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Interdisciplinary Perspectives on Sustainability, Development, and Culture in the Mediterranean and Beyond

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The Mediterranean region, with its rich cultural tapestry and diverse socio-economic dynamics, continues to provide fertile ground for interdisciplinary academic inquiry. In this issue of our International Journal of Euro-Mediterranean Studies, we are pleased to present a collection of six papers that each contribute unique insights into the pressing challenges and opportunities facing Mediterranean societies today. Ranging from rural tourism and climate change to urban flood management and post-pandemic media consumption, these articles reflect the breadth of inquiry necessary to understand and shape the region's future.

CULTURE AND TOURISM: MUSIC AS A RURAL CATALYST

The paper by Govedarica et al. explores an overlooked dimension of rural tourism: the role of musicians as cultural agents and drivers of regional development. By positioning musicians not just as entertainers but as integral parts of local identity and economic revitalization, this research stimulates the discourse on cultural tourism. In the context of Mediterranean rural areas, where depopulation and economic stagnation are common, this paper reveals how music and local cultural assets can become important tools for community building and sustainable tourism. The authors advocate for strategic integration of musicians into tourism development plans, urging policymakers to harness their cultural capital more effectively.

SPORTS DECISION-MAKING: INSIGHTS FROM SERBIAN GYMNASTICS

From cultural tourism to athletic cognition, Kolar et al. delve into the realm of decision-making in sports, specifically analyzing how gymnas-
[6] tics coaches in Serbia navigate complex choices. This study provides critical insights into the cognitive and contextual factors that influence coaching strategies. It combines elements of psychology, pedagogy, and sports science to construct a picture of how high-stakes decisions are made in elite sport settings. Given the increasing professionalization of sports across the Mediterranean region, the paper contributes to an understanding of how knowledge, intuition, and experience intersect in high-performance environments.

CLIMATE CHANGE AND KNOWLEDGE MANAGEMENT IN THE PETROLEUM SECTOR

The work of Ahmed Aly et al. shifts our attention to the industrial and environmental sphere, examining the Egyptian petroleum sector's capacity for climate change management through a knowledge management lens. The authors develop a valuable framework for evaluating how effectively organizations collect, share, and apply climate-related knowledge. By focusing on a high-emissions industry within a vulnerable region, the study presents both a diagnostic tool and a call to action. The findings emphasize the importance of embedding knowledge-driven sustainability strategies in corporate and governmental frameworks, particularly in sectors with significant environmental footprints.

YOUTH, MEDIA, AND POST-PANDEMIC RECOVERY IN MOROCCO

The Covid-19 pandemic has left deep psychological and societal imprints, particularly among the youth. In their paper, El Attari et al. examine how Moroccan youth consumed media during and after the pandemic, offering a critical post-crisis analysis. Through surveys and behavioral data, the study highlights the change in media habits, perceptions of information credibility, and broader societal anxieties. This work not only contributes to the global literature on after pandemic times but also highlights the unique cultural and informational landscape of North Africa. Policymakers and educators can draw from this

research to develop more effective youth engagement and media literacy programs in the wake of future crises.

ECONOMIC INTEGRATION:A MEDITERRANEAN IMPERATIVE

[7]

Finally, Fabian et al. tackle one of the most enduring challenges in the region: economic integration. The authors provide a thorough examination of the barriers and opportunities for greater economic cooperation among Mediterranean states. From trade and infrastructure to regulatory harmonization, the paper argues that deeper economic integration is not just beneficial but essential for the region's stability and prosperity. By comparing different integration models and examining case studies, the authors present a persuasive case for renewed political commitment to regional cooperation in an era marked by geopolitical uncertainty and economic fragmentation.

CONCLUSION: TOWARD A HOLISTIC VISION

Collectively, these papers underscore the importance of interdisciplinary approaches in addressing the Mediterranean region's complex challenges. They invite us to consider how cultural identity, scientific innovation, governance, and regional solidarity intersect in shaping resilient futures. As editors, we are proud to host these important contributions and hope they inspire further research and collaboration across disciplinary and national borders.

IJEMS | SCIENTIFIC ARTICLE

Musicians, as an Important Building Block of Mediterranean Rural Tourism

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This paper looks into the significant role of musicians in improving rural tourism offerings. Rural tourism is one of the main pillars of economic development and cultural preservation as it is a tool that provides jobs, improves the local quality of life, and supports the renovation of historic sites. Through their creativity, musicians safeguard and spread intangible cultural heritage, such as traditional music and dance, which positively influences the financial performance of rural tourism entrepreneurs. Music festivals and events in the countryside are also a great source of rural tourism. They bring in substantial revenue and help form a favorable image of the destination. Events in less-favored areas have attracted visitors by diversifying tourism offerings and encouraging regional development. Despite this, their success is contingent upon good planning and proper organisation. This study investigates the influences of factors such as state support, proactivity, job satisfaction, luck, and personality traits on the success and development of musicians in Mediterranean countries, specifically in Slovenia and Montenegro. It has been revealed that including cultural resources into tourism strategies makes rural areas more attractive and competitive. Empirical studies on rural tourism indi-

cate that musicians contribute significantly to cultural tourism by attracting visitors, preserving local heritage, and stimulating economic growth, thereby supporting the sustainable development of rural areas.

[10]

Key Words: musicians, rural tourism, Mediterranean region, state support, self-confidence

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INTRODUCTION

This paper aims to determine the importance of the musician's role in building the offer in a rural tourism destination. Rural tourism has become essential for economic growth and cultural preservation in many areas. It generates employment, improves the quality of life for local population and fosters the restoration and surveillance of historic places. Among the various factors that make rural places attractive, musicians and folk music deserve a unique position. They play a critical role in defining the identity of rural areas, which become more appealing to tourists in search of authentic and immersive experiences.

Musicians, in fact, by their art and performances, contribute to both preserving and propagating intangible cultural heritage, such as traditional music or dance. This cultural diversity can dramatically impact the financial performance of rural tourism entrepreneurs by attracting a broader variety of tourists. Traditional music is an important start in rural tourism development, as it provides creative and engaging services that fundamentally improve the competitive advantage of rural areas.

This is why music festivals and events play a significant role in rural tourism. Not only do they comprise a large portion of revenue through tourists spending on accommodation, food, and transportation, but they also help to create a good image of the destination. They are also effective instruments for regional development, attracting tourists to otherwise less popular regions and adding to tourism product variety. However, the outcome of such events depends on musician's readiness to cooperate and their level of proactivity.

Therefore, musicians are one of the essential backbones of rural tourism offerings. They provide a rich cultural experience that makes a

difference in providing tourism products and, therefore, helps the sustainable development of rural areas. Their contribution to rural tourism draws attention to the need to embed cultural assets into tourism plans to increase the attractiveness and competitiveness of rural destinations. [11]

THEORETICAL BACKGROUND

Tourism has emerged as one of the largest and fastest-growing economic sectors globally, contributing significantly to international trade and employment (Croce 2018; Lew 2011; Agbola et al. 2020). Despite its economic importance, tourism faces challenges related to sustainability, inclusivity, and climate change (Croce 2018; Moreno de la Santa 2020; Scott et al. 2012). The industry's growth has led to increased recognition of its potential to foster economic development and alleviate poverty, particularly in developing countries (Saarinen et al. 2011). However, tourism's vulnerability to external factors, such as the COVID-19 pandemic, highlights the need to understand demand drivers and practical strategies better (Agbola et al. 2020). As the sector continues to expand, there is a growing emphasis on mitigating negative impacts and promoting sustainable practices (Croce 2018; Willson 2015). Researchers caution against overgeneralising tourism's benefits and impacts, emphasizing the need for more nuanced approaches to address its complex challenges (Sharpley 2012).

Rural tourism offers significant economic development and cultural preservation opportunities in rural areas. It can create jobs, improve the local quality of life, and support the restoration of historic sites (Corina 2018). Musicians and traditional music play a crucial role in rural tourism offerings, contributing to the distinctiveness of destinations (Rudan and Stipanović 2021). Intangible cultural heritage, including music and dance, can positively influence the financial results for rural tourism entrepreneurs (Starčević et al. 2022). Tradition, encompassing music, dance, and local cuisine, is a key initiator of rural tourism development (Antic et al. 2015). Rural tourism can strengthen the competitive position of destinations through creative offerings and private-sector involvement (Gannon 1994). It has the potential to build economic independence for rural communities, as evidenced by the success of tourist villages in other regions (Maret et al. 2018; Triyanto et al. 2018). The inclusion of music industry offerings can be leveraged to design cultural experiences for demanding tourists (Vaz et al. 2017).

In both developed and developing countries, tourism is frequently supposed to be a viable means of raising the economic activity of regions. Additionally, developing a tourism industry has been noted to promote the destination's image, enabling the region to achieve other
[12] objectives, such as business recruitment and retention.

Music festivals and events significantly impact tourism, particularly in rural and lesser-known destinations. This is especially typical for regions with a rich cultural tradition, which certainly includes Mediterranean countries. Music events can boost local economies by generating revenue through tourist expenditure on accommodation, food, and transportation (Baldi et al. 2022; Čekrlija and Milić 2024). They also contribute to destination image formation and place-making (Duarte et al. 2018). Music tourism can lead to cultural changes, affecting local musicians and traditions (Basu and Imara 2014; Stipanović et al. 2023). Festivals serve as key tools for regional development, attracting visitors to less-favoured areas and diversifying tourism offerings (Ribeiro et al. 2006). These events not only have economic impacts, but also bring social, cultural, and political implications for host communities (Dujmović and Vitasović 2012). However, the success of music events in promoting tourism depends on strategic planning, organization and the willingness of musicians to contribute (Čekrlija and Milić 2024).

Based on the introduction provided, the following research question could be formulated: How do factors such as state support, job satisfaction, luck, and personality traits (self-confidence, subjective norms, internal locus of control) influence the proactivity of musicians and, consequently, their readiness to be involved in the growth of rural music tourism in Mediterranean countries like Slovenia and Montenegro?

HYPOTHESES DEVELOPMENT

Rural tourism has become an increasingly important regional development and re-imaging strategy in Mediterranean countries, particularly as they face global rural restructuring challenges (Hall and Mitchell 2000). Previous research has mentioned music as one of the traditional elements that can attract tourists to rural areas, alongside dance, clothing, and culinary specialties (Antic et al. 2015). Integrating cultural resources, including traditional music, into rural tourism offerings can enhance the appeal of destinations and contribute to rural revitalization (Wang 2023). However, rural tourism development still involves a complex interplay of various factors, including natural beauty, lo-

cal traditions, and government policies (Antic et al. 2015; Wang 2023).

It's important to recognize that while rural tourism can provide opportunities for economic development and job creation in rural areas, also it also presents challenges and potential adverse impacts (Boz et al. 2018; Saarinen 2007). Sustainable rural tourism development requires careful planning and consideration of economic, social, and environmental factors (Boz et al. 2018; Fun et al. 2014). [13]

The interplay between state support, proactivity, luck, and work satisfaction creates a complex environment for Mediterranean musicians. While state support provides opportunities and resources, individual proactivity remains crucial for career advancement. The cultural understanding of luck and fortune adds another layer to this dynamic, potentially influencing how musicians perceive and pursue opportunities. Job satisfaction, especially when combined with a supportive work-family culture, can help sustain proactive behaviors and commitment to one's musical career despite challenges and uncertainties.

State support for the music industry varies across Mediterranean countries, with some nations recognizing its potential as both cultural and economic asset. A recent study in Kosovo found that the art and music sector has shown considerable growth potential, contributing to the country's cultural and economic environment by providing employment opportunities (Breznica et al. 2024). The Kosovan music scene encompasses various genres, from traditional folk music to modern styles, catering to both local and global preferences. Slovenia and Montenegro share a recent past with Kosovo, so we derived hypotheses H1 and H2 based on these findings.

H1 The level of perceived state support differs between the observed regions

H1a A higher level of perceived state support leads to a higher level of proactivity

Proactivity plays a significant role in the success of musicians in Mediterranean countries. Research by Smale et al. (2019) has shown that proactive career behaviours, such as self-promotion, networking, and continuous skill development, positively correlate with musicians' subjective financial success, as measured by income stability, career satisfaction, and professional opportunities (Smale et al. 2019). Proactivity emerges as a crucial trait for musicians and entrepreneurs in Mediterranean countries, particularly during economic crises, as it

enables adaptability, opportunity recognition, and financial resilience (Toubes et al. 2019). However, the relationship between proactivity and work-life balance is more complex. Interestingly, the benefits of career proactivity may vary across cultures, with factors such as in-group collectivism, power distance, and uncertainty avoidance influencing the outcomes (Smale et al. 2019). The concept of luck and fortune also plays a role in the social imagination of Mediterranean musicians. Anthropological studies have highlighted how idioms of luck and fortune can connect humans, potentially influencing the perceived success of musicians (da Col 2012). This understanding of luck may interact with proactive behaviours, shaping how musicians approach their careers and interpret their successes or failures. On this basis, we set our hypotheses H2, H3 and H4.

[14]

- H2 The percentage of income from the music industry differs between the observed regions
- H2a A higher percentage of income from the music industry leads to a higher level of proactivity
- H3 The level of perceived luck differs across the observed regions
- H3a A higher level of perceived luck is associated with a higher level of proactivity

Work satisfaction is another crucial factor that influences musicians. Research has shown that job satisfaction can be a motivational resource for maintaining high levels of proactivity over time (Strauss et al. 2015). Additionally, a supportive work-family culture has been associated with less work-family conflict, greater job satisfaction, and greater affective commitment (de Janasz et al. 2013). Balancing their artistic pursuits with family responsibilities may be particularly important for musicians in the Mediterranean region, given the cultural emphasis on family in many of these countries. On this basis, we set our hypothesis H5.

- H4 The level of work satisfaction differs between the observed regions
- H4a A higher level of work satisfaction leads to a higher level of proactivity

Research on musicians' personalities and cognitive profiles has revealed interesting differences both among various groups of musicians and between musicians and non-musicians. These differences extend

factors such as subjective norms, self-confidence, and locus of control, which can vary based on factors such as musical training, instrument type, and cultural background. Subjective norms among musicians are also influenced by the type of musical training they receive. For instance, Rose et al. (2018) suggest that formal music learning is associated with higher levels of conscientiousness, while musicians, in general, tend to have higher levels of openness to experience compared to population norms. Research also indicates that the close environment may shape musicians' perceptions of what is expected or valued within their musical community (Rose et al. 2019). [15]

Self-confidence among musicians seems to be closely tied to their performance abilities and their perception of control over their skills. Hanton and Connaughton (2002) highlight that perceived control is a crucial moderating factor in how musicians interpret anxiety symptoms and their impact on performance. When musicians feel in control of their symptoms, they tend to interpret them as facilitative for performance, leading to increased self-confidence. Conversely, a lack of perceived control can result in debilitative effects on performance and lower self-confidence (Hanton and Connaughton 2002). The locus of control among musicians may differ based on their musical background, expertise and cultural environment. Agres et al. (2022) suggest that musicians are more sensitive to the dynamic and schematic properties of musical stimuli than non-musicians. This heightened sensitivity could indicate a more internal locus of control, as musicians may feel more capable of understanding and manipulating musical elements (Agres et al. 2022). Additionally, Porflitt and Rosas (2020) reveal that different types of musicians (rhythmic, melodic, and harmonic) exhibit varying cognitive performances, which could influence their perception of control over their musical abilities (Porflitt and Rosas 2020). While the available research does not explicitly address regional differences in these aspects, it is reasonable to assume that cultural factors and local environment may contribute to variations in subjective norms, self-confidence, and locus of control among musicians in different regions.

On this basis, we believe it makes sense to include personality factors into our research model and to explore these potential regional differences and their implications.

H5 The level of perceived self-confidence differs between the observed regions

H5a A higher level of perceived self-confidence leads to a higher level of proactivity

H6 The level of perceived subjective norms differs between the observed regions

[16]

H6a A higher level of perceived subjective norms leads to a higher level of proactivity

H7 The level of internal locus of control differs between the observed regions

H7a A higher-level internal locus of control is associated with a higher level of proactivity

METHODOLOGY AND RESULTS

To test the hypotheses, we collected data in Slovenia and Montenegro in 2023. In both cases, the population consists of musicians in the observed region, which was in 2023. The data were collected using an online survey questionnaire and with the help of regional musicians' associations.

The values of the variables were compared using the *t*-test between independent samples. To test the assumed dependence relations, we set up a linear regression model for each region separately to test the hypotheses in each region. In this way, we also enabled the comparison of regression coefficients between the observed regions.

The gender composition of the sample is comparable in both regions. in both cases, the sample is approximately two-thirds male and 1/3 female. Table 1 also shows the regional composition of the sample, namely by age, years of activity in the music industry and the percentage of personal revenue that comes from the music industry. The sample size is appropriate if we note that the Montenegro sample is small but still sufficient to meet the minimum requirements for carrying out the planned analyses (Louangrath 2017).

The dependent variable in our linear regression model is the individual's proactivity level. We collected data using a 10-item Likert scale, which has been used and validated in previous research. Items are captured on 7-step scale (Bateman and Crant 1993).

For all independent variables, we also used previously used and validated scales. To measure the perceived level of state support, a 5-point six-item scale was used. The scale originates from the research on the perceived organizational support (Eisenberger et al. 2001). Self-

TABLE 1 Sample Frequencies

Country	Male		Female		Total	
	n	%	*n*	%	*n*	%
Slovenia	116	64.4	64	35.6	180	100.0
Montenegro	30	66.7	15	33.3	45	100.0
Total	146	64.9	79	35.1	225	100.0

[17]

Country	Item	*n*	Mean	SD
Slovenia	Age	181	43.44	12.37
	Years in music	179	20.35	15.45
	Percent of income	176	56.89	38.07
Montenegro	Age	45	36.84	9.94
	Years in music	43	12.98	10.66
	Percent of income	42	48.36	40.08

TABLE 2 *t*-Test Results

Item	*t*	Sig.	Mean*
Percent of incom from music	1.291	0.198	8.52900
State support	3.608	0.000	3.17828
Self confidence	−2.562	0.012	−1.24785
Proactivity	−0.840	0.402	−1.17469
Subjective norms	1.407	0.161	0.84003
Luck	−2.070	0.040	−2.64935
Internal locus of control	0.425	0.671	0.54170
Work satisfaction	3.206	0.003	2.39261

NOTES * Slovenia-Montenegro.

confidence was measured with nine items on 5-point Likert scale previously used in a study of private and public self-consciousness (Vleeming and Engelse 1981). Subjective norms were captured with three items on 7-point scale based on a previous study of entrepreneurial programs in relation to students entrepreneurial intention after graduation (Levenson 1973; Souitaris et al. 2007).

