, R. D., & Narkhede, B. E. (2022). A systematic literature review of the agro-food supply chain: Challenges, network design, and performance measurement perspectives. Sustainable Production and Consumption, 29, 685-704.

Yang, Y., Guan, J., Nwaogu, J. M., Chan, A. P., Chi, H. L., & Luk, C. W. (2022). Attaining higher levels of circularity in construction: Scientometric review and cross-industry exploration. Journal of Cleaner Production, 133934.

Zailan, R., Lim, J. S., Manan, Z. A., Alwi, S. R. W., Mohammadi-ivatloo, B., & Jamaluddin, K. (2021). Malaysia scenario of biomass supply chain-cogeneration system and optimization modeling development: A review. Renewable and Sustainable Energy Reviews, 148, 111289.

Components of family protection policy violation: The case of Turkiye

Sahika Gokmen[1], Anil Eralp[2]

[1]Department of Econometrics, Ankara Haci Bayram Veli University, Turkiye*
Department of Statistics, Uppsala University, Sweden
[2] Department of Econometrics, Bolu Abant Izzet Baysal University, Turkiye
[*]Corresponding Author: sahika.gokmen@hbv.edu.tr , sahika.gokmen@statistics.uu.se

Abstract

The smallest and most significant pillar of society is the family. In this sense, family harmony and contentment directly influence societal harmony and peace. Domestic violence is a significant element that has an impact on the social order in this regard. Many nations, including Turkiye, have laws in place to protect families. When these laws are broken, some family members commit crimes and wind in prison. These laws are usually broken when a family member use force against other members of family, which called as domestic violence. The resistance to the family protection measure has not received as much attention as domestic violence studies, despite the fact that there are many studies on domestic violence in the literature. This study's primary motivation is to investigate the variables that influence criminal behavior in Turkiye in the context of family protection measures. Spatial panel data analysis used for the analysis as criminal behavior, including the education level and/or cultural shape, are generally reflect the regional effects. The data obtained from the Turkish Statistical Institute (TURKSTAT) which also means the data includes regions classified at Level 2 of the Statistical Region Unit Classification for the years 2014 to 2020. Based on the purpose of the study, a bunch of variables are taken as components for the investigation of family protection police violation. According to the findings, factors such as education, gender, labor force participation, and internal migration, as well as spatial and unit effects, have an impact on the violation of family protection.

Keywords: Family protection, Domestic violence, Spatial panel data analysis, Crime numbers.

1. Introduction

Domestic violence is a significant element that has an impact on the social order in the society. Many nations, including Turkiye, have laws in place to protect families. When these laws are broken, some family members commit crimes and wind up in prison. These kinds of crimes are not only affecting the family members but also the welfare of society (Brito, 1999). In recent years, a great deal of Government attention has been devoted to raising public awareness about the problem of domestic violence, to improving the prosecution and conviction rate of offenders and to extending the legal protection available to victims. Due to this, governs improve legal protection procedures for these types of criminals to protect victims. In that sense, most notably the question of how domestic violence is distributed in the community and whether there are any social and or economic factors which underpin or exacerbate it. This question is important in the development of effective crime prevention strategies as it can help us to develop more effective crime prevention strategies.

This kind of criminal behavior generally reflects regional patterns as it happens with education level and/or culture. Analysis of spatial variation in reports of non-fatal domestic violence suggests that it is much more common in areas which are socially disadvantaged (Devery, 1992). Hence, taking hand this issue with spatial aspect is crucial. Making spatial analysis about domestic violence may contain two approaches; first, it can be organized a big survey study for data or, second, it can be used macro-data for analysis. If we look at to the literature there are limited amount of study that examine the domestic violence title in spatial analysis view. While some studies examine the regional affects in regular analysis procedure with a representative region variable (Devery, 1992; Eralp and Gokmen, 2023; etc.), some studies directly use spatial analysis (Holmes, 2009; Little, 2017; Rodrigues et al., 2017; Seid et al., 2021; etc.). The common point of these studies is that generally survey data are used in all of them. However, unlike crime statistics, survey data does represent a measure of domestic violence. On the other hand, it is possible to find research that worked with police records regarding domestic violence, such as Gracia et al. (2015), Britt et al. (2005), Serra et al. (2022), etc. These kinds of studies are restricted just for some countries or regions, and this is an obstacle for examining regional effects. Based on that literature review, it has been realized that macro-data analysis has not been used for Turkiye and so, fulling this blank for Turkiye is main motivation of this study. The purpose of the investigation is to learn more about the factors that affect criminal

behavior spatially for Turkiye in relation to family protection measures. To analyze domestic violence regionally, the spatial econometrics model is used in addition to the TURKSTAT data obtained by the authors for this study.

The paper is conducted in 4 sections. After the first Introduction part, Spatial panel econometric models are introduced in the second section. The Empirical analysis in Chapter 3 which also contains the data information in it while all the findings and recommendations are summarized in the last Conclusion chapter, Chapter 4.

2. Spatial Panel Econometric Models

The classical linear regression model can be written in matrix representation as follows:

$$y = X\beta + e \tag{1}$$

where *y* is an $NT \times 1$ dimensional vector and contains the observation data of the dependent variable; *X* is a non-stochastic $NT \times K$ dimensional vector containing the observation values of the explanatory variable; β is a $k \times 1$ dimensional vector of coefficients and *e* is an $NT \times 1$ dimensional vector of random error terms.

According to the first law of geography proposed by Tobler (1970), things that are close are more related than things that are far away. Therefore, the assumption of independence of observations makes the classical regression model greatly simplifies the process. However, in the context of spatial data, this simplification is unlikely to be appropriate due to the possibility of spatial dependence between error terms. Therefore, the spatial dependence of the residuals or the independent variable may make the estimation results biased and inconsistent. Spatial dependence, or regional observation, describes a situation in which the values are dependent on those in the nearby neighboring region. Based on the work of Anselin (1988), spatial dependence can be analyzed as equation (1) can be defined in two basic ways. One of them called as spatial lag dependence while the other one is called as spatial error dependence (Fischer and Wang, 2011: 32).

In spatial cross-section data analysis, the time effect cannot be taken into account. In addition, not including unobservable unit effects in the analysis may result in biased estimates. These problems can be overcome by using panel datasets. In fact, the efficiency of the predictions can be increased by increasing the number of observations. In addition, econometric problems such as multicollinearity can be overcome (Eralp et al., 2023).

Panel data sets are two-dimensional data sets that consisting of cross-sectional and time dimensions. In some studies, as in this study, when one-dimensional cross-sectional or time series data are used, "sufficient" observation values cannot be reached. In such cases, preferring working with panel data sets increased the size of data. Increasing the number of data also increases the degrees of freedom, reduces multicollinearity among explanatory variables and increases the efficiency of estimations. Moreover, more complex behavioral models can be constructed and tested when using panel data models based on panel data sets compared to econometric models based on both cross-sectional and time series data. In addition to these advantages, perhaps the most important advantage of panel data models is that they allow for the modeling of unobserved effects. These effects can be identified both for units, which is the cross-sectional dimension, and for time points, which is the time dimension (Hsiao, 2003: 1-7).

In spatial econometrics, the relationships between locations are expressed by a spatial weight matrix. The spatial weight matrix is used to reflect the spatial structure of the observed data. In other words, basically, by expressing the relationships between regions with this matrix, spatial structure information is added to spatial models. Various methods are used to reflect the neighborhood relationship between observations with this matrix. The most frequently used of these in practice is the boundary neighborhood. In the boundary neighborhood, three different neighborhoods are defined as castle, bishop, and queen's neighborhood according to the common edges and corners shared by the spaces. In the boundary adjacency matrix, neighboring regions are denoted by 1 and non-neighboring regions by 0. The spatial weight matrix is an $n \times n$ positive symmetric matrix consisting of 1 and 0 with *n* units. However, in practice, row standardization is usually applied to the spatial weight matrix.

Models with spatial lags are derived from economic theories that assume that neighboring locations or points in space interact with each other and that this interaction creates a spillover effect. Therefore, spatial lagged models explain the spatial correlation (dependence) in the dependent variable. Spatial lag model (Spatial Lag Model or Spatial Autoregressive Model, SAR) is obtained by extending the classical linear regression model by adding the dependent variable to the model as an explanatory variable after weighting it with the weight matrix.

$$Y = \rho WY + a\iota_n + X\beta + e \tag{2}$$

where ρ is the spatial autocorrelation parameter and measures the spillover effect; W is the weight matrix. e is the random error term, which has the distribution $N(0, \sigma^2 I)$ is assumed.

Spatial Error Model (SEM) considers spatial dependence in the error term. For example, spatial error dependence may arise from unobservable latent variables that are spatially correlated. It can also arise from variables collected for analysis from neighbors that do not accurately reflect area boundaries (Fischer & Wang, 2011: 33) The spatial error model can be represented as an autoregressive process arising from spatial correlation between the error terms of the classical linear regression model as in equations (3)-(4).

$$Y = X\beta + e \tag{3}$$

$$e = \lambda W_1 e + u \tag{4}$$

where e is the random error term of the regression model in equation (3) and under the assumption of spatial autocorrelation, the autoregressive process in equation (4) is written and the random error term u of this model is assumed to have $N(0, \sigma^2 I)$ distributions.

Under the spatial autoregressive process, the stochastic error term exhibits spatial dependence assuming that the SAR and SEM models are combined and a generalized model is presented in Anselin (1988). The model proposed as a description can be shown as follow:

$$Y = \rho W_1 Y + X\beta + e \tag{5}$$

$$e = \lambda W_2 e + u \tag{6}$$

where W_1 and W_2 are two different weight matrices.

3. Empirical Analysis

In the study, NUTS 2 level data for the years 2014-2020 are used. The limitations on access to the data for the variables played a role in selecting the analysis period's cross-sectional and time dimensions. The data are obtained from Turkish Statistical Institute - TURKSTAT and the variables are created by the authors. The definitions of the variables used in the analysis are given in Table 1.

Table 1. Definitions of variables

violence	The share of contrary to the measures for family protection in the total crime (%).
high_edu	Ratio of female with undergraduate and higher education graduate to male with the same education.
edu	Ratio of female with high school or lower education to male with the same education.
migration	Net-migration rate (%)
labor	Labor force participation rate of male aged 15 and over (%).
schooling	Schooling ratio of female by secondary education (%).

At the beginning stage of the analysis, Turkiye's crime proportions of domestic violence are visualized as in Map 1. Taking into account Turkiye's regional differences, maps for the years 2014 and 2020 are created for this variable based on the assumption that the violence variable has a geographically heterogeneous distribution; in other words, it has spatial effects. Based on the Map 1,

violence rates decrease from darker to lighter colors. Accordingly, in 2014, the first thing that draws attention is that there are spatial clusters. The other striking point is that, contrary to expectations, the rate of violence is relatively lower in the Southeastern Anatolia region. When 2020 year is analyzed, it is seen that spatial clustering is continuing according to 2014. However, while the rate of violence has decreased in some regions, it has increased in others. For example, the increase in the TR63 region is significant. When both maps are evaluated together, it is considered that there are spatial clusters. However, this needs to be tested statistically.

2014   2020
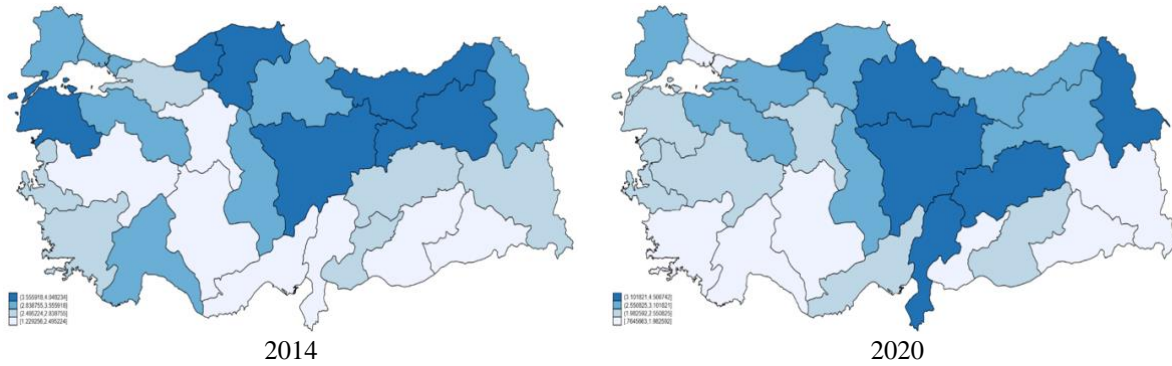
Map 1. Geographical distribution of the violence variable

Depending on the modeling structure of unobservable unit and/or time effects, panel data models are classified into two categories: fixed effects models and random effects models. If the model is constructed in such a way that these effects are included in the model as an explanatory variable, the model is called a fixed effects model. Instead, if unobservable effects are treated as a component of the random error term of the model, the model is called a random effects model. In addition, only one or both of the unobservable unit and time effects can be included in the model. If only one effect is included in the model, the model is called unidirectional; if both effects are included, the model is called bidirectional.

Panel data sets are essentially a pooling of cross-sectional data and their time series. Although it is a priori assumed that there are mostly fixed unit effects in these pooled data, it is necessary to test whether these effects exist. The Chow test can be used to test for unit effects. However, the error term of the pooled model must fit a normal distribution with zero mean and variance. If the error term is not constant variance, it can be tested using the F-statistic obtained after the transformation to be applied if the variance structure is known. This test is known as the Roy-Zellner test (Baltagi, 2021: 75-79). When possible unobserved effects are predicted as a component of the error term in pooled data, the Lagrange Multiplier (LM) test developed by Breusch and Pagan (1980) is generally used to determine whether the random effects model or the pooled model is valid. After deciding whether the data set contains unit effects, it is necessary to decide whether to use the fixed effects model or the random effects model. In the selection of fixed effect and random effect panel data models, there are two different decision-making situations based on the researcher's decision and Hausman test. When there is no randomness in the selection of the sample units, the fixed effects model is preferred. However, Hausman test as a formal test taking into account the structure of unobserved effects within the model is a general method followed in empirical studies.

Table 2. Model Estimation

	OLS	FE	SAR-FE	SEM-FE	SAC-FE

high_edu	-4.8823***	-16.1427***	-12.5280***	-14.3134***	-6.9069***
edu	-10.0126***	4.4691	3.4260	3.5652	2.7849**
migration	-0.0052	0.0061	0.0058*	0.0057	0.0052**
labor	-0.0226	-0.0899***	-0.0760***	-0.0799**	-0.0398**
schooling	0.1164***	0.0633**	0.0474	0.0490	0.0317**
Rho			0.2352**		0.6807***
lambda				0.1760	-0.7909***
N	182	182	182	182	182
Rsquare	0.2886	0.3661	0.3896	0.3637	0.4295
AIC	445.8067	278.4882	274.8890	279.8771	261.9121
BIC	465.0308	294.5082	297.3170	302.3051	287.5442
F-test		8.9400***			
Hausman test		44.8300***	21.0500***		
Pesaran CD test		24.6450***			
LR test			14.9800***	19.9600***	
*** p<0.01, ** p<0.05, * p<0.10					

Table 2 presents the estimation results of the models, and the first column presents the pooled OLS model estimation results. The F-test and Hausman test results indicate that there are unobserved unit effects, and the appropriate panel data model is the fixed effects model. In addition to this initial analysis, in panel data models, cross-sectional dependence may arise in the presence of common shocks or spatial dependence (De Hoyos and Sarafidis, 2006). Pesaran (2006) shows that ignoring cross-sectional dependence leads to significant bias and dimension distortion. Therefore, we investigate whether the severity variable is cross-sectional dependent. As a result of the test, it is found that the violence variable has cross-sectional dependence. As the violence variable has cross-sectional dependence, it is decided to use spatial panel data models. According to this, it is necessary to determine the appropriate model among the fixed effect SAR, SEM and SAC models. LR test is used for determining the appropriate model and SAC-FE model is selected as the appropriate model.

Table 3. Direct, indirect, and total effects

	Direct	Indirect	Total
high_edu	-8.1396***	-13.5720***	-21.7116***
edu	3.2761**	5.7677	9.0438*
migration	0.0066**	0.0114*	0.0180**
labor	-0.0468**	-0.0744*	-0.1212**
schooling	0.0377**	0.0640*	0.1018*
*** p<0.01, ** p<0.05, * p<0.10			

After determining the appropriate model, as stated by LeSage and Pace (2009) and Elhort (2014), the direct, indirect and total effects of the SAC-FE model coefficients should be obtained and interpreted through these coefficients. These effects are given in Table 3. According to the SAC-FE model estimation results in Table 3, the direct, indirect, and total effects are statistically significant for all explanatory variables except the indirect effect of the explanatory variables high education and education. High education has a negative sign as one's expected, while low education has a positive sign. Also, educated women make a positive contribution to the society in terms of violence. Young female' participation in education has been found to have an increasing effect on violence. Considering the definition of the violence variable, this situation can be considered as a reflection of the increase in young female' views on violence and their awareness of reporting it. Though, the interpretation of these variables should be done with caution as this study is conducted in macro scale. Besides, men's participation in the labor force contributes to a decrease in violence which is also in line with the literature.

4. Conclusions

Domestic violence is a significant element that has an impact on the social order in a society. Many governs, including Turkiye, have been working on developing the laws to protect families. These laws are usually broken when a family member use force against other members of family, which called as domestic violence. The crime numbers of the family protection law have not received as much attention as domestic violence studies, despite the fact that there are many studies on domestic violence in the literature. The main motivation behind this study is to look at the factors that affect criminal behavior in Turkiye in relation to family protection policies. For this aim, spatial panel data analysis used for the analysis as it takes into consideration the regional effects. The data obtained from the TURKSTAT which also means the data includes regions classified at Level 2 of the Statistical Region Unit Classification for the years 2014 to 2020.

According to the main findings, both spatial and unit effects have an impact on the violation of family protection law. After deciding the best model in the related conditions as SAC-FE model, it can be said that the factors such as education, gender, labor force participation, and internal migration have an statistically important effects on domestic violence. If we look at a bit more in detail, high education has a negative affect while low education has a positive. Also, violence is becoming more prevalent while young women are enrolled in school. These findings are in line with the expectations as it seems a reflection of the increase in young female' views on violence and their awareness of reporting it. Besides, as one expected, decreased violence is a result of men's employment in the workforce.

It should be emphasized that a region's bordering effects are stronger than its own effects. This shows being a role model for a family may have diffuse effect on domestic violence. At this regard, supporting being a highly educated women and/or increasing the labor force participation with new and different job opportunities may have an important role about decreasing domestic violence. This also shows that, laws and precautions may be organized as starting from families to the general. Smallest participants of society can be a role model for their environment and may help to create both more peaceful and developed societies.

References

Anselin, L. (1988). *Spatial econometrics: Methods and models*. Kluwer Academic Publishers.

Baltagi, B. H. (2021*). Econometric analysis of panel data*, Switzerland: Springer Nature.

Breusch, T. S. & Pagan, A. R. (1980). The Lagrange multiplier test and its applications to model specification in econometrics. *Review of Economic Studies*, 47: 239–253.

Brito, T. L. (1999). *The welfarization of family law*. U. Kan. L. Rev., 48:229.

Britt, H. R., Carlin, B. P., Toomey, T. L., & Wagenaar, A. C. (2005). Neighborhood level spatial analysis of the relationship between alcohol outlet density and criminal violence. *Environmental and Ecological Statistics*, 12:411-426.

Devery, C. (1992). *Domestic Violence in NSW: a regional analysis*. New South Wales Bureau of Crime Statistics and Research.

De Hoyos, R.E. & Sarafidis, V. (2006). "Testing for Cross-sectional Dependence in Panel-data Models". *The Stata journal*, 6(4), 482-496.

Elhorst, J.P. (2014). *Spatial Econometrics: From Cross-sectional Data to Spatial Panels*. Heidelberg, Springer.

Eralp, A., Gokmen, S., & Dagalp, R. (2023). Maximum likelihood estimation of spatial lag models in the presence of the error-prone variables. *Communications in Statistics-Theory and Methods*, 52(10), 3229-3240.

Eralp A., Gokmen S. (2023). The Impact of Poverty on Partner Violence against Women under Regional Effects: The Case of Turkey. *Journal of Interpersonal Violence*, 38(5-6):4906-4924.

Fischer, M. M., & Wang, J. (2011). *Spatial data analysis: Models, methods and techniques*. Springer Science & Business Media.

Gracia, E., López-Quílez, A., Marco, M., Lladosa, S. & Lila, M. (2015). The spatial epidemiology of intimate partner violence: do neighborhoods matter? *American journal of epidemiology*, 182(1):58-66.

Holmes, C. (2009). Destabilizing homonormativity and the public/private dichotomy in North American lesbian domestic violence discourses. *Gender, Place & Culture*, 16(1):77-95.

Hsiao, C. (2003). *Analysis of Panel Data*, Second Edition, New York: Cambridge University Press.

Little, J. (2017). Understanding domestic violence in rural spaces: A research agenda. *Progress in Human Geography*, 41(4):472-488.

Lesage, J. & Pace, R. K. (2009). *Introduction to Spatial Econometrics*. Chapman and Hall/CRC.

Pesaran, M.H. (2006). "Estimation and Inference in Large Heterogeneous Panel with a Multifactor Error Structure". *Econometrica*, 74 (4), 967-1012.

Rodrigues, N. C. P., O'Dwyer, G., Kramer de Noronha Andrade, M., Flynn, M. B., Leite Maia Monteiro, D., & Teresa Saraiva Lino, V. (2017). The increase in domestic violence in Brazil from 2009-2014. *Ciencia & saude coletiva*, 22:2873-2880.

Seid, E., Melese, T. & Alemu, K. (2021). Spatial distribution and predictors of domestic violence against women: evidence from analysis of Ethiopian demographic health survey 2016. *BMC women's health*, 21:1-15.

Serra, L., Vall-Llosera, L., Varga, D., Saurina, C., Saez, M., & Renart, G. (2022). Analysis of the geographic pattern of the police reports for domestic violence in Girona (Spain). *BMC public health*, 22(1):1-11.

Tobler, W. R. (1970). A computer movie simulating urban growth in the Detroit region. *Economic Geography*, 46(sup1). 234-240.

Financial challenges of Western Balkans countries after covid -19 pandemic: The case of Albania.

Ardi Bezo[1], Lorena Bezo (Balili)[2]

[1]Department of Finance-Accounting, Faculty of Economy, University Colleges of Business, Albania*
[2] Department of Finance, Faculty of Economy, University of Tirana, Albania.
e-mail: abezo@kub.edu.al; lorenabalili@feut.edu.al.

Abstract

The global economic situation in recent years has undergone major changes in different sectors due to the pandemic that began in 2019. It was not at all easy for these countries with weak and fragile economies to face this pandemic in every dimension of their economies sectors. Different situations were created and put the different social strata of populations in great difficulty to provide food as well as the vital needs of these peoples of different countries in the world. The purpose of this paper is precisely to present how these countries such as those of the Western Balkans, which have weak economies, cope with the pandemic. The response of governments of these countries have their biggest challenges with their people in different sectors of the economy. Which of their sectors did it manage to capture more, which layers of the population were more endangered and which were more impoverished, how these sectors of the economy were negatively correlated and how it were affected in economy of these countries. In conclusion, this study in relation with the economic situations of the countries of the Western Balkans, how it was affected Albania and how much the Albanian economy had economic growth in relation to other economies. How did the government respond and what were the financial instruments used to cope with this rather difficult period. All these, this paper study will bring this comparative panorama in an economic and financial analyses and the way between the countries of the Western Balkans.

Keywords: **Western Balkans response, Covid-19 crisis, economic growth, challenges and development of western Balkans.**

1. Introduction

The countries of the Western Balkans were affected by the pandemic and the energy crisis, as were other countries in Europe and the world, from which we expected to have high levels of inflation and deep recession in these economies. The recession was expected to have a major impact on countries such as Montenegro, Albania and Kosovo, which are highly dependent on tourism and suffered a major contraction in this sector. Montenegro, Albania and Kosovo were expected to experience strong shocks in the decline of GDP of over 8 p.p. compared to pre-pandemic forecasts in 2020. While Serbia, Bosnia Herzegovina and North Macedonia were expected to have recessions with milder declines that could range from 3.2, 3 and 4.1%, compared to before the pandemic. What was noticed by the economies of all the Western Balkan countries was their impact from the pandemic crisis affected demand and supply in domestic markets and this was reflected in the country's economy. With the decrease in demand, we would certainly have a decrease in exports and public and private investments, which caused a decrease in the economies of these countries. We had a decline in foreign direct investments, which would negatively affect the opening of new jobs and the progress of technology in the market. The restrictive measures on the free movement of people during the pandemic brought a strong impact on the tourism of these countries, especially in Albania and Montenegro. There was also a decrease in remittances from immigrants, which are very important for the economies of these two countries, affecting domestic investments as well. Knowing that remittances account for an average of 10% of GDP and they fell, thus increasing unemployment in developed European countries that brought about this situation.

All the countries of the WB to face the crisis took measures to mitigate the negative effects and bankruptcies of businesses. The governments of different countries take drastic measures to overcome and mitigate the fiscal burden and to find supporting instruments for businesses and families. In this paper, six countries of the Western Balkans will be analyzed, the economic challenges caused by the pandemic and the preventive measures by their governments. The expectation of these measures taken would result in a contraction of the economies in the entire region.

Literature Review

During the last twenty years, the European perspective for the countries of the Western Balkans has experienced a gradual erosion of its enlargement policy. (Richter & Wunsch, 2019) although the delays for membership in the EU as well as the increasing influence of developing powers in the Western Balkans also continued with the dynamics of the Western Balkan states. According to the OECD's March 2021 Economic Outlook ((OECD, 2021)) the global GDP expressed in real terms shrank by 3.4 percent in 2020 but is projected to rise by 5.6 and 4.0 percent in 2021 and 2022, respectively.

The EU is also challenged by the rise of the so-called developing powers. Meanwhile, the middle powers promote the spread of global power and questioning the international order. Many researchers have spoken about the dominance of the middle powers and according to ((Gonzalez & Levaggi , 2016)) he wrote that the influence of Russia, which has been so great that it is promoting in the Western Balkans exactly the opposite of the EU, namely: censorship, militarization, incitement to war, disinformation campaigns, instability and non-membership in the EU and NATO ((Bieber & Tzifakis, 2021)). Russia tries to develop its influence in this region ((E, 2018)) Russian influence in the Western Balkans poses a security threat to the EU. The Western Balkans have always had strong economic ties with the EU. In recent years, Europeans have been concerned about the presence of increasingly emerging powers in the Western Balkans ((Ryan & Gray , 2018)). The EU and its enlargement policy reflect the way in which EU institutions and a number of member states, including Germany and France, seek to formulate their policies towards the Western Balkans ((Ker-Lindsay, Armakolas, Balfour, & Stratulat, 2020)).

Meanwhile, the topic of this paper is the analysis of the impact of the COVID-19 pandemic and the energy crisis in the countries of the Western Balkans (Albania, Bosnia and Herzegovina, Montenegro, North Macedonia and Serbia). Both the COVID-19 Pandemic and the energy crisis have caused major disruptions in the economic activity of WB countries, which were already lagging behind in terms of economic conversions to a Union ((commision, 2021)).

Referring to the March 2021 Economic Outlook reports of the OECD (OECD, 2021) global GDP expressed in real terms contracted in 2020, and was projected to increase in 2021 and 2022. It has always been recognized that the pandemic COVID-19 and the energy crisis have overshadowed other developments in different sectors, while at the same time accelerating existing trends ((Balkans in Europe Policy Advisory Group (BiEPAG), 2020)). These crises have severely hit external demand, prices of export goods, commodities and the flow of international remittances ((worldbank.org, 2020)) on the one hand, as well as financial outflows, exchange rates, foreign exchange reserves and interest rates, on the other hand.

Global inflation was affected by the pandemic, the energy crisis and the resulting deep price volatility ((Baker, 2020)), and its overall economic effects have not yet been assessed ((Zaremba, 2021)). Meanwhile, the increase in the public debt burden of countries is predicted to become one of the epicenters of the main legacy of the COVID-19 pandemic ((Salmeron, Adria, & García, 2020)).

The pandemic and the energy crisis showed that all the countries with the lowest incomes were the ones that were affected the most. Emerging market economies (EMEs) during the pandemic and energy crisis have faced the largest capital outflows ((BIS, 2020)) resulting from the negative spillovers of economic downturns in developed economies. And finally, less developed countries compared to developed ones have less space available to mitigate the negative effects of the crisis ((Aizenman, 2019)).

Data and analyses

The experts found that in all the countries of the Western Balkans, recession would appear as a result of the fall in internal and external demand during the COVID-19 crisis. In order to prevent the pandemic, preventive measures were put in place, social distancing up to the closing of businesses, they created supply interruptions and reduced the income and consumption of families. But economic growth started to be strong in the first half of 2022, which were above expectations. Investment and private consumption were the main drivers of growth. Remittances and salary increase, as well as increases in private credit, have supported private consumption. What was observed was that the biggest investments were in North Macedonia, Serbia and Bosnia-Herzegovina. The increase in Inflation during 2022 in the Western Balkans has increased due to a connection between the increase in demand and supply.. What was expected for 2022 was that inflation would be in double digits in all the countries of the Western Balkans except Albania. It was noted that food inflation reached up to 25% in Bosnia-Herzegovina, Montenegro and North Macedonia. The increase in inflation was largely influenced by the increase in commodities.

There is stability in the financial sector which has been maintained, but the growth of a higher inflation would continuously test the financial sector. As far as bad loans are concerned, the trajectory is downward (on average by 4.4% in March 2022) and the direct impact on the banking sector has definitely been the war in Ukraine, which has brought restrictions. It should be mentioned that the tighter conditions of global financing will bring about a slowdown in internal and external demand, and therefore will bring about a weakening of business and consumer confidence and these will definitely affect the financial sector of the region.

Export indicators in the region have started to slow, just as imports have risen sharply due to higher food and energy costs. We see that the deficits are increasing in all the countries of the Western Balkans and in some cases, such as Kosovo, Montenegro and

Serbia, they are in double digits. For the region, the current account deficit was predicted at 54.9% of GDP in 2021 and at 8.7% of GDP in 2022.

For 2023, it is expected that economic growth in the Western Balkans will decrease (by 0.3 percentage points) to 2.8%. According to the references of the World Bank, which estimates the decrease for 2023 for Albania, Bosnia, Kosovo, Montenegro, North Macedonia and Serbia by 0.3 percentage points to 2.8%, and predicts that it will continue to have high inflation in 2023. . Rising energy and food prices have driven inflation to levels not seen for many years, shrinking purchasing power and business confidence. Inflation terms in food reached 25% in Bosnia, Montenegro and North Macedonia. The Bank's expectations are that the inflation terms will be at 10.9% in 2022, remain double-digit in all Western Balkan countries with the exception of Albania, and decrease to 6.4% in 2023.

The economy of Albania inside-out approach

Starting with an analysis for Albania, we can give an overview of the economy in the year that coincides with the end of the pandemic and during the energy crisis. So first, the growth of 3-3.2% would seem acceptable in a year of stagflation at the global level, but of course it is important how the growth has come. Potential growth is definitely limited to some sectors of the economy that usually do not bring massive benefits to society. The Albanian economy experienced growth in the first quarter of 2022, which boosted private consumption, exports and investments (Bank, 2022)). Private consumption by consumers comes after a large part of income was spent on the purchase of goods and services, including here food (bank, 2022-23). For example, according to some official sources, an average family in Albania in 2020), 41.6% of consumer spending was spent on food and non-alcoholic beverages and this period was before 2022. Another thing about growth, we can say that it has grown because here financial institutions calculate everything in economic growth in value and not in quantity. If the analysis were calculated in quantity, then it would be easy and verifiable that Albanians spend a lot to consume less, as seen in the figure for trade.

Figure 1: Consumer Price Index (Unit: %)
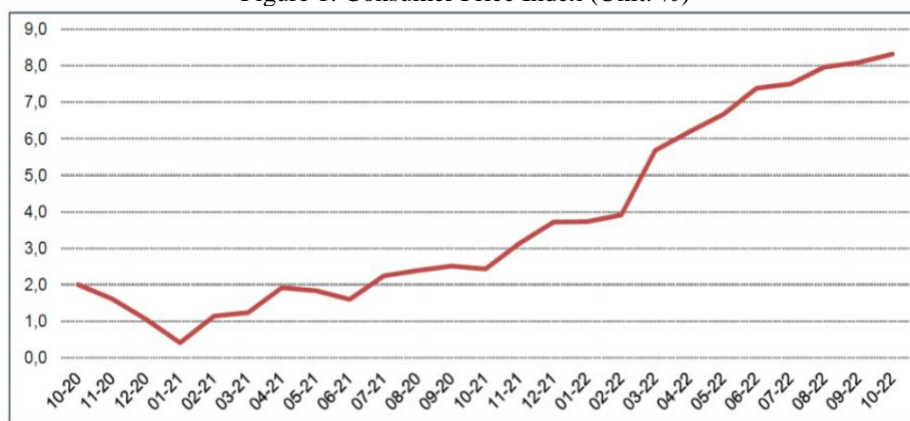
Source: INSTAT

As can be seen, there is a decrease in the volume of goods transported during the ten months of the year, both by sea and by 20.3% and 25.6%. (Trade, down over 20% this year – Only air transport with growth, especially for passengers, 2022). While we will compare exports with the value in the first ten months of 2022, it has increased by 35%, comparing it to a year ago, and while imports have increased by 23.1%, comparing it to a year ago. (INSTAT, n.d.)

In Albania, the flow and effects of increasing inflation is the increase in fuel prices. So in March, the price of oil in Albania increased to 260 lek (or 2.22 euros) per liter in the local market, reaching historical peaks, this increase was almost 35% from the end of February. The war in Ukraine significantly affected the increase in inflation levels, as never before for many years.

Inflation terms reached 8.3% in October, while this was 2.4% a year ago. These effects affected transport prices by almost 17%, followed by 14.6% in the "Food and non-alcoholic beverages" sector. Compared to a year ago, what affected and was affected more in the food category is the increase in oil prices by +27.4%; dairy foods +25%; cereals by +17%. (Consumer Price Index, Institute of Statistics., 2022)

The main concern for the different layers of the Albanian society for 60%, is their economic situation which is strongly affected by the increase in inflation and some of them can survive financially, some cannot.

And this crisis showed precisely that the effects of price increases are affecting food security as well as for families with average incomes, which spend more than half of their wages on food. Even according to the European Commission (EC), almost 69% of employees in Albania have difficulties in meeting their monthly needs, a high percentage compared to Western countries. (Monitor, 2022). The crisis has a strong connection with corruption and they feed on each other and for the year 2022 according to the "Global

Corruption Index" Albania is ranked 127th out of 196 (Profile, 2022). How big the effects of this crisis will be difficult to measure, but one thing is certain that the citizens will pay more for their living.

Another impact of the crisis seems to have caught the real estate market. Citizens no longer have the opportunity to buy a house with these interests and prices that the crisis has also affected the real estate industry. Compared to a year ago, according to the Fischer index of apartment prices, calculated by the Bank of Albania, the average price of apartments sold during the 6 months of 2022 has increased by 39%. Here we have the strongest growth of the index since a decade. (Monitor, Loans are increasing, as the monthly installments of families that have taken home loans have increased., 2022)

Energy sector

As for energy prices, they have suffered a decline with the record levels of 2022, also due to global growth and its effects. There has been a large fluctuation in prices, with large differences between energy commodities. Energy prices are expected to fall over the next two years, but remain well above their recent five-year average. Accumulated volatility is likely to have other periods of energy prices. The global recession remains the main downside risk for energy markets, which could cause a significant decrease in energy demand and lower prices.

The situation of energy crisis period in Albania

During 2022, the available electricity decreased by 5.8%. The net domestic production of electricity reached the value of 7,003 GWh from 8,963 GWh of energy produced in 2021, marking a decrease in production by 21.9%. This production was realized by public hydropower plants to the extent of 55.1%, by private and concessionary hydropower plants to the extent of 44.2% and by other producers (Photovoltaics) to the extent of 0.7% of the net domestic production of electricity. The gross import of electricity (energy in receipt) reached the value of 3,044 GWh from 2,253 GWh that was a year ago, marking an increase of 35.1%. The gross export of electricity (energy in delivery) reached the value of 2,123 GWh from 2,800 GWh, marking a decrease of 24.2% (Fig 2).

Figure 2: Available energy, net domestic production, gross import and export
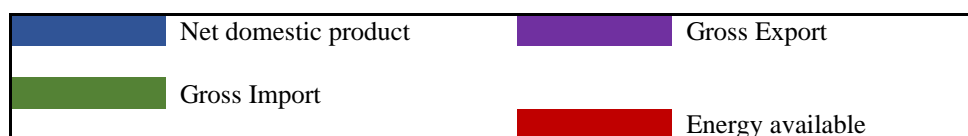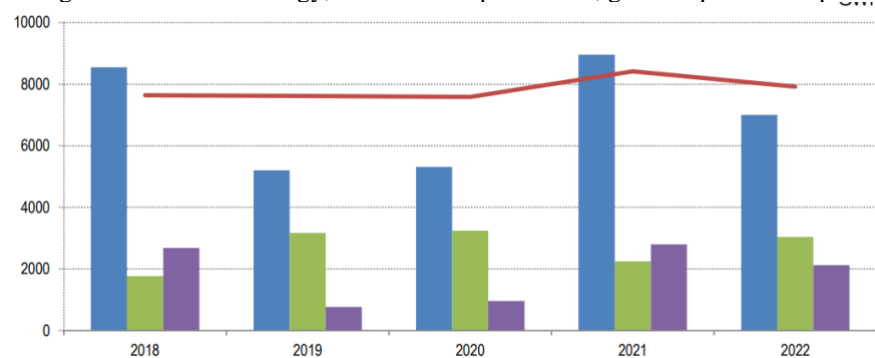
Source: INSTAT

Table 1: Balance of electric power, 2021-2022

2021	2022	Indicators
8,414,808	7,923,653	Available electricity
8,962,703	7,002,647	Net domestic production
0	0	Thermo
8,921,947	6,951,387	Hydro
5,343,974	3,858,562	Net public producers
5,392,709	3,895,093	Gross public producers

24

|		
48,735	36,531	Losses and own consumption
3,577,973	3,092,825	Independent power producers
40,756	51,260	Other producers (Photovoltaics)
2,252,548	3,043,533	Gross import (including exchanges)
2,800,443	2,122,527	Gross export (including exchanges)
8,414,808	**7,923,653**	**Consumption of electricity**
1,784,871	1,657,835	Electrical losses
227,918	199,994	Losses in transmission
1,556,953	1,457,840	Losses in distribution
1,028,670	980,012	Technical losses in distribution
528,283	477,828	Non-technical losses in distribution*
6,629,937	6,265,818	Consumption of electricity by domestic users
3,089,500	3,074,801	Households
3,540,437	3,191,018	Non households

Source: INSTAT

Public hydropower plants, in 2022, produced 3,859 GWh from 5,344 GWh produced in 2021, thus marking a decrease in production by 27.8%. Private and concessionary hydropower plants, produced 3,093 GWh from 3,578 GWh produced a year ago, marking a decrease in electricity production by 13.6%. As for the exchange of electricity (difference between export and gross import of energy), in 2022, it reached the negative value of 921 GWh, comparing it with the year 2021, where there was a positive value of 548 GWh (fig. 3).

Figure 3: Exchange of electricity

Gross Export	Gross Import	Exchange of Electricity
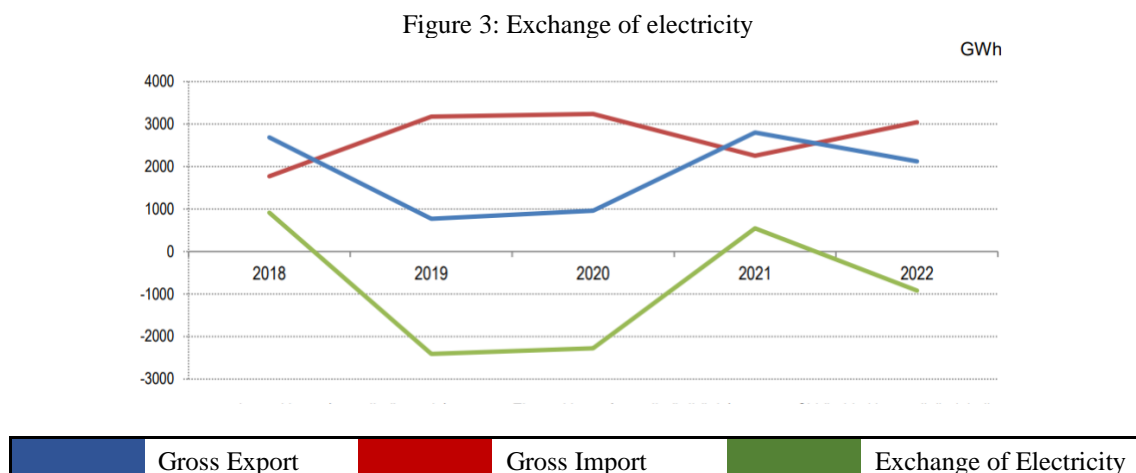
Source: INSTAT

The use of electricity by consumers, in 2022, reached the value of 6,266 GWh from 6,630 GWh that was in 2021. The use of electricity by household consumers decreased by 0.5%, reaching the value of 3,075 GWh from 3,090 GWh that was in in 2021, while the use by non-household consumers decreased by 9.9% reaching the value of 3,191 GWh from 3,540 GWh that was a year ago (fig.4). Use of electricity by consumers

Figure 4: Use of electricity by consumers
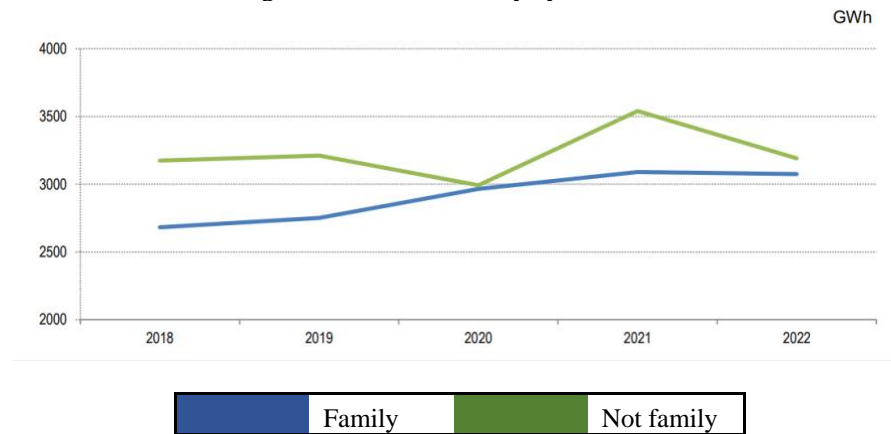
Source: INSTAT

To deal with the energy crisis situation, the Albanian government took some measures supporting for the citizens and business companies by not changing the prices in the domestic market. This came to the aid of the population and was one of the best measures taken directly by the government towards the citizens. As for the indirect impact on the business or the consumer, the energy crisis certainly affected the countries with which the trade was connected, and it included the increase in prices due to the energy crisis.

Government Response

As for the support that the Albanian government is implementing, the important reforms focus on support for equitable growth, which will increase productivity and competitiveness in the economy, create more jobs and improve governance and the provision of public services. We can say that the Albanian government, through connection and access to regional and global markets, together with export and market diversification, can help to promote the fastest growth of the domestic economy. After the aftermath of the earthquake, the pandemic and the price crisis, the government's focus is now on full recovery with special attention on tourism, agriculture and digitization. During the 2021-2022 period, the economy experienced a return to growth and full recovery to pre-pandemic levels and the revival of travel, construction and extractive industries. Also, private investments, consumption and public spending influenced growth, while public debt remained high. As for the rise in inflation, and the war in Ukraine, they threaten economic and poverty prospects going forward. On the revenue side, the Government plans to introduce a number of tax policy measures, provided for in the MTRS. The revenue gains from these measures in the short term are expected to be offset by slower growth and partly by the increase in the taxable minimum wage introduced at the end of 2022. Also, the World Bank and international institutions are cooperating to support the government in supporting these challenges and implementing the country's long-term vision.

Conclusion

The year 2022 of the economic aspect of Albania was a reality where citizens would have to be faced with a choice between food and medicine, rent and savings, as well as payment to heat with energy or not. On the other hand, the central bank increased the base rate to 2.75 percent in November in order to respond to the market. Meanwhile, growth is expected to remain restrained in this year 2023, in the context of tighter global financial conditions, the expected economic slowdown in Europe and the withdrawal of political support for reconstruction after the earthquake. We can also say that exports, consumption and investments are expected to grow at rates below those of the period before the pandemic. Inflation terms are expected to begin moving toward the 3% target by 2025. The central bank is also expected to further increase the policy rate by an additional 2-2.5 percentage points in this year 2023. Recently, we can say that the primary balance is expected to reach 0.7% of GDP only after 2023. It is expected that we will have a fiscal consolidation which will come mainly from the expenditure side. While further increases in food and energy prices are a key risk to growth, as they could affect real disposable incomes, slow poverty reduction and limit fiscal space. Knowing that Albania is a small and open economy, it is very exposed to external shocks, such as the recession in Europe or the further tightening of financing conditions in the international capital markets beyond the current year. Also, internal risks come from natural disasters, or public-private partnerships and SOEs, in addition to fiscal risks stemming from the energy sector.