From the same study, we also used 4 items for measuring the internal locus of control level which we supplemented with four additional items used in the research of multidimensional locus of control (Levenson 1973). Work satisfaction was captured with 5 item scale (Oyler 2007).

To compare the two observed regions by individual variables, we

TABLE 3 Country-Level Variable Comparison: Hypotheses Confirmation

H	Observed variable	Confirmed
H1	The level of perceived state support	Yes
H2	The percentage of income from the music industry	No
H3	The level of perceived luck	Yes
H4	The level of work satisfaction	Yes
H5	The level of perceived self-confidence	Yes
H6	The level of perceived subjective norms	No
H7	The level of internal locus of control	No

[18]

used the *t*-test of means of independent samples to test the hypotheses. The results of the *t*-test are summarized in table 2. We detected a statistically significant difference between the two groups in perceived state support. In this case, we detected a very high significance level (p = 0.000). Slovenian musicians perceive a higher level of state support compared to their colleagues from Montenegro. Interestingly, in the case of self-confidence, we detected an equally high statistically significant difference (p = 0.012), but in favour of Montenegrin musicians. Montenegrin musicians also attach greater importance to the lucky circumstances necessary for successful operation in the music industry (p = 0.040).

Regarding job satisfaction, the detected statistically significant difference (p = 0.003) showed higher satisfaction among Slovenian musicians. We did not detect statistically significant differences between the two groups for the other observed factors. An overview of the confirmed hypotheses is given in table 3.

We used a regression model to test the causal relationships between the independent variables presented in the introduction of this paragraph and musicians' proactivity, which is the model's dependent variable. We developed a regression model for each region separately to compare the two regions. The regression coefficients are given in table 4.

The results of the models show that only a few of the factors included affect the proactivity of music industry stakeholders. This is especially true for Montenegro, where we detected a statistically significant causal relationship only in the case of self-assessed level of self-confidence (p = 0.043). All other factors do not have a statistically significant effect on the proactivity of Montenegrin musicians. The model

TABLE 4 Regression Models Coefficients

Country	Item	*B*	*β*	*t*	Sig.
Slovenia	(Constant)	12.720		2.128	0.035
	Percent of incom from music	−0.026	−0.127	−1.762	0.081
	State	−0.217	−0.140	−1.988	0.049
	Self_confidence	0.979	0.467	6.472	0.000
	Subj_norms	−0.072	−0.030	−0.388	0.698
	Luck	0.078	0.069	0.976	0.331
	Locus	0.252	0.234	2.980	0.004
	Work_satisf	0.294	0.120	1.546	0.125
	Gend_F	4.043	0.250	3.557	0.001
Montenegro	(Constant)	10.230		0.704	0.489
	Percent of incom from music	−0.006	−0.035	−0.217	0.830
	State	−0.456	−0.315	−1.652	0.113
	Self_confidence	0.929	0.386	2.150	0.043
	Subj_norms	0.584	0.319	1.318	0.201
	Luck	−0.221	−0.212	−1.257	0.222
	Locus	0.340	0.314	1.395	0.177
	Work_satisf	0.304	0.186	0.886	0.385
	Gend_F	−0.226	−0.014	−0.087	0.931

NOTES Dependent variable: proactivity.

[19]

is quite good at the sample level, explaining 45.9% of the variance in proactivity in Slovenia and 53.5% in Montenegro. In Slovenia, proactivity is statistically significantly affected by perceived state support (p = 0.049), level of self-confidence (p = 0.000) and the level of internal locus of control of behaviour (p = 0.004).

It is worth mentioning that a higher level of perceived state support leads to a lower level of individual proactivity. We believe such a result would require an in-depth analysis to explain the reasons. In any case, the result represents a good motive for future research. In both observed countries, self-confidence stands out as the most potent factor (SLO β = 0.467 and MNE β = 0.386).

In addition to the independent variables, we included the respondent's gender in the model as a control variable. The analysis showed that in Slovenia, female musicians are statistically significantly more proactive than their male counterparts (p = 0.001). However, in Montenegro, we did not detect statistically significant differences between the genders. Table 5 gives an overview of the tested hypotheses.

TABLE 5 Country-Level Hypotheses Confirmation

H	Independent variable	Slovenia	Montenegro
H1a	The level of perceived state support	Yes	No
H2a	The percentage of income from the music industry	No	No
H3a	The level of perceived luck	No	No
H4a	The level of work satisfaction	No	No
H5a	The level of perceived self-confidence	Yes	Yes
H6a	The level of perceived subjective norms	No	No
H7a	The level of internal locus of control	Yes	No

NOTES Dependent variable: proactivity.

[20]

DISCUSSION

The research results show a strong connection with general theoretical positions, which can be summarized through a few facts. As a globally growing economic sector, rural tourism can strongly contribute to economic development and the preservation of cultural heritage in rural areas. Within these frameworks, the basis is formed by activities such as traditional music, dance, clothing, and culinary specialities (Guo et al. 2023). These activities significantly contribute to the attractiveness of destinations and the revitalization of rural areas.

Rural tourism also plays a key role in preserving cultural heritage, promoting sustainable development, and increasing economic opportunities in rural areas. In this context, musicians represent an essential factor in developing tourism in rural areas. Mediterranean countries can undoubtedly use their rich cultural heritage to develop tourism in rural regions. Of course, the willingness of music industry stakeholders to participate in this project is of key importance for successfully implementing this idea. Musicians are an essential part of the rural tourism offer, attracting visitors with their artistry and Mediterranean authenticity, and creating unique experiences. Branding that connects rural tourism and musical tradition strengthens the recognition of regions and builds an emotional bond with visitors, encouraging tourism's long-term development (Damnjanovic et al. 2009).

To ensure readiness for cooperation, state support is needed. In this context, we found that Slovenian musicians recognize state support for their activity as an essential factor that encourages a higher level of proactivity. On the other hand, their Montenegrin colleagues on the other side of the Mediterranean do not perceive state support as an important factor. The perceived difference is worth in-depth consider-

ation and analysis to uncover the underlying causes. The reason may lie in the possibly too low level of support for the music industry from the state so far. From this perspective, it would be beneficial for state bodies responsible for developing rural tourism to place greater emphasis on supporting the music industry and its participants. In doing so, [21]
it is necessary to focus on the visibility of this support, as the musicians themselves must positively recognise it. Only in this case can we rightly expect a greater willingness for active cooperation among musicians. This conclusion is in line with the existing theory, as sustainable rural development can be achieved mainly through the integration of tourism and local cultural practices (Coroș et al. 2021; Kim and Jamal 2015). In addition to the above, previous studies emphasise the importance of better governance for more successful tourism development in rural regions (Lane and Kastenholz 2015).

Of course, we should not overlook the critical fact that the research found a negative correlation between the level of proactivity and perceived state support. This means that higher perceived support can also lead to lower stakeholder proactivity. From this perspective, we also believe that further research is needed to identify the reasons for such results. This is consistent with the theoretical argument that proactivity is essential for achieving success, even though there is limited support. This result is consistent with research indicating that state support can provide resources and opportunities, but individual proactivity remains key to career advancement (Hall and Mitchell 2000; Wang 2023).

The observation that proactivity was better predicted by self-confidence in both countries provides theoretical support to the assumption that self-confidence is a crucial determinant of proactive behaviour. Several studies report that self-confidence is related to perceptions of control over ability and performance, which, in turn, should facilitate proactiveness (Hanton and Connaughton 2002; Agres et al. 2022), and thus confirms the specificity of this within this body of research. When comparing the two observed Mediterranean regions, we detected a higher level of self-confidence among Montenegrin musicians, which may also be a consequence of the previous finding that they receive less support from the state and are thus more dependent on their abilities.

The research results show that musicians in Montenegro attach greater importance to luck, which can shape their approach to their careers and proactivity. This is an interesting finding related to theoretical

claims about the role of luck in the social imagination of musicians. Da Col, in his study, discovered that the cultural perception of the notion of luck is a potential explanatory factor in success and proactivity perception (da Col 2012). In light of this finding, it is worth mentioning the
[22] possibility that musicians in Montenegro attach greater significance to luck than their Slovenian counterparts, possibly due to the lower level of state support for their activity.

The research additionally found that musicians in Slovenia are more satisfied with their jobs, which can contribute to their proactivity. However, this factor was significant only in Slovenia when tested with a regression model. Owing to the results of the studies, many authors have formulated in their research the conclusion that job satisfaction can be a motivational resource to sustain high levels of proactivity (Strauss et al. 2015; de Janasz et al. 2013), which emphasizes the significance of the results obtained, since it is in agreement with the previously established relationship between job satisfaction and high levels of proactivity in the music industry.

Music plays a crucial role in enhancing rural tourism offerings, particularly through the valorisation of traditional and local music heritage (Rudan and Stipanović 2021; Krajnović and Gortan-Carlin 2007). However, challenges arise from the commercialization of rural spaces and the potential loss of authentic cultural experiences (Wu 2017). Additional challenges lie in fully exploiting rural tourism potential, including the need to build trust, rebuild social capital, and integrate local communities into development processes (Demonja 2014; Quaranta et al. 2016a). Accordingly, educating the younger generation can undoubtedly contribute to the further development of rural music tourism in Slovenia and Montenegro, as it reflects the specific interest of the inhabitants in musical education in these regions. The Mediterranean cultural environment in Slovenia encourages students to join numerous musical groups of various genres during and after their studies (Plevnik et al. 2021), enhancing the local music scene and its appeal to visitors. This creates a unique synergy between musical tradition and tourism, supporting the sustainable development of rural areas.

CONCLUSION

Rural tourism has emerged as an important driving factor in economic growth and cultural protection across the globe. Musicians, using their artistry and performing activities, contribute to rural regions' distinc-

tive cultural identity, which in turn makes regions more attractive to tourists seeking genuine and immersive experiences. This is especially important for regions with a rich cultural tradition, which certainly includes Mediterranean countries.

[23] Rural tourism is a key driver of economic development, contributing to income diversification, job creation, and cultural preservation. Studies indicate that it enhances local economies by promoting small businesses, reducing urban migration, and fostering sustainable resource management (Dimitrijević et al. 2022; Livandovschi 2022; Sert 2024). Rural tourism supports environmental conservation through ecotourism initiatives and incentivizes the protection of cultural heritage. It contributes to preserving cultural heritage, natural resources, and traditional crafts (Sert 2024; Tola et al. 2024). Community involvement is crucial for successful rural tourism development, as it fosters a deeper understanding of local challenges and promotes innovative solutions (Kuqi et al. 2019). Rural tourism benefits both tourists and host communities, improving infrastructure and quality. However, inadequate infrastructure, seasonal demand fluctuations, and environmental degradation require strategic policy interventions life (Slusariuc 2018; Tola et al. 2024).

Our analysis shows that several determinants, such as state assistance, self-efficacy, job satisfaction, and cultural variations, shape musicians' proactivity. Although state funding is critical, it should be structured to encourage musicians' autonomy and creativity without fostering excessivedependence on subsidies. Self-confidence among musicians was identified as one of the main determinants of proactivity in both observed regions.

The study also highlights the need to support an understanding of cultural nuances. Rural tourism has become a cornerstone of economic growth and cultural heritage in many Mediterranean areas. Musicians are, moreover, critical actors in the construction of the distinctive cultural identity of rural Mediterranean communities via their performance/artistic practices. Hence, rural communities have become increasingly desirable tourist destinations that display authenticity and immersive experiences. This study emphasises the role of managing critical motivational factors, with the goal of raising the musician's proactivity levels.

The research shows that some background variables affecting musicians' proactivity are state support, self-efficacy, job satisfaction, and

cultural variability. State aid is, of course, crucial, but it should be designed to encourage engagement with the arts by musicians in a way that does lead to excessive dependence on such support. Notably, self-confidence emerged as the most decisive factor influencing proactivity
[24] among musicians, underscoring the need for self-confidence training and professional development workshops.

In general, the paper contributes to the sustainable regional development of Mediterranean rural areas by providing insights into some of the variables driving musicians' initiative and music tourism development. The findings can be applied to enhance the music industry and rural tourism offerings in Slovenia, Montenegro, and other Mediterranean regions. This would ultimately improve the appeal of rural destinations while promoting economic development, cultural preservation, and the development of proactive skills in musicians through education. In addition, it draws attention to the importance of more sophisticated support structures for musicians and more robust approaches for creating rural music tourism.

The study's limitations include the small sample size in Montenegro, which may affect the general validity of the findings, and the geographical limitation to only two Mediterranean countries, which makes it difficult to generalize to wider regions. Self-reporting scales may introduce bias, while the time frame, which is limited to 2023, does not allow for insight into long-term trends. In addition, the study does not include a wider range of factors, such as cultural differences or financial barriers, limiting the results' comprehensiveness.

For further research, we suggest including a wider geographical area and additional factors such as cultural differences, financial barriers and the impact of digitalization, which would allow for a more comprehensive analysis. Additionally, long-term studies and the use of qualitative methods would contribute to a deeper understanding of the dynamic factors that influence musicians' proactivity and the development of music tourism.

REFERENCES

Agbola, F. W., T. Dogru, and U. Gunter. 2020a. 'Tourism Demand: Emerging Theoretical and Empirical Issues.' *Tourism Economics* 26 (8): 1307–10.

Agres, K., T. Y. Tay, and M. Pearce. 2022. 'Comparing Musicians and Non-Musicians' Expectations in Music and Vision.' In *ACM International*

Conference Proceeding Series, 74–9. Association for Computing Machinery.

Antic, A., A. Vujko, and T. Gajic. 2015. 'Tradition as an Initiator of Rural Tourism Destinations Development.' *Škola biznisa* 2 (12): 9–20.

Baldi, L., M. Peri, G. Baldi, and M. T. Trentinaglia. 2022. 'Economic Impact of an International Musical Event in a Small Destination: What Benefits for Local and Rural Development?' *Event Management* 26 (2): 419–36.

Basu, R., and M. Imara. 2014. 'From the Perspective of Musicians in Goa: How Has Tourism Changed Music Culture?' *Journal of Tourism and Hospitality Management* 2 (9): 343–56.

Bateman, T. S., and J. M. Crant. 1993. 'The Proactive Component of Organizational Behavior: A Measure and Correlates.' *Journal of Organizational Behavior* 14 (2): 103–18.

Boz, I., O. Kilic, and C. Kaynakci. 2018. 'Rural Tourism Contributions to Rural Development in the Eastern Black Sea Region of Turkey.' *International Journal of Scientific Research and Management* 6 (4): AH-2018.

Breznica, R. K., B. Luzha, F. G. Rexhepi, and B. R. Rexhepi. 2024. 'An Analysis of The Economic Impact Potential of The Art Music Scene in Kosovo: Is It a Burden or An Additional Value for Society?' *International Journal of Religion* 5 (5): 460–74.

Čekrlija, S., and Z. Milić. 2024. 'The Significance of Tourist Consumption from the Perspective of Organizing Music Festivals.' *Science International Journal* 3 (1): 133–7.

Col, G. da. 2012. 'Introduction: Natural Philosophies of Fortune-Luck, Vitality, and Uncontrolled Relatedness.' *Social Analysis* 56 (1): 1–23.

Corina, S. G. 2018. 'Rural Tourism an Opportunity for Sustenable Development.' *Ovidius University Annals: Economic Sciences Series* 18 (2): 349–53.

Coroș, M. M., D. Privitera, L. M. Păunescu, A. Nedelcu, C. Lupu, and A. Ganușceac. 2021. 'Mărginimea Sibiului Tells Its Story: Sustainability, Cultural Heritage and Rural Tourism; A Supply-Side Perspective.' *Sustainability* (Switzerland) 13 (9): 5309.

Croce, V. 2018. 'With Growth Comes Accountability: Could a Leisure Activity Turn into a Driver for Sustainable Growth?' *Journal of Tourism Futures* 4 (3): 218–32.

Damnjanovic, V., M. Kravic, and T. Abdul Razek. 2009. 'Tourism Branding Strategy of the Mediterranean Region.' *International Journal of Euro-Mediterranean Studies* 2 (1): 99–120.

Dimitrijević, M., L. Ristić, and N. Bošković. 2022. 'Rural Tourism as a Driver of the Economic and Rural Development in the Republic of

Serbia.' *Menadzment u hotelijerstvu i turizmu* 10 (1). https://doi.org/10.5937/menhottur2201079d.

Demonja, D. 2014. 'Pregled i analiza stanja ruralnog turizma u hrvatskoj.' *Sociologija i prostor* 52 (1): 69–90.

[26] Duarte, P., J. A. Folgado-Fernández, and J. M. Hernández-Mogollón. 2018. 'Measurement of the Impact of Music Festivals on Destination Image: The Case of a Womad Festival.' *Event Management* 22 (4): 517–26.

Dujmović, M., and A. Vitasović. 2012. 'Festivals, Local Communities and Tourism.' In *Soundtracks: Music, Tourism and Travel Conference,* 1–8. Leeds Metropolitan University.

Eisenberger, R., S. Armeli, B. Rexwinkel, P. D. Lynch, and L. Rhoades. 2001. 'Reciprocation of Perceived Organizational Support.' *Journal of Applied Psychology* 86 (1): 42–51.

Fun, F. S., L. M. Chiun, P. Songan, and V. Nair. 2014. 'The Impact of Local Communities' Involvement and Relationship Quality on Sustainable Rural Tourism in Rural Area, Sarawak: The Moderating Impact of Self-Efficacy.' *Procedia: Social and Behavioral Sciences* 144:60–5.

Gannon, A. 1994. 'Rural Tourism as a Factor in Rural Community Economic Development for Economies in Transition.' *Journal of Sustainable Tourism* 2 (1–2): 51–60.

Guo, B., Y. M. Wang, H. Zhang, C. Liang, Y. Feng, and F. Hu. 2023. 'Impact of the Digital Economy on High-Quality Urban Economic Development: Evidence from Chinese Cities.' *Economic Modelling* 120:106194.

Hall, C. M., and R. Mitchell. 2000. 'Wine Tourism in the Mediterranean: A Tool for Restructuring and Development.' *Thunderbird International Business Review* 42 (4): 445–65.

Hanton, S., and D. Connaughton. 2002. 'Perceived Control of Anxiety and Its Relationship to Self-Confidence and Performance.' *Research Quarterly for Exercise and Sport* 73 (1): 87–97.

Janasz, S. de, S. J. Behson, K. Jonsen, and M. J. Lankau. 2013. 'Dual Sources of Support for Dual Roles: How Mentoring and Work-Family Culture Influence Work-Family Conflict and Job Attitudes.' *International Journal of Human Resource Management* 24 (7): 1435–53.

Kim, S., and T. Jamal. 2015. 'The Co-Evolution of Rural Tourism and Sustainable Rural Development in Hongdong, Korea: Complexity, Conflict and Local Response.' *Journal of Sustainable Tourism* 23 (8–9): 1363–85.

Krajnović, A., and I. P. Gortan-Carlin. 2007. 'Possibilities of Music Heritage Tourist Valorization: An Example of Istria.' *Tourism and Hospitality Management* 13 (2): 469–82.

Kuqi, B., H. Shabani, and P. Hasanaj. 2019. 'The Role of Community in Rural Tourism Development and Economic Impact.' *Knowledge: International Journal* 34 (1): 229–34.

Lane, B., and E. Kastenholz. 2015. 'Rural Tourism: The Evolution of Practice and Research Approaches – towards a New Generation Concept?' *Journal of Sustainable Tourism* 23 (8–9): 1133–56.

Levenson, H. 1973. 'Multidimensional Locus of Control in Psychiatric Patients.' *Journal of Consulting and Clinical Psychology* 41 (3): 397–404.

Lew, A. A. 2011. 'Tourism's Role in the Global Economy.' *Tourism Geographies* 13 (1): 148–51.

Livandovschi, R. 2022. 'The Role of the Rural Tourism in Developing the Economy of Rural Regions'. In *Competitiveness and Innovation in the Knowledge Economy: 26th International Scientific Conference*. ASEM.

Louangrath, P. 2017. 'Minimum Sample Size Method Based on Survey Scales.' *International Journal of Research & Methodology in Social Science* 3 (3): 44–52.

Maret, S., C. G. Iwu, T. B. Musikavanhu, and R. D. Handayani. 2018. 'Rural Tourism as a Way to Build Economic Independence.' *African Journal of Hospitality, Tourism and Leisure* 7 (4): 1–11.

Moreno de la Santa, J. G. S. 2020. 'Tourism as a Lever for a More Inclusive Society.' *Worldwide Hospitality and Tourism Themes* 12 (6): 731–8.

Oyler, J. D. 2007. 'Core Self-Evaluations And Job Satisfaction: The Role Of Organizational And Community Embeddedness.' PhD diss., Virginia Polytechnic Institute and State University.

Plevnik, M., M. Gerževič, I. Lešnik, I. Babnik, and K. Babnik. 2021. 'The Mediterranean as a Factor of Enrolment InMusic Programmes of Individual Musical Instruments in Music Schools: A Case Study of Slovenia.' *International Journal of Euro-Mediterranean Studies* 14 (2): 91–105.

Porflitt, F., and R. Rosas. 2020. 'Core Music Elements: Rhythmic, Melodic and Harmonic Musicians Show Differences in Cognitive Performance (Elementos Básicos de La Música: Músicos Rítmicos, Melódicos y Armónicos Muestran Diferencias de Desempeño Cognitivo).' *Estudios de Psicologia* 41 (3): 532–62.

Quaranta, G., E. Citro, and R. Salvia. 2016. 'Economic and Social Sustainable Synergies to Promote Innovations in Rural Tourism and Local Development.' *Sustainability* (Switzerland) 8 (7): 668.

Ribeiro, J. C., L. Vareiro, C. P. Fabeiro, and X. Pardellas de Blas. 2006. 'Importância Da Celebração de Eventos Culturais Parao Turismo Do Minho-Lima: Um Estudo de Caso.' *Revista Portuguesa de Estudos Regionais* 11: 61–76.

Rose, D., A. Jones Bartoli, and P. Heaton. 2019. 'Formal-Informal Musi-

cal Learning, Sex and Musicians' Personalities.' *Personality and Individual Differences* 142:207–13.

Rudan, E., and C. Stipanović. 2021. 'Music in the Tourism Offering of Rural Regions (the Case of Eastern Croatia).' *European Countryside* 13 (3): 685–96.

[28]

Saarinen, J. 2007. 'Contradictions of Rural Tourism Initiatives in Rural Development Contexts: Finnish Rural Tourism Strategy Case Study.' *Current Issues in Tourism* 10 (1): 96–105.

Saarinen, J., C. Rogerson, and H. Manwa. 2011. 'Tourism and Millennium Development Goals: Tourism for Global Development?' *Current Issues in Tourism* 14 (3): 201–3.

Scott, D., S. Gössling, and C. M. Hall. 2012. 'International Tourism and Climate Change.' *Wiley Interdisciplinary Reviews: Climate Change* 3: 213–32.

Sert, A. N. 2024. 'Rural Tourism As Promoter of Rural Development.' *Journal of Management and Economic Studies* 6 (4): 370–9.

Sharpley, R. 2012. 'Tourism and Vulnerability: A Case of Pessimism?' *Tourism Recreation Research* 37 (3): 257–60.

Slusariuc, G. C. 2018. 'Rural Tourism an Opportunity for Sustenable Development.' *Ovidius University Annals: Economic Sciences Series* 18 (2): 349–53.

Smale, A., S. Bagdadli, R. Cotton, S. Dello Russo, M. Dickmann, A. Dysvik, M. Gianecchini, R. Kaše, M. Lazarova, A. Reichel, P. Rozo, M. Verbruggen 2019. 'Proactive Career Behaviors and Subjective Career Success: The Moderating Role of National Culture.' *Journal of Organizational Behavior* 40 (1): 105–22.

Souitaris, V., S. Zerbinati, and A. Al-Laham. 2007. 'Do Entrepreneurship Programmes Raise Entrepreneurial Intention of Science and Engineering Students? The Effect of Learning, Inspiration and Resources.' *Journal of Business Venturing* 22 (4): 566–91.

Starčević, K., Ž. Vojinović, and J. Glavaš. 2022. 'Intangible Cultural Heritage and Their Influence on Financial Results in Rural Tourism.' *Ekonomika poljoprivrede* 69 (2): 483–96.

Stipanović, C., E. Rudan, and V. Zubović. 2023. 'Enhancing Competitiveness for Economic and Tourism Growth: Case of Croatia.' In *Tourism in Southern and Eastern Europe* 7:397–408.

Strauss, K., M. A. Griffin, S. K. Parker, and C. M. Mason. 2015. 'Building and Sustaining Proactive Behaviors: The Role of Adaptivity and Job Satisfaction.' *Journal of Business and Psychology* 30 (1): 63–72.

Tola, A., A. Minga, and E. Muca. 2024. 'Rural Tourism: Nurturing Prosperity and Community Resilience.' *Edelweiss Applied Science and Technology* 8 (3): 279–89.

Toubes, D. R., J. García del Junco, and M. Abe. 2019. 'Cross-Cultural Analysis of Japanese and Mediterranean Entrepreneurs during the Global Economic Crisis.' *Journal of International and Global Studies* 10 (2): 3.

Triyanto, C. G. I., T. B. Musikavanhu, and R. D. Handayani. 2018. 'Rural Tourism as a Way to Build Economic Independence.' *African Journal of Hospitality, Tourism and Leisure* 7 (4): 1–11.

Vaz, M., A. Dinis, and O. Silva. 2017. 'New Rurality, Traditional Music and Tourist Experience.' *Journal of Tourism, Heritage & Services Marketing* 3 (1): 25–32.

Vleeming, R. G., and J. A. Engelse. 1981. 'Assessment of Private and Public Self-Consciousness: A Dutch Replication.' *Journal of Personality Assessment* 45 (4): 385–9.

Wang, H. 2023. 'Study on the Development of Rural Tourism and Cultural Integration in Zhejiang Province.' *Frontiers in Business, Economics and Management* 7 (2): 74–9.

Willson, G. 2015. *Taking Responsibility for Tourism*. Taylor & Francis.

Wu, J. 2017. 'Ethnic Tourism and the Big Song: Public Pedagogies and the Ambiguity of Environmental Discourse in Southwest China.' *Educational Philosophy and Theory* 49 (5): 480–500.

IJEMS | SCIENTIFIC ARTICLE

How Do Serbian Gymnastics Coaches Make Decisions?

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Different authors argue that coaching is fundamentally a decision-making (hereinafter: DM) process, while coaches' DM has been identified as a key element of a coach's practice. In the present study, we examined the DM behavior of Serbian gymnastics coaches. The sample consisted of 53 coaches (age: 40.96±13.04 years). Manifested DM behavior was measured during the national coaching seminar using the General DM Style Inventory, which includes five DM styles defined as rational, intuitive, dependent, spontaneous and avoidant DM. Factor analyses were performed to reveal the DM styles' structure. Pearson's correlation coefficient was used to identify the association between DM styles, demographic and professional characteristics, and ANOVA was used to detect differences between more experienced and less experienced coaches. The results showed that coaches use a combination of all five DM styles when making decisions, but mostly use rational and dependent DM styles. Based on the discovered average structure of the DM styles, we can conclude that Serbian gymnastics coaches are mostly rational decision-makers who increase their rationality by seeking advice, opinions, and knowledge from colleagues when making decisions. Furthermore, more experienced coaches can make decisions more independently and also faster when the situation is urgent or time-limited.

Key Words: Serbian gymnastics coaches, decision-making styles, structure, demographic characteristics, professional characteristics, experience

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INTRODUCTION

Different authors argue that coaching is essentially a decision-making (hereinafter: DM) process (Abraham and Collins 2011, 367; Lyle and Muir 2020, 1), with coaches' DM identified as a key aspect of their practice (Kaya 2014, 333; Coutts 2017, 717; Till et al. 2018, 14). It is considered the hallmark of an expert coach (Nash and Collins, 2006) and one of the most important skills a coach must possess (Post and van Gelder 2023). DM is a defining element of coaching expertise (Harvey et al. 2015).

[32]

Athletes' performance is mainly determined by their developed capabilities (knowledge, abilities, characteristics, and motivation) and effective training process management, the long-term goal of which is to transform the athlete's capabilities to meet the demands of their sport (Kolar et al. 2006, 11). Nash and Collins (2006, 467) view coaches as managers of the training process, responsible for planning, organizing, implementing, and evaluating. They coordinate experts and athletes and delegate tasks to optimize the training process (Kolar et al. 2025, 2). The aforementioned sets of the coach's managerial tasks within a sports training process represent the substantive aspect of the coach's role, while the basic method of their work is making decisions (Abraham et al. 2006, 549; Kolar and Tušak 2022, 49; Wilson and Kiely 2023, 2).

DM is a process defined as a choice between options (Heller and Hindle 2001, 154), influenced by the interplay of two cognitive systems: System 1 (intuitive, heuristic) and System 2 (rational, analytical) (Kahneman 2017, 576). System 1 enables quick, creative decisions, especially with domain-specific experience (Klein 2015, 164), while System 2 is characterized by slower, more deliberate and conscious thinking used for complex evaluations and long-term planning (Evans and Stanovich 2013; Gonzalez-Loureiro and Vlačić 2016; Kahneman 2017). System 2 also ensures decisions align with strategic goals (Elbanna and Child 2007, 445–6; Bayo and Akintokunbo 2022, 58). DM styles emerge from these fundamental cognitive styles and are influenced by personality, biases, knowledge, and experience (Harren 1979; Scott and Bruce 1995). Various authors have defined DM styles as (1) hierarchically subordinate to the fundamental cognitive styles (Spicer and Sadler-Smith 2005, 146; Kozhevnikov 2007, 473; Dewberry et al. 2013, 784; Kolar et al. 2025, 2) and (2) manifesting at the decision-making level. DM styles are learned responses to specific situations, not mutually exclusive, and occur in variouscombinations in individuals (Scott and Bruce 1995). The General Decision-Making Style Inventory (hereinafter: GDMS) is the

most commonly used questionnaire for assessing these styles (Berisha et al. 2018, 3; Urieta et al. 2021, 2).

Coaches are highly trained professionals (experts) with specialized knowledge and experience in their sport (Lyle and Muir 2020, 14). Ericsson (2018a, 3–4) describes an expert as someone who is highly skilled [33]
and knowledgeable in a particular field, or someone who is widely recognized as a reliable source of knowledge, techniques, or skills, with their judgments being acknowledged as authoritative both publicly and by their peers. Ericsson et al. (1993, 372) argue that expertise and expert performance are developed through extensive experience in a specific domain, which requires long-term involvement (at least 10 years or 10,000 hours) in deliberate practice in that domain. Kolar et al. (2025, 12) argue that a coach's expertise is defined by (1) years of experience (2) within a specific domain, and (3) achieving high-level results in international competitions. Only the coach who fulfills all three criteria can be recognized as an expert, with their decisions – whether long-term or sudden – being highly valid and reliable.

This study will examine the DM styles of Serbian gymnastics coaches, focusing on (1) the overall DM styles structure and (2) mutual correlations of DM styles, (3) their correlations with coaches' demographic and professional characteristics, and (4) differences in the DM styles used between more and less experienced coaches.

LITERATURE REVIEW

Despite the growing recognition of the importance of coaches' DM in the training process, which involves adapting or tailoring the coach's DM behavior to the specific or even unique needs of the athlete and of the chosen sport (Harvey et al. 2015, 152), research in the field of sports coaching theory still lacks empirical insights into coaches' DM styles.

There are quite a few studies in which the authors dealt mainly with the leadership styles and behaviors of sports coaches (Chelladurai and Arnott 1985; Côté et al. 1995; Marshall 2006; Kaya 2014; Elderton 2020; Jin et al. 2022; Jawoosh et al. 2022) and applied the findings to their DM behavior in various situations and contexts. These studies primarily focus on identifying the coach's leadership style, particularly how it influences the level of athlete involvement in decision-making processes.

Abraham and Collins (2015, 1) report that there has recently been an increased interest in using Naturalistic Decision Making (here-

inafter: NDM) paradigm and the Recognition Primed Decision Making (hereinafter: RPD) model to examine and understand the DM of sport coaches in time-limited situations. The NDM approach (Klein 2008; 2015) is an alternative to the normative, rationalistic DM process
[34] approach, whose main orientation is that decision-makers in natural settings rely heavily on expert intuition. Bossard et al. (2022, 1), in their study, note that there is an extensive number of studies where different authors use the RPD model to explore the DM behavior of expert coaches (Abraham and Collins 2015; Harvey et al. 2015; Collins et al. 2016; Collins and Collins 2016; Ashford et al. 2020) from different sports in natural settings. Findings suggest that coaches have an initial desire to engage in RPD-type behavior and have the capacity to be 'experts' but may not use this capacity unless forced to do so (Abraham and Collins 2015, 1). Also, Harvey et al. (2015, 152) stated that NDM can offer a suitable framework to apply to coaches' DM behavior and Collins et al. (2016, 5–6) added that there are considerable variations, both between coaches and between sports, in the perceived frequency of intuitive DM use (RPD model). They found that, in all cases, coaches acknowledged the need for careful planning across all elements of their work, where the intuitive aspects of the coaches' DM emerged differentially across the macro (planning stage) and micro (implementation stage) processes of the training session. Moreover, Richards et al. (2016, 73) argue that the DM process is complex and multifactorial, where a crucial underpinning for the efficient application of the coach's tactical knowledge is the use of a slow, deliberate and reflective examination of the process.

In the field of the sports training process, there are certainly many situations in which coaches make decisions consistent with the NDM paradigm and the use of the RPD model, but as Kahneman and Klein (2009, 524–5) point out, there are three fundamental conditions for valid intuitive reasoning. The environment within which the reasoning takes place (1) must be orderly, there (2) must be the possibility for the decision-maker to learn the rules of its orderliness, and (3) there must be adequate feedback about their thoughts and actions. Only if all conditions are met at the same time will the associative memory (stored tacit knowledge or experience) be able to recognize the circumstances and produce quick and accurate decisions. Introducing the NDM paradigm and the RPD model into sports coaching has provided a deeper understanding of how coaches handle the complexity,

crises, and uncertainty of training. It offers a framework for explaining how coaches make decisions in the dynamic, high-pressure moments of coaching.

Abraham and Collins (2011), together with Martindale and Collins (2007), argue that, like the NDM paradigm, the classic DM model (normative model, hereafter CDM) also has limitations, and they introduced the concept of professional judgment and DM (hereafter PJDM) as a comprehensive model for understanding and facilitating the complex behavior of DM in sports coaches. By integrating the principles of CDM and NDM into PJDM, the authors suggest that coaches make decisions along a continuum from logical and rational options to intuitive, experience-based decision-making. Moreover, Collins et al. (2016, 2) also described the concept of nested DM, which can be understood as an application of PJDM to coaching. They argue that higher-order/longer-term (strategic) decisions should be taken in a more considered, deliberative (CDM) fashion, while immediate, in-session (operative) decisions are more short-term and almost intuitive (more reflective of an NDM approach). This 'nesting' of intuitive, short-term decisions within more deliberate, long-term decisions is a key feature of the coaching process, helping to align immediate actions with broader, long-term goals. The PJDM model, therefore, assumes that the DM process of coaches, depending on the (1) problem situation and the (2) goal of the decision, occurs both within System 1 (specific domain expert intuition) and within System 2 (bounded rational analytical process). [35]

The latent use of different cognitive styles (System 1 and 2) used by coaches in their DM behavior can be detected through manifest DM styles that shape the coach's DM behavior. Manifested DM behavior was observed and measured with Scott and Bruce's (1995, 829) GDMS inventory by Giske et al. (2013), who investigated soccer coaches' DM styles in relation to elite and non-elite coaching experience and level of playing history. The results of their study show that soccer coaches mostly use the rational or intuitive DM style and almost no avoidant DM style, and that coaches with more expertise in a specific-domain of coaching statistically significantly use more rational and intuitive DM styles than non-experts. Additionally, coaches with elite-level player experience also show statistically significantly greater use of intuitive and rational DM styles than coaches without that experience (Giske et al. 2013, 695). The second study, conducted by Noh et al. (2018) explored

the relationship between soccer club coaches' DM style, basic psychological needs and intention to continue exercising. This study's results showed that coaches' rational and intuitive DM styles have a positive effect on the participants' basic psychological needs, while coaches' de-
[36] pendent and avoidant styles have a negative effect on their basic psychological needs. Furthermore, this study also revealed that coaches' rational and intuitive DM styles have a positive effect on sport participants' intention to continue exercising, while coaches' avoidant style has a negative effect on their intention to continue to exercise (Noh et al. 2018, 10). In both studies, the structure of decision-making styles within all formed samples (entire, experts, non-experts …) was the same. Coaches demonstrate the highest proportion of use of both functional DM styles (1) rational and (2) intuitive, followed in order by the so-called non-functional DM styles, (3) dependent, (4) spontaneous, and (5) avoidant DM style. The use of functional DM styles in DM processes generally leads to correct and effective decisions, while the increased presence of non-functional styles in the overall DM style structure of coaches could indicate the risk that their DM behavior often leads to negative results and inconsistent decisions (Mitchell et al. 2011, 693–4; Faletič and Avsec 2013, 133).