In conclusion, we can say that this crisis has encouraged the growth of inequality, social exclusion and the escalation of tensions. It is essential to say that Albania was not in a strong position when it came to economic performance even before the current shocks in the economic system, so the effects were great from the pandemic crisis and the energy crisis.

References

(2022). Retrieved from INSTAT: https://www.instat.gov.al/al/temat/%C3%A7mimet/indeksi-i-%C3%A7mimeve-t%C3%AB-konsumit/publikimet/2022/indeksi-i-%C3%A7mimeve-t%C3%AB-konsumit-tetor-2022/

Aizenman. (2019). Hoarding for Stormy Days - Test of International Reserves Providing Financial Buffer Services. *National bureau of economic research*.

Albania, I. o. (2020). *Household consumption expenditures in Albania.* Retrieved from https://www.instat.gov.al/en/statistical-literacy/household-consumption-expenditures-in-albania/

Baker, S. R. (2020). HOW DOES HOUSEHOLD SPENDING RESPOND TO AN EPIDEMIC? CONSUMPTION. *NATIONAL BUREAU OF ECONOMIC RESEARCH*.

Balkans in Europe Policy Advisory Group (BiEPAG) welcomed 3 new members. (2020). Retrieved from BiEPAG: https://biepag.eu/news/balkans-in-europe-policy-advisory-group-biepag-welcomed-3-new-members/

bank, E. (2022-23). *EBRD Albania Transition Report* .

Bank, W. (2022). *Western Balkans Regular Economic Report: Beyond the Crises.* No.22.

Bieber, F., & Tzifakis, N. (2021). The Western Balkans in the World. Linkages and Relations with Non-Western Countries.

BIS. (2020). *Annual Economic Report 2020.* Retrieved from https://www.bis.org/publ/arpdf/ar2020e.pdf

commision, E. (2021). *website of the European Union*. Retrieved from https://neighbourhood-enlargement.ec.europa.eu/enlargement-policy/enhanced-eu-engagement-western-balkans_en

E, G. T. (2018). "Time for Action in the Western Balkans. Policy Prescriptions for American Diplomacy", East West Institute and National Committee on American Foreign Policy, New York, . *East West Institute and National Committee on American Foreign Policy*, pp. 1-19.

Gonzalez, & Levaggi , A. (2016). *"Towards the peripheries of the Western World: Eurasian regional policies in Latin America".*

INSTAT. (n.d.). (INSTAT, Editor) Retrieved 2022, from https://www.instat.gov.al/media/10979/press-releasess-tetor-2022.pdf

Ker-Lindsay, J., Armakolas, ,. I., Balfour, R., & Stratulat, C. (2020). *The national politics of EU enlargement in the Western Balkans.* (1, Ed.)

Monitor. (2022). Retrieved from Monitor: https://www.monitor.al/pse-ikin-69-e-te-punesuarve-ne-shqiperi-nuk-plotesojne-nevojat-mujore-rekord-ne-europe/

Monitor. (2022). Retrieved from Monitor: https://www.monitor.al/shtrenjtohen-kredite-sa-jane-rritur-kestet-mujore-te-familjeve-qe-kane-marre-hua-per-shtepi/

OECD. (2021). *"The territorial impact of COVID-19: Managing the crisis and recovery across levels of government.*

Othon, A. (2012). "Turkey's Assertive Presence in Southeast Europe: Between Identity Politics and Elite Pragmatism", in Öktem Kerem, Kadioğlu Ayşe, Karli Mehmet (eds.), Another Empire? A decade of Turkey's Foreign Policy Under the Justice and Deve. *Istanbul Bilgi University Press,* , pp. 185-208.

Profile, G. R. (2022). Retrieved from Global Corruption Index, country profile: https://risk-indexes.com/global-corruption-index/

Richter, & Wunsch, N. (2019). "Money, power, glory: the linkages between EU conditionality and state capture in the Western Balkans",. *Journal of europian public policy*, 6-17.

Ryan, H., & Gray , A. (2018). *"Beware Chinese Trojan horses in the Balkans, EU warns",.* Retrieved from politico.eu: https://www.politico.eu/article/johannes-hahn-beware-chinese-trojan-horses-in-the-balkans-eu-warns-enlargement-politico-podcast/

Salmeron, M., Adria, & García, J. A. (2020). "The debt burden of the COVID-19 crisis. *Caixa bank research*.

SCAN. (2022). Retrieved from https://scantv.al/tregtia-renie-mbi-20-kete-vit-vetem-transporti-ajror-me-rritje-sidomos-per-pasagjeret/

worldbank.org. (2020). *Publication: The World Bank Annual Report 2020: Supporting Countries in Unprecedented Times.* Retrieved from https://openknowledge.worldbank.org

Zaremba, A. (2021). COVID-19, government policy responses, and stock market liquidity around the world: A note. *Research in International Business and Finance, 26*.

List of Figures:

List of Table:

Evaluation of financial portfolio in Albanian Banking System during and after Covid-19

Lorena Bezo (Balili) [1], Ardi Bezo[2]

[1]Department of Finance, Faculty of Economy, University of Tirana, Albania*
[2] Department of Finance, Faculty of Economy, University Colleges of Business, Albania
e-mail: lorenabalili@feut.edu.al ; abezo@kub.edu.al

Abstract

The main focus of the article is to investigate the structure of the financial investment portfolio of commercial banks in Albania. The structure of the banking financial portfolio in Albania is dominated by the investment in government bonds. A downward trend can be easily seen since the second half of 2019, where the minimum point 73, 28% is reached at the beginning of 2020, which also dates to the spread of Covid-19 in Albania.

The study period includes two important moments related to the Covid-19 Pandemic and the War in Ukraine. In order to make a critical and interpretive investigation of the study, the interest rate data of treasury bills (3,6,12 months) and government bonds (2Y, 3Y, 5Y, 7Y, 10Y and 15Y with fixed income) were obtained, in order to find a connection between the amount invested in these instruments and their interest rates.

Uncertainty and increased risk during the pandemic reduced the tendency of banks to lend, shifting investments to government securities as safer investments. The evidence in the study shows an increase in the amount invested in government securities and a decrease in the amount of loans in the system. According to the results of the study, there is a stronger correlation between long-term investment instruments, compared to the shortest terms. The results showed a more stronger and positive relationship for 7-year government bonds than for other securities types.

Keywords: interest rate, pandemic Covid-19, government bond, treasure bills, risk

1. Introduction

Investment in government instruments has increased significantly in recent years by commercial banks, especially in emerging market and developing economies.

Mainly in developing countries, high investment in government securities is viewed with skepticism. The main role of banks is mainly focused on intermediation of capital for the private sector. The increase in the involvement of banks in the public debt is accompanied by a decrease in credit to the private sector, reflecting a negative correlation between them. The increase in investment pressure in public instruments comes as a result of several factors: First, the high liquidity that these instruments offer; Second, the high interest rates of instruments create pressure to increase public investment with lower risk and reducing private investment with higher risk; Thirdly, the economic performance, which is directly reflected in the private investment of loans, is accompanied by a decrease in loans when the economy deteriorates; Fourth, the role that banks play as commercial agents (dealer in the second market) for public instruments; Fifth, the regulatory authority's restrictions on bank investments towards private loans; Sixth, reducing the level of bank provisions for public instruments as their risk is lower than private sector loans. Seventh, the possibility of using government instruments as collateral in the possibility of obtaining financing from the Central Bank increases. (In Albania through REPO repurchase agreements).

According to (Gennaioli, Martin and Rossi) the latest economic theories show that banks that invest large amounts in government bonds risk the non-payment of obligations by the government, fundamentally damaging their balance sheets, causing a decrease in the level of lending, leading to a banking crisis and a decline in economic activity.

The analysis focuses on the recent European public debt crisis, but with limitations: the analysis is specific only to the European public debt crisis (Popov and Van Horen 2014)(Marco 2018), limiting the degree of its inclusion. It would be of interest to have a higher degree of inclusion by analyzing the risk of government debt default in both poor and developing countries.

(Acharya, Drechsler and Schnabl)and (Drechsler, Drechse and Marques-Ibanez) emphasized taking banks' excess risk in government bonds during the euro-zone crisis, but the generality of this trend remains to be assessed.

Commercial banks aim to mediate capital in the economy by mainly orienting their investment in loans and creating a portfolio of securities. Traditional banking relies on trading money in the private market through loan contracts. Due to the limitations that are present in the Albanian reality for the capital market, the opportunities for investment are very low. On the other hand, commercial

banks in the exercise of their activity are under the restrictive framework supported by the Basel standards. One of these restrictions, according to Basel, is related to the risk of financial instruments in which banks are allowed to invest. where commercial banks can invest. Since the final goal of the supervision activity is to limit the risk of the banking activity, the titles where these banks can invest must be of low risk. For these reasons, banks in Albania mainly focus their investment portfolio on treasury bonds and government bonds.

Given that the supervision process is bipolar in Albania, i.e. by two different authorities, the second level banks are supervised by the Financial Supervision Authority in their function as custodians of public securities stimulating the OTC secondary market and by the Central Bank of Albania. Currently, there are 10 banks that exercise this function out of 11 banks in the banking system. The presence of public securities in the investment portfolio of banks is related firstly to the purpose of the investment and secondly to the realization of the service of the commercial agent in the secondary market.

The focus of the paper will be on the first goal, that of investment. For this reason, the study seeks to achieve the following objectives:
• Investigate the structure of the financial investment portfolio of commercial banks in Albania;
• To assess the weight that government securities have to the total assets of the banking system;
• To evaluate the behavior of banks in their loans investment and government securities by analyzing the weight of government instruments/total bank loans;
• Explain descriptively if there is a correlation between the amount invested in government instruments and the performance of interest rates;
• To comment on the above results during the two most important moments of the last years, COVID-19 and the War in Ukraine.

II. Literature Review

According to the analysis of (Gennaio, Martin and Rossi), descriptive statistics show that in economies that do not result in economic failure, banks hold an average of 9% of their assets in government bonds. Whereas in countries that fail at least once, investment averages 13.5% in normal years and 14.5% during failure years. During the economic decline or failure, the risk increases by reducing the lending capacity of banks to the private sector and replacing it with investments in government instruments. A different trend is observed even among countries with different development standards. OECD countries hold an average of 8.43% of bank assets invested in government bonds and non-OECD countries hold 12.39%. In conclusion, the increase in the amount of public securities is higher in less developed countries that experience economic defaults.

(Becker and Ivashina) in their study during the years 2007-2015, found that many European firms were replacing their financing from banks towards bond issuance because banks were expanding the scale of investment in domestic public debt securities. Evidence from the study showed that the level of domestic government debt held by commercial banks in 2013 was double the amount held in 2007.

(Ongena, Popov and Van Horen) in their study found that during the euro zone public debt crisis, the behavior of domestic banks differed from foreign banks. More specifically, domestic banks and mainly state-owned banks bought more domestic public debt instruments than foreign banks. Especially at times when governments have to finance their needs with high issuance of internal debt. The holding of public debt also varies significantly between different countries, where the largest amount is found in the banking sector of Emerging Market and Developing Economies than others.

(Dell'Ariccia, Ferreira and Jenkinson) in their study over 2005-2014 years, found that public debt securities as part of total bank assets represented 7.8 percent in AE countries versus 16.8 percent in Emerging Market and Developing Economies.

(Emran and Faraz) in their study with a sample of 60 developing countries, found a negative relationship between banks' claims on public debt and credit to the private sector. They did not reveal evidence for a rebalancing hypothesis of the investment portfolio.

(Gennaio, Martin and Rossi) in their study used a sample of 191 countries, but focused more on the effects of government default on the lending activity of banks that invest a significant portion of their funds in government instruments.

III. Research Methodology

The study used official secondary data published by the Bank of Albania, the Financial Supervision Agency and the Bankers' Association of Albania. The collected data have been processed by the authors to achieve the objectives set forth in this study. The main analysis of the paper is based on the qualitative interpretation of secondary data for the period January 2016- February 2023 with a six-month frequency of the investment portfolio in government securities from commercial banks in Albania. The study period includes two important moments related to the Covid-19 Pandemic and the War in Ukraine. In order to make a critical and interpretive investigation of the study, the interest rate data of treasury bills (3,6,12 months) and government bonds (2Y, 3Y, 5Y, 7Y, 10Y and 15Y with fixed income) were obtained, in order to find a connection between the amount invested in these instruments and their interest rates.

IV. Results

In order to analyze two important moments that have affected the global economy, the Covid-19 Pandemic and the War in Ukraine, the period 2016-February 2023 has been taken into the study. To study the degree of impact that these two crucial moments had on the financial portfolio of commercial banks, in figure 1 is presented the weight of government securities in the banking investment portfolio.

According to the analysis of figure 1, is clearly seen a dominant weight of government securities inside the banking portfolio, which culminates with 83.41% in the end of 2017. A downward trend can be easily seen since the second half of 2019, where the minimum point 73, 28% is reached at the beginning of 2020, which also dates to the spread of Covid-19 in Albania, a decrease of almost 12%. Banking investment trends have remained low, mainly in lending as a result of increased global risk. After the start of the war in Ukraine in February 2022, there is a continuous decrease in the weight of government instruments in the banking investment portfolio, reaching a new minimum point in February 2023 with 72.06%. The effects of the war were transmitted to all global economies, significantly affecting all macroeconomic parameters, mainly in an increased inflation as a result of the increase in commodity prices. The sensitivity to this global risk, also experienced in the interior of the Albanian economy, is mainly evidenced in the decrease in investment in loans, being balanced by the increase in the amount of the bank's financial portfolio.

The growth of the total volume of banking financial portfolio has been higher than the growth of investment in government securities resulting in a continuously declining indicator since the COVID-19 Pandemic and the War in Ukraine. This is evident in figure 2, in which a continuous increase in the share of investment in government securities to total banking assets is observed. The upward trend is finalized with the highest value in December 2022 with a weight of 26.57% from 23.1% that was in December 2016. So a significant increase of 15%. In contrast to the evidence of other economies, during normal and stable periods, banks' holdings of government bonds are around 9% of assets and during unstable periods they hold slightly higher amounts. (Gennaio, Martin and Rossi).
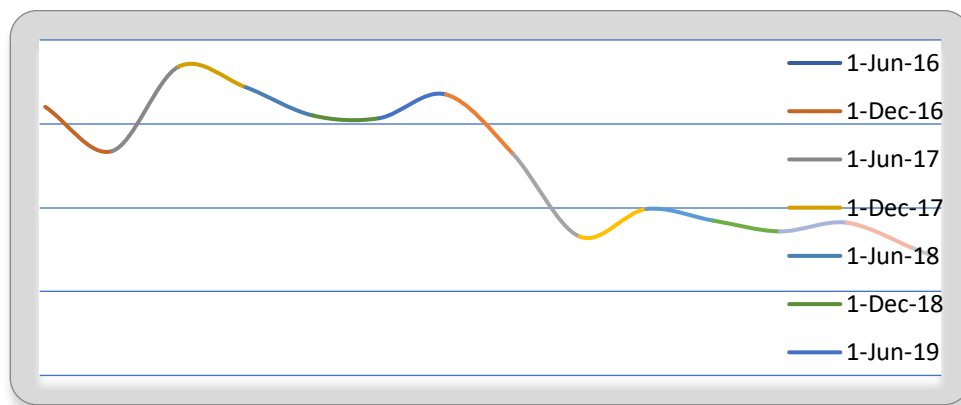

Figure 5: The weight of government securities in the banking investment portfolio
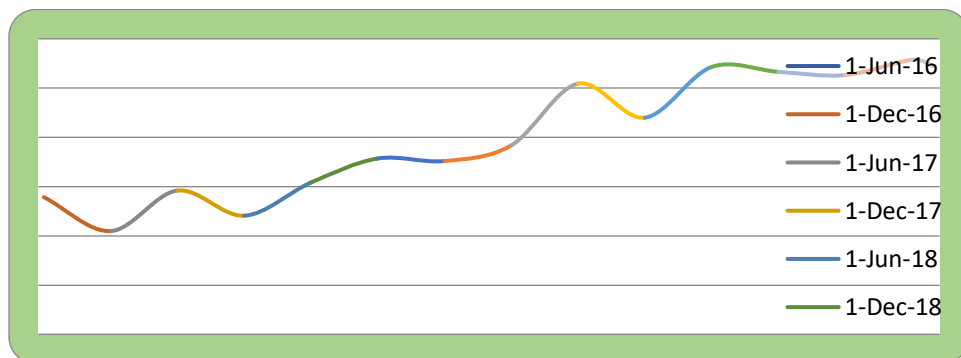*Source: (Bank of Albania) Author's calculation*

Figure 6: The weight of government securities to total banking assets
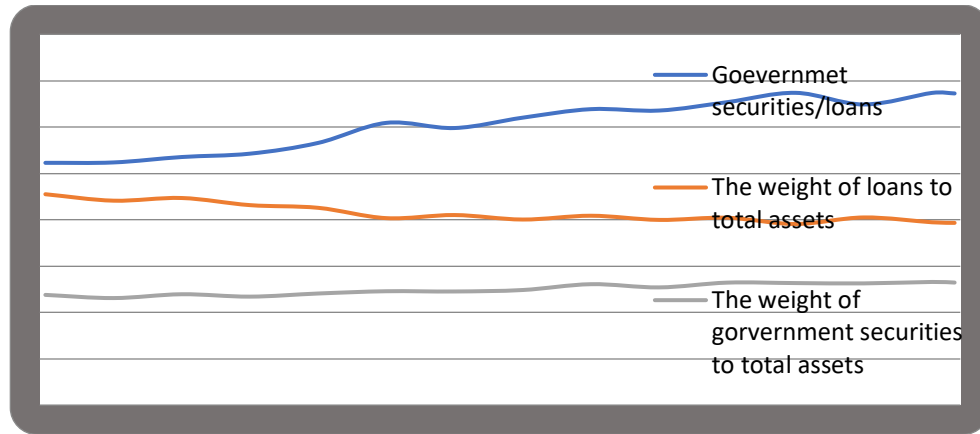*Source: (Bank of Albania) Author's calculation*

Figure 7: Government securities/loans ; The weight of loans / total assets ; The weight of government securities/ total assets
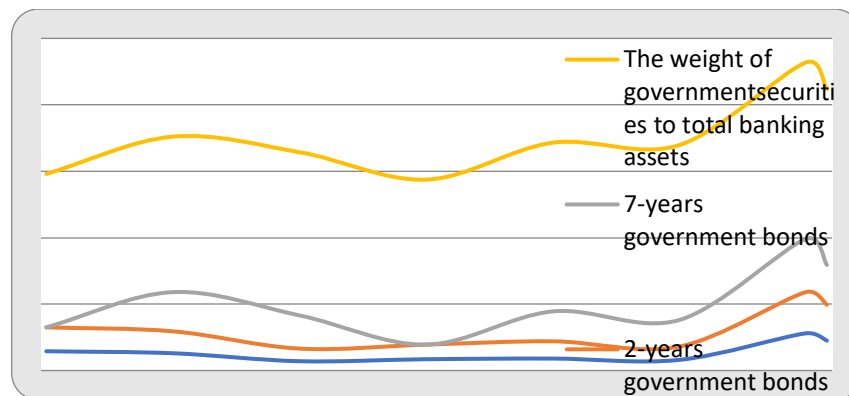*Source: (Bank of Albania) Author's calculation*

Figure 8: The relationship between the performance of interest rates and the amount invested in government bonds
Source: (Bank of Albania); Author's calculation

Figure 3 presents the weight of government securities /total loans in the Albanian banking system. An upward trend is observed, culminating in December 2022 with 67.36%, indicating an increase in the amount invested in government securities and a decrease in the amount of loans in the system. This is confirmed by the other two graphs; the weight of loans to total assets which has decreased and the weight of government to total assets which has increased. Uncertainty and increased risk during the pandemic reduced the tendency of banks to lend, shifting investments to government securities as safer investments.

In order to study the relationship between the amount invested in government securities and the performance of the interest rates of these securities, is presented figure 4. The study tested 3, 6, 12 month T-Bills and 2, 3, 5, 7, 10 and 15 year government bonds against the amount invested in government securities/total banking assets.

In Figure 4, 15-year bonds have been eliminated since they were issued for the first time in November 2021, 10-year bonds were issued less frequently during the study period, 3- and 6-month T-Bills show a weaker relationship with the weight invested in securities governmental. Other public instruments are included in the above figure. According to the illustration, there is a stronger correlation between the most long-term investment instruments, that is, for 7-year government bonds, than for the most short-term instruments. This proves a positive relationship between the amount invested and the performance of yields, mainly in long-term securities. The main reason is related to the higher interest of commercial banks to have long-term government securities in their financial investment portfolio since their yield is higher than short-term securities. The volatility of the 7-year bond yield is more reflective of macroeconomic effects as a result of the longer duration compared to other securities.

The main reasons for the increase in investment in public bonds in Albania are: the increase in the time structure of public bonds up to 15 years has made the most long-term treasury instruments an investment that competes with credit; the standards of capital requirements against asset classes has increased the pressure on banks to direct their capital towards assets with lower risk; the third: the returns brought by investments in public bonds are higher than the costs of raising funds, ensuring a positive spread and high liquidity.

Conclusions:

Commercial banks aim to mediate capital in the economy by mainly orienting their investment in loans and creating a portfolio of securities. Traditional banking relies on trading money in the private market through loan contracts. Due to the credit and the liquidity risk that these contracts have, banks direct part of their capital towards financial securities. This is because investing in these securities offers the possibility of positive returns and liquidity.

The structure of the banking financial portfolio in Albania is dominated by the investment in government bonds conditioned by: the lack of the capital market in Albania; the restrictive framework applied by the Bank of Albania for the risk profile of banking investment; the trading agent role that commercial banks have for government securities in the OTC secondary market.

Banking investment trends remained low during the period of study, mainly in lending as a result of increased global risk. After the start of the war in Ukraine in February 2022, there is a continuous decrease in the weight of government instruments in the banking investment portfolio, reaching a new minimum point in February 2023 with 72.06%.