Kolar et al. (2025, 8) in their study developed a conceptual framework for coaches' decision making in conventional sport (e.g. gymnastics, figure skating) which encompass a wide range of situations that may arise during training and the potential approaches for addressing them. This should result in different types of decisions and characteristic of coaches' decision-making behavior. The developed conceptual framework foresees three types of decisions (strategic, tactical and operational), each of which should have a different role in the comprehensive process of sports training. To define the types of decisions, the (1) expected time frame of validity, (2) time impact, and (3) level of urgency of decisions made were primarily used. The authors point out that these three types of decisions should have a (1) distinct role in the comprehensive process of sports training, should be (2) carried out on the basis of different cognitive processes, (3) be manifested in the forms of different DM style structures and (4) be enforced by using different leadership styles. From this perspective, therefore, each type of decision identified has its own unique role, significance, and meaning in managing comprehensive sport training process. As the authors note, if we are aware of the level of knowledge and the amount of experience

of the coaches and we find out (measure) their DM style structure, the conceptual framework provides clear guidance on which coach should be entrusted with managing athletes during training and competitions (Kolar et al. 2025, 11).

[37]

METHODS

Participants

The sample consisted of 53 Serbian gymnastics coaches (age: 40.96± 13.04 years), which represents nearly the entire population of Serbian gymnastics coaches and exceeds the minimum requirement for conducting factor analysis (de Winter et al. 2009). The upper age limit was 79 years, while the lower age limit was 20 years. The most experienced coach had 38 years of experience, and the least experienced had 2 years (12.91±9.21 years). The sample included 17 men (32.1%) and 36 women (67.9%). Participants completed the questionnaire during the national coaching seminar in Kostolac (Serbia, August 2023). All subjects participated in the study voluntarily and without any compensation.

Instrument

The DM style was measured using the GDMS (Scott and Bruce 1995), which was translated into Serbian. The GDMS questionnaire measures five different DM styles: rational, intuitive, dependent, avoidant, and spontaneous. The questionnaire consists of 25 items (5 for each DM style) ranging on a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). A total score for each of the five DM styles was obtained by summing the item scores that measured each DM style, with scores ranging from 5 to 25. The GDMS scales have previously demonstrated good psychometric characteristics across different samples (managers, students, the general population, military officers, sport managers, sport coaches and others) from various countries (Scott and Bruce 1995; Thunholm 2004; Spicer and Sadler-Smith 2005; Gambetti et al. 2008; Curşeu and Schruijer; 2012; Avsec 2012; Giske et al. 2013; Bavoľár and Orosová 2015; Noh et al. 2018; Alacreu-Crespo et. al 2019; Kolar and Tušak 2022). In this study, the alpha coefficients of the scales ranged between 0.472 (spontaneous) to 0.870 (avoidant) (table 1). The Cronbach's alpha for the entire GDMS is 0.726, which is a good indicator of internal consistency. The reliability coefficient for the spontaneous style was deemed adequate, while other coefficients indicated moderate to strong internal consistency (Taber 2018, 1278). Gen-

eral information questions about gender, age, experience, level of education, status, and success of the coach were also added.

Statistical Analysis

[38] Statistical data processing was carried out using the Statistical Package for the Social Sciences 29 (IBM SPSS). The factor analysis method – Principal Component Factoring (PCF) and varimax rotation of factors – was used to test the assumption about the structure of DM styles. Factor extraction was carried out using Kaiser-Guttman's criterion (Eigenvalue > 1) and the scree plot diagram (Cattell's Scree Test) (Cattell 1966). Before applying the factor analysis (hereinafter: FA), the data adequacy was tested with the Keiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's test of sphericity. Values of the KMO test above 0.6 indicate that the analyzed data is suitable for the use of FA (Tabachnick and Fidell 2007). Bartlett's test must show significant differences at a risk level of less than 5% ($p < 0.05$), indicating that the correlation matrix is not uniform and that the observed variables are related to some extent. The internal consistency of the overall scale and subscales was measured using Cronbach's alpha coefficient. Pearson's correlation coefficient was used to identify the association between DM styles, demographic and professional characteristics of the sample, and ANOVA was used to detect differences between more experienced and less experienced coaches.

RESULTS

Table 1 shows descriptive statistics for five DM styles. The average values of the individual DM style use (Mean/Value) were calculated from the scores dedicated to items assigned to an individual DM style (Scott and Bruce 1995). The average share of the individual DM style use (Mean/% of maximum) in relation to the maximum possible total value of the sum of items of the individual DM style (maximum = 25) was also calculated for each DM style.

The structure of the DM styles (table 1) revealed that Serbian coaches, on average, most often use the rational and dependent DM styles. These are followed by the intuitive and spontaneous DM styles, whereas coaches are least likely to use the avoidant DM style. Similar results on the structure of DM styles in different samples were also found by other authors (Scott and Bruce 1995; Giske et al. 2013; Ghazi and Hu 2016; Krasniqi et al. 2019; Noh et al. 2018; Kolar and Tušak 2022).

TABLE 1 Descriptive Statistics and Internal Consistency of DM Styles

DM Styles	N	Min	Max	Mean		SD	Skew.	Kurt.	α
				Value	%				
DMSR	53	15	25	21.83	87.3	2.548	−0.883	0.564	0.806
DMSI	53	10	25	16.45	65.8	3.297	0.643	0.584	0.744
DMSD	53	9	25	17.81	71.2	3.294	−0.169	0.116	0.790
DMSA	53	5	22	9.53	38.1	4.145	1.060	0.851	0.870
DMSS	53	8	17	12.81	51.2	2.466	0.010	−0.810	0.472

NOTES DMSR – rational style, DMSI – intuitive style, DMSD – dependent style, DMSA – avoidant style, DMSS – spontaneous style.

TABLE 2 The Kaiser-Meyer-Olkin (KMO) Test and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.639
Bartlett's Test of Sphericity	Approx. χ^2	682.612
	DF	300.000
	Sig.	0.000

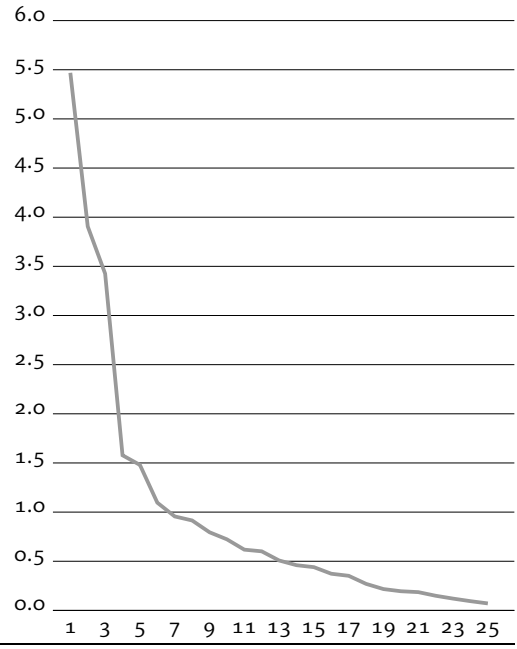
The average structure of DM styles also reveals that Serbian coaches achieve a significantly high proportion of use of the rational DM style (87.3%), as well as high proportions of use of the dependent (71.2%) and intuitive (65.8%) DM styles, while the spontaneous style is used occasionally (51.2%) and the avoidant style is mostly not used (38.1%) in the training process.

Before applying FA, the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity (table 2) were carried out to evaluate the factorability. The KMO measure of sampling adequacy was 0.639 (the required minimum is above 0.6) and the significance of Bartlett's test of sphericity was 0.000 ($p < 0.01$). The results of both tests show that the studied sample is suitable for performing FA.

The structure of the decision-making styles of Serbian gymnastics coaches was verified by FA using the method of principal components with varimax rotation (table 3). The FA procedure based on Kaiser-Guttman's criterion extracted six (6) factors, which cumulatively explain 67.820% of the total variance. Table 3 also shows a scree plot diagram with the factor eigenvalue curve bending at the fifth factor, indicating that a five-factor solution corresponds to the GDMS model and could also be considered a valid result of the FA (Scott and Bruce 1995; Spicer and Sadler-Smith 2005). Thus, the rotated solution with five factors explains 62.957% of the total variance of the observed variables.

TABLE 3 FA of the GDMS Inventory and Scree Plot Diagram

(a)	(b)			(c)			(d)		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
1	5.469	21.876	21.876	5.469	21.876	21.876	4.125	16.499	16.499
2	3.906	15.625	37.500	3.906	15.625	37.500	3.431	13.726	30.225
3	3.426	13.704	51.204	3.426	13.704	51.204	3.028	12.113	42.338
4	1.578	6.312	57.516	1.578	6.312	57.516	2.887	11.549	53.887
5	1.480	5.919	63.435	1.480	5.919	63.435	2.268	9.070	62.957
6	1.096	4.384	67.820	1.096	4.384	67.820	1.216	4.862	67.820
7	0.956	3.826	71.645						
8	0.915	3.661	75.307						
9	0.795	3.178	78.485						
10	0.723	2.893	81.378						
11	0.618	2.473	83.851						
12	0.601	2.406	86.257						
13	0.508	2.032	88.289						
14	0.460	1.842	90.131						
15	0.440	1.761	91.891						
16	0.373	1.490	93.381						
17	0.352	1.407	94.788						
18	0.270	1.080	95.868						
19	0.217	0.869	96.738						
20	0.195	0.782	97.519						
21	0.186	0.745	98.265						
22	0.149	0.597	98.861						
23	0.120	0.482	99.343						
24	0.094	0.375	99.718						
25	0.071	0.282	100.000						



NOTES Column headings are as follows: (a) component, (b) initial eigenvalues, (c) extraction sums of squared loadings, (d) rotation sums of squared loadings, (1) total, (2) percentage of variance, (3) cumulative percentage.

[40]

Table 4 shows the factor structure and factor loadings of the items included in the GDMS inventory. The first factor is associated with all five items measuring the avoidant style and two items from the spontaneous DM style (DMSS4 and DMSS2). The projections of avoidant style items on the first factor are high (factor loadings from 0.700 to 0.816), while the projection of the spontaneous DM style items on the same factor is very low (0.472, 0.382). Therefore, the first factor can be

TABLE 4 Factor Structure and Factor Loadings of the 25 Items of the GDMS Inventory

Items	Component					
	1	2	3	4	5	6
DMSA1	0.816					
DMSA4	0.809					
DMSA3	0.780					
DMSA2	0.775					
DMSA5	0.700					
DMSS4	0.472					
DMSS2	0.373					
DMSR5		0.837				
DMSR4		0.795				
DMSR3		0.717				
DMSR1		0.623				
DMSR2		0.413				
DMSD1			0.818			
DMSD2			0.800			
DMSD3			0.742			
DMSD4			0.634			
DMSD5			0.531			
DMSI1				0.783		
DMSI2				0.759		
DMSI5				0.735		
DMSI4				0.730		
DMSS3					0.779	
DMSS1					0.647	
DMSS5					0.518	
DMSI3						0.643

NOTES DMSA1–5 – avoidant style items, DMSR1–5 – rational style items, DMSD1–5 – dependent style items, DMSI1–5 – intuitive style items, DMSS1–5 – spontaneous style items.

named the 'avoidant style', explaining 16.499% of the total variance of the rotated solution (table 3). It can be observed that all the items measuring a rational DM style (DMSR1 to DMSR5) are related to the second factor (factor loadings from 0.413 to 0.837). This factor explains 13.726% of the total variance of the rotated solution (table 3) and can be named the 'rational style'. The third factor is explained with five dependent DM style variables (DMSD1 to DMSD5) with factor loadings from 0.531 to

0.818. The third factor explains 12.113% of the total variance (table 3) and can be named the 'dependent style'. The fourth factor (table 4) is explained by four items measuring the intuitive DM style (DMSI1, 2, 4 and 5) with factor loadings from 0.730 to 0.783. The fourth factor ex-
[42] plains 11.549% of the total variance of the rotated solution (table 3) and can be named the 'intuitive style'. The fifth factor is explained by only three items, belonging to the spontaneous DM style (DMSS1, 3 and 5) with factor loadings 0.518 and 0.779. The fifth factor explains 9.070% of the total variance of the rotated solution (table 3) and can be named the 'spontaneous style'. The sixth factor of the rotated solution is explained by only one variable from the intuitive DM style (DMSI3), with a factor loading of 0.643, explaining 4.862% of the total variance (table 3). This variable was distributed outside the predicted DM styles. Since the scree plot diagram suggests a five-factor solution (table 3) and the sixth factor is defined by only one variable (table 4), we will exclude this factor from further analysis.

Regardless of the clarity of the five-factor structure model, which is consistent with the original GDMS model from Scott and Bruce (1995), some variables are nevertheless distributed outside the predicted DM styles. The obtained factor model shows a good stability for the avoidant, rational and dependent DM styles in terms of the included items. The stability of intuitive DM style is relatively good, while the spontaneous style scale proved to be very unstable and problematic. However, it should be noted that, even in the original paper by Scott and Bruce (1995), the spontaneous style was added at a later stage, and the items and questions are somehow ambiguous. The items, which in the presented study (table 4) were not projected onto the factors in accordance with the original model, are DMSS2 ('I often make decisions on the spur of the moment'), DMSS4 ('I often make impulsive decisions'), and DMSI3 ('I generally make decisions that feel right to me').

Some other authors have also faced a similar problem with the same variables on different samples (Baiocco et al. 2009; Reyna et al. 2014; Fischer et al. 2015; del Campo et al. 2016; Kolar and Tušak 2022). The variables that were not distributed among the factors in accordance with the intended model were named 'problematic items' and due to missing content validity or ambiguity, they were excluded from future considerations in their research. Based on that, we will also, in the continuation of the present study, remove the mentioned variables from

the structure of the DM styles of Serbian gymnastics coaches and consider the DM style structure with 22 items.

In the continuation of the investigation of the characteristics of the DM behavior of Serbian coaches, we examined the connections between the extracted DM styles and also the connections of these styles with [43] some demographic and professional characteristics of the selected sample. Table 5 shows that rational and avoidant DM styles are negatively statistically correlated at a 1% level risk, which is in line with the findings of other authors (Scott in Bruce 1995, 830; Spicer and Sadler-Smith 2005, 141; Baiocco et al. 2009, 968; Faletič and Avsec 2013, 138; Hariri et al. 2014, 293). This type of connection between these two styles was also expected, since the rational DM style depends on the decision-makers fully following the rules and procedures in the judgment process, with the aim of making the best possible decision, while the avoidant DM style is characterized by the fact that the decision maker avoids the decision, is not capable of relevant judgment and manifests itself mainly in indecisive behavior. A statistically significant positive association at a 1% risk level was also found between the intuitive and spontaneous DM styles. Similar conclusions were also reached by other authors (Scott and Bruce 1995; Thunholm 2004; Spicer and Sadler-Smith 2005; Baiocco et al. 2009; Curşeu and Schruijer 2012; Faletič and Avsec 2013; Reyna et. al. 2014; Hariri et al. 2014; Bavoľár and Orosová 2015; Berisha et al. 2018). These findings align with our expectations, as both intuitive and spontaneous decision-making styles are linked at a latent level to the intuitive-experiential cognitive style (Alacreu-Crespo et al. 2019), which defines the manifestation of these styles. The analysis of associations between individual styles also showed a statistically significant positive correlation at a 5% risk level between dependent and avoidant DM styles, which requires caution and is addressed and explained in the discussion section.

Table 5 also shows that the age, experience, status, and success of coaches are all positively correlated at a 1% significance level. This suggests that more experienced coaches are also older, achieve better results with their athletes, and hold higher positions within the national coaching hierarchy. This fact may also indicate a positive human resource strategy within the coaching organization in Serbian gymnastics. An examination of statistically significant associations at different risk levels (table 5) of demographic and professional characteristics of coaches with DM styles shows that female coaches (Faletič and Avsec

TABLE 5 Correlations between the DM Styles, Demographics and Professional Characteristics

Item	1	2	3	4	5	6	7	8	9	10
1 Gender										
2 Age	0.619									
3 Exper.	0.839	0.000***								
4 Educat.	0.825	0.367	0.639							
5 Status	0.759	0.031**	0.002***	0.549						
6 Success	0.793	0.172	0.021**	0.179	0.000***					
7 DMSR	0.502	0.999	0.795	0.561	0.989	0.555				
8 DMSI	0.449	0.458	0.573	0.714	0.999	0.475	0.935			
9 DMSD	0.437	0.312	0.020**	0.635	0.907	0.740	0.187	0.250		
10 DMSA	0.362	0.411	0.640	0.806	0.536	0.188	0.003***	0.406	0.016**	
11 DMSS	0.013**	0.072*	0.023**	0.831	0.782	0.993	0.595	0.002***	0.314	0.181

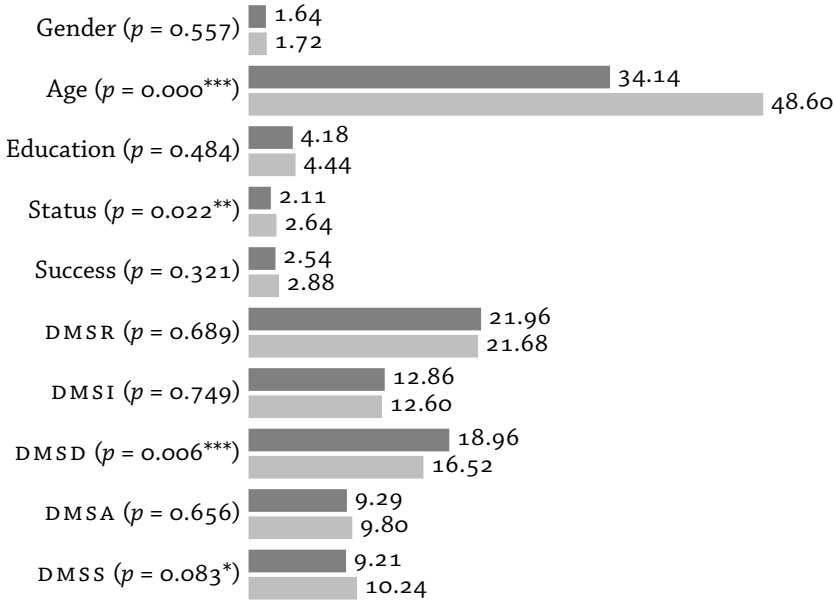
NOTES * Correlation is significant at the 0.10 level (2-tailed), ** correlation is significant at the 0.05 level (2-tailed), *** correlation is significant at the 0.01 level (2-tailed).