The study show a continuous increase in the share of investment in government bonds to total banking assets. The upward trend is finalized with the highest value in December 2022 with a weight of 26.57% from 23.1% that was in December 2016. So a significant increase of 15%. These results vary significantly from the evidence of other economies, during normal and stable periods, banks' holdings of government bonds are around 9% of assets and during unstable periods they hold slightly higher amounts.

Uncertainty and increased risk during the pandemic reduced the tendency of banks to lend, shifting investments to government securities as safer investments. The evidence in the study shows an increase in the amount invested in government securities and a decrease in the amount of loans in the system.

According to the results of the study, there is a stronger correlation between long-term investment instruments, compared to the shortest terms. The results showed a more stronger and positive relationship for 7-year government bonds than for other securities types. The main reason is related to the higher interest of commercial banks to have long-term government securities in their financial investment portfolio since their yield is higher than short-term securities.

References:

Acharya, V., Drechsler, I., & Schnabl, P. (2014). A Pyrrhic Victory? Bank Bailouts and Sovereign Credit Risk. *The Journal of Finance , 69* (6), 2689-2739.

Bank of Albania. (n.d.).

Becker, B., & Ivashina, V. (February 2018). Financial Repression in the European Sovereign Debt Crisis. *Review of Finance , 22* (1), 83–115.

Dell'Ariccia, Ferreira, G., Jenkinson, C., Laeven, N., Martin, L., Minoiu, A., et al. (2018). *Managing the sovereign-bank nexus.* IMF Departmental Papers.

Drechsler, I., Drechse, T., Marques-Ibanez, D., & Schnabl, P. (2014). Who borrows from the lender of last resort? *Journal Finance*

Emran, M. S., & Faraz, S. (2009). *Lazy Banks? Government Borrowing and Private Credit in Developing Countries.* The George Washington University, Institute for International Economic Policy.

Gennaio, N., Martin, A., & Rossi, S. (October 2018). Banks, government Bonds, and Default: What do the data Say? *Journal of Monetary Economics* , li a, b, a.

Gennaioli, N., Martin, A., & Rossi, S. (2014). Sovereign default, domestic banks, and financial institutions. *The Journal of Finance , Vol. 69* (2), 819-866.

Marco, F. D. (2018). Bank Lending and the European Sovereign Debt Crisis. *Journal of Financial and Quantitative Analysis , 54* (1), 155 - 182.

Ongena, S., Popov, A., & Van Horen, N. (2016). *The Invisible Hand of the Government: Moral Suasion during the European Sovereign Debt Crisis.* Netherlands Central Bank, Research Department.

Popov, A., & Van Horen, N. (2014). Exporting Sovereign Stress: Evidence from Syndicated Bank Lending during the Euro Area Sovereign Debt Crisis. *Review of Finance , 19* (5), 1825–1866.

List of Figures:

Specific challenges for a sustainable nautical tourism

D. Gračan[1], M. Uran Maravić[2], R. Agbaba[3]

[1] Department of Tourism, University of Rijeka, Faculty of Tourism and Hospitality Management, Croatia*
[2] Department of Tourism, University of Prinorska, Faculty of Tourism studies, Slovenia
[3]Department of Tourism, University of Rijeka, Faculty of Tourism and Hospitality Management, Croatia
[*]Corresponding Author: e-mail: danielag@fthm.hr

Abstract

Aims of the research point out the existence of various external changes and changes in the environment, which have led in a positive or negative way to changes in the impact and trends in nautical tourism, but also to changes in the behaviour of tourists. Purpose of the paper is to identify those changes that have the strongest effect on the impact of nautical tourism. In this paper, nautical tourism is the focus of the research.

The following theoretical and empirical research goals have been defined: to analyse the economic, environmental and social impacts of nautical tourism and identification, analysis of the exogenous changes that caused but also influenced these impacts and analyse the exogenous changes that are most pronounced in these evolving and very challenging moments, as well as the growing importance of digital technologies, digital business models and smart tourism technology. In addition to analysing the most pronounced exogenous changes, the paper aims to identify those changes that have the strongest effect on the impact of nautical tourism, so that they can be managed in the future and prepare adequately for the consequences. The paper reports on the research, includes suggestions for the future research and provides information about any identified limitations during the research process.

The paper will highlight the context in which the exogenous changes have left their mark on nautical tourism and will reveal changes in the impact of nautical tourism. The paper will explore specific challenges for sustainable nautical tourism. Taking into account current exogenous changes, the proposed research will improve theoretical knowledge and provide a deeper understanding of the impacts of nautical tourism, the results of which will serve as a basis for decision-making in tourism management.

Keywords: sustainable tourism, sustainable nautical tourism, specific challenges, impacts of nautical tourism

1. Introduction

Tourism activities are linked to the interaction among human beings, beginning with a physical movement of a person from a habitually-frequented environment to one or more destinations. With rapid industrialization, the current social system is facing a variety of situations that deplete resources, pollute the environment and generate large amounts of waste. Excessive destinations dependence on tourism, as a primary economic activity, make them more vulnerable to global negative effects.

Acknowledging the current global changes and trends in the tourist market, we are witnessing existence of various external changes. The tourism industry is also sensitive to external disasters and the deterioration of the tourism product. Some of the exogenous changes have been present for many years and all tourism stakeholders have been warned of their impact. These are mainly the effects of excessive tourism development through the usurpation of the most sensitive and often attractive tourist areas, environmental degradation, pollution, waste management, ozone holes, global warming and others. On the other hand, strong exogenous changes are occurring due to the development of digital technologies and the accompanying digital business transformation, which register a strong impact on various aspects of tourism.

In this paper, nautical tourism, as relatively new multidisciplinary tourism activity is in the focus of the research. Coastal and maritime tourism are the largest maritime activities in Europe with almost 3.2 million people employed. They generate a total of € 183 billion in gross value added and represent over one third of the maritime economy. This paper analyses the effects on nautical tourism with special emphasize on the environment. The crisis situations that occur in the maritime industry are high-energy consumption, high water pollution and increased port production. All of this have led to changes in the impact and trends in nautical tourism, but also to changes in the behaviour of tourists. Pollution created by vessels, in addition to disrupting the natural ecological

balance, also encourages climate change, therefore, ecological restoration measures can help improve the quality of the environment on land and in water. The goal of the paper is to determine which exogenous changes attack the nautical tourism, which ones occur most often and what are their causes. Also, the aim is to present possible solutions to such situations, applying to a greater extent to the principles of sustainable development.

The main goal of the paper is to uncover and illuminate the context, which exogenous changes have left their mark on nautical tourism and will reveal changes in the impact of nautical tourism. The main research question is: How are the impacts of nautical tourism influenced by exogenous changes? Understanding the impacts of tourism is important for finding ways to manage these impacts satisfactorily (Getz & Page, 1997). This paper will research specific exogenous changes that are undoubtedly taking place and observe their impacts, particularly in the context of nautical tourism development. The overarching aim is not only to reduce the ecological footprint of the nautical tourism, but also to modify the behaviour of the "users", increasing personal and social awareness.

2. Overview of previous research

The tourism impacts have been scientifically analysed from different aspects, including theoretical concepts and quantitative papers, the analysis of which preceded the conception of this paper. There has also been previous research focused on impacts of certain types of tourism of particular interest, such as nautical tourism, which is the subject of this paper (Brida & Zapata, 2010; Brida, Del Chiappa & Abbate, 2013; Del Chiappa, Lorenzo-Romero & Gallarza, 2016; Del Chiappa, Meleddu & Pulina, 2012; Brida, Del Chiappa, Meleddu & Pulina, 2012b; Brida, Del Chiappa, Meleddu & Pulina, 2012c; Brida, Del Chiappa, Meleddu & Pulin 2014; MacNeill & Wozniak, 2018). According to Brandano's (2015) classification, tourism impacts include four different approaches: 1) macroeconomic, which considers the impacts of tourism on economic variables, 2) microeconomic, which is based on variables at the level of individual sectors or destinations, 3) resident-based approach, which examines residents' perceptions related to tourism impacts is investigated, and 4) interdisciplinary approach, which considers the impacts of tourism in relation to various activities that are not directly related to tourism.

Nautical tourism in Croatia is an important factor for the tourism development and the Croatian economy. There are untapped potentials that with a good development plan and strategy can grow and enable Croatia to compete with other Mediterranean countries by offering them to potential users. Investments in infrastructure are very important to maintain economic activity in times of crisis, thus promoting the sustainable development of the country. The Croatian ports of nautical tourism generate an annual income of about 95 million euros, of which the largest part, in some cases more than 70%, comes from revenues from berthing fees. The Croatian Adriatic coast is 1777 km long and occupies the largest part of the eastern coast of the country. The total length of the coastline with islands is three times larger and amounts to 5,835 km, which is about ¾ of the total Adriatic coastline. In addition to the increase in total seasonal tourism, nautical tourism is expected to be a long-term source of income and one of the driving forces for the expansion of the tourist offer in the early and late seasons (Ivanić, Perić Hadžić & Mohović, 2018). The importance of nautical tourism for the economic development of the country is also reflected in the high multiplier effect, which makes it one of the most competitive Croatian products in the world. It is a selective form of tourism, which ensures a minimum of 180-210 business days per year, while the turnover of invested capital is much more dynamic compared to hotel capacities. Nautical tourism is also considered one of the most dynamic forms of leisure tourism. With its multiplicative effects, it contributes to a richer and more diversified quality of life, urbanization, and spatial design, opening the way to other effects directly or indirectly related to the general tourist humanization of space. The consumption of boaters, especially foreign ones, has numerous direct and indirect effects on individual economic entities and the state in general. In addition, construction companies, shipbuilders and other industries are involved in the construction of ports for nautical tourism, selling their products to boaters and offering them gastronomic and commercial services (Jugović, Kovačić & Hadžić, 2011).

Social impacts are understood as behavioural changes (Spaapen et al. 2011; Assessment, 1995). For Vanclay (2002), social impacts reflect the changes people experience in their lifestyles, cultures, communities, political systems, environments, health and well-being, personal and property rights, and fears and aspirations (Lora, 2020; Fox, 1977). There is a large body of literature that accuses the tourism industry of negative social and cultural impacts, such as cultural change, increased crime, increased begging and gambling, displacement of locals through rising prices and sometimes forced displacement, immigration of outsiders, devaluation of local language and culture (Deery et al. 2012; Easterling 2004; Wall & Mathieson, 2006). Tourism is also credited with positive outcomes, such as expanding international peace and understanding, strengthening heritage and culture preservation, breaking down religious, racial and linguistic barriers, and increasing appreciation of one's culture (Wall & Mathieson, 2006). As for the social aspect of nautical tourism, its contribution is seen in the transmission of information, knowledge, culture and lifestyle. In this way, nautical tourism makes a significant contribution, as its foreign boats and yachts and their equipment attract the local population,

encouraging the development of ideas, creativity and free thinking. The influence that nautical tourism exerts on the general development of an area or a country in social terms concerns in particular the education of young people. From the point of view of the host country, nautical tourism represents an important source of foreign exchange earnings, considered as a special form of export, so-called invisible export (Jugović, Kovačić & Hadžić, 2011).

Environmental impacts refer to changes in the biological, physical, or chemical state of the environment that determine the quantity and quality of ecosystems and eventually affect human health and socioeconomic performance (Kristensen, 2004). Tang (2015) asserts that understanding the relationship between tourism and the environment is important because of the complex interaction of environmental impacts generated by tourism. According to Rizal et al. (2020), environmental impacts need to be monitored and considered as a basis for decision-making on the readiness of a tourism development. According to Arintoko et al. (2020), some research results show that environmental impact is considered as a factor to measure sustainable tourism (Lee et al., 2013; Lundberg, 2015; Vargas-Sánchez et al., 2009; Diedrich, García-Buades, 2009). Mangwane et al. (2019) suggest that in order to maintain sustainable tourism, local communities must engage in responsible tourism initiatives and practise responsible tourism ethics during the management and operation of their tourism enterprises (Setokoe, 2013). In a study by Costa et al. (2020) on tourism impacts and residents' perceptions, the results showed that residents have positive attitudes towards economic, as well as cultural, social and environmental impacts. The study also emphasizes differences in attitude depending on age, gender and professional activity (Ludic et al., 2020).

Tourism was among the first activities that undergo a process of digital transformation due to its specific characteristics - such as the intangible nature of products, no possibility of trying before purchase (Henama, 2018), geographical distance at the time of purchase, information-intensive selection and decision-making process (Crnojevac et al., 2010), etc. Such characteristics make tourism very suitable for the use of digital technologies and for the development of related digital business models with the aim of creating additional value. In the further transformation process of tourism, which will continue in the near future, new technologies and digital business models are expected to continue to play an important role (Mihalescu et al., 2016). In order to determine impacts of nautical tourism, i.e. considering the main aspects of economic, social and environmental impacts, a sustainable tourism destination model was developed (Shafiee et al., 2019). Its theoretical part is used to determine the impact of exogenous changes on selected elements of the model. To date, no scientific article on nautical tourism has been found in which this model has been tested. For this reason, the scientific contribution of this paper is reflected in comprehensive research results on this topic, which will also serve as a basis for further research.

3. The analysis of nautical tourism in Croatia

Nautica is one of the best positioned tourism products on the market in Croatia. Thanks to a very attractive and indented coastline with more than a thousand islands, favorable conditions for sailing during a large part of the year, quality tourist infrastructure and a long tradition of nautical tourism, this segment of the offer is developing rapidly and Croatia is now one of the best European and world destinations for sailors. The above growth has been highlighted especially for the nautical charter until 2019, when the beginning of the pandemic COVID-19 caused a significant decrease in demand (Croatian tourist board, 2020).

Table 1. Model of nautical tourism classification according to the principle of basic activities (after 2019)

1. SECONDARY ACTIVITIES	BASIC TYPES AND SUBTYPES OF NAUTICAL TOURISM				2. SUPPLEMENTARY ACTIVITIES
	NAUTICAL TOURISM INDUSTRY				
Diving tourism	**Doing business at the port of nautical tourism and port - related activities**		**Cruising**		Dry dock
Surfing	Nautical tourism ports	Charter	Small shippers (local cruising)	Ports for receiving large cruisers	Shipbuilding of mega yachts
Rafting	Anchorage	Motor boats with and without skipper	Day trips	a) Large city ports	Production of small vessels
Submarine	Mooring	Sailing boats with and without skipper	Multy-day excursions with accommodation service	Cruise Europe members	Production of equipment
Rowing	Marinas, by category			Non members	Skipper service
Fishing tourism				b) Other small local ports	Information service
Robinson tourism					Sailing schools
Lighthouse tourism					Research institutes and educational centres
Others					Other services

Source: Luković, T., Piplica, D., Hruška, D., 2021. Argument for Evidence-Based Development of Sustainable Normative Framework for Nautical Tourism Ports: Case of Croatia, *Transaction on maritime science*, pp. 1-11.

According to the State Statistics Office, in 2021, 183 ports were active in the field of nautical tourism in Croatia. In the period from 2016 to 2020, the number of ports has increased continuously, while in 2021 decreased from 185 to a total of 183 ports. In the structure of ports for nautical tourism, most are marinas (47%), followed by anchorages (45%), while the least are berths (8%). Most of the ports for nautical tourism are located in the area of Dalmatian counties (more than 70%), while slightly less than 30% of marinas are located in the area of other Adriatic counties. As of August 31, 2019, a total of 18,942 connections were registered in Croatia. On the same day, after two years, 14,805 vessels were registered at fixed berths, of which 81.3% were moored at sea. Of these, 44% of vessels were registered under Croatian flag, 16% under Austrian flag and 17% under German flag.

Analyzing the nautical traffic on the territory of Croatia, in the last year before the 2019 pandemic, 538 thousand arrivals and 3.56 million overnight stays were recorded in the nautical charter, which in the circumstances of the time represented 2.7% of commercial arrivals and 3.7% of commercial overnight stays at the national level. In the pandemic, nautical charter traffic has been declining, although lower than the average of all accommodation capacity combined, reaching 87% of 2019 traffic by 2021. At the same time, nautical charter traffic has maintained a stable share of total commercial traffic at the national level. The structure of total arrivals and overnight stays in nautical charter traffic in 2021 shows the strongest concentration of traffic in the area of Split-Dalmatia, Zadar and Šibenik-Knin counties. Looking at the nautical charter market, Germans, Austrians and Britons were the most numerous guests in the nautical charter segment in terms of overnight stays in the last year before the pandemic, while the domestic market ranked fifth in terms of overnight stays. In 2020, the pandemic leads to a significant change in the ranking of the main nautical charter markets, but in 2021 the situation is partially consolidated and demand from certain markets returns after a one-year decline (e.g., U.S.).

The pandemic resulted in an increased focus on demand during the summer months, as numerous restrictions prevented travel at all during much of 2020 and 2021. Despite the generally unfavorable circumstances, sea charters made an above-average contribution to Croatian off-season results (Croatian tourist board, 2021).

4. The challenges of nautical tourism

Coastal and maritime tourism have become one of the most important growth areas of tourism. This type of tourism includes many recreational activities which involve travel away from one's place of residence which have as their host or focus the marine environment and/or the coastal zone. However, the overcrowding of coasts and the exploitation of their natural resources call into question the sustainability of this sector. Environmental degradation threatens the prosperity of many coastal towns and villages, affecting their wealth, authenticity, and cultural traditions, and undermining their attractiveness as destinations. These challenges are also exacerbated by business fragmentation, difficulties in accessing finance and investment, and by environmental pressures.

Figure   1.   Challenges for coastal
and   maritime   tourism
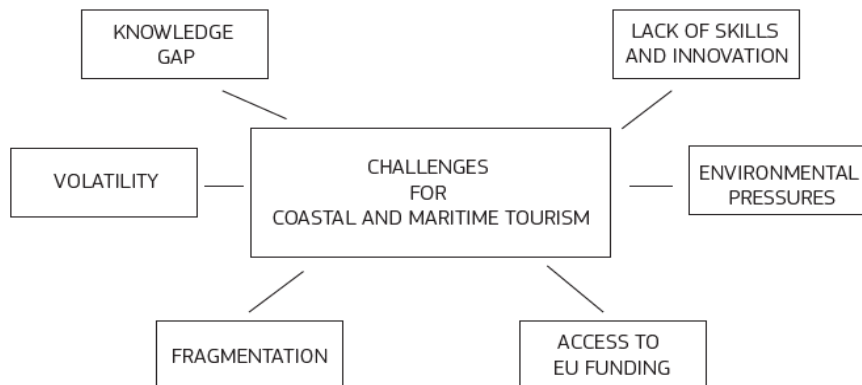
Nautical tourism emerges as a strategic ally of society to highlight the value of the natural and cultural resources of coastal areas. Activities such as sailing, surfing, kayaking, scuba diving, or snorkeling, are highly dependent on well-maintained landscapes and healthy marine ecosystems. Nautical tourism is a strategic means of transmitting values that connect people to nature and sport, and has a very positive educational impact on both visitors and local communities. It is not free of environmental impacts and its ecological footprint needs to be well managed and reduced. Because it has both environmental benefits and environmental burdens, it is in a privileged position to lead the way to sustainability, bringing together public administrations, businesses and civil society in a shared commitment to the sustainable development of coastal communities. It can improve the quality of tourism and help preserve the integrity of the coast while taking advantage of the opportunities offered by the so-called "green economy" (FEDETON).

The uncontrolled and ill-conceived construction of marinas for nautical tourism and associated infrastructure and superstructure in an area that is sensitive by nature often leads to a complete loss and devaluation of the aesthetic value of the landscape. Great care must be taken in the use of coastal space when constructing marinas, so the law should restrict commercial construction in environmentally sensitive areas. Nautical tourism is the biggest user of the waters and, if it wants to develop successfully, it must become the biggest promoter of environmental protection. At the same time, a strong concentration of ports for nautical tourism on a narrow coastal strip must be avoided, as marine pollution is more difficult to control. Ports and their construction in natural parks (Kornati, Pakleni otoci, etc.) are particularly dangerous for the environment, as they can pollute the natural environment. Due to the distance from the supply points and the lack of municipal infrastructure, they can have difficulties in supply and cause problems in the preservation of the natural environment. Uncontrolled sport fishing and various other underwater activities can pose a threat to biological life, especially shellfish and historical-cultural treasures in the sea (Kovačić, 2003).

Nautical tourism develops mainly due to the demand of foreign tourists, which refers to the establishment of berths in marinas and tourist ports, but also to the demand for accommodation of vessels in dry marinas. This demand inevitably leads to a higher environmental impact for several reasons. First, the technical and technological equipment of tourist ports doesn't fully meet current and future needs, while marinas are not adequately equipped to receive sanitary water from boats and even some of the existing marinas do not have adequate equipment. Second, certain quantities of mineral oils that enter the sea during regular maintenance of marine engines or accidental spills enter the sea as a specific element of pollution. When some of the foreign boats change oil, the amount of waste oil entering the sea increases dramatically. Thirdly, the presence of toxic substances exuded from underwater antifouling paints of ships is a specific pollution. Due to disruptions and losses in the farming of edible shellfish in the countries of northern Europe and North America, strict criteria have been established for the application and use of these coatings for large vessels only (Kovačić, 2003).

As stated in the paradigm of sustainable development, further development of nautical tourism should be shifted from the destruction of space by its uncontrolled construction to systematic and targeted development planning (Kovačić, 2003). Sustainable development implies undertaking actions in the area of production and consumption that provide ecologically efficient alternatives, reduce

pressure on ecosystems, and promote the conservation of natural heritage and biodiversity. It involves innovation in the design and marketing of less environmentally damaging nautical products and services, creating environmental awareness among boaters, and motivating consumption habits that incorporate environmental concerns into their purchasing decisions. Both destination managers and the business people who deliver content to these areas have a key role in shaping nautical destinations. Progress in implementing concrete measures that contribute to the sustainability of nautical destinations therefore requires the active engagement of all relevant stakeholders (FEDETON).

5. How to effectively reduce negative effects in nautical tourism?

In comparison with Italy, France and Spain, the development of nautical tourism in Croatia is lagging behind. Through positive and negative consequences of the development of nautical tourism in these countries, especially on the economy and the environment, Croatia can see its own direction of development (Kovačić, Gržetić & Bosković, 2011).

Maritime transport infrastructure, which includes nautical tourism ports, supports the maritime transport system and is the physical basis for providing all necessary services for the functions of the system. However, in addition to the propulsive development of nautical tourism, arises the question how to effectively implement environmental pollution control and evaluation of green development, while the size and business performance continue to grow rapidly? How to effectively implement ecological standards and reduce negative effects in nautical tourism? Protecting and improving the quality of existing natural, ecological, cultural-historical, coastal, and marine resources is the responsibility of everyone involved in the system of planning and managing those resources (Kovačić, Gržetić & Bosković, 2011).