[44]

2013, 139; Bayram and Aydemir 2017, 911), older (Faletič and Avsec 2013, 139; Bulog 2016, 399) and more experienced coaches are on average more spontaneous in DM, while younger coaches tend to be more dependent decision-makers.

The analysis of the connections between the measured variables revealed that the experience of the coaches is the parameter that forms the largest number of statistically significant connections with the other measured parameters. We can also assume that experience is the statistical source of some other connections. For this reason, we divided the sample of coaches into two groups based on the number of years of coaching experience and analyzed whether there are any differences between the groups formed in this way in the other measured parameters. Thus, coaches with ten (10) or fewer years of experience were included in the group of less experienced coaches, while those with more than 10 years of experience were classified as more experienced coaches (Ericsson 2018b, 746, Kolar et al. 2025, 12).

Analysis of the differences between more and less experienced coaches (figure 1) shows that more experienced coaches are statistically significantly older (p = 0.000) and have a statistically significantly higher coaching status (p = 0.022). An examination of the differences in the structure of DM styles between the two groups reveals that more experienced coaches are statistically more likely to be spontaneous decision-makers (p = 0.083) while less experienced coaches tend to be more dependent decision-makers (p = 0.006). Similar results were also obtained



[45]

FIGURE 1 Analysis of differences between More and Less Experienced Coaches

NOTES Dark – less experience, light – more experience; * correlation is significant at the 0.10 level (2-tailed), ** correlation is significant at the 0.05 level (2-tailed), *** correlation is significant at the 0.01 level (2-tailed).

in the research on the decision-making styles of football coaches (Giske et al. 2013), but the differences in this study were not significant.

DISCUSSION

The DM style refers to how an individual gathers, interprets, and uses information to make decisions. Thunholm (2004) defined it as a response pattern demonstrated when confronted with a decision. DM styles significantly impact a coach's performance, which in turn affects athlete outcomes (Kolar et al. 2025, 12). As Rowe and Boulgarides (1992) noted, DM styles are essential for effective DM and should be assessed.

This study found that Serbian gymnastics coaches employ a combination of all five DM styles, with rational and dependent styles being the most common, indicating that they are primarily rational decision-makers. Rational decision-makers critically evaluate evidence and follow a structured, time-consuming process before making decisions (Fitzgerald et al. 2017). Interestingly, the dependent style, which

is less prevalent in other coaching studies (Giske et al. 2013; Noh et al. 2018), was the second most frequently used. Alacreu-Crespo et al. (2019) found that dependent decision-makers seek emotional and instrumental support (e.g., moral support, advice, help and information
[46] from others), relying on others to increase the rationality of their decisions (Vroom 2003; Khasawneh et al. 2011). This aligns with the theory of extended rationality (Secchi 2010), where coaches reduce limitations in information processing by consulting others (Simon 1976).

However, the correlation analysis (table 5) revealed a significant positive relationship between the dependent and avoidant DM styles. This combination, referred to as a dependent-avoidant DM style, can be seen as dysfunctional (Faletič and Avsec 2013, 133; Fischer et al. 2015, 525), as such individuals are either unable or unwilling to accept responsibility for decisions and tend to avoid DM, shifting responsibility onto others (Scott and Bruce 1995; Harren 1979).

Experience level also impacts DM styles (figure 1). More experienced coaches tend to be older, have higher national coaching status, and are less likely to rely on the dependent style compared to their less experienced counterparts. Phillips et al. (1984, 497) found that decision-makers with a dominant dependent style tend to lack confidence and seek confirmation from others. Less experienced coaches (figure 1), often with lower status in the national coaching hierarchies, are more likely to use the dependent style due to their limited authority to make independent decisions and less domain-specific knowledge (Kahneman and Klein 2009).

Additionally, more experienced coaches tend to be more spontaneous decision-makers. Kolar et al. (2025, 10) noted that spontaneous decisions typically arise during operational-type decisions in the training process and are often driven by a coach's gut feeling (System 1), coupled with the urgency to act quickly. These decisions can also be understood in accordance with Thunholm's (2004, 941) definition as a high-speed, intuitive DM style decision, used in DM situations that are under time pressure. These decisions are essential in unpredictable situations and are valid only when made by experienced coaches who possess sufficient tacit knowledge, acquired in a specific domain environment, and have learned the rules of that domain through frequent and accurate feedback (Kahneman and Klein 2009, 524–5). In contrast, novice coaches may rely on guesswork or be influenced by cognitive biases, which makes their decisions less reliable (Kolar et al. 2025). There-

fore, the frequent use of the spontaneous DM style among experienced coaches was both expected and appropriate.

CONCLUSION

Based on the average structure of the DM styles discovered in this study, we can conclude that Serbian gymnastics coaches are primarily rational decision-makers who enhance their rationality by consulting with colleagues for advice, opinions, and knowledge when making decisions, and that more experienced coaches can make decisions more independently and also faster when the situation is urgent or time-limited. The findings of this research support the theoretical framework of coaches' DM in conventional sports, developed by Kolar et al. (2025), and contribute to a better understanding of the importance of coaches' DM and knowledge expansion. However, the study has some limitations, mostly related to the relatively small sample drawn from a single cultural environment. Therefore, future research in this field is needed. [47]

REFERENCES

Abraham, A., and D. Collins. 2011. 'Taking the Next Step: Ways forward for Coaching Science.' *Quest* 63:366–84.

Abraham, A., and D. Collins. 2015. 'Professional Judgement and Decision Making in Sport Coaching: To Jump or Not to Jump.' Paper presented at the International Conference on Naturalistic Decision Making, 9–12 June, McLean, VA.

Abraham, A., D. Collins, and R. Martindale. 2006. 'The Coaching Schematic: Validation through Expert Coach Consensus.' *Journal of Sports Sciences* 24 (6): 549–64.

Alacreu-Crespo, A., M. C. Fuentes, D. Abad-Tortosa, I. Cano-Lopez, E. Gonzalez, and M. A. Serrano. 2019. 'Spanish Validation of General Decision-Making Style Scale: Sex Invariance, Sex Differences and Relationship with Personality and Coping Style.' *Judgment and Decision Making* 14(6): 739–51.

Ashford, M., A. Abraham, and J. Poolton. 2020. 'A Communal Language for Decision Making in Team Invasion Sports.' *International Sport Coaching Journal* 8 (1): 122–9.

Avsec, A. 2012. 'Do Emotionally Intelligent Individuals Use More Adaptive Decision-Making Styles?' *Studia Psychologica* 54 (3): 209–19.

Baiocco, R., F. Laghi, and M. D'Alessio. 2009. 'Decision-Making Style among Adolescents: Relationship with Sensation Seeking and Locus of Control.' *Journal of Adolescence* 32:963–76.

Bavoľár, J., and O. Orosová. 2015. 'Decision-Making Styles and Their Associations with Decision-Making Competencies and Mental Health.' *Judgment and Decision Making* 10 (1): 115–22.

Bayo, P. L., and O. O. Akintokunbo. 2022. 'Strategic Decision Making: Process and Aid to Better Decision Making in Organizations: A Literature Review Approach.' *International Journal of Economics and Business Management* 8 (1): 56–62.

Bayram, N., and M. Aydemir. 2017. 'Decision-Making Styles and Personality Traits.' *International Journal of Recent Advances in Organizational Behaviour and Decision Sciences* 3 (1): 905–15.

Berisha, G., J. S. Pula, and B. Krasniqi. 2018. 'Convergent Validity of Two Decision Making Style Measures.' *Journal of Dynamic Decision Making* 4 (1): 1–8.

Bossard, C., T. Kérivel, S. Dugény, P. Bagot, T. Fontaine, and G. Kermarrec. 2022. 'Naturalistic Decision-Making in Sport: How Current Advances into Recognition Primed Decision Model Offer Insights for Future Research in Sport Settings?' *Frontiers in Psychology* 13:936140.

Bulog, I. 2016. 'The Influence of Top Management Demographic Characteristics on Decision Making Approaches.' *Ekonomski vjesnik* 29 (2): 393–403.

Chelladurai, P., and M. Arnott. 1985. 'Decision Styles in Coaching: Preferences of Basketball Players.' *Research Quarterly for Exercise and Sport* 56 (1): 15–24.

Cattell, R. 1966. 'The Scree Test for the Number of Factors.' *Multivariate Behavioral Research* 1:245–76.

Collins, L., and D. Collins. 2016. 'Professional Judgement and Decision-Making in Adventure Sports Coaching: The Role of Interaction.' *Journal of Sports Science* 34:1231–9.

Collins, D., L. Collins, and H. J. Carson. 2016. 'If It Feels Right, Do It: Intuitive Decision Making in a Sample of High-Level Sport Coaches.' *Frontiers in Psychology* 7:504.

Côté, J., J. Salmela, P. Trudel, A. Baria, and S. Russell. 1995. 'The Coaching Model: A Grounded Assessment of Expert Gymnastics Coaches' Knowledge.' *Journal of Sport and Exercise Psychology* 17:1–17.

Coutts, A. J. 2017. 'Challenges in Developing Evidence-Based Practice in High-Performance Sport.' *International Journal of Sports Physiology and Performance* 12:717–18.

Curşeu, P. L., and S. G. L. Schruijer. 2012. 'Decision Style and Rationality: An Analysis of Predictive Validity of the General Decision-Making Style Inventory.' *Educational and Psychological Measurement* 72 (6): 1053–62.

de Winter, J. C. F., D. Dodou, and P. A. Wieringa. 2009. 'Exploratory Factor Analysis with Small Sample Sizes.' *Multivariate Behavioral Research* 44 (2): 147–81.

del Campo, C., S. Pauser, E. Steiner, and R. Vetschera. 2016. 'Decision Making Styles and the Use of Heuristics in Decision Making.' *Journal of Business Economics* 86 (4): 389–412.

Dewberry, C., M. Juanchich and S. Narendran. 2013. 'Decision-Making Competence in Everyday Life: The Roles of General Cognitive Styles, Decision-Making Styles and Personality.' *Personality and Individual Differences* 55:783–8.

Elbanna, S., and J. Child. 2007. 'Influences on Strategic Decision Effectiveness: Development and Test of an Integrative Model.' *Strategic Management Journal* 28:431–53.

Elderon, W. 2020. 'Learner-Centred Coaching.' Acecoach, 21 January. https://acecoach.com/learner-centred-coaching/

Ericsson, A. K. 2018a. 'An Introduction to the Second Edition of The Cambridge Handbook of Expertise and Expert Performance: Its Development, Organization and Content.' In *The Cambridge Handbook of Expertise and Expert Performance,* edited by K. A. Ericsson, R. R. Hoffman, A, Kozbelt, and A. M. Williams. Cambridge University Press.

Ericsson, A. K. 2018b. 'The Differential Influence on Experience, Practice and Deliberate Practice on Development of Superior Individual Performance of Experts.' In *The Cambridge Handbook of Expertise and Expert Performance,* edited by K. A. Ericsson, R. R. Hoffman, A, Kozbelt, and A. M. Williams. Cambridge University Press.

Ericsson, A. K., R. T. Krampe, and C. Tesch-Romer. 1993. 'The Role of Deliberate Practice in the Acquisition of Expert Performance.' *Psychological Review* 100 (3): 363–406.

Evans, J. S. B. T., and K. E. Stanovich. 2013. 'Dual-Process Theories of Higher Cognition: Advancing the Debate.' *Perspectives on Psychological Science* 8(3): 223–41.

Faletič, L., and A. Avsec. 2013. 'Stili odločanja kot napovedniki psihičnega blagostanja.' *Anthropos* 45 (3–4): 129–49.

Fischer, S., K. Soyez, and S. Gurtner. 2015. 'Adapting Scott and Bruce's General Decision-Making Style Inventory to Patient Decision Making in Provider Choice.' *Medical Decision Making* 35 (4): 525–32.

Fitzgerald, D. R., S. Mohammed, and G. O. Kremer. 2017. 'Differences in the Way We Decide: The Effect of Decision Style Diversity on Process Conflict in Design Teams.' *Personality and Individual Differences* 104:339–44.

Gambetti, E., M. Fabbri, L. Bensi, and L. Tonetti. 2008. 'A contribution

to the Italian validation of General Decision-Style Inventory.' *Personality and Individual Differences* 44 (4): 842–52.

Ghazi, A. M. A., and W. Hu. 2016. 'Impact of Individual Decision-Making Styles on Marketing Information System Based Decision-Making: An Empirical Study of Saudi Arabia Manufacturing Firms.' *Journal of International Business Research and Marketing* 1 (3): 27–39.

Giske, R., B. Benestad, K. Haraldstad, and R. Høigaard. 2013. 'Decision-Making Styles among Norwegian Soccer Coaches: An Analysis of Decision-Making Style in Relation to Elite and Non-Elite Coaching and Level of Playing History.' *International Journal of Sports Science and Coaching* 8(4): 689–701.

Gonzalez-Loureiro, M., and B. Vlačić. 2016. 'International Business Decisions and Manager's Cognitive Style: Opening up Research Avenues from Cognitive Behavioral Strategy.' *Revista Eletrônica Gestão and Sociedade* 10 (27): 1501–22.

Hariri, H., R. Monypenny, and M. Prideaux. 2014. 'Leadership Styles and Decision-Making Styles in an Indonesian School Context.' *School Leadership and Management* 34 (3): 284–98.

Harren, V. A. 1979. 'A Model of Career Decision-Making for College Students.' *Journal of Vocational Behavior* 14:119–33.

Harvey, S., J. Lyle, and B. Muir. 2015. 'Naturalistic Decision Making in High Performance Team Sport Coaching.' *International Sport Coaching Journal* 2:152–68.

Heller, R., and T. Hindle. 2001. *Veliki poslovni priročnik.* Mladinska knjiga.

Jawoosh, H. N., H. A. Alshukri, M. H. Kzar, M. N. Kizar, M. A. A. Ameer, and M. R. A. Razak. 2022. 'Analysis of Coaches' Leadership Style and Its Impact on Athletes' Satisfaction in University Football Teams.' *International Journal of Human Movement and Sports Sciences* 10 (6): 1115–25.

Jin, H., S. Kim, A. Love, Y. Jin, and J. Zhao. 2022. 'Effects of Leadership Style on Coach-Athlete Relationship, Athletes' Motivations, and Athlete Satisfaction.' *Frontiers in Psychology* 13:1012953.

Kahneman, D. 2017. *Razmišljanje, hitro in počasno.* UMCO.

Kahneman, D., and G. Klein. 2009. 'Condition for Intu6itive Expertise: A Failure to Disagree.' *American Psychologist* 64 (6): 515–26.

Kaya, A. 2014. 'Decision Making by Coaches and Athletes in Sport.' *Procedia: Social and Behavioral Sciences* 152:333–8.

Khasawneh, S., A. Alomati, and A. Abu-Tineh. 2011. 'Decision-Making Styles of Department Chairs at Public Jordanian Universities: A High-Expectancy Workforce.' *Tertiary Education and Management* 17 (4): 309–18.

Klein, G. 2008. 'Naturalistic Decision Making.' *The Journal of the Human Factors and Ergonomics Society* 50 (3): 456–60.

Klein, G. 2015. 'A Naturalistic Decision-Making Perspective on Studying Intuitive Decision Making.' *Journal of Applied Research in Memory and Cognition* 4:164–8.

Kolar, E., and M. Tušak. 2022. 'The Decision-Making Style Structure of Slovenian Sport Managers.' *Annales Kinesiologiae* 13 (1): 47–73.

Kolar, E., M. Kovač, and S. Piletič. 2006. 'Ravnanje s športniki v konvencionalnih športnih panogah.' In *Gimnastika za trenerje in pedagoge 2*, edited by E. Kolar and S. Piletič. Gimnastična zveza Slovenije.

Kolar, E., R. Biloslavo, R. Pišot, S. Veličković, and M. Tušak. 2025. 'Conceptual Framework of Coaches' Decision-Making in Conventional Sports.' *Frontiers in Psychology* 15:1498186.

Kozhevnikov, M. 2007. 'Cognitive Styles in the Context of Modern Psychology: Toward an Integrated Framework of Cognitive Style.' *Psychological Bulletin* 133(3): 464–81.

Krasniqi, B. A., G. Berisha, and J. S. Pula. 2019. 'Does Decision-Making Style Predict Managers' Entrepreneurial Intentions?' *Journal of Global Entrepreneurship Research* 9 (68): 1–15.

Lyle, J. W. B., and B. Muir. 2020. 'Coaches' Decision Making.' In *The Routledge International Encyclopedia of Sport and Exercise Psychology*. Routledge.

Marshall, M. K. 2006. 'The Critical Factors of Coaching Practice Leading to Successful Coaching Outcomes.' PhD diss., Antioch University.

Martindale, A., and D. Collins. 2007. 'Enhancing the Evaluation of Effectiveness with Professional Judgement and Decision Making.' *The Sport Psychologist* 21:458–74.