Nautical tourism can be affected by a number of climate change related impacts (e.g. flooding, erosion, saltwater intrusion, increase in temperatures and periods of dry/drought) that can have direct and indirect effects on coastal and maritime tourism. The examples of exogenous changes in nautical tourism are climate change and the acidification of oceans that change marine ecosystems. The protective functions of the world's coastal habitats are rapidly deteriorating from overdevelopment and climate change. Climate change affects shellfish aquaculture (Beck et al., 2017). Deoxygenation disrupted the balance of marine life and reduced the habitat of commercial fish species. Increasingly frequent floods, erosions, embankments and saltwater intrusions are affecting coastal habitats, people, important infrastructure and tourism, with significant losses for national economies. Coral reefs are one of the most sensitive ecosystems to climate change, mainly because corals are very sensitive to temperature fluctuations and because ocean acidification interferes with the calcification process that forms the basis for reef formation. Green creations as defence systems can help mitigate hazards, provide protection, and manage resources related to other ecosystem services. This includes the possibility of forcibly sanctioning prohibited pollution and the intervention of the competent authorities in order to limit the damage caused by incidents.

According to Jerebić and Pavlin (2018), other key factors that will shape the demand trends in the nautical tourism are overcapacity, global market fluctuations, emerging markets, sustainable development and environmental awareness, new technologies, transparency and customer support. Among them, overcapacity seems to be a major problem. Despite the increased risk to coastal infrastructure from rising sea levels, the human population growth rate is the highest in coastal areas (Beck et al., 2017). At the same time, the increase in tourist traffic has a negative impact on the environment.

Renewable energy provides the new opportunities for nautical tourism (Alison et al., 2014). The technology encompasses hybrid vessels that combine renewable energy and fossil fuel power, according to their own construction design of non-fossil fuels, where each has its advantages and disadvantages. The question arises due to the economy of the production of such fuels, as opposed to the costs of importing fossil fuels. Solar energy has the potential as an aid to other fuels, but is not advanced enough to provide the primary startup of that wind energy, which has also been shown to have strong potential in various implementations. Hybrid boats, as a combination of multiple energy sources, offer the best. The oil crisis of the late 1970s resulted in a small number of critical experiments and the results showed great savings in fuel use and improved ship performance, from known and available renewable energy technologies.

A green port system according to which the focus should be on monitoring energy consumption and pollutant emissions, innovation of scientific research technologies and the development of a green port scheme to deepen the concept of green development and improve energy conservation and environmental capacity (Bai et al., 2019). The 'Green Harbor' initiative was officially proposed at the 2009 United Nations Conference on Climate Change. The results of the research have contributed to the new fields of energy

application, intensive use of resources, control and promotion of pollution of ships and ports, and the organization for green transport. The authors proposed a list of measures that include fluid management of pollutants and air pollution, noise control, low carbon emissions and energy savings, and conservation, organization and management of marine biology. The concept of green development includes systematic planning of the green port, formulation and implementation of development plans, green development publicity and education, planned training and journalistic activities. Key indicators within the concept are following: structure of energy consumption, use of resources for conservation and recycling, prevention and control of pollution of port areas, ecological renewal of ports and environmental management, Green Transport Organization, energy conservation and environmental protection of ports. Ecological renewal of ports and landscaping is conceived through the actual effect of landscaping in the green area of the port.

The Mediterranean countries are successful in the development of nautical tourism, which includes an orientation to the socio-cultural aspect of development. The planning and design of the construction of ports for nautical tourism and their organization within the institutional norms that determine the rules and possibilities of long-term development were considered especially at the end of the 20th century. The best results were achieved in France and Spain, thanks to the system of concessioning and legislation that supports investments in nautical tourism ports (Kovačić, Gržetić & Bosković, 2011).

In all this, the role of management is extremely important, which must become more flexible, better in anticipating and responding to sudden situations and be able to facilitate change where it is desired, through a range of technological, economic, communication and management solutions. This includes understanding human behaviour under stress, using emerging technology to better identify and protect exposed areas, ensuring connectivity of relevant sides, and the ability to respond constructively to emergencies and surprises. By reducing the risk of disasters, developing an adequate warning system, timely detection of potential hazards and high-level communication, there is less possibility of negative consequences that any incident situation may cause. Adoption of existing practices, through accumulated knowledge and formulation of action plans, are prerequisites for achieving flexibility of tourist destinations and their preparedness for future crisis situations.

6. Conclusions

Thanks to the attractive coastline with many islands, nautical tourism represents an authentic and highly recognizable tourism product of Croatia. Croatia has ideal conditions for the development of nautical tourism thanks to a number of advantages, such are protected ports, favorable geographical location, preserved nature and clean seas. However, nautical tourism has not yet reached the level of quality that corresponds to the available resources. Its further development should focus on spatial and environmental objectives that ensure quality spatial planning and sustainable development of nautical tourism without compromising the fundamental values of natural resources, emphasizing in particular the importance of preserving the environment.
Respecting the principles of sustainable development as one of the most important external factors, nautical tourism can establish models and development plans that allow efficiency not only in the implementation of business processes, but also in the framework of environmental protection and protection of living standards. An example of this are the ports for nautical tourism in the developed European countries, which are very flexible and adaptable to the changes in the environment. These processes are also visible in the Croatian ports of nautical tourism through the introduction of computerization, automation, individualization and internationalization of the offer and services. It can be concluded that the nautical requirements include an offer adapted to each individual sailor, which means that the marketing approach, the principles of sustainable development and economic profitability are taken into account in further development planning.

References

Alison, L., Alison, E., Noone, G., Elntib, S., Waring, S., & Christiansen, P., 2014. The efficacy of rapport-based techniques for minimizing counter-interrogation tactics amongst a field sample of terrorists. *Psychology, public policy, and law,* Vol. 20, No. 4, pp. 421-430.

Assessment, S. I., 1995. Guidelines and principles for social impact assessment. *Environmental Impact Assessment Review*, Vol. 15, No. 1, pp. 11-43.

Bai, X., Acharya, K., 2019. Removal of seven endocrine disrupting chemicals (EDCs) from municipal wastewater effluents by a freshwater green alga. *Environmental Pollution*, Vol. 247, pp. 534-540.

Beck, H. E., Vergopolan, N., Pan, M., Levizzani, V., Van Dijk, A. I., Weedon, G. P., ... & Wood, E. F., 2017. Global-scale evaluation of 22 precipitation datasets using gauge observations and hydrological modeling. *Hydrology and Earth System Sciences*, Vol. 21, No. 12, pp. 6201-6217.

European Commission, 2014. *European Strategy for more Growth and Jobs in Coastal and Maritime Tourism* http://ec.europa.eu/maritimeaffairs/policy/coastal_tourism/index_en.htm

European Federation of Nautical Tourism Destinations (FEEDETON). *European Manifest for Sustainable Nautical Tourism* http://www.nautical-tourism.eu/upload/files/06_15%20Manifeste%20ANG%2012p(1).pdf

Favro, S., Saganić, I., 2006. Sustainable development of nautical tourism in Croatia. *New Perspectives and Values in World Tourism & Tourism Management in the Future*, TURK - KAZAKH INTERNATIONAL TOURISM CONFERENCE 2006, Akdeniz University, Alnya Faculty of Business, pp. 602-620.

Getz, D., S. Page., 1997. *The Business of Rural Tourism: International Perspectives*. Auckland, NZ: Thomson Learning, pp. 1-217.

Henama, U. S., 2018. Disruptive entrepreneurship using Airbnb: the South African experience. *African Journal of Hospitality, Tourism and Leisure*, Vol. 7, No. 1, pp. 1-16

Hrvatska turistička zajednica, 2020. *NAUTIČKI TURIZAM HRVATSKE nautički charter – izdanje 2020.* https://www.htz.hr/sites/default/files/2022-07/Nauti%C4%8Dki%20turizam%20Hrvatske%20-%20nauti%C4%8Dki%20charter%20-izdanje%202020.pdf

Hrvatska turistička zajednica, 2021. *NAUTIČKI TURIZAM HRVATSKE nautički charter – izdanje 2022.* https://www.htz.hr/sites/default/files/2022-07/Nauti%C4%8Dki%20turizam%20Hrvatske%20-%20nauti%C4%8Dki%20charter%20-izdanje%202022.pdf

Ivanić, K., Perić Hadžić, A., Mohović, Đ., 2018. Nautical Tourism: Generator of Croatian Economy Development, *Scientific Journal of Maritime Research*, Vol. 32, No. 1, pp. 59-66.

Jerebić, V., Pavlin, S., 2018. Global Economy Crisis and its Impact on Operational Container Carrier's Strategy, *Promet - Traffic&Transportation*, Vol. 30, No. 2, pp. 187-194.

Jugović, A., Kovačić, M., Hadžić, A., 2011. Sustainable development model for nautical tourism ports, *Tourism and Hospitality Management*, Vol. 17, No. 2, pp. 175-186. https://doi.org/10.20867/thm.17.2.1

Kovačić, M., 2003. Razvoj nautičkih luka u funkciji održivog razvoja nautičkog turizma. *Pomorski zbornik,* Vol. 41, No. 1, str. 135-154.

Kovačić, M., Gržetić, Z., Bosković, D., 2011. Nautical tourism in fostering the sustainable development: A case study of Croatia's coast and Island, *TOURISMOS: AN INTERNATIONAL MULTIDISCIPLINARY JOURNAL OF TOURISM*, Vol. 6, No. 1, pp. 221-232.

Kristensen, T., 2004. The physical context of creativity. *Creativity and innovation management*, Vol. 13, No. 2, pp. 89-96.

Luković, T., Piplica, D., Hruška, D., 2021. Argument for Evidence-Based Development of Sustainable Normative Framework for Nautical Tourism Ports: Case of Croatia, *Transaction on maritime science*, Vol. 10., No.1, pp. 1-11.

Spaapen, J., Van Drooge, L., 2011. Introducing 'productive interactions' in social impact assessment. *Research evaluation*, Vol. 20, No. 3, pp. 211-218.

Wall, G., Mathieson, A., 2006. *Tourism: change, impacts, and opportunities*. Pearson Education, pp. 1-412.

Edith Durham role in Albanian Anthropological Studies

Gelanda SHKURTAJ

Full-time Professor
Department of Law, Faculty of Law and International Relations, "Epoka" University, Tirana (Albania)
*Corresponding Author: e-mail: gshkurtaj@epoka.edu.al

Abstract

Among all Albanologists or researchers of Albanian ethnology, the work of Edith Durham has been selected with special attention, since her Albanian studies have influenced more than anyone else the anthropological image of Kanun and the international anthropology's opinion on Albanians. Edith Durham's studies and contribution are an added value in the whole history of ethnological studies in Albania, but before interpreting or summarizing her observations in Northern Albania, it is worth to correctly and well understand the concept of kin. Tribe/kin is an entity of great interest to anthropologists since in any specific study of a certain community or society, attention is focused on two aspects: a-how human society was organized in its beginnings and b-what was the form of its organization before modernity. Here, we must first understand what was the concept of tribe in Albanian anthropology, and then how the tribe was conceived and described in the anthropological studies of Edith Durham. This would help understand the tribal organization at present. The word Customary Law derives from the word custom, which in Slavic means norm, while the Albanians and Kanun of their mountains was not only created based on the mores (moral, social and cultural traditions) of Albanians, but was also not influenced by the Slavic Customary Law.

Key words: Kanun – Customary Law – Edith Durham – Albanian tribes – Ethnology – Kanun authenticity – Anthropology;

Introduction

It is well known the fact that studies on the origin of Customary Law have been deliberately overlooked in the anthropology of law, having as an underlying reason the maintenance of a position where the nationalist trace in the studies of cultural origins would not be felt. However, the researcher BARDHOSHI (Bardhoshi. 2016), in his paper "Anthropology of Kanun" pays special attention to the application of the Knotic law thesis, as a practical law, as long as it is embodied or fully assimilated into the culture of a given population. According to him, the importance of the objective precept of this thesis is closely linked with the debate of the continuity or not of Kanun Law, where although the one who issued this thesis may not be familiar with Kanun law, the latter meets the criteria to be introduced into the concept of Knotic Law. From the point of view of the existence of a universal law, where it merges into the culture and is thus called a Knotic Law then the Kanun Law also deserves to be considered as such, since it is universal not only because of the totality of the territory where it extends, but also because of the similarity to more laws of the time, but also embodied in the culture of population where it finds a place and is applied (Pupovci. 1967).

Further, there is something to state about what this Kanun contained, which was nothing but the law of the Albanian highlands, that had become foci of anti-Ottoman resistance by opposing their laws and not implementing them. In these self-defensive and organized circumstances in the mountains, the mountaineering society had the appearance of a military unit, therefore the very term "bayrak" which is of Turkish origin, was precisely a definition of the conqueror, considering the Albanian mountain as a military unit, where it basic unit was the family, i.e. the house. It has been noted that our categories regarding tribal societies have been created from the studies of various travelers (Albanologists) who have visited Albania.

They have never been observed and precepted with the logic of accepting something different from modernity, as happened in Albania, but the categories of primitive law or traditional culture were created seeing them as the opposite of modernity. As such and under the same point of view, Durham's anthropology also appears among its studies on the tribe among Albanians (Durham. 2013). It should be noted that the tribes of Northern Albania have been one of the most classic habitats for anthropological studies of foreigners against Albanians. Among the most appropriate judgments are those of Bardhoshi, believing that foreign and local authors who have significantly influenced the creation of categories on the tribe among Albanians are Durham, Nopche, Gjeçovi and Cvijiq.

Role of the tribe in Durham anthropological studies

Durham, as mentioned above, has played a key role, also because it is understood more clearly as it has not brought obstacles from the language which was fully in English. Although positions have been held thereon that have sometimes seen it as influenced by weak evolutionism, and at other times as a philo-Albanian researcher, in the end her position in relation to the traditional tribe and culture has not been studied on a critical level (Bardhoshi. 2016). But she is not the only one who has given her opinion about the tribe among Albanians, as before her there are anthropologists like Marcel Mauss, who in an essay on the social organization of Albanians at the beginning of the 20th century, compares them to the Indo-Europeans who had not yet entered history. His point of view was the nationalist perspective and certainly many ideas about the nation in that time context were of the idea that tribal societies had no sense of nationhood (Durham. 2013)..

Another influential anthropologist in tribal studies among Albanians, stands on the same wavelength as Maussi, because he describes Albanians as a population in Europe of 1 million inhabitants who are organized into 60 tribes that lack solidarity. Thus, a prevailing idea of foreign and Albanian anthropologists is that tribal societies were not organized and with solidarity at the national level. Back to Durham's anthropology, her precept on the tribe carries the concept of a guide which serves to understand the image of tribe in the Albanian anthropology. To stir a theoretical debate on the tribe according to Durham, firstly the idea of how she saw the tribe among Albanians (Pupovci. 1967), is presented. She saw it as related to the concept of one or several, common ancestors. Marriage between members of the tribe was forbidden, because they look at each other as brothers and sisters, although according to her, there were marriages with common ancestors in the masculine line, while the woman was not counted at all.

In order to have a correct image regarding this concept of hers, i.e., that the Albanian tribe originates from a common ancestor, it is considered as a partial truth since the myth of common ancestors has been seen by the inhabitants themselves as a decision of their ancestors. But they can affirm this themselves, since it is not a visible or easily evident fact within the time span of an ethnographic visit or expedition. At least the stage of building a confidential relationship with the same cultural basis (Durham. 2013), should be passed. Another cultural element that often invokes the myth of common ancestors, is precisely the phenomenon of exogamy, which, since it is utterly inapplicable within the tribe, then the image of a common ancestor constitutes the essence of the opposition to endogamy and goes a long way in view of strengthening the criterion of exogamy.

Likewise, the radical argument that Albanians calculate their ancestry in the paternal blood line, is also partially true since, if we accept that common ancestors have multiple social functions, the few or other tribes that calculate their ancestry in the maternal line are a little proud thereof. In fact, the rule of exogamy does not only extend to the paternal path, but also to the maternal one, even though it is often taboo or limited to several generations. Therefore, if we were to raise the question of whether or not descent in the maternal line among Albanian tribes is counted, the answer is affirmative. In the tradition of the Albanian tribes, a woman's blood is seen in two aspects. Firstly, if there is a relationship, i.e. to exclude endogamy at all costs, and secondly in the meaning of the physical and moral qualities she carries as a transmitter of these virtues to her heirs (Durham. 2013).

This is so true that a woman's belonging is not only seen as whose daughter she is, but also as a granddaughter and great-granddaughter. Although there is a thesis that Albanians did not believe in blood ties through the mother's path, the fact cannot be overlooked that even today you hear the expression "brother of the same genre/kindred", referring to the bond created through the mother's milk.

Role of woman in Durham studies

Another element in view of the belief that blood inherited through the maternal line is important and that woman's role is not the one prescribed according to Durham, comes to us from the Epic of Kreshniks, when Muji receives divine strength from the milk of Fairies. Allegations that Kanun and Epic of Kreshniks are two different things, are irrelevant, since the rhapsody and its receiver are part of the society that, as a basis of law, have the Kanun Law (Bardhoshi. 2016). The listener is the man who has Kanun Law as his main system and within him there are many antagonistic elements of this thesis, such as the fact that he talks about tribal and social solidarity, exogamy, property, hono   r, keeping his word, taking the place of the ethnographic fact and Kanun-oriented structure.

Another phenomenon, which goes in favor of the maternal blood tie, are the fraternal communities, which have in their memory the establishment by a single daughter. According to the Albanian ethnography, Curraj represents a typical case. As if an equally convincing argument is given by the typical expression such as

"*A certain brotherhood, although belonging to a certain tribe, had not advanced until the first of them married the daughter of a certain family, which normally belongs to another tribe*".

Durham's descriptions lack some data on tribes such as Gashi and Bytyçi, while these tribes constitute per se very complex communities. For Gashi, she states they are mainly Muslim tribes, while Bytyçi does not say anything. Likewise, for many other provinces such as Luma, Hasi, Dibra, Mat, he states they are classified as Muslim tribes and he pays a little more attention to the province of Mat, given the historical fact of the existence of Ahmet ZOGU, who apparently has not won all the sympathy of the researcher as she herself states

"*In 1908, when all tribes were eager for the independence of Albania, noone could have foreseen that its fate would be thrown into the hands of the wildest and least educated of all the tribes.*".

It is argued that Durham's opinion of Mat is unfounded, since she herself did not visit it, and that the province of Mat is not known as a tribal province, but as a very complex social community, where even its inhabitants do not have a social memory or collective self-image in relation to this community as a tribe. In this province the term tribe is used in many senses, including the village social community. According to the researcher Kurti, not only Mat is not a tribe, but also the villages in this province are made up of communities with different tribal origins. Valuable and affirmative on the other hand are also the studies of Lef Nos, wherefrom it appears that firstly they are from the same time period when Durham also studied them, and secondly because there is no presence of any tribe at the provincial level or beyond a small community, integral part of the village. He speaks in the meantime or knows Dibra as a tribe, literally stating

"*It is also said to be a tribe and I found it unvisitable. It has as bad a reputation as Mat*".

But in fact, even Dibra does not constitute a tribal community. Here is the mountain of social and political community, and this territory has been overlooked by Western anthropology. But as compensation, thanks to the work of the ethnologist Xhemal Martini (Martini. 2003), we have an interesting anthropological study regarding the tribal organization or Kanun Law of this area. In his book, Dibra Kanun Law, he furnishes explanations about the community of these villages, which are complex and consist of families with different tribal and kinship backgrounds. Meanwhile, anthropologist Mark Tirta (Tirta. 2003), gives an explanation of the social structure of the mountain in Dibra province, giving us a concept that has not been used by international researchers of anthropology among Albanians.
But the partial truth of Durham's concept regarding the tribe in Albania, is also reflected in the image of a peaceful tribe, as it is in Has. According to her

"*It is a vast tribe from Mirdita and conquered by Hashi, very backward to the point where they feared that arrival of the foreigner might bring annexation by the great powers..omiss…*".

Contrary to what Durham thought, Hasi area has in its memory a tribal social community. This is reinforced by the existence within it of some tribal surnames such as Berisha, Thaçi, Shala, Hoti, Gashi, Krasniqi. Also, in view of respecting the exogamy system, the province of Hasi maintains a social memory towards it and there is no room for judgments that exogamy exists only for economic reasons. There is no place as there are brotherhoods which have no economic connection and continue to maintain exogamy among themselves (Bardhoshi. 2016). The same judgment applies to Luma, which she visited on her way back from Prizen to further study the Muslim Albanian tribes, defining it as a tribe. There is no evidence to date that Luma province can be considered a tribe, but what emerges from the historical archives is the presence of an exogamous village, and where the origin of families that make it up is very complex. These persuasive ideas that Hasi area does not constitute a tribe, are found in Luma Kanun.

Conclusions

In conclusion, the ethnography done at that time, was accompanied by a lack of trust between the parties and consequently brought many problems in data collection. Social phenomena of the time that had a direct relationship with the tribe, such as newcomers entering certain tribes, theory of tribal support, territorial exogamy at the beginning of the 19th century (Durham. 2013), were left unstudied by Durham and other researchers. What is proven to be vaguely treated by anthropology in the Balkans, is the acceptance of the new arrival, provided that the latter takes the surname and fraternal affiliation of the native. Rituals or acceptance procedures are also cornerstones in modern anthropology:

a-for the way he accepted it;
b-building the social structure in three ways, marriage, tribe and supportive brotherhood;
c-acceptance of the other as the key element of the science of anthropology itself.

From this logic, not only there is no tribal community where all members are of common descent, according to the inhabitants, but this homogeneous tribal community is not even extended to village level, according to the meaning attributed by Durham. From an anthropological point of view, village has characteristics of a legal community rather than of an imaginary tribe.

Instances of supportive fraternity are also found in Durham's studies, but not analyzed by her. In the Albanian ethnography, there are cases where in the classic territory of a tribe, such as Merturi, there are families who have carried another tribal identity and joined this tribe. However, this support would be considered complete only when the social and collective memory of such a fact is extinguished (Bardhoshi. 2016). The reasons underlying the motives for leaving a country, which consequently become the cause of the ascent of the other tribe through support or attachment, are among the most diverse, but what is worth mentioning here is the fact that that person has firstly given up his former identity. Secondly, if support is required to escape the bloodfeud murderer, he can ask the elders forgiveness since he no longer belongs to the blood he had before in the brotherhood, and finally the new tribal community has the duty to protect the tribe newly introduced to them.

Regarding exogamy, Bardhoshi cites a case in Kosovo, where it happened that two young people with the same last name got married, but this, only when one of the families was supported by the other family. Therefore, the categories on the tribe among Albanians, were created based on anthropology between the XIX-XX centuries, which are characterized on one hand by the fact of the influence of linear evolutionism, by the lack of long time in ethnographic studies, by the advancement of the concept of a hyper-patriarchal society, not counting the person on the maternal path, not recognizing the phenomenon of support etc. Even in the tribe-territory report, the idea that tribes have fixed territories similar to state solidarity, is considered in these studies.

References

Durham, Edith 2013. "Shqipëria e Epërme. Një udhëtim në Shqipërinë e veriut në vitin 1908", Tiranë: IDK publishing.

Shkurtaj, Gelanda 2022. "Doke dhe Tradita. Një histori e shkurtër e Gjakmarrjes ndër Kanunet Shqiptarë", Tiranë: TOENA publishing.

Bardhoshi, Nebi. 2007. "E drejta kanunore dhe shteti i së drejtës", Polis, nr. 3, Tiranë.

Bardhoshi, Nebi. 2010. "Për një antropologji të modernitetit shqiptar", Kultura popullore, Tiranë: Instituti i Antropologjisë Kulturore dhe i Studimit të Artit.

Bardhoshi, Nebi. 2013. "Analiza e gjakmarrjes si një antropologji e shtetit", Identitet Kulturor Shqiptar në 100 vjet, Tiranë: Qendra e Studimeve Albanologjike.

Bardhoshi, Nebi., (2004), Veçori të ndarjes së pasurisë sipas së drejtës dokesore (Krahina e Hasit)., Tiranë, "Kultura popullore", 2004, f. 129-128.

Bardhoshi, Nebi., (2007), E drejta kanunore dhe shteti i së drejtës, "Polis", Nr. 3.

Bardhoshi, Nebi., (2007)., Mbi të drejtën kanunore në Has., Tiranë, IKP, Kultura Popullore.

Bardhoshi, Nebi, (2009), Njeriu i Kanunit në një shoqëri postsocialiste, Tiranë, Polis 8, Universiteti, Europian i Tiranës, f. 114-132.

Bardhoshi, Nebi. (2009). Rrok Zojzi per te drejtën kanunore shqiptare ; Një vështrim kritik, Kultura Popullore, 2009, 44-67. R
Rrok Zojzi on Albanian Costumary Law in Albania : A Critical Perspective, Tirane, Kultura Popullore, 2009, 44-67.

Bardhoshi, Nebi (2010), Në mes ideologjisë së tregut të lirë dhe diktaturës së kushurinjëve, Tiranë, Jus&Justicia IV, Universiteti Europian i Tiranës, f. 69-79.

Bardhoshi, Nebi. (2012). Dinamika Ligjore në një zone kufitare, Tiranë, Kultura Popullore, Instituti i Antropologjisë Kulturore dhe Studimit te Artit, f. 235-247.

Bardhoshi, Nebi. (2013), Gurtë e Kufinit: Kanuni, prona, strukturimi social, Tiranë, UET-Press.

Bardhoshi, Nebi. (2013). Analiza e gjakmarrjes si një antropologji e shtetit, Tiranë. Në volumin e Konferencës, Identitet Kulturor Shqiptar në 100 vjet, f. 200-204.

Bardhoshi, Nebi. 2013. Legal Dynamics in border area: Betëeen Customary Law and State law, Journal of Legal Anthropology, Vol. 1. No. 3, pp. 314-332.

Buda, Aleks, (1977), Etnografia shqiptare dhe disa probleme të saj, "Konferenca Kombëtare e Studimeve Etnografie" (28-30 qershor), Tiranë 1977, f. 15-35.

Coon, Charlot, (1950), The mountains of gaints, Cambridge, Massachusetts, SHBA, botuar nga Muzeu.

De Waal, Clarissa. 2005. Mbijetesa: Shqipëria në post-komunizëm, Tiranë, Botimi i Institutit të Studimeve Ndërkombëtare.

Elezi, Ismet., (1969), Karakteri i së drejtës zakonore gjatë pushtimit turk, Tiranë, "Konferenca e Dytë e Studimeve Albanologjike" (12-18 janar), 1968, vll. II, f. 165-170.

Elezi, Ismet, (2006), E drejta zakonore e Labërisë, Tiranë, "Toena".

Elezi, Ismet, (2006), Kanuni i Labërisë, Tiranë, "Toena".

Nopça, Franz, 2013. [1913], Fiset e Malësisë së Shqipërisë Veriore dhe e Drejta Zakonore e tyre, Tiranë, Botimet Eneas.

Peinsipp, Walther. 2005, Populli i Shqipeve të Malit: Një kontribut në "arkeologjinë" e Drejtësisë dhe antropologjinë sociologjike të Ballkanit, Tiranë, "Mirdita".

Pupovci, Syrja, (1965), Kushtet shoqnore ekonomike në të cilat ka qenë në fuqi kanuni i Lekë Dukagjinit dhe shqyrtimet e përgjithshme juridike për KLD-në, Prishtinë, "Përparimi", nr. 6, f. 350-384.

Pupovci, Syrja, (1967), Kanuni i Lekë Dukagjinit: Burimet, origjina, emni, dhe
vlefshmenija., Prishtinë, Përparimi, nr. 8., f. 965-1015.

Pupovci, Syrja, (1969), Formalizimi dhe besa në të drejtën e detyrimeve në Kanunin e Lekë Dukagjinit, Tiranë, "Konferenca e Dytë e Studimeve Albanologjike", (12-18 janar 1968), vëll. II, 181-188.

Hasluck, Margaret., (1954), Ligji i pashkruar shqiptar, Tiranë, Arkivi i Etnologjisë, IAKSA-QSA.

Albanian Kanun either a Roman or a Barbar model code

Gelanda SHKURTAJ

Full-time Professor
Department of Law, Faculty of Law and International Relations, "Epoka" University, Tirana (Albania)
*Corresponding Author: e-mail: gshkurtaj@epoka.edu.al

Abstract

In the studies of foreign anthropologists on the Albanian Kanun and Kanun Law, works of the Albanologist Franc NOPÇA are especially remarkable. This author, having traveled and lived for a period of time at the beginning of the 19th century in Northern Albania, had the opportunity to closely know and experience life of the Albanian highlander, his concept of life and the approach to Kanun- oriented society according to his own cultural and social outlook at that time. Therefore, his most important work in relation to this field "The Highland Kins of Northern Albania and their Customary Law" starts with the description of history of the formation of tribes of the Albanian Highlands, informing us in detail about Shoshi , Shala, Komani, Shllaku and so on. Also being a researcher who, I repeat, dedicated a part of his daily life to life in the mountain villages and Kanun study, he provides a psycho-sociological description of the Albanian highlander who, together with Castelleti, remain not only the most unique works in this field but also the most comprehensive works related to the character of the Albanian and not replaced by any ethnographic works from the beginning of the nation-state to the post-modern Albanian state.

Key words: Kanun - Nopça – Albanian kins – Longobards – Barbarians – Customs Law – Reconciliation – Legal norm.

Introduction

The peculiarity of studies and writings that Nopça left behind about Kanun does not simply underlie analyzing Kanun from a historical and sociological perspective, which other researchers have attempted and succeeded in, suffice to mention Castelleti or Salvatore Vilari (Pupovci. 1967). Notwithstanding multi-dimensional values related to the study of Kanun in general this author introduces to us, is the extent of Kanun law, in particular comparatively with the rights of many other countries, both in Europe and in other countries around the world, thereby conveying to us some aspects of Kanun which have always coexisted with it, but have been slightly shifted from the general attention, clearly prioritizing the social aspect of Kanun and not the legal one:

a-Kanun, on one hand, has the unique feature that is Albanian autochthonous but not hermit. On the contrary, many legal norms contained therein, are also included in many legal codes and norms, such as in Roman law, German law, barbarian laws etc and he supports with evidence how a certain legal institute which exists within Kanun, has its sisters in all legal codes or norms of other countries, regardless of the element of time;

b- attaches to Kanun a primary value in the role it effectively has and should have, that of a group of legal norms, from which the author Nopça also makes not only a chronological classification, but also legal logic, dividing the legal institutes of guilt against the person, honor, property law, martial law, individual law, law dealing with things, marriage law, legal proceedings and so on.

Given that his entire work cited above is of exceptional importance in relation to every aspect of the Albanian Kanun (Pupovci.1967), but since it is impossible to allow for the space of this topic, only two moments in the content of the fifth chapter of work, the first about punishments in general, and the second moment in relation to legal and illegal murders, shall be taken as reference. The sanctioning elements of punishment, in addition to death in Kanun law, also include punishment with only money, demolition, burning of the house and confiscation of property. Hence, these alternative methods of death penalty, according to Nopça (Nopça, Franz, 2013. [1913]), all existed in Italian law during Middle Ages. According to the Albanian Kanun, some part of money was given to the head of tribe and the rest to the injured party. Even in this aspect, Nopça finds a parallel in the "Barbarian Laws" "Leges Barbarorum", which were passed during the invasions in Italy and Dalmatia, from which it was evident that influence in Montenegro was still alive at the time of the work.

The fact of non-payment only in cash, due to the poverty that characterized Albanian society, and the partial repayment of this form of punishment was done in addition to the partial payment, by giving animals or even weapons. Yet, this is an aspect very similar to what was done in Germany during Middle Ages, to what was done among the old Irish who paid their punishments with animals, or in other countries of Balkan peninsula, where countries like Serbia, have applied this form since the year 1300, or Bosnia

around the year 1323. Not only that, but the form of punishment with payment in cash, in many countries of a 1200 was the only form of repayment of severe punishments, as it could be for instance, forced dishonor of a woman. This happened in Italy and Dalmatia and is found in many statutes of Italy of that time, such as that of Susa and Verona up to the oldest, which was the Statute of Parma.

Even though in many countries of the region, including Italy and Dalmatia, forms of crippling or public disfigurement of convicts were vital as methods of punishment, according to the author Nopça, it is not noticed that the Kanun of Highlands has any norm for the punishment of convicts. Compared to other countries of the time, the fact of the lack of punishment for those convicted by corporal punishment in the Albanian Kanun, which was commonly done and accepted as a form of punishment in addition to monetary punishment in Turkey or Serbia, is interpreted by Nopca as an element that raises Kanun above the others from a humanist point of view and therefore contemporary, also upgrading the gentle and kind-hearted character of Albanians who did not have in their culture the torture of others. Another serious punitive element, according to the author Nopça (Nopça, Franz, 2013. [1913]), which is missing in the Albanian Kanun Code, is precisely that of deprivation of liberty. This element is very present in many codes of neighboring or European countries.

Therefore, he takes Rome as an example, which was under the strong influence of Roman law, as well as France which took this example by being under the influence of this law, as it is absent in the law of ancient Greeks. Although it must be stated that in the beginning even Italy did not use this form for a long period of time, but simply as a coercive measure, for an appropriate term until the opportunity for the convict to pay. Another vital aspect is the absence of death penalty as a punitive measure in the Albanian Kanun law.

Punishment in Kanun and similarity to the laws of ancient Greece

The author explains how this form of punishment was highly widespread in classical Greece, where many macabre forms of this type of punishment were applied to the convict, such as hanging, poisoning, burning on fire, falling from a cliff. It is noted that such punishments are not absent even in Roman law, while it is absent in Celtic, German and Barbarian laws. There was a return of the influence of Roman law in Italy in the 1200s as well as in Dalmatia, where cases of increasing such death sentences were felt until the 1700s. It is felt later in Balkans countries the form of death penalty being executed as a relative or fellow countryman in Serbia and Montenegro, with stoning and then around the middle of the 19th century, shooting in the public eye (Nopça, Franz, 2013. [1913]). The fact is that these forms were nowhere provided for in the Kanun of Albanian Highlands, putting it in a very positive place in terms of radical forms of punishment, but those that remained as such punishment methods, as stated above, were those of demolition, confiscation of property and deportation abroad.

In fact, deportation abroad, used in the Albanian Kanun law, aims to leave the tribe's territory, using a "protective" measure for a human life. Therefore, in another sense, this measure or method of punishment seeks to prevent a continuous bloodshed between tribes, in the event it is used as an alternative measure of bloodfeud. Although it is found as the same concept in the law of ancient Greeks, it is conceptually distanced from exile or outlawry, which is a punitive element used by northern European countries. Also, the expulsion from the tribe's territory has nothing in common even with the official decision to leave the country, which was commonly used in Roman law. It was used similarly to the provisions of Kanun, only in Montenegro around 1796, to punish persons who wanted to prevent execution by escaping. Likewise, the punitive method of land destruction has been present in Albania, accompanied by phenomena such as cutting and burning trees, but it is known to be applicable in other countries, such as Montenegro in the 17th century, or in Italy which was used since 1168.

This measure of punishment, i.e. the destruction or burning of houses, was part of the Italian or German law and comes as evidence of this document studied in the old law of Grum. However, since the 15th century this form of punishment began to disappear, over time this method was transformed or prepared the ground for another somewhat more civil form if it can be called so, the punishment, but more severe from the perspective of financial burden, which was precisely that of the confiscation of assets. This form takes place there since the beginning of 16th century.

Apparently, it is applied in Naples and Corsica around the 17th century, while in many other places in Italy, around the 16th century, confiscation was done permanently. This way of punishment in Albanian Kanun law was realized both permanently and temporarily and was present at the beginning of the 19th century, at the time of the author Nopça's studies (Nopça, Franz, 2013. [1913]). It is an interesting fact that this form of punishment is the same even in the Italian law of 18th century and it is distanced or distinguished from it only by the fact that confiscation in Albania went totally to compensate the injured party, while in Italy it went partially for the governing authority and partly for the injured party. Arguments in support of this similarity in the punitive measure of confiscation of property are found in Montenegro and Serbia, as well as in the Barbarian Laws, Lombard Law of Lintprand, Salic Law.

It is noted that such legal institution in medieval Italy was recognized by a very large part of the statutes of XIII, XIV, XV centuries, such as that of Trani, while in the old statutes of XII century, confiscation was the same as that in Albania, which was fully in favor of the injured party. Other elements, such as punishment in the land of another tribe, as provided for in Albanian Kanun

law, can also be found in the Italian statutes of Middle Ages, such as those of Verçel, Milan etc, but it was mainly based on reciprocity (Coon. 1950). Thus, it could rarely happen that a criminal was punished in the territory of another tribe, while the taking of animals was allowed as appropriate. What is not known is the degree of punishment of the woman in relation to the man in Albanian Kanun law, this because the author sees the punitive element in Kanun as very similar to the one generally provided for in the Italian law of Middle Ages, as well as being that in this time period, the punishment in Italy between men and women was different, so the woman was not punished severely, judging that the same could have happened in Albania.

The author Nopça, in furtherance of his work, in the fifth chapter, where he deeply researches the origin of legal norms that have similarities in Kanun and in other systems of laws in Europe or elsewhere, at the time of Kanun before or later, has a key approach regarding the legal institution of murder as legal and illegal one according to his concept. Among the legal murders, Nopça lists the murder due to adultery (according to the Kanun of Lekë Dukgjini) and compares its content according to our Kanun and laws such as among the Celts who killed for dishonoring a wife. Also, the dishonor of both wife and concubine (prostitute) were equally punished (Nopça, Franz, 2013. [1913]).

In Roman law, a woman who cheated on her husband was killed by her father. In the laws of the Breviarium Alariciarum, the woman who cheated could only be killed *in flagrante delicto*, while in the lands of Burgonja the law was that the offender and she should be killed together *in flagrante delicto*, a similarity that is also provided for in the Kanun of Lek Dukagjin, according to which she and the offender should be killed with a bullet. According to Prokiras Legum, the adulterer killed himself after being warned three times, while there was the possibility of being punished by killing both, but it was considered a crime to kill only one and leave the other.

Nopça and Longobardi law

The Italian Code of the 19th century recognized the fact of the concurrent murder of the woman and offender, while later this right was transferred to an alternative form of punishment that, in the event of the case brought to court, the shame was repaid in a punishment in cash. There were cases when the punishment escalated to physical violence, while over the centuries somewhere the woman was punished by murder and the offender by money, until it was passed to the punishment of woman with payment in cash. The situation in Bulgaria is interesting, where it was not allowed to kill a woman who cheated on her husband, but to burn her in front of the whole village, while such a form was applied to the Muslim Albanians of eastern Albania. Montenegro used the method of punishing by ugliness/disfigurement the woman who cheated, by cutting off her nose. The Islamic law recognized until the end of 19th century the murder in *flagrante delicto* of two culprits, but the death penalty was imposed only in the case of repeated adultery by the woman.

Another aspect of legal murder, in the Albanian Kanun code, is that of the murder committed by the head of household against a member of the family for any fault (the case of the son's murder by the father according to the Kanun of Lekë Dukagjini). In this case, the criminal fact is deemed as punishment and not as murder, even according to Kanun, it is considered suicide. This kind of analogy with Kanun is observed in the laws of the old Romans, where the father of the family "pater familias" was the judge of the family (Zojzi. 2009, p.44-67), he could kill his sister, wife or daughter for honor. Similar elements where the father of the family is vested unlimited power to kill his family members, are observed in the laws of the old Romans, in the code of the Gauls, from which the Irish and the Longobards were later inspired.

Restrictions were imposed in the late Middle Ages in Italy and Dalmatia where the father's power was limited to maintain discipline in the family. Another element is the killing of a person outside the scope of law, known in Italian and German law, also known in the Albanian Kanun with application in the Great Highlands, when someone who did not enjoy anyone's loyalty, was killed.To put it in more general terms than revenge, as far as it is a violent and archaic aspect, it existed and in Italy was accepted until the 13th century even by law. Italy had the right to kill the woman and offender, and the Byzantines and Islamists [2] adopted it from Italy.

Conclusions

Nopça, when it is about illegal murder in Albania, distinguishes it for self-defense, intentional and unintentional one. From the punitive point of view, they have the same punishment according to Kanun. An interesting aspect in Kanun is the killing of the thief when he enters the house secretly. It is similar to the law of Aceh and Dagestan where beating is allowed but not murder. In case it occurs, a light penalty is paid in cash. Despite the different attitudes of different legal systems, where the Italian one is mainly felt both for the murder of the night thief and for the murder of the running thief, it is noted that there are two facts missing in the

---

[2] NOPÇA, Franc 2013. Tribes of the Northern Albania Highlands and their Customary Law. Eneas Sources. P. 419

Kanun of Albanian customary law. This is explained by the fact that in Kanun, "murder for self-defense causes the murderer to be subject of blood feud". Hence, in conclusion of this observation of Nopça regarding legal or illegal murders, the Albanian Kanun recognizes forced murders, where most of them are defined as honor-related blood feuds.

Murders by force or for blood feud, as they are called in Albania, were also significant among the Irish, but in contrast to Kanun, their law provided for a lighter punishment (Coon. 1950). The duel was not known in Albania, except in Malesi e Madhe (Great Highlands), although it is judged by the author that this custom has been suppressed due to the Turkish invasion.

He finds the truth in the expression "we are dealing with a druge" which in the mouth of Albanians, young Greeks and Armenians meant that they are involved in a fight and sending a drug was an invitation to a duel. In conclusion, Nopça holds that the non-acceptance of protection in Albanian law is indicative of an archaic element within this law, while the absence of a duel must be an influence of the law of Southern or South-Eastern Europe. The special merit of his work is an example for every kind of anthropologist and belief of the thesis that anthropology done "in house" (De Waal. 2005), understood as done by researchers who identify and become equal with the social and cultural environment where they study, produce better results at work. This is precisely the case of Nopça.

He himself says in the preface of his work that it took him a long time to live and share many problems with the Albanians of the communities where he lived, until he became part of their trouble, judgment, thought and even the game. Yet, he never attempts to give a definition for both Kanun and the Albanians, leaving open the paths of research and judgments that can be made about it. The overview of descriptions speaks very clearly of a genuine interest of the anthropologist to present the facts truthfully and at the same time comparatively, as a method the latter is very efficient and valuable to have a fair imagination and a fact-based critical version.

References

Shkurtaj, Gelanda 2022. "Doke dhe Tradita. Një histori e shkurtër e Gjakmarrjes ndër Kanunet Shqiptarë", Tiranë: TOENA publishing.

Bardhoshi, Nebi. 2007. "E drejta kanunore dhe shteti i së drejtës", Polis, nr. 3, Tiranë.

Bardhoshi, Nebi. 2010. "Për një antropologji të modernitetit shqiptar", Kultura popullore, Tiranë: Instituti i Antropologjisë Kulturore dhe i Studimit të Artit.

Bardhoshi, Nebi. 2013. "Analiza e gjakmarrjes si një antropologji e shtetit", Identitet Kulturor Shqiptar në 100 vjet, Tiranë: Qendra e Studimeve Albanologjike.

Bardhoshi, Nebi., (2004), Veçori të ndarjes së pasurisë sipas së drejtës dokesore (Krahina e Hasit)., Tiranë, "Kultura popullore", 2004, f. 129-128.

Bardhoshi, Nebi., (2007), E drejta kanunore dhe shteti i së drejtës, "Polis", Nr. 3.

Bardhoshi, Nebi., (2007)., Mbi të drejtën kanunore në Has., Tiranë, IKP, Kultura Popullore.

Bardhoshi, Nebi, (2009), Njeriu i Kanunit në një shoqëri postsocialiste, Tiranë, Polis 8, Universiteti, Europian i Tiranës, f. 114-132.

Bardhoshi, Nebi. (2009). Rrok Zojzi per te drejtën kanunore shqiptare ; Një vështrim kritik, Kultura Popullore, 2009, 44-67. R
Rrok Zojzi on Albanian Costumary Law in Albania : A Critical Perspective, Tirane, Kultura Popullore, 2009, 44-67.

Bardhoshi, Nebi (2010), Në mes ideologjisë së tregut të lirë dhe diktaturës së kushurinjëve, Tiranë, Jus&Justicia IV, Universiteti Europian i Tiranës, f. 69-79.

Bardhoshi, Nebi. (2012). Dinamika Ligjore në një zone kufitare, Tiranë, Kultura Popullore, Instituti i Antropologjisë Kulturore dhe Studimit te Artit, f. 235-247.

Bardhoshi, Nebi. (2013), Gurtë e Kufinit: Kanuni, prona, strukturimi social, Tiranë, UET-Press.

Bardhoshi, Nebi. (2013). Analiza e gjakmarrjes si një antropologji e shtetit, Tiranë. Në volumin e Konferencës, Identitet Kulturor Shqiptar në 100 vjet, f. 200-204.