Mitchell, J. R., D. A. Shepherd, and M. P. Sharfman. 2011. 'Erratic Strategic Decisions: When and Why Managers are Inconsistent in Strategic Decision Making.' *Strategic Management Journal* 32:683–704.

Nash, C., and D. Collins. 2006. 'Tacit Knowledge in Expert Coaching: Science or Art?' *Quest* 58:464–76.

Noh, Y. K., K. Lee, and C. H. Bum. 2018. 'The Relationship between Soccer Club Coaches' Decision-Making Style, Basic Psychological Needs, and Intention to Continue to Exercise: Based on Amateur Male Soccer Club Members in Korea.' *Social Science* 7 (1): 200.

Phillips, S. D., N. J. Pazienza, and H. H. Ferrin. 1984. 'Decision-Making Styles and Problem-Solving Appraisal.' *Journal of Counselling Psychology* 31(4): 497–502.

Post, G., and T. van Gelder. 2023. 'Seven Kinds of Decisions Sports Coaches Make.' *Strategies: A Journal for Physical and Sport Educators* 36 (5): 24–36.

Reyna, C., M. V. Ortiz, and R. G. Revilla. 2014. 'Exploratory Structural Equation Modelling of General Decision-Making Style Inventory.' *Revista de Psicologia* 23 (1): 33–9.

Richards, P., D. Collins, and D. R. Mascarenhas. 2016. 'Developing Team Decision-Making: A Holistic Framework Integrating Both On-Field and Off-Field Pedagogical Coaching Processes.' *Sports Coaching Review* 6:57–75.

Rowe, A. J., and J. D. Boulgarides. 1992. *Managerial Decision Making: A Guide to Successful Business Decisions*. McMillan.

Scott, S. G., and R. A. Bruce. 1995. 'Decision-Making Style: The Development and Assessment of a New Measure.' *Educational and Psychological Measurement* 55 (5): 818–31.

Secchi, D. 2010. *Extendable Rationality: Understanding Decision Making in Organizations*. Springer.

Simon, H. A. 1976. 'From Substantive to Procedural Rationality.' In *Method and Appraisal in Economics,* edited by S. J. Latsis. Cambridge University Press.

Spicer, D. P., and E. Sadler-Smith. 2005. 'An Examination of the General Decision-Making Style Questionnaire in Two UK Samples.' *Journal of Managerial Psychology* 20 (2): 137–49.

Urieta, P., A. Aluja, L. F. Garcia, F. Balada, and E. Lacomba. 2021. 'Decision-Making and the Alternative Five Factor Personality Model: Exploring the Role of Personality Traits, Age, Sex and Social Position.' *Frontiers in Psychology* 12:717705.

Tabachnick, B. G., and L. S. Fidell. 2007. *Using Multivariate Statistics*. 5th ed. Pearson Education.

Taber, K. S. 2018. 'The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education.' *Research in Science Education* 48:1273–96.

Thunholm, P. 2004. 'Decision-Making Style: Habit, Style or Both?' *Personality and Individual Differences* 36:931–44.

Till, K. A., R. Muir, A. Abraham, D. Piggott, and J. Tee. 2019. 'A Framework for Decision-Making within Strength and Conditioning Coaching.' *Strength and Conditioning Journal* 41 (1): 14–26.

Vroom, V. H. 2003. 'Educating Managers for Decision-Making and Leadership.' *Management Decision* 41 (10): 968–78.

Wilson, P. J., and J. Kiely. 2023. 'Developing Decision-Making Expertise in Professional Sports Staff: What We Can Learn from the Good Judgement Project.' *Sports Med Open* 9 (1): 100.

IJEMS | SCIENTIFIC ARTICLE

Knowledge Management Index for Better Climate Change Management: A Case Study in the Egyptian Petroleum Sector

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Climate change presents significant challenges to organizations, requiring adaptation and mitigation strategies grounded in climate-related knowledge and technological innovation. The petroleum sector faces increasing regulatory and environmental pressures. In response, this study introduces the Climate Change Knowledge Management Index (CKI), a novel metric designed to assess climate knowledge preparedness by integrating energy, environmental, and knowledge management systems. The CKI provides a standardized framework for evaluating how petroleum organizations manage, formalize, and apply climate-relevant knowledge in strategic decision-making. The index was applied to two Egyptian petroleum companies with differing knowledge management approaches, revealing notable differences in climate resilience. The company with formal knowledge management practices scored 0.283, demonstrating stronger integration, lower emissions, and more informed climate decisions. In contrast, the comparison company scored 0.133. Both scores were benchmarked against an optimal value of 0.606. These findings highlight the role of structured knowledge management in strengthening climate resilience and supporting strategic choices across high-emission sectors. The CKI equips decision-makers with a practical tool to evaluate and improve knowledge governance, particularly in developing economies. Its diagnostic capacity offers valuable guidance for sectors transitioning toward sustainable operations.

Key Words: climate change management, knowledge management index, strategic decision-making, energy management systems, environmental management systems, petroleum sector

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[54]

INTRODUCTION

Applying a Knowledge Management System (KMS) is pivotal in enhancing organizational performance, particularly in the petroleum sector, which operates under complex environmental and operational constraints (Abdelwhab Ali et al. 2019). Organizations in this industry must comply with stringent environmental regulations while maintaining efficient and uninterrupted operations. To meet these dual demands, a KMS is essential for capturing, preserving, and sharing critical institutional knowledge (Orsato et al. 2017). Beyond protecting technical know-how, an effective KMS enhances adaptability by linking employee expertise with structured organizational systems (Yang et al. 2024). Previous research has emphasized the strategic role of KMS in improving climate change management and operational resilience (Ahmed and Elshazly 2021).

The Egyptian petroleum sector stands at a critical intersection between economic growth and environmental vulnerability. Beyond its economic significance, the sector's exposure to climate-induced disruptions, ranging from infrastructure damage due to sea-level rise to operational inefficiencies caused by temperature extremes, poses challenges beyond traditional risk management frameworks (Shaltout et al. 2015; Shaltout 2019). In response, there is a growing emphasis on aligning operational practices with international climate commitments, notably Egypt's ratification of the Paris Agreement (United Nations 2015) and its national efforts toward achieving Sustainable Development Goals (SDGS) 7 and 13 (United Nations 2015). Addressing these challenges demands a strategic shift: organizations must embed knowledge-driven resilience mechanisms that interlink environmental stewardship, energy management, and institutional learning within their core business models.

The Egyptian petroleum sector plays a strategic economic role, contributing approximately 24% of the national GDP while simultaneously facing acute climate risks, such as coastal flooding and rising sea temperatures (Shaltout et al. 2015). This dual vulnerability necessitates the adoption of integrated management systems that balance operational continuity with climate adaptation imperatives. However, exist-

ing frameworks often fail to adequately represent these unique sectoral challenges, reinforcing the need for more targeted climate knowledge management initiatives.

At the macroeconomic level, the Knowledge Economy Index (KEI), developed by the World Bank Institute, provides a benchmark for evaluating how countries utilize knowledge to drive innovation and sustainability (World Bank 2009). However, for industries exposed to climate-related risks, such as the petroleum sector, there is an increasing need to integrate KMS with Energy Management Systems (EnMS) and Environmental Management Systems (EMS). Janus (2016) emphasizes that embedding KMS within environmental strategies is vital for building long-term resilience. [55]

The theoretical foundations of Knowledge Management (KM) in high-risk industries draw heavily from Nonaka's (1994) SECI model, which identifies four knowledge conversion processes: socialization, externalization, combination, and internalization. This model explains how frontline operational expertise (e.g., emission reduction techniques) becomes institutionalized through documentation and training in climate change contexts.

Recent global developments have further accelerated the integration of knowledge systems with sustainability efforts. The growing reliance on Environmental, Social, and Governance (ESG) reporting frameworks, such as those developed by the Global Reporting Initiative (2021) and the World Economic Forum's stakeholder capitalism metrics (World Economic Forum 2020), compels petroleum companies to demonstrate tangible knowledge management practices related to environmental stewardship. Furthermore, international financial institutions increasingly link credit ratings and investment decisions to demonstrated climate resilience, emphasizing the strategic importance of formalized climate knowledge systems within corporate governance structures (Global Reporting Initiative 2021; World Economic Forum 2020). International financial institutions increasingly link credit ratings and investment decisions to demonstrated climate resilience, further elevating the strategic importance of formalized climate knowledge systems within corporate governance structures.

This integration has been gaining attention in Egypt. Implementing ISO 50001 EnMS has led to measurable improvements in energy efficiency and reductions in greenhouse gas emissions. (Salaheldin et al. 2015). Complementing this, structured decision-making tools such

as the Analytic Hierarchy Process (AHP) and Fuzzy AHP have proven valuable for prioritizing sustainability projects across environmental, economic, and social pillars (Galal and Moneim 2015; Salaheldin 2009; Salaheldin et al. 2015). While KEI and AHP-based tools exist,
[56] none integrate KMS, EnMS, and EMS into a unified framework for sector-specific climate resilience assessment, particularly within the petroleum sector. The CKI introduced in this study is the first diagnostic tool to combine these management systems into a unified, operationalized framework, enhancing climate resilience.

This study addresses this gap by introducing the Climate Change Knowledge Management Index (CKI), a novel framework designed to evaluate how organizations manage climate-related knowledge by integrating KMS, EnMS, and EMS practices. The CKI leverages international standards and structured methodologies, such as AHP, to provide a multi-criteria evaluation system tailored to the complexities of the petroleum sector.

Given its strategic economic role and growing vulnerability to climate-related risks, the Egyptian petroleum sector is a fitting context for this study. Cross-sectoral collaboration is vital in this landscape, as Penca et al. (2024) argue that building transdisciplinary competencies is essential for developing actionable solutions to sustainability challenges. Furthermore, the scientific contributions of Shaltout et al. (2015) and Shaltout's (2019) work, particularly on sea-level rise and sea surface temperature trends, underscore the urgent need to translate environmental data into operational strategies.

This research also builds upon broader regional initiatives to promote green transformation in industrial sectors across North Africa. Recent national strategies, such as Egypt's Integrated Sustainable Energy Strategy (ISES) 2035 (Ministry of Electricity and Renewable Energy 2016), emphasize the importance of coupling energy and environmental management systems with knowledge-based innovation as essential for advancing sustainable development. Thus, the Climate Change Knowledge Management Index (CKI) addresses immediate organizational needs and contributes to Egypt's broader national objectives toward achieving a greener, more resilient economy (Ministry of Electricity and Renewable Energy 2016; United Nations 2015).

Accordingly, this study aims to develop and validate the CKI as a practical, scalable tool for enhancing climate resilience in the Egyptian petroleum sector.

LITERATURE REVIEW: THEORETICAL AND METHODOLOGICAL FOUNDATIONS

While the introduction outlined the rationale for integrating KM into climate resilience efforts, this section comprehensively reviews the theoretical and methodological foundations supporting the CKI's development. KMS has long been recognized as a catalyst for innovation and adaptability, particularly in complex, high-risk industries like the petroleum sector (Abdelwhab Ali et al. 2019). The World Bank's Knowledge Economy Index (KEI) provides a foundational framework for assessing national knowledge infrastructures, highlighting how effective knowledge use contributes to long-term sustainability (World Bank 2009). However, the KEI lacks the operational granularity necessary to evaluate KM performance within individual organizations or specific sectors. [57]

Building on this global perspective, national-level studies have increasingly emphasized the importance of formalized knowledge systems in specific sectors. Previous research emphasized KMS's strategic role in supporting climate change adaptation and operational continuity in Egypt's energy sector. Ahmed and Elshazly (2021) highlight the urgent need to formalize tacit knowledge flows into structured systems for resilience building. In parallel with knowledge management development, structured decision-making methodologies have emerged as critical tools for evaluating sustainability priorities.

Researchers and practitioners increasingly rely on structured decision-making methods to prioritize and assess complex environmental and operational criteria. Among these, the Analytic Hierarchy Process (AHP), developed by Saaty (1980), remains predominant. In the Egyptian context, Galal and Moneim (2015) applied AHP to develop a sustainability index that balances economic, environmental, and social considerations, an approach conceptually aligned with the CKI introduced in this study.

While AHP offers a solid foundation for prioritization, emerging hybrid models have further enhanced decision-making under uncertainty. However, while AHP provides a structured prioritization method, its reliance on subjective pairwise comparisons introduces potential bias. This study mitigates such risks by employing expert validation techniques and consistency ratio checks during the matrix development.

Hybrid models such as Fuzzy AHP (Salaheldin 2009) have gained

traction in enhancing decision-making under uncertainty. Notably, Salaheldin (2009; Salahedin et al. 2015) applied both AHP and Fuzzy AHP to prioritize energy improvement projects and evaluate the performance of energy management systems in Egyptian industrial facilities. These studies illustrate how integrating KMS with structured frameworks such as EnMS and EMS can support more sustainable and efficient operations. Building on this foundation, the CKI extends these tools to evaluate knowledge management maturity in the context of climate resilience. However, operationalizing climate knowledge resilience also requires addressing fundamental challenges related to knowledge conversion processes.

[58]

Knowledge Conversion Challenges in Climate Resilience

The theoretical foundations of knowledge management in high-risk sectors, such as the petroleum sector, heavily rely on Nonaka's (1994) SECI model, which outlines four knowledge conversion processes: socialization, externalization, combination, and internalization. While socialization (informal tacit knowledge sharing) predominates frontline climate adaptation practices, formalizing this knowledge remains an ongoing challenge. The 'know-how paradox,' where critical safety or operational expertise resists documentation (Orsato et al. 2017), along with the knowledge attrition linked to aging workforces (Abdelwhab Ali et al. 2019), presents significant barriers.

Empirical studies reinforce this gap: ISO 30401-certified KMS implementations have been shown to improve climate resilience metrics by 18–22% in comparable sectors (Janus 2016). However, Salaheldin et al. (2015) found that approximately 63% of climate-related operational knowledge remains tacit in the Egyptian petrochemical sector, underscoring the critical need for structured knowledge conversion systems. These insights align with findings from Ahmed and Elshazly (2021), which emphasized KM maturity gaps in Egyptian energy firms and highlighted the necessity of integrated KM benchmarks to support sustainability transitions. External regulatory frameworks also shape climate knowledge management practices alongside internal knowledge dynamics.

Regulatory Context and Sectoral Imperatives

Egypt's national 2030 sustainability agenda mandates the integration of Environmental Management Systems (EMS) and Energy Manage-

ment Systems (EnMS) across industrial sectors. However, as noted in Ahmed and Elshazly (2021), no standardized framework for benchmarking Knowledge Management System (KMS) maturity exists against these environmental standards. The CKI addresses this regulatory gap by offering a scalable diagnostic tool that aligns knowledge governance with broader sustainability mandates, enhancing compliance and organizational resilience. Beyond organizational and regulatory considerations, integrating ecological knowledge has become increasingly vital for comprehensive climate resilience.

Ecological Context for Climate Knowledge Integration

Beyond traditional organizational frameworks, recent studies highlight the ecological dimensions of climate knowledge integration. Mangrove ecosystems, for example, play a critical role in carbon sequestration, offering natural solutions to rising CO_2 levels (Awad et al. 2023). Integrating such environmental insights into CKM systems enables petroleum organizations to align operational strategies with environmental sustainability goals. The CKI encourages incorporating ecological data into strategic planning processes, supporting more holistic approaches to climate resilience.

In summary, existing literature lacks a sector-specific framework to assess how petroleum organizations structure, prioritize, and utilize climate-related knowledge. The CKI is designed to fill this gap by drawing on existing models like AHP, EnMS, and EMS and aligning them within a unified KMS-based evaluation framework. This innovative tool is both a diagnostic instrument and a strategic guide for organizations striving for knowledge-driven climate resilience.

METHODOLOGY

Methodology Description

The research methodology primarily relies on analyzing questionnaires using structured techniques. It begins with designing a draft questionnaire based on the study objectives. The draft was reviewed through structured interviews with field experts to enhance its accuracy.

After revisions, the finalized version was distributed online to reach the maximum number of targeted respondents. Additionally, to ensure the clarity and reliability of the survey, we followed three key validation steps: expert review, cognitive interviewing, and usability testing, as recommended by Beatty et al. (2020).

TABLE 1 Hierarchy of Key Performance Indicators

(1)	(2)	(3)	(4)	(5)	(6)
EnMS	IEN	E1	Percentage of employees having Awareness sessions of the EnMS	I_{11}	Max
		E2	Energy intensity	I_{12}	Min
		E3	Energy efficiency midterm target [%] (3–5 years)	I_{13}	Max
EMS	IEV	N1	Percentage of employees having Awareness sessions of EMS	I_{21}	Max
		N2	Percentage of direct and indirect GHG emissions from sources owned or controlled by the company and from the generation of acquired and consumed electricity, steam, heat, or cooling (collectively referred to as 'electricity') (Scope 1 & 2) [tons]	I_{22}	Min
		N3	Percentage of all indirect GHG emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions (Scope 3) [tons]	I_{23}	Min
KMS	IKM	K1	Percentage of employees having Awareness sessions of the KMS	I_{31}	Max
		K2	The percentage of climate–related ideas collected from employees	I_{32}	Max
		K3	Percentage of climate–related converted knowledge (implicit to explicit)	I_{33}	Max

NOTES Column headings are as follows: (1) main system, (2) pillar, (3) KPI, (4) KPI descriptions, (5) ID for each KPI, (6) the optimal directions. Appreciation of GHG refers to Greenhouse Gases.

[60]

The structured interviews involved asking all participants the same questions in a fixed order (Rashidi et al. 2014). These questions cover the level of importance of each Key Performance Indicator (KPI) in relation to the others in each pillar listed in table 1.

Structured interviews were employed to ensure consistency in data collection. This approach allowed for a standardized set of questions, facilitating comparability across responses and reducing potential biases in data interpretation (Rashidi et al. 2014).

The methodology was implemented through nine steps:

1 Initial design of the first questionnaire.
2 Structured interviews to adjust the first questionnaire.
3 Designing the first questionnaire and distributing it by using Google Forms.
4 Collect and analyze the results.

5 Calculate the weight of each pillar.
6 Define three KPIS for each pillar.
7 A second structured interview with only decision-makers to calculate the weight of KPIS.
8 Define the formula to calculate CKI.
9 Apply this formula to two different companies.