Bardhoshi, Nebi. 2013. Legal Dynamics in border area: Betëeen Customary Law and State law, Journal of Legal Anthropology, Vol. 1. No. 3, pp. 314-332.

Buda, Aleks, (1977), Etnografia shqiptare dhe disa probleme të saj, "Konferenca Kombëtare e Studimeve Etnografie" (28-30 qershor), Tiranë 1977, f. 15-35.

Coon, Charlot, (1950), The mountains of gaints, Cambridge, Massachusetts, SHBA, botuar nga Muzeu.

De Waal, Clarissa. 2005. Mbijetesa: Shqipëria në post-komunizëm, Tiranë, Botimi i Institutit të Studimeve Ndërkombëtare.

Elezi, Ismet., (1969), Karakteri i së drejtës zakonore gjatë pushtimit turk, Tiranë, "Konferenca e Dytë e Studimeve Albanologjike" (12-18 janar), 1968, vll. II, f. 165-170.

Elezi, Ismet, (2006), E drejta zakonore e Labërisë, Tiranë, "Toena".

Elezi, Ismet, (2006), Kanuni i Labërisë, Tiranë, "Toena".

Nopça, Franz, 2013. [1913], Fiset e Malësisë së Shqipërisë Veriore dhe e Drejta Zakonore e tyre, Tiranë, Botimet Eneas.

Peinsipp, Walther. 2005, Populli i Shqipeve të Malit: Një kontribut në "arkeologjinë" e Drejtësisë dhe antropologjinë sociologjike të Ballkanit, Tiranë, "Mirdita".

Pupovci, Syrja, (1965), Kushtet shoqnore ekonomike në të cilat ka qenë në fuqi kanuni i Lekë Dukagjinit dhe shqyrtimet e përgjithshme juridike për KLD-në, Prishtinë, "Përparimi", nr. 6, f. 350-384.

Pupovci, Syrja, (1967), Kanuni i Lekë Dukagjinit: Burimet, origjina, emni, dhe
vlefshmenija., Prishtinë, Përparimi, nr. 8., f. 965-1015.

Pupovci, Syrja, (1969), Formalizimi dhe besa në të drejtën e detyrimeve në Kanunin e Lekë Dukagjinit, Tiranë, "Konferenca e Dytë e Studimeve Albanologjike", (12-18 janar 1968), vëll. II, 181-188.

 Hasluck, Margaret., (1954), Ligji i pashkruar shqiptar, Tiranë, Arkivi i Etnologjisë, IAKSA-QSA.
.

Consumer attitudes towards beef consumption and future perspectives

Kristína Predanócyová[1], Diana Pindešová[2], Ľubica Kubicová[3]

[1*]*AgroBioTech Research Centre, Slovak University of Agriculture in Nitra, Slovakia*
[2]*AgroBioTech Research Centre, Slovak University of Agriculture in Nitra, Slovakia*
[3]*Institute of Marketing, Trade and Social Studies, Faculty of Economics and Management, Slovak University of Agriculture in Nitra, Slovakia*
[*]*Corresponding Author: e-mail: kristina.predanocyova@uniag.sk*

Abstract

Beef meat consumption has become a controversial issue in the food market. From the one point of view, adequate beef consumption brings health benefits to consumers, but on the other hand, its production causes negative impacts on the environment. The aim of the paper was to point out beef consumption and examine consumer attitudes towards current and future beef consumption. The aim was achieved through a consumer survey conducted in Slovakia (n=1,061 beef consumers). Using various statistical methods, consumer attitudes towards beef consumption were identified. The results showed that the average beef consumption is approximately 11.9 kg per year and respondent. The quality is key factor affecting purchase and consumption of beef, which is perceived by origin and composition. Consumers consume beef for taste and nutritional reasons. Results further indicate that consumers will not plan to change the amount of beef consumption in the future and consumption may be influenced by meat adulteration, animal diseases and composition. Furthermore, consumers were divided according to the amount of consumption into three segments: occasional consumers, regular consumers, heavy consumers and the differences in consumer behavior between these segments were indicated. The paper provides a new insight into the consumer behavior on beef market segmented according to the amount of beef consumed, thereby enriching the theoretical framework. The results can also be used by meat companies in the future direction of beef production, and by policy makers for the creation of strategies related to public health and the aspect of sustainability in the diet.

Keywords: beef meat, consumption, consumer, behavior, attitudes, future perspectives

1. Introduction

Beef meat is an important part of the human diet and is a source of nutrition (Ritchie *et al.*, 2017). Beef is considered as source of high biological value protein and essential nutrients important for the human body (Wyness, 2016; Giromini and Givens, 2022). Beef meat contains vitamins D, B1, B2, B3, B5, B6, B12 (Li, 2017) and is also a rich source of minerals such as iron, magnesium, zinc, phosphorus and others (Miciński *et al.*, 2012).

Changes in beef consumption could be affected by many reasons. First of them are economic reasons (Bifaretti *et al.*, 2023) mainly related to rapid income growth. Improving the understanding about the impacts of household income on beef consumption is a prerequisite for forecasting future beef demand (Zhu *et al.*, 2021). Moreover, in the recent years beef consumption has been affected by new lifestyles and eating behavior (Bifaretti *et al.*, 2023). The change in beef consumption is also a result of shifting away from meat-heavy diets towards diets containing more plant-based foods. This means that the nutritional trend associated with flexitarianism, vegetarianism and veganism can significantly influence the beef market in the future (Dagevos, 2021). Beef consumption should be also influenced by increasing consumer health concerns (Bifaretti *et al.*, 2023) and negative consumer perception in terms of health implications (Troy *et al.*, 2016). Excessive consumption is associated with negative health aspects such as development of chronic diseases including coronary heart disease, colon cancer and diabetes (De Smet and Vossen, 2016; Hu *et al.*, 2019). Another determinant affecting beef consumption is consumer concerns related to animal welfare and environmental impact. Beef meat production and consumption is becoming an increasingly mentioned issue in connection with environmental protection and sustainability. The environmental impacts of beef production and the concerns on the overall sustainability of beef meat have become a national and international issue (Rotz *et al.*, 2019). According to Ritchie *et al.* (2017) livestock production is considered one of the agriculture sectors with high environmental impacts and therefore beef production faces various sustainability challenges such as climate change, animal health, land use and water resources and also changing consumer perceptions related to the consumption of safe, healthy and tasty beef (Gerber *et al.*, 2015; Liu *et al.*, 2022).

Beef meat consumption, which is preceded by a purchase, can be determined by many factors. The key ones are health effects, nutrition, safety, sustainability, taste, color, tenderness or juiciness (Gagaoua *et al.*, 2022). Henchion *et al.* (2014) pointed out that quality is becoming increasingly important in consumer choice of beef meat. Beef quality can be evaluated by many parameters and is often associated with many attributes of beef. Consumers' perception of beef quality is determined by various intrinsic (appearance,

safety, technological, sensory and nutritional characteristics) and extrinsic (image, livestock systems, price, business strategy) quality attributes. Furthermore, consumers increasingly emphasize on extrinsic quality cues such as environmental sustainability or animal welfare (Liu *et al.*, 2022). Several studies have shown differences in the perception of the quality characteristics of beef. A survey conducted by Schnettler *et al.* (2010) states that consumers consider the most important intrinsic quality cues related to the sensory quality of meat and health aspects. According to Rajic *et al.* (2022), sensory characteristics, meat color and fat content are determined as the most important intrinsic quality cues of beef and extrinsic quality cues (price, certification logos and brand). Barcellos *et al.* (2019) reported that beef buyers are more interested in extrinsic quality indicators of meat quality than internal indicators. The quality is important attribute not only for consumers but also for other subjects operating on the meat market, who are interested in increasing the quality by searching for sustainable and innovative approaches (Gagaoua *et al.*, 2022). According to Pighin *et al.* (2016) improving the quality of beef in a sustainable manner could be achieved by appropriate management of production systems.

Based on the above, it can be concluded that the beef industry should adapt to consumer expectations and focus on issues related to ensuring the nutritional and taste quality of meat, food safety, environmental protection, animal welfare and other factors related to sustainability of the beef meat sector. Production of high-quality beef meat is an important attribute for the future direction of European beef industry (Hocquette *et al.*, 2018). On the other hand, it is necessary to point out that the increasing consumer health and environmental concerns are expected to lead to a transition to alternative sources of protein, as well as to the substitution of proteins from red meats towards those from poultry meat and fish (Bifaretti *et al.*, 2023). In this context, Götze and Brunner (2021) stated that meat alternatives may not always represent a full-fledged substitute for meat, but can be consumed as a complementary component in the consumer's diet.

For the future development of beef market, it is essential to know consumer attitudes towards beef consumption with and emphasis on future perspectives. On this background, the aim of the paper is to point out beef consumption and explore consumer attitudes towards current and future beef consumption in Slovakia. Slovakia belongs to countries with low beef consumption. The current average annual beef consumption is only at the level of 6 kg per capita and only reaches 30% of the recommended doses. (SOSR, 2023; Bielik *et al.*, 2021; Krížová and Buday, 2015). The consumer study is based on a consumer survey conducted in Slovakia on a sample of 1,061 beef meat consumers. The study explored consumption patterns towards beef meat with emphasis on reasons for consumption, determinants of consumption and future perspectives. The results of the consumer study will enrich the literature on consumer behavior of beef meat consumers divided into segments in terms of the amount of consumption. The consumer study also provides information applicable in food companies for marketing strategies development. The study is also beneficial for consumers and provides relevant information for better orientation in the beef market with the aim of increasing their consumption of beef meat.

Based on the above reasoning and the aim of this paper, the following research questions were formulated:

RQ1:What are the differences in the behavior and preferences of beef meat consumers in individual segments?

RQ2:What are the key factors determining the purchase and subsequent consumption of beef?

RQ3:Which determinants may influence future beef consumption?

2. Materials and Methods

The aim of the paper was achieved by using and processing primary data, which were obtained by consumer survey. This questionnaire survey was conducted on a sample of 1,061 respondents in Slovakia and the aim was to identify consumer attitudes towards beef consumption and future perspectives from the view of consumers and point out to the factors affecting current and future beef consumption in Slovakia. Consumer involved in the survey were divided according to eight socio-demographic characteristics (Table 1).

Table 1. Socio-demographic characteristics of respondents

		n	%
Gender	male	503	47.41
	female	558	52.59
Age	≤ 25 years	395	37.23
	26 – 50 years	472	44.49
	≥50 years	194	18.29
Education	elementary	39	3.68
	secondary	507	47.79
	university	515	48.54
Place of residence	urban	587	55.33
	rural	474	44.68
Members in household	1 member	57	5.37
	2 members	215	20.26
	3 members	291	27.43
	4 members	316	29.78

	≥ 5 members	182	17.15
Monthly income of respondent	≤ 500 €	378	35.63
	501-1,000 €	413	38.93
	1,001-1,500 €	187	17.63
	1,501-2,000 €	55	5.18
	≥ 2,001€	28	2.64
Monthly income of household	≤ 1,000 €	179	16.87
	1,001-2,000 €	518	48.82
	2,001-3,000 €	254	23.94
	3,001-4,000 €	60	5.66
	≥4,001€	50	4.71
Economic activity	Employed	540	50.90
	Student	307	28.94
	Self-employed	98	9.24
	Unemployed	8	0.75
	Retired	82	7.73
	Maternity leave	26	2.45

In terms of the amount of beef consumed compared with the recommended doses regarding the health recommendations (17.4 kg), consumers were divided into 3 segments: insufficient level of consumption (below the recommended doses), adequate consumption (+-10% of recommended doses) or excessive consumption (above the recommended doses).

Consumers divided into three segments, further expressed their attitudes towards the key reasons for consuming beef, namely taste of beef, high level of nutritional benefits, part of a rational diet, habit and other reasons. These consumers attitudes were analyzed using the Chi-square test of independence.

We were also focused on factors determining the purchase and subsequent consumption of beef on a 10-point scale (1 representing the unimportance and 10 the high importance). Consumers evaluated 25 factors, namely quality, freshness, meat content, aroma, origin, appearance, experience, durability, health, producer, price, emulsifiers, product information, proteins, water, fat, size of packaging, energy, salt, saturated fatty acids, ecological aspects, nitrates, appearance of packaging, convenience, product promotion. These factors were evaluated by consumers and we pointed out to the differences in the factor evaluation using Kruskal-Wallis test. We examined the differences in the evaluation of the impact of selected factors on beef purchase and consumption in different segments by using the Friedman test, applying its post hoc test Nemenyi's procedure and results were also showed by Demsar plot for each segment.

Furthermore, we also examined differences in future beef consumption between segments using the Kruskal-Wallis test. Consumers also evaluated 12 determinants for future beef market, namely meat adulteration, animal diseases, composition, animal welfare, food scandals, consumption of cultured meat, consumption of hybrid meat products, consumption of edible insects, meat supply, plant-based meat consumption, harmfulness of meat, vegetarianism/veganism. These determinants were evaluated on a 10-point scale (1 representing the unimportance and 10 the high importance) and we examine the differences in the evaluation of these determinants between the segments using Kruskal-Wallis test. In our research, we focused on differences in the evaluation of possible future determinants of beef meat consumption in each segment. Using Friedman and Nemenyi's procedure, we examined the differences in the evaluation of these determinants and the differences were graphically represented by Demsar plots.

The collected data were processed by using Microsoft Excel. For statistical testing the significance level of 0.05 was set and the statistical methods were conducted in XLSTAT 2022.4.1.

3. Results

The results of the consumer survey showed that the average annual beef consumption per respondent involved in the survey was 11.89 kg. In terms of the amount of beef consumed, consumers were divided into 3 segments. The first segment represents up to 68.05% of the respondents whose consumption was below the recommended doses. The average annual beef consumption was only 6.69 kg per consumer and hence the segment was named as "Occasional beef consumers". The second segment comprises 18.19% of the respondents and included those whose beef consumption was within the recommended intake range. The average annual consumption of these consumers was 16.57 kg, this was a reasonable consumption and hence the segment was named as "Regular beef consumers". The last segment consists of consumers with excessive beef consumption, i.e. consumption above the recommended intake. This segment included 13.76% of the respondents and their average annual consumption was up to 31.29 kg. As this was a relatively high beef consumption, this segment was named as "Heavy beef consumers".

Consumers evaluated the key reason for consuming beef meat and meat products. In general, it can be stated that almost 30% of the consumers noted taste as the key reason, followed by high level of nutritional benefits (28.09%), part of a rational diet (20.17%), or

habit (12.72%). Further, it was identified no differences in the ratings of the key reason for beef consumption among the segments using the Chi-square contingency test. However, slight differences were pointed out. The most important reason for consumption for the "Occasional beef consumers" segment was the taste of beef, while consumers from the other two segments "Regular beef consumers" and "Heavy beef consumers" considered the high level of nutritional value of beef as the key reason for consumption. The key reason for consumption ratings and the differences between segments are shown in Table 2.

Table 2. The key reason for beef consumption

Reasons for consumption	Total	Occasional beef consumers	Regular beef consumers	Heavy beef consumers
taste	29.88%	31.72%	24.87%	27.40%
high level of nutritional value	28.09%	27.42%	31.61%	26.71%
part of a rational diet	20.17%	18.98%	20.21%	26.03%
habit (e.g. from childhood)	12.72%	13.30%	12.95%	9.59%
good experience with the products	6.41%	5.54%	7.77%	8.90%
other	2.73%	3.05%	2.59%	1.37%

Slovak consumers rated 25 selected factors determining the purchase and subsequent consumption of beef in terms of their importance. Based on the results and the mean values of these factors, the following ranking of importance can be found: quality (mean=8.54), freshness (mean=8.49), meat content (mean=8.26), aroma (mean=7.86), origin (mean=7.84), appearance (mean=7.76), experience (mean=7.68), durability (mean=7.59), health (mean=7.43), producer (mean=7.38), price (mean=7.38), emulsifiers (mean=7.01), product information (mean=7.01), proteins (mean=6.60), water (mean=6.56), fat (mean=6.34), size of packaging (mean=6.29), energy (mean=6.19), salt (mean=6.07), saturated fatty acids (mean=5.97), ecological aspect (mean=5.70), nitrates (mean=5.68), appearance of packaging (mean=5.52), persuasiveness (mean=5.52), product promotion (mean=4.99).

In addition to the above, the factors determining purchase and consumption of beef were also ranked in order of importance in each segment. Statistically significant differences between the three segments of Slovak beef consumers were identified based on the results of the Kruskal-Wallis test in the following factors: quality ($p<0.0001$), nitrates ($p=0.040$), meat content ($p<0.0001$), salt ($p=0.021$), water ($p=0.001$), emulsifiers ($p<0.0001$), fat ($p=0.000$), appearance ($p<0.0001$), aroma ($p=0.000$), origin ($p<0.0001$), producer ($p=0.000$), price ($p=0.000$), freshness ($p<0.0001$), durability ($p<0.0001$), health ($p=0.001$), product information ($p<0.0001$), experience ($p<0.0001$), ecological aspect ($p=0.022$), convenience ($p=0.023$)

By applying Friedman's test followed by Nemenyi's test, we examined the differences in the evaluation of the impact of selected factors on beef purchase and consumption in each segment ($p<0.0001$). The results showed that quality, freshness and meat content are the key factors for segment "Occasional Beef Consumers". Segment "Regular beef consumers" considered factors of quality, freshness, meat content, origin, aroma and experience as key ones in beef consumption. For the last segment "Heavy beef consumers", the most important factors for purchasing and consumption are freshness, quality, meat content, aroma, appearance, origin, health aspect, durability, producer, experience, and protein content. Statistically significant differences between the factors affecting beef purchase and consumption for each segment are graphically shown by Demsar plots (Figure 1 - Figure 3).
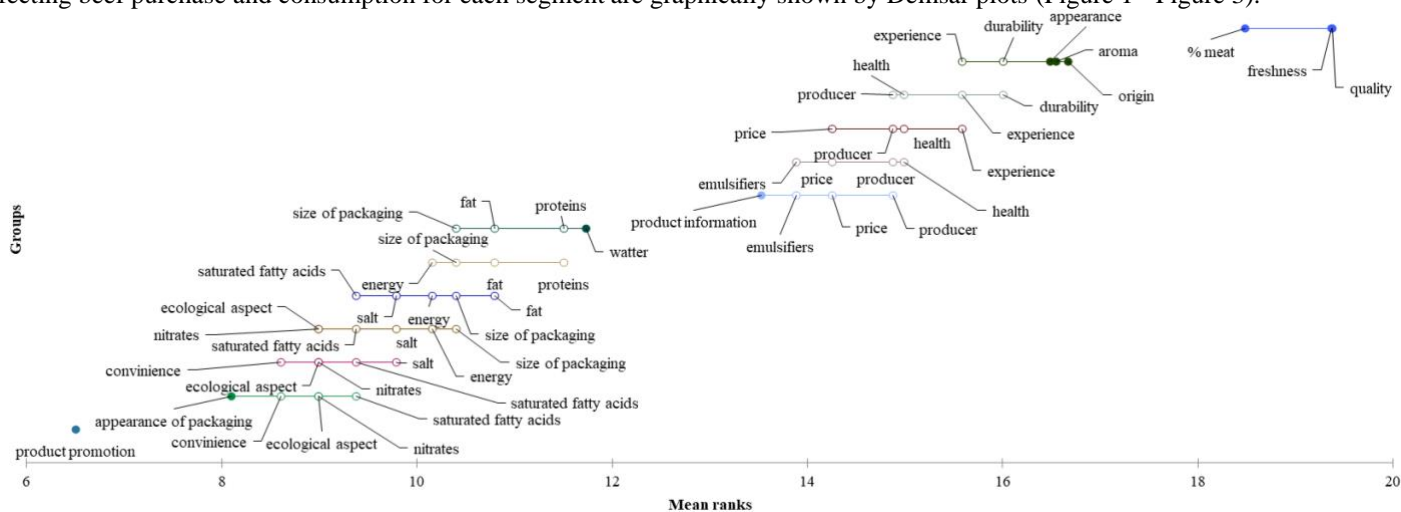

Figure 1. Factors affecting the purchase and consumption of segment "Occasional beef consumers"
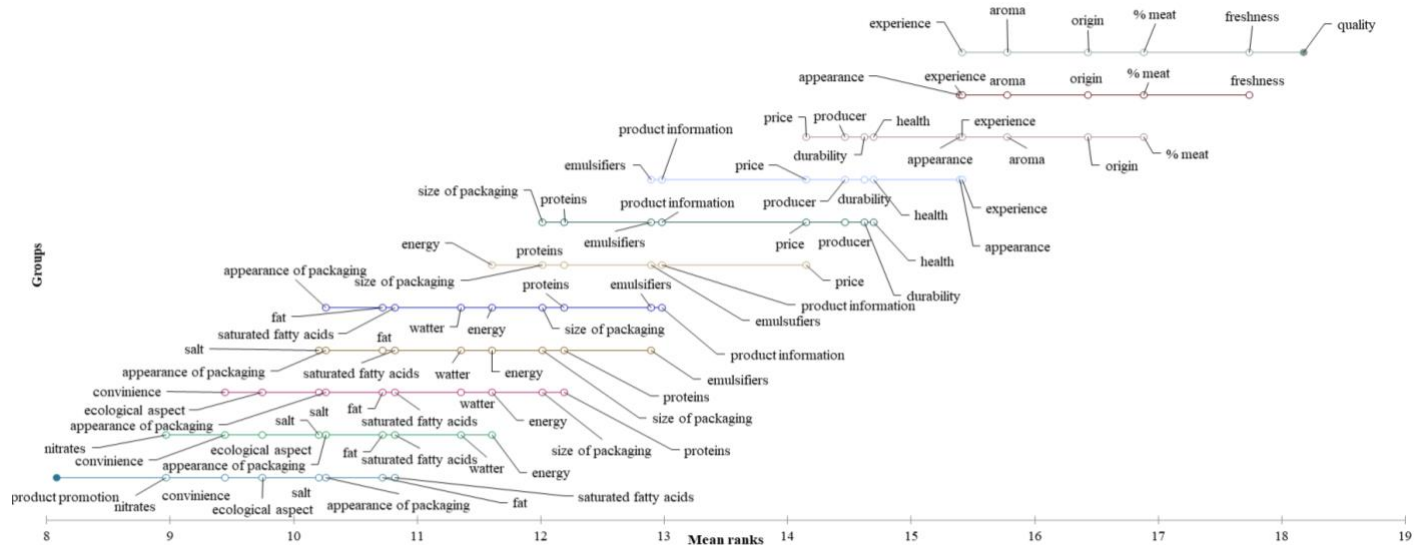
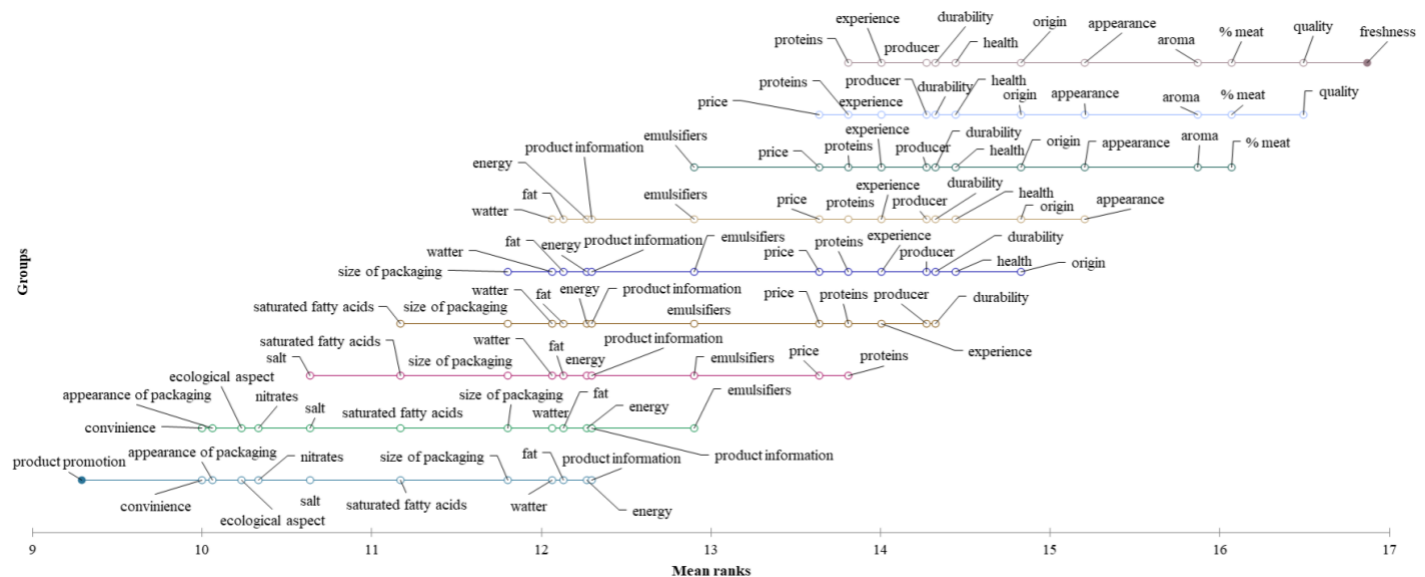**Figure 2.** Factors affecting the purchase and consumption of segment "Regular beef consumers"

Figure 3. Factors affecting the purchase and consumption of segment "Heavy beef consumers"

Given the fact that beef consumption is a debated topic, especially for future developments with regarding the health and sustainability, Slovak consumers have stated to the planned future beef consumption. Based on the results and mean values, it can be generally concluded that consumers will not plan to change their current level of beef consumption in the future. However, it should be pointed out that the results of the Kruskal-Wallis test identified the existence of differences in future beef consumption between segments, mainly between the "Occasional beef consumers" segment and the "Heavy beef consumers" segment. Future trends in beef meat and meat product consumption by segments were assessed as follows: "Occasional beef consumers" (mean=4.997), "Regular beef consumers" (mean=4.891), "Heavy beef consumers" (mean=4.630).

In the context of future beef consumption, Slovak consumers also evaluated the importance of twelve possible determinants influencing the future direction of the beef market. Based on the results and mean values, the factors were evaluated in order of importance as follows: meat adulteration (mean=7.11), animal diseases (mean=7.05), composition of meat and meat products (mean=6.87), animal welfare (mean=6.43), food scandals (mean=6.01), consumption of cultured meat (mean=5.40), consumption of hybrid meat products (mean=5.33), consumption of edible insects (mean=4.95), meat supply (mean=4.70), plant-based meat consumption (mean=3.94), harmfulness of meat to health (mean=3.86), vegetarianism/veganism (mean=3.61). This suggests that meat adulteration, animal diseases and composition of meat and meat products are key determinants for the Slovak consumer when deciding to consume beef with a view to the future.

In addition, the significance of the determinants of future consumption in individual segments was also examined. The results of the Kruskal-Wallis test showed, that between the segments a different evaluation of these determinants were proven: food scandals ($p<0.0001$), composition ($p<0.0001$), meat adulteration ($p<0.0001$), animal welfare ($p<0.0001$), animal diseases ($p<0.0001$).

Differences in the evaluation of other determinants were not identified. Furthermore, the differences in the evaluation of the determinants of future consumption in all segments were examined. Based on the result of the Friedman test and the Nemenyi method, it is possible to state the existence of statistically significant differences in all segments ($p<0.0001$). It is possible to point out the fact that animal diseases, meat adulteration, and composition are decisive factors for the "Occasional beef consumers" segment, and for the other two segments, besides these determinants, animal welfare is also important. Statistically significant differences in the assessment of the determinants of future beef consumption for each segment are graphically represented by Demsar plots (Figure 4 - Figure 6).
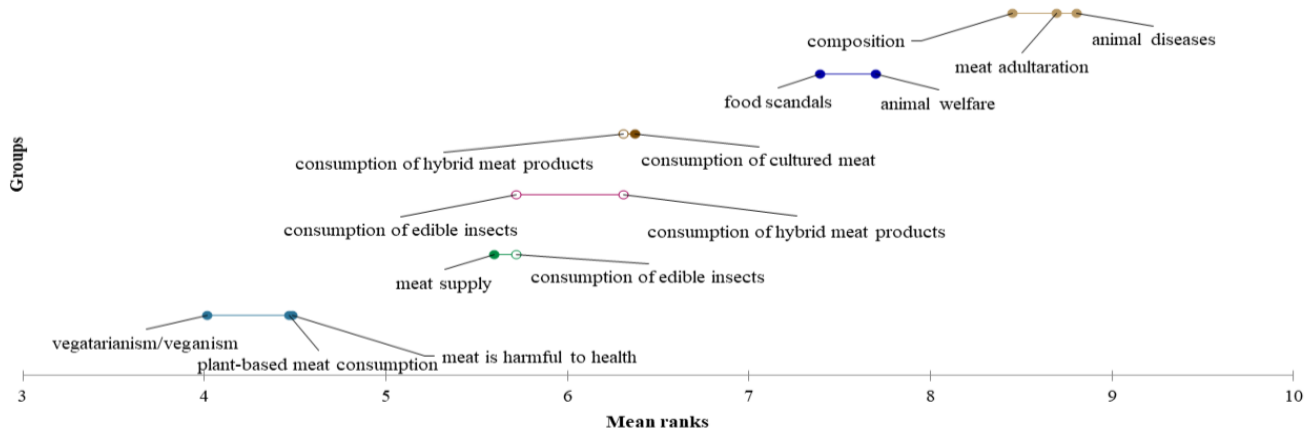

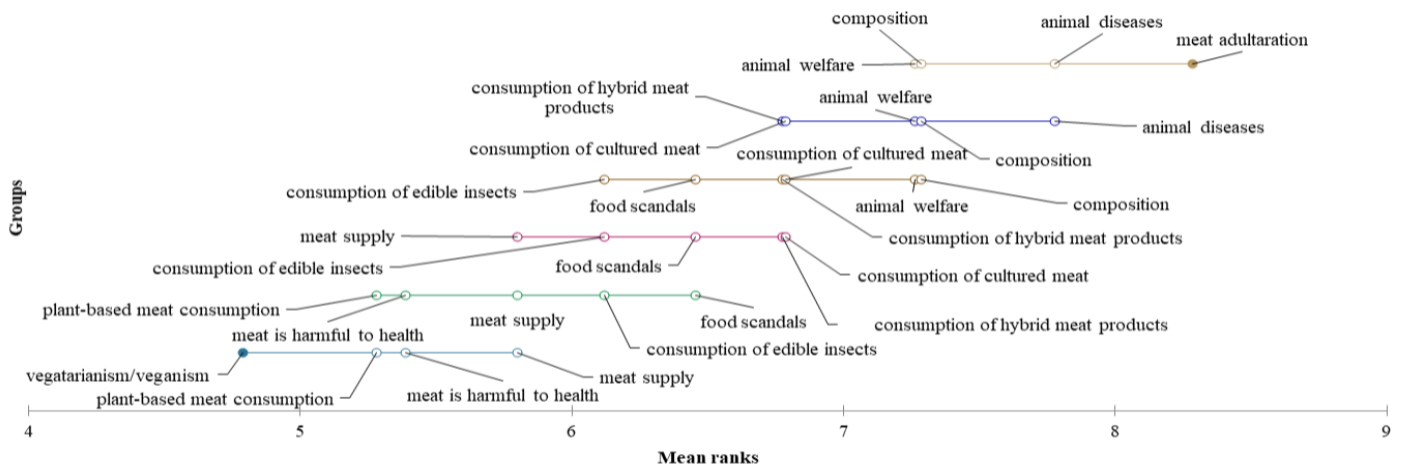**Figure 4.** Determinants of future beef consumption of "Occasional beef consumer"

Figure 5. Determinants of future beef consumption of "Regular beef consumers"
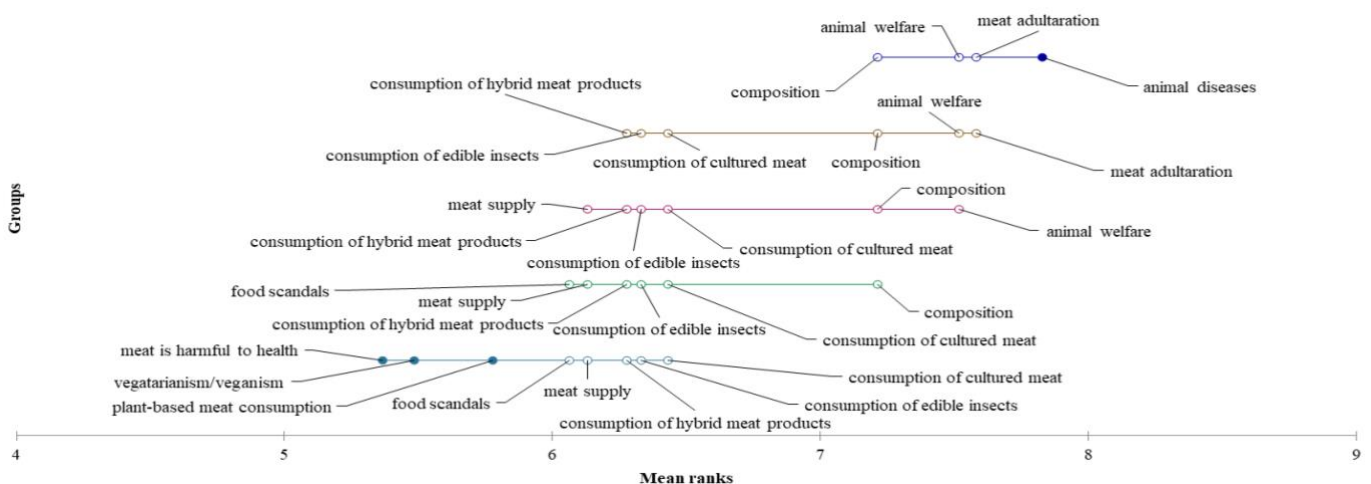

Figure 6. Determinants of future beef consumption of "Heavy beef consumers"

4. Discussion

The results of the questionnaire survey showed an insufficient beef consumption among Slovak consumers, which was also confirmed by the research of Krížová and Buday (2015). The low consumption of this type of meat may be caused due to higher consumption of other types of meat such as poultry or pork, food scandals (SOSR, 2023; Bielik *et al*., 2021), increasing interest of consumers in various meat alternatives (Boukid and Gagaoua, 2022) and also increasing consumer prices. According to Hocquette *et al.* (2018), the price of beef is higher compared to other types of meat, and the purchasing power of consumers is a key determinant of beef consumption. The results of our study showed that quality, freshness, meat content, aroma, origin, appearance, previous experience, durability, health aspects, producer and also price are the most important factors when purchasing and consuming beef.

Furthermore, study by Uys and Bisschoff (2016) identified factors that influence consumers when purchasing beef, namely meat quality, convenience, health, farming practices, purchase preferences, purchase intention, packaging and product presentation. According to a study conducted by Merlino *et al.* (2018), consumers considered price and animal welfare as the most important factors and less important beef meat characteristics were tenderness, taste, color, animal origins, quality certification, traceability and also nutritional information. However, according to Tsitsos *et al.* (2021), the most important factors for choosing beef are taste (aroma, juiciness, tenderness) and appearance (color, fat content). The most important aspects of beef consumption according to Magalhaes *et al.* (2022) are personal satisfaction and taste and the most important characteristics of meat are color, freshness, fat content, price and durability. However, it is necessary to note that consumer preferences in different countries differ due to the influence of many aspects.

In most countries, beef makes up considerably less than half of the total meat consumption, but despite the relatively low consumption of this type of meat, the demand for beef as a source of protein is growing (Smith *et al*., 2018). However, consumption in developing countries has increased rapidly, but beef consumption in developed countries is at a stable level (Waldron and Fisher, 2016). The results of our research showed that consumers will not plan to change the level of meat consumption in the future. The consumers included in our research consider meat adulteration, animal diseases, meat composition, animal welfare and also the existence of food scandals to be the most important factors in the future consumption of beef. The future consumption of beef may be determined by various factors such as climate changes, environmental issues, the development of meat consumption (Smith *et al*., 2018) and also changing consumer habits and preferences (Milford *et al*., 2019).

5. Conclusions

To conclude, beef industry should adapt to consumer expectations and focus on issues related to ensuring the nutritional and taste quality of beef, food safety protection, environmental protection, animal welfare and other factors related to sustainability of the beef meat sector. Therefore, we can state, that trends in beef meat consumption are affected by changing lifestyle, eating habits, negative impacts on the environment and rising prices. Based on the mentioned trends in beef market we conducted questionnaire survey. In our research, the respondents were divided into occasional, regular and heavy beef consumers according to annual beef consumption and we identified different consumer attitudes toward beef consumption and future development of consumption. Occasional beef consumers consume beef for its taste, nutrition and they consider quality, freshness, meat content as key factors affecting their consumption. The most important determinants of future consumption of beef are animal diseases, meat adulteration, and meat composition. The second group are regular beef consumers, who consume beef because of nutrition and taste. Their consumption of beef is influenced by quality, freshness and meat content similar to occasional beef consumers. Future consumption of regular beef consumers will be determined by animal diseases, meat adulteration, composition and animal welfare. Heavy beef consumers also consume beef for nutrition, taste and they consider freshness, quality, meat content, aroma, appearance, origin, health, durability, producer, experience, proteins as a key factor of consumption. For heavy beef consumers, the most important determinants of future beef consumption are animal diseases, meat adulteration, animal welfare, composition. Based on the results we can conclude that in Slovakia, there is a low level of beef consumption and it is important to support it. We suggest to support consumer awareness of beef related to health effects. Moreover, it is important to inform and educate consumers about environmental impact of beef production and also to support the consumption of high-quality beef of Slovak origin. For future research, we recommend to monitor the developing situation on the beef market in Slovakia and abroad and to examine current trends in production and consumption of beef meat.

Acknowledgements

References

Barcellos V.C., Mottin C., Prado R.M.D., Schenkel T., Viana C., Vital A.C.P., Bersot L.D.S., Sañudo C. and Prado I.N.D., 2019. How the perception of quality for beef evaluated by the buyer at the time of purchase: Study in three Brazilian cities of different sizes-Curitiba, Campo Mourão and Palotina. *Acta Scientiarum*, *Animal Sciences*, Vol. 41.

Bielik P., Hanová M. and Benda-Prokeinová R., 2021. How to be sustainable in beef consumption – Exploring the factors. Case study. *Agricultural Economics*, Vol. 67, No. 9, pp. 382-390.

Bifaretti A., Pavan E. and Grigioni G., 2023. Consumer Attitudes and Concerns about Beef Consumption in Argentina and Other South American Countries. *Agriculture*, Vol. 13, No. 3, pp. 560.

Boukid F. and Gagaoua M., 2022. Meat alternatives: A proofed commodity? *Advances in Food and Nutrition Research*, Vol. 101, pp. 213-236.

Dagevos H., 2021. Finding flexitarians: Current studies on meat eaters and meat reducers. *Trends in Food Science & Technology*, Vol. 114, pp. 530-539.

De Smet S. and Vossen E., 2016. Meat: The balance between nutrition and health. A review. *Meat Science*, Vol. 120, pp. 145-156.

Gagaoua M., Duffy G., Álvarez García C., Burgess C., Hamill R., Crofton E.C., Botinestean C., Ferragina A., Cafferky J., Mullen A.M. and Troy D., 2022. Current research and emerging tools to improve fresh red meat quality. *Irish Journal of Agricultural and Food Research,* Vol. 61, No. 1, pp. 145-167.

Gerber P.J., Mottet A., Opio C.I., Falcucci A. and Teillard F., 2015. Environmental impacts of beef production: Review of challenges and perspectives for durability. *Meat science*, Vol. 109, pp. 2-12.

Giromini C. and Givens D.I., 2022. Benefits and Risks Associated with Meat Consumption during Key Life Processes and in Relation to the Risk of Chronic Diseases. *Foods*, Vol. 11, No. 14, pp. 2063.

Götze F. and Brunner T.A., 2021. A consumer segmentation study for meat and meat alternatives in Switzerland. *Foods*, Vol. 10, No. 6, pp. 1273.

Henchion M., McCarthy M., Resconi V.C. and Troy D., 2014. Meat consumption: Trends and quality matters. *Meat science*, Vol. 98, No. 3, pp. 561-568.

Hocquette J.F., Ellies-Oury M.P., Lherm M., Pineau C., Deblitz C. and Farmer L., 2018. Current situation and future prospects for beef production in Europe—A review. *Asian-Australasian Journal of Animal Sciences*, Vol. 31, No. 7, pp. 1017-1035.

Hu, F.B., Otis, B.O. and McCarthy, G., 2019. Can Plant-Based Meat Alternatives Be Part of a Healthy and Sustainable Diet? *JAMA*, Vol. 322, No. 16, pp. 1547-1548.

Krížová S. and Buday Š., 2015. Socio-economic aspects of food consumption in Slovakia: overview of contemporary issues. *Journal of Food and Nutrition Research*, Vol. 54, No. 1, pp. 21-30.

Li C., 2017. The Role of Beef in Human Nutrition and Health. In: Dikeman, E.M. (ed.) *Ensuring Safety and Quality in the Production of Beef Burleigh Dodds Science*, pp. 329-338, Cambridge, UK.

Liu J., Ellies-Oury M.P., Stoyanchev T. and Hocquette J.F., 2022. Consumer perception of beef quality and how to control, improve and predict it? Focus on eating quality. *Foods*, Vol. 11, No. 12, pp. 1732.

Magalhaes D.R., Maza M.T., Prado I.N.D., Fiorentini G., Kirinus J.K. and Campo M.D.M., 2022. An exploratory study of the purchase and consumption of beef: Geographical and cultural differences between Spain and Brazil. *Foods*, Vol. 11, No. 1, p. 129.

Merlino V.M., Borra D., Girgenti V., Dal Vecchio A. and Massaglia S., 2018. Beef meat preferences of consumers from Northwest Italy: Analysis of choice attributes. *Meat science,* Vol. 143, pp.119-128.

Miciński J., Zwierzchowski G., Kowalski I.M., Wojtkiewicz J. and Szarek J., 2012. Health-supporting properties of beef. *Journal of Elementology*, Vol. 17, No. 1, pp. 149-157.

Milford A.B., Le Mouël C., Bodirsky B.L. and Rolinski S., 2019. Drivers of meat consumption. *Appetite*, Vol. 141, p. 104313.

Pighin D., Pazos A., Chamorro V., Paschetta F., Cunzolo S., Godoy F., Messina V., Pordomingo A. and Grigioni G., 2016. A Contribution of Beef to Human Health: A Review of the Role of the Animal Production Systems. *Scientific World Journal*, Vol. 2016, pp. 1-10.

Rajic S., Simunovic S., Djordjevic V., Raseta M., Tomasevic I. and Djekic I., 2022. Quality Multiverse of Beef and Pork Meat in a Single Score. *Foods*, Vol. 11, No. 8, pp. 1154.

Ritchie H., Rosado P. and Roser M., 2017. *Meat and dairy production*. Retrieved from https://ourworldindata.org/meat-production.

Rotz C.A., Asem-Hiablie S., Place S. and Thoma G., 2019. Environmental footprints of beef cattle production in the United States. *Agricultural systems*, Vol. 169, pp. 1-13.

Schnettler B., Fica D., Sepúlveda N., Sepúlveda J. and Denegri M., 2010. Valuation of intrinsic and extrinsic attributes on the purchase of beef in southern Chile. *Rev. Cient. (Maracaibo),* Vol. 20, No. 1, pp. 101-109.

Smith S.B., Gotoh T. and Greenwood P.L., 2018. Current situation and future prospects for global beef production: overview of special issue. *Asian-Australasian Journal of Animal Sciences*, Vol. 31, No. 7, pp. 927-932.

SOSR, Statistical Office of the Slovak Republic, 2022. *Consumption of selected kinds of foodstuffs per capita*. Retrieved from https://datacube.statistics.sk/#!/view/en/VBD_SLOVSTAT/ps2041rs/v_ps2041rs_00_00_00_en

Troy D.J., Tiwari B.K. and Joo S.T., 2016. Health Implications of Beef Intramuscular Fat Consumption. *Korean Journal for Food Science of Animal Resources*, Vol. 36. No. 5, pp. 577-582.

Tsitsos A., Economou V., Arsenos G., Kalitsis T., Argyriadou A. and Theodoridis A., 2021. Greek and European consumer behaviour towards beef, lamb and mutton meat safety and quality: A review. *International Journal of Agricultural Resources, Governance and Ecology*, Vol. 17, No. 2-4, pp. 414-431.

Uys P. and Bisschoff C., 2016. Identifying consumer buying preferences of beef. *Problems and perspectives in management*, Vol. 14, No. 4, pp. 256-263.

Waldron S. and Fisher B.S., 2016. Major developments in global and regional beef markets.

Wyness L., 2016. The role of red meat in the diet: nutrition and health benefits. *Proceedings of the Nutrition Society*, Vol. 75, No. 3, pp. 227-232.

Zhu W., Chen Y., Zhao J. and Wu B., 2021. Impacts of household income on beef at-home consumption: Evidence from Urban China. *Journal of Integrative Agriculture*, Vol. 20, No. 6, 1701-1715.