[61]

The CKI was applied to two companies within the Egyptian petroleum sector. One has implemented a KMS in compliance with ISO 30401, while the other has not, allowing for a clear comparison of the index's performance under different KM conditions. Both companies had previously adopted energy management systems, ensuring a fair basis for comparison. Access to performance data in this sector is typically restricted, which further shapes the scope of the application. Given these constraints, a focused two-company application was considered appropriate for the initial validation of the CKI. The goal at this stage was not to generalize findings, but to assess the index's practical relevance. Broader applications are recommended in future research to confirm its robustness across the sector.

The questionnaires include quality control questions to measure the respondents' seriousness and relevance to the field of research.

The first questionnaire was built to measure the weight of the three main pillars using 15 questions, as seen in Appendix 1. Then, a structured interview with six experts was conducted: an operations manager in a petrochemicals company, a quality manager of an oil refining company, an energy efficiency manager in a petrochemicals company, the exploration manager in an upstream company, and the head of the oceanography department at Alexandria University. This structured interview omits three questions, adds two new questions, and clarifies three of the existing questions. The final questionnaire consists of 14 questions, including personal information, nature of work, and technical information (Appendix 2).

The adjusted form of the first questionnaire was distributed using Google Forms and was valid for two weeks (from January 22, 2023 to February 5, 2023). This questionnaire was only distributed within the Egyptian petroleum sector and was valid for all its categories and disciplines. The quality control strategy accepts only the responses that complete their information and answers.

The second survey started with a structured interview technique de-

signed only for organizational decision-makers. It was performed to identify the specific weight of each KPI inside each main pillar.

The questionnaire design strategy involved using the AHP, as described by Saaty (1980). This method was employed to calculate the
[62] weights of each pillar and all its corresponding KPIS.

In addition, the Inconsistency Index (ICI) was used as a quality control factor. First, a Consistency Ratio (CR) is used to measure how consistent the judgments have been relative to large samples of purely random judgments. If the CR is over 0.1, then the judgments should be considered untrustworthy, as explained by Salaheldin et al. (2015).

Analytical Hierarchy Process (AHP)

The AHP, developed by Thomas Saaty in 1980, is a widely used decision-making tool based on pairwise comparisons. It assigns relative weights to key factors, in this study, EnMS, EMS, and KMS, through a structured comparison process (Saaty 1980). Pairwise comparisons provide numerical values for the relative importance of each factor, helping determine the priority vector for further calculations.

This study used the first survey to evaluate the three main pillars, and the second survey was to assess the KPIS across three hierarchical levels. This approach ensures rational decision-making by comparing two elements at a time without external influence (Saaty 1990).

Weighting Criteria Using AHP

AHP was applied to determine the relative importance of criteria and sub-criteria, using a nine-point scale to rank their significance (Saaty 2008). Six pairwise comparison matrices were created to evaluate the main hierarchy (EnMS, EMS, and KMS) (Ramík 2020). This method is further supported by Salaheldin (2009), who utilized FAHP for bid evaluations in petrochemical projects, and Salaheldin et al. (2015), who applied AHP for energy efficiency optimization in the petrochemical sector.

The evaluation comparison scale used to assess the relative importance between factors follows Saaty's (1980) nine-point scale in the Analytic Hierarchy Process (AHP). Experts used Saaty's scale, where 1 indicates equal importance and 9 represents extreme importance. Intermediate values 3, 5, and 7 correspond to moderate, strong, and very strong importance, respectively. A detailed summary of the entire comparison scale is provided in Appendix 2.

TABLE 2 Pairwise Comparison Matrix for AHP Calculations

	A	B	C
A	1	a	a
B	1/a	1	1/b
C	1/a	c	1
Sum			

[63]

The pairwise comparison process adheres to Saaty's (1980) AHP methodology, wherein criteria are evaluated relative to one another to derive a consistent priority vector. Table 2 presents the structural form of the comparison matrix employed in this study.

The decision makers' judgment may be inconsistent; therefore, it was necessary to analyze the inconsistency of the pairwise comparison. This was achieved by calculating the ICI and Inconsistency Ratio (ICR). The preference ratings given by the decision-makers were considered consistent if the ICR was less than or equal to 0.1. The ICI and ICR were calculated using equations (1) and (2), respectively.

$$\text{ICR} = \frac{\lambda_{\max} - n}{n - 1}, \tag{1}$$

$$\text{ICI} = \frac{\text{ICR}}{\text{RI}}. \tag{2}$$

Where n is the size of the comparison matrix, $\lambda_{\max}$ is the eigenvalue, and RI is the random index depending on the matrix size. The pairwise comparison is to be conducted by many decision-makers to arrive at the relative weight for each criterion. The weights obtained from the subjective judgment of each decision maker are aggregated using the geometric mean as per equations (3) and (4):

$$\boldsymbol{w}_{1ij}^{m} = \left(\prod_{m=1}^{n} \boldsymbol{w}_{1ij}^{m} \right)^{\frac{1}{n}} \text{ For all } i \text{ and } j, \tag{3}$$

$$\boldsymbol{w}_{kl}^{m} = \left(\prod_{m=1}^{n} \boldsymbol{w}_{kl}^{m} \right)^{\frac{1}{n}} \text{ For all } k \text{ and } l. \tag{4}$$

Where $\boldsymbol{w}_{1ij}^{m}$ indicates the weight $\boldsymbol{w}_{1ij}$ given by the m^{th} decision maker, and n represents the number of decision-makers involved in setting the criteria preferences.

In the current study, the geometric mean prioritizes all elements. The advantage of the geometric mean is that it gives equal weight to each number in the set, which can be helpful when calculating growth

rates or rates of return. The disadvantage is that it cannot be used with negative numbers (Vogel 2022) which is not considered in our study.

The *t*-test is applied to measure the main differences between the geometric means. The *t*-test is a statistical test used to identify whether
[64] the difference between two means is significant or not (Liang et al. 2019).

The CKI Hierarchy

The CKI is measured in terms of three main pillars represented: (a) EnMS, (b) EMS, and (c) KMS. To assess the degree of conformance concerning each pillar, several KPIS consider each pillar's main aspects. Thus, a hierarchy of KPIS is suggested as shown in table 1.

The first level of the hierarchy includes the three pillars of EnMS, EMS, and KMS.

The second Level in the hierarchy represents the KPIS' identification (ID), definition, and improvement direction, which are presented in table 1. All these indicators have one level of subcategories and are thus labelled I_{kl}. Two suffixes identify each indicator: the first (k) indicates the main pillar, and the second (l) indicates the KPIS.

The following criteria are considered in selecting the relevant indicators (Galal and Moneim 2015):

- Measurability: This can be measured using quantitative or qualitative data.
- Ease of access to data is based on readily available data in the facility; no extra effort is needed for data collection.
- Non-dimensionality: This is indicated as a ratio of the same units to facilitate the aggregation of all indicators into a single dimensionless value.
- Relevancy: relates directly to the dimensions of sustainability.

The definition and formula of each indicator will be discussed as follows.

The EnMS Pillar (IEN)

It measures the extent to which the organization controls its energy consumption, including promoting awareness and managing consumption practices. In addition, this pillar evaluates the organization's economic approach to managing its climate change knowledge.

The KPIS are:

- Percentage of employees having awareness sessions of EnMS:

$$I_{11} = \frac{\begin{array}{c}\textit{no. of employees have energy management system}\\ \textit{awareness sessions}\end{array}}{\textit{total number of employees}} \tag{5}$$

- Energy intensity [65]

$$I_{12} = 1 - \frac{\textit{\$ value of eneregy consumption}}{\textit{\$ value of total inputs of production}} \tag{6}$$

- Energy efficiency midterm target [%] (3–5 years)

$$I_{13} = \frac{\textit{\$ value of eneregy consumption}}{\textit{\$ value of total inputs of production}} \tag{7}$$

The EMS Pillar (IEV)

It measures the extent to which emissions from any organizational process are controlled. This pillar also measures the number of employees aware of this system and its effect. The key performance indicators are:

- Percentage of employees having Awareness sessions of EMS:

$$I_{21} = \frac{\begin{array}{c}\textit{no. of employees have environment management}\\ \textit{system awareness sessions}\end{array}}{\textit{total number of employees}} \tag{8}$$

- Percentage of direct and indirect GHG emissions from sources owned or controlled by the company and from the generation of acquired and consumed electricity, steam, heat, or cooling (collectively referred to as 'electricity') (Scope 1 & 2) [tons]:

$$I_{22} = 1 - \frac{\begin{array}{c}\textit{total direct and indirect emissions}\\ \textit{(Scope 1 \& 2)}\end{array}}{\begin{array}{c}\textit{weight of annual emissions quantity}\\ \textit{produced (All Scopes)}\end{array}} \tag{9}$$

- Percentage of indirect GHG emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions (Scope 3) [tons]:

$$I_{23} = 1 - \frac{\textit{Total indirect emissions (Scope 3)}}{\begin{array}{c}\textit{weight of annual emisions quantity}\\ \textit{produced (All Scopes)}\end{array}} \tag{10}$$

The KMS Pillar (IKM)

It measures the value added by sharing knowledge and its efficiency. This represents the social effect of key performance indicators that reflect the well-being of the laborers and their development. The key performance indicators are:

- Percentage of employees having Awareness sessions of KMS:

$$I_{31} = \frac{\textit{no. of employees have knowledge management system awareness sessions}}{\textit{total number of employees}} \tag{11}$$

[66]

- Percentage of climate-related collected ideas from employees annually:

$$I_{32} = \frac{\textit{no. of climate related ideas}}{\textit{total number of ideas}} \tag{12}$$

- Percentage of climate-related converted knowledge (implicit to explicit):

$$I_{33} = \frac{\textit{no. of converted climate related knowledge}}{\textit{total number of converted knowledge}} \tag{13}$$

Calculating the CKI

The calculation of the CKI is achieved in two steps. First step, the KPIS within each of the three pillars are algebraically added using their respective weight to obtain a single measure for each. The three resulting measures are the IEN, IEV, and IKM, which are obtained using equations (14–16), respectively.

$$I_{\mathrm{EN}} = \sum_{i=1}^{3} \boldsymbol{w}_{1i} I_{1i} \tag{14}$$

$$I_{\mathrm{EV}} = \sum_{i=1}^{3} \boldsymbol{w}_{2i} I_{2i} \tag{15}$$

$$I_{\mathrm{KM}} = \sum_{i=1}^{3} \boldsymbol{w}_{3i} I_{3i} \tag{16}$$

Second step, the three resulting pillars are considered as three components of a vector in a three-dimensional space to arrive at the CKI as per equation (17):

$$\mathrm{CKI} = \sqrt{I_{\mathrm{EN}}^2 + I_{\mathrm{EV}}^2 + I_{\mathrm{KM}}^2} \tag{17}$$

RESULTS

The study initially collected 52 responses during the questionnaire's time frame. However, two responses were removed due to incomplete information, and an additional nine responses were excluded because they were not employed in the petroleum sector. Moreover, five responses were rejected based on the quality control criterion, specifically

due to a high inconsistency ratio. As a result, 36 valid responses were retained for analysis.

First Questionnaire (Target Group Whose Occupation Is Related to the Petroleum Sector)

[67]

The survey of 36 Egyptian petroleum professionals revealed a significant operational disparity: downstream operations (oil refining, petrochemicals, gas processing plants) accounted for 86% of responses (n = 31), with representation from oil refining (42%, n = 13), petrochemicals (32%, n = 10), natural gas processing (13%, n = 4), and service providers in O&M, HSE, and maintenance (13%, n = 4). In contrast, (Oil & Gas Exploration and Production) represented only 14% (n = 5).

This distribution highlights the strong representation of processing/manufacturing roles and potentially lower engagement in upstream operations with climate change knowledge initiatives. The findings suggest:

- Upstream professionals may be less aware of or engaged with climate initiatives.
- Targeted awareness programs are needed for exploration/production teams.
- Further research should investigate specific knowledge gaps.

Notably, gender analysis showed no significant differences in response patterns across sectors.

The Upstream Category

The results indicate that, according to industry sectors and the upstream category, workers in this sector tend to place greater importance on awareness about energy management and climate change knowledge than on other drivers (EnMS, EMS, and KMS).

The upstream category has five responses:

- All participants are male, as women are rarely represented in upstream fields.
- 4 out of are 5 in the age range 35–45, 1 out of 5 is in the age range 45–55.
- All participants hold middle management positions.
- All participants work in operational fields.

TABLE 3 The Geometric Mean Values for the Upstream and Downstream Categories

Pillar	Upstream		Downstream	
	Geometric Mean	Normalized	Geometric Mean	Normalized
IEN	0.2659	0.3924	0.2459	0.3647
IEV	0.2830	0.4176	0.3038	0.4506
IKM	0.1288	0.1900	0.1246	0.1848

As shown in table 3, employees working in the upstream segment of the petroleum industry reported that EMS had the highest influence on their knowledge about climate change, with a share of 41.76%. The EnMS came next, accounting for 39.24% of the impact. Meanwhile, KMS was seen as having a minor role, contributing only 19.00% to their understanding. These results suggest that EMS and EnMS primarily shape climate-related knowledge in upstream operations, while KMS practices may still need further attention.

The Downstream Category

The downstream category is divided into refining, petrochemicals, natural gas, and services industries (table 3). The results indicate that workers in this sector tend to place greater importance on awareness about environmental management and climate change knowledge than on other drivers (EnMS, EMS, and KMS).

The downstream category has 31 responses:

- 2 out of 31 are female, and 29 out of 31 are male.
- 4 out of 31 are in the age range 25–35, 18 out of 31 are in the age range 35–45, 8 out of 31 are in the age range 45–55, and 1 out of 31 is in the age range above 55.
- 8 out of 31 are senior-level, 16 out of 31 are middle management level, and 7 out of 31 are top-level management.

According to the results presented in table 3, most workers in the downstream segment identified EnMS as the most influential factor in shaping their climate change knowledge, with a score of 45.05%. The EMS followed at 36.46%, while KMS had the least reported impact at 18.47%. These findings highlight the central role of energy and environmental systems in promoting climate awareness in downstream operations and suggest an opportunity to improve KMS's contribution in this area.

The segmentation of respondents based on their field of work, in-

TABLE 4 Fields of Work

Pillar	(1)	(2)	(3)	(4)	(5)	(6)	(7)
IEN	0.4175	0.1828	0.7480	0.6168	0.2087	0.2045	0.2024
IEV	0.4186	0.6543	0.1542	0.2622	0.4959	0.7379	0.4778
IKM	0.1639	0.1628	0.0979	0.1210	0.2954	0.0577	0.3198

[69]

NOTES Column headings indicate the geometric field of each field as follows: (1) Operations, (2) Maintenance, (3) Energy Management, (4) Quality Assurance, (5) Health, Safety and Environment (HSE), (6) Management, and (7) Administration.

cluding operations, maintenance, and management, reveals that the majority are from operations (50%), followed by maintenance and condition monitoring (8%), quality assurance (8%), health, safety, and environment (HSE) (8%), administration (8%), laboratory (3%), energy management (8%), and management (6%).

The responses from operations personnel indicate no significant difference between the impact of EnMS and EMS on climate change knowledge, as demonstrated in table 4. Responses from the maintenance field of work, HSE, management, and administration personnel were consistent with expectations, given that their work largely adheres to standards, and the only field with standardized regulations is environmental management. The responses from energy management professionals aligned with expectations, reflecting their focus on their specialized field. Quality assurance staff shared a similar perspective, with heightened concern for EMS.

Regarding the managerial level, middle management positions comprise 58.33% of the respondents, senior-level roles make up 22.22%, and top-level management constitutes 19.44%. Lastly, the geometric mean is normalized for the filtered data, and the analysis reveals that the EMS exerts the most significant influence on climate change awareness within the organization (43.92%), followed by the EnMS (37.43%). The KMS exhibits the least impact, contributing 18.64%.

Accordingly, the second questionnaire was conducted with decision-makers through a structured interview to determine the weights of indicators for each pillar mentioned above.

Second Questionnaire (Target Group: Decision-Makers Working in the Egyptian Petroleum Sector)

The second questionnaire was a structured interview conducted with 10 decision-makers working in the Egyptian petroleum sector to evaluate

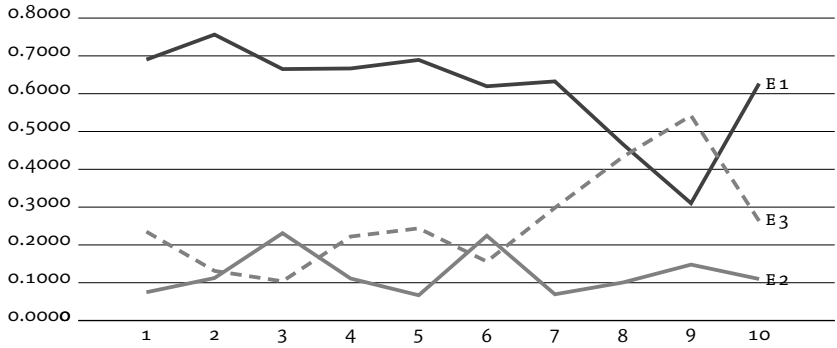

FIGURE 1 KPIS of EnMS

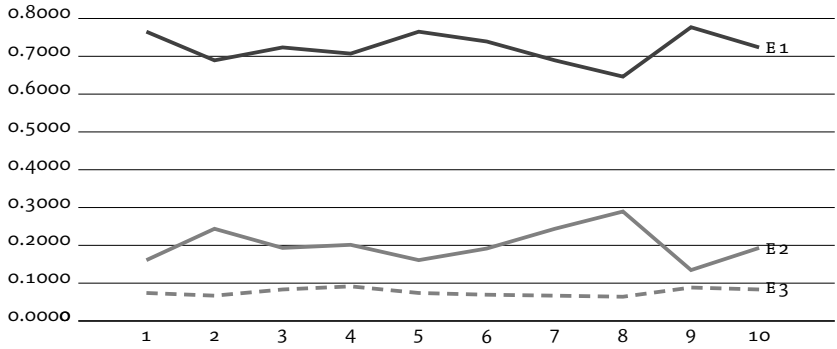

FIGURE 2 EMS's KPIS

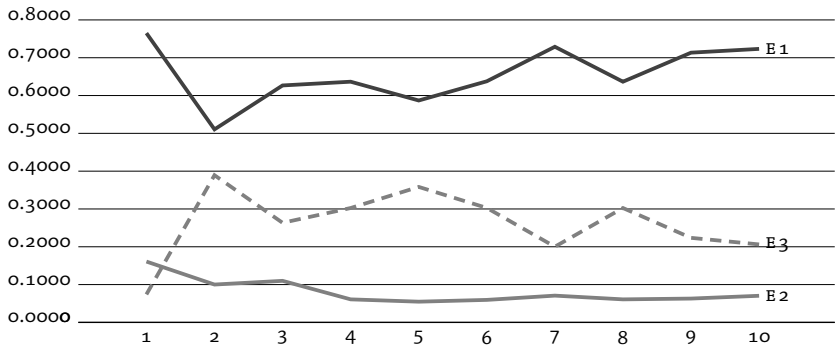

FIGURE 3 KMS's KPIS

the weight of the Key Performance Indicators (KPIS) that may affect the knowledge of each pillar in this study (table 1).

First, the main KPIS and their weights for the EnMS are listed in table 6 and shown in figure 1. The results highlight the greater significance

of raising employee awareness compared to other KPIs. Secondly, for the EMS, table 6 lists the selected main KPIs and their weights. The results show the importance of raising employee awareness over the other KPIs as seen in figure 2.

Finally, the main selected KPIs and their weights for the KMS, as listed in table 6, show that raising awareness among employees is considered more important than the other KPIs, as illustrated in figure 3. [71]

Final Weights

The final weights for each KPI (refer to table 1 for descriptions) were derived through AHP pairwise comparisons. For EnMS, employee awareness sessions (E1) received the highest weight (0.63), followed by energy intensity (E2) and midterm targets (E3) at 0.12 and 0.25, respectively. A similar weighting pattern emerged for EMS (N1 = 0.73) and KMS (K1 = 0.67), confirming the importance of awareness-building in climate knowledge governance (table 6).

FRAMEWORK IMPLEMENTATION

The proposed framework was implemented to evaluate the CKI of two petroleum sector companies in Alexandria, Egypt. Both companies are certified with four quality certificates: ISO 9001, ISO 14001, ISO 50001, and ISO 45001; however, Company 1 also holds ISO 30401. The companies employ between 1,000 and 3,000 staff members.

Selecting two companies with varying levels of KMS maturity enabled testing the framework under different real-world conditions. This diversity enhanced the validation process by demonstrating the CKI's ability to assess organizational readiness across different operational contexts. Moreover, this choice balanced methodological rigor with practical constraints, such as data accessibility within the petroleum sector.

Data Collection

The data required to calculate the various indicators were collected from the two companies and are presented in table 5. Notably, the data needed for calculating the indicators does not require special data collection, as they are part of the standard data recorded for any plant. These align with other information typically required for different quality systems in use, meaning there is no additional burden associated with the sustainability assessment.

TABLE 5 Data Collected from the Two Companies

Data description	1	2
Number of employees who attended EnMS awareness sessions	850	100
Total number of employees	1100	2200
[72] Dollar value of energy consumption ($)	320	500
Dollar value of total inputs of production ($)	1450	1700
Number of employees who attended EMS awareness sessions	400	350
Weight of annual emissions quantity produced (All Scopes)	560	1300
Total direct and indirect emissions (Scope 1 & 2)	450	700
Total indirect emissions (Scope 3)	300	450
Number of employees who attended KMS awareness sessions	200	10
Total number of ideas collected from employees annually for devel.	185	20
Number of climate-related ideas collected from employees annually	45	10
Total number of converted knowledge (implicit to explicit)	60	15
Number of climate-related knowledge conversions.	12	2

NOTES The (Dollar value $) indicates the financial value of the data.

Calculations

Utilizing multiple existing data sources – such as ISO 50001 audit reports, ISO 14001 compliance documentation, and internal training records – enabled effective data triangulation. This cross-verification enhanced both the reliability and validity of the collected information, reducing the potential for bias and ensuring that KPI evaluations accurately reflected actual operational practices rather than isolated documents or individual reports.

All quantitative indicators (e.g., energy consumption, emissions data) were validated against the companies' ISO 50001 and 14001 audit reports to ensure reliability. For employee awareness metrics (KPIS K1, N1, E1), data were cross-checked with training attendance records to ensure consistency. However, Scope 3 (indirect emissions, KPI N3) relies on supplier self-reports, which is a known limitation in the petroleum sector (Galal and Moneim 2015). This potential bias was mitigated by averaging the responses of multiple decision-makers, thereby enhancing data reliability.

Despite the structured approach, specific challenges were encountered during data collection. Access to detailed operational data was sometimes restricted due to confidentiality concerns. Additionally, inconsistencies were observed in how different departments documented their environmental or energy-related knowledge practices. These chal-

lenges required careful clarification through follow-up interviews and reinforced the need to triangulate findings across multiple sources.

The verified data were systematically mapped to the corresponding KPIs. Where discrepancies existed among documents, interviews, and observations, expert judgment and consensus validation techniques were employed to adjust scoring. This ensured that the final CKI values accurately reflected documented practices and operational behaviors within each organization. [73]

While the CKI framework was successfully applied, several operational challenges emerged that warrant discussion. First, variations in departmental awareness of knowledge management protocols complicated the aggregation of accurate data, especially regarding tacit-to-explicit knowledge conversions. Second, resistance to sharing sensitive environmental and energy information delayed parts of the validation process, highlighting an underlying cultural barrier to open knowledge exchange in petroleum organizations.

Despite these challenges, the implementation demonstrated the framework's flexibility and adaptability. Utilizing pre-existing ISO-related data significantly reduced the burden of new data collection, proving that the CKI can be integrated with existing quality management systems without requiring major procedural overhauls. This characteristic is critical for encouraging adoption within resource-constrained or operationally conservative sectors.

Furthermore, the cross-functional involvement of operational, HSE, energy, and management personnel enriched the quality of the collected insights. This suggests that CKI assessments are most effective when designed as multidisciplinary exercises rather than siloed technical evaluations. Future applications could benefit from formalizing this cross-functional collaboration early in the assessment process to streamline data collection and enhance diagnostic accuracy.

Table 6 shows that the CKI was calculated for the companies under study using the methodology described in equations (1) through (16), based on the data from table 5. The Climate Change Knowledge Management Index (CKI) was mathematically computed according to equation (17), where the summation includes all selected KPIs. This approach ensures that indicators with higher strategic importance, as determined by expert judgment, have a greater influence on the final CKI score.

A benchmark value of 0.606 was established based on evaluations

TABLE 6 Final Calculations

KPI	w	Company 1		Company 2		Ideal	
		I	$w \times I$	I	$w \times I$	I	$w \times I$
I_{11} (E1)	0.6313	0.7727	0.4878	0.0455	0.0287	1.0000	0.6313
I_{12} (E2)	0.1206	0.7793	0.0940	0.7059	0.0851	1.0000	0.1206
I_{13} (E3)	0.2481	0.2207	0.0548	0.2941	0.0730	1.0000	0.2481
I_{21} (N1)	0.7260	0.3636	0.2640	0.1591	0.1155	1.0000	0.7260
I_{22} (N2)	0.1979	0.1964	0.0389	0.4615	0.0913	1.0000	0.1979
I_{23} (N3)	0.0761	0.4643	0.0353	0.6539	0.0498	1.0000	0.0761
I_{31} (K1)	0.6719	0.1818	0.1222	0.0046	0.0031	1.0000	0.6719
I_{32} (K2)	0.0786	0.2432	0.0191	0.5000	0.0393	1.0000	0.0786
I_{33} (K3)	0.2495	0.2000	0.0499	0.1333	0.0333	1.0000	0.2495
IEN	0.3743	0.1826		0.0107		0.2363	
		0.0352		0.0319		0.0451	
		0.0205		0.0271		0.0929	
		0.2383		0.0699		0.3743	
IEV	0.4392	0.1160		0.0507		0.3190	
		0.0171		0.0401		0.0870	
		0.0155		0.0219		0.0334	
		0.1485		0.1127		0.4392	
IKM	0.1864	0.0228		0.0006		0.1252	
		0.0036		0.0073		0.0147	
		0.0093		0.0062		0.0465	
		0.0356		0.0141		0.1864	
	CKI	0.2830		0.1334		0.6064	
	CKI/Ideal	46.67%		21.99%			

[74]

by an expert panel. This value reflects a realistic upper limit for mature organizations operating within the petroleum sector and represents the expected integration level of knowledge, energy, and environmental management systems under current best practices.

The CKI score for the evaluated company that applies the KMS was 0.208, equivalent to 46.67% of the theoretical maximum (0.208 ÷ 0.606 × 100). In contrast, the CKI score for the other company was 0.133, representing 21.99% of the theoretical maximum.

The first company's higher CKI score indicates stronger formalization and integration of climate knowledge within its operational strategies. Conversely, the second company's lower score suggests frag-

mented or informal practices, particularly regarding knowledge sharing and environmental sustainability initiatives.

This dimensionless index serves multiple purposes: it functions as a performance benchmark, a tool for tracking longitudinal improvement, and a comparative metric within the sector. Beyond the aggregate CKI scores, a deeper analysis of individual KPI trends provides additional insights into each organization's specific focus areas and strategic behaviors. [75]

The resulting scores indicate a considerable opportunity to improve the organization's climate knowledge management practices and progress toward alignment with best-practice standards. The results reveal a clear pattern: companies place greater emphasis on training employees about climate issues (awareness sessions) than on technical indicators like energy use or emissions. They prioritize these training programs three to nine times more than technical objectives.

This behavior aligns with knowledge management theories that emphasize externalization and socialization phases (Nonaka 1994), where cultivating awareness and shared understanding precedes technical system optimization.

The results indicate that Egyptian petroleum companies prioritize culturally preparing their teams for climate action rather than merely setting strict targets. This finding is consistent with Salaheldin et al.'s (2015) conclusion that changing workplace habits is often more complicated than achieving technical goals.

FUTURE WORK

Future research could examine the applicability of this framework in other sectors, particularly those that are resource-intensive or heavily reliant on knowledge management. Tracking the CKI over time could provide valuable insights into how organizations mature in managing climate-related knowledge. Moreover, raising awareness about the strategic value of KM, not just as a tool for documentation but as a key driver of resilience, should be prioritized.

Future studies could also explore the potential for sectoral benchmarking by applying the CKI across industries such as mining, chemical manufacturing, or logistics, where climate resilience is increasingly vital. Conducting cross-sector comparisons would validate the index's adaptability and help refine its weighting structures to accommodate sector-specific challenges.

In addition, future researchers may investigate the integration of digital technologies, such as artificial intelligence and blockchain, into CKI assessments. Leveraging digital tools could enhance data collection accuracy, real-time monitoring, and transparency in climate
[76] knowledge governance.

Furthermore, integrating Geographic Information Systems (GIS) into future CKI assessments could provide critical spatial insights into climate vulnerabilities, resource allocation, and operational risks. Companies could develop geographically targeted knowledge management strategies by mapping organizational facilities against climate exposure data, such as flood zones, heat stress indices, or coastal erosion maps. This spatial integration would enhance the CKI's ability to guide location-specific adaptation planning, operational risk mitigation, and informed decision-making.

CONCLUSION

The CKI represents a novel contribution to climate action by systematically quantifying the role of KM in organizational resilience. Its validation across two Egyptian petroleum companies, one with an ISO 30401-compliant KMS and one without, demonstrated strong diagnostic utility. The company's significantly higher CKI score (0.283 vs. 0.133) with formalized KMS implementation underscores the framework's practical value for assessing climate knowledge maturity. While this initial study focused on a limited sample, the contrast in outcomes offers a robust foundation for future scalability testing across diverse organizational contexts.

The CKI's integrative framework bridges critical gaps between Energy Management System (EnMS), Environment Management System (EMS), and Knowledge Management System (KMS), offering a standardized approach to measure climate-related knowledge governance. By translating technical practices into quantifiable metrics, the index aligns with global climate resilience priorities, particularly in high-impact sectors like petroleum.

Its application within the Egyptian petroleum sector yielded operationally meaningful results, suggesting the CKI's promise as a sector-specific benchmarking tool. Though not yet generalizable, the framework's adaptability supports its use in assessments and cross-industry replication.

Finally, the study revealed structural insights: downstream opera-

tions showed greater engagement with environmental systems than upstream segments, and middle managers, who accounted for 58% of respondents, emerged as critical actors in climate knowledge dissemination. These findings point to two strategic imperatives: enhancing climate awareness in upstream operations and continuing investment in middle management development programs to sustain progress in knowledge-driven climate adaptation.

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REFERENCES

Abdelwhab Ali, A., D. D. D. Panneer Selvam, L. Paris, and A. Gunasekaran. 2019. 'Key Factors Influencing Knowledge Sharing Practices and Its Relationship with Organizational Performance within the Oil and Gas Industry.' *Journal of Knowledge Management* 23 (9): 1806–37.

Ahmed, Aly A., and A. Elshazly. 2021. "A Knowledge Management System as a Tool for Better Climate Change Management." In *Innovation in Urban and Regional Planning,* edited by D. La Rosa and R. Privitera. Lecture Notes in Civil Engineering 146. Springer.

Awad, A., A. El-Sammak, A. Elshazly, and E. A. El-Masry. 2023. 'Carbon Sequestration in Mangrove Sediments as Climate Change Mitigation Tool: A Case Study from the Red Sea, Egypt.' *Egyptian Journal of Aquatic Biology & Fisheries* 27 (4).

Beatty, P. C., D. Collins, L. Kaye, J.-L. Padilla, G. B. Willis, and A. Wilmot, eds. 2020. *Advances in Questionnaire Design, Development, Evaluation, and Testing.* Wiley.

Galal, N. M., and A. F. A. Moneim. 2015. 'A Mathematical Programming Approach to the Optimal Sustainable Product Mix for the Process Industry.' *Sustainability* 7 (10): 13085–103.

Global Reporting Initiative. 2021. *Consolidated Set of GRI Sustainability Reporting Standards 2021.* Global Sustainability Standards Board.

Janus, S. S. 2016. *Becoming a Knowledge-Sharing Organization.* International Bank for Reconstruction and Development and The World Bank.

Liang, G., W. Fu, and K. Wang. 2019. 'Analysis of *t*-Test Misuses and SPSS Operations in Medical Research Papers.' *Burns and Trauma* 7. https://doi.org/10.1186/s41038-019-0170-3.

Ministry of Electricity and Renewable Energy. 2016. *Integrated Sustainable Energy Strategy (ISES) to 2035*. Arab Republic of Egypt.

Nonaka, I. 1994. 'A Dynamic Theory of Organizational Knowledge Creation.' *Organization Science* 5 (1): 14–37.

Orsato, R. J., S. R. Barakat, and J. G. F. de Campos. 2017. 'Organizational Adaptation to Climate Change: Learning to Anticipate Energy Disruptions.' *International Journal of Climate Change Strategies and Management* 9 (5): 645–65.

Penca, J., A. Barbanti, C. Cvitanovic, A. Hamza-Chaffai, A. Elshazly, J. B. Jouffray, N. Mejjad, and M. Mokos. 2024. 'Building Competences for Researchers Working Towards Ocean Sustainability.' *Marine Policy* 163. https://doi.org/10.1016/j.marpol.2024.106132.

Ramík, J. 2020. *Pairwise Comparisons Method: Theory and Applications in Decision Making*. Lecture Notes in Economics and Mathematical Systems 690. Springer.

Rashidi, M. Nor, R. Ara Begum, M. Mokhtar, and J. J. Pereira. 2014. 'The Conduct of Structured Interviews as Research Implementation Method.' *Journal of Advanced Research Design* 1 (1): 28–34.

Saaty, T. L. 1980. 'The Analytic Hierarchy Process (AHP).' *Journal of the Operational Research Society* 41 (11): 1073–6.

Saaty, T. L. 1990. 'How to Make a Decision: The Analytic Hierarchy Process.' *European Journal of Operational Research* 48 (1): 9–26.

Saaty, T. L. 2008. 'Decision Making with the Analytic Hierarchy Process.' *International Journal of Services Sciences* 1 (1): 83–98.

Salaheldin, M. 2009. 'Solution of Fuzzy Analytic Hierarchy Process Using Simulation.' Paper presented at the PEDAC'09 International Conference on Production Engineering, Design, and Control, Alexandria, 10–12 February.

Salaheldin, M., A. F. Abdul Moneim, and M. N. Fors. 2015. 'Prioritization of Improvement Projects in Energy Management System.' Paper presented at the 45th International Conference on Computers & Industrial Engineering (CIE45), Metz, 28–30 October.

Shaltout, M. L. 2019. 'Recent Sea Surface Temperature Trends and Future Scenarios for the Red Sea.' *Oceanologia* 61 (4): 484–504.

Shaltout, M. L., K. Tonbol, and A. Omstedt. 2015. 'Sea-Level Change and Projected Future Flooding Along the Egyptian Mediterranean Coast.' *Oceanologia* 57 (4): 293–307.

United Nations. 2015. 'The Paris Agreement.' https://unfccc.int/sites/default/files/english_paris_agreement.pdf

United Nations. 2015. *Transforming Our World: The 2030 Agenda for Sustainable Development*. United Nations.

Vogel, R. M. 2022. 'The Geometric Mean?' *Communications in Statistics – Theory and Methods* 51 (1): 82–94.

World Bank. 2012. *Measuring Knowledge in the World's Economies*. The World Bank.

World Economic Forum. 2020. *Measuring Stakeholder Capitalism: Towards Common Metrics and Consistent Reporting of Sustainable Value Creation*. World Economic Forum.

Yang, M., T. T. Luu, and D. Wang. 2024. 'The Effect of Internal Knowledge Transfer on the Relationship Between Personality Traits and Employee Service Performance: A Multilevel Model.' *Journal of Knowledge Management* 28 (3): 799–826.

APPENDIX 1: SURVEY 1

In the field of climate change and the development of plans of managing its impacts, a lot of scientific research and international institutions have emphasized the importance of having a knowledge management system to ensure increased awareness of the implementation of the best dally practices at work to ensure reducing the impacts of climate change as much as possible. In order to achieve the best value for a system for knowledge of climate change, I propose that it is important to think it to the existing management and quality systems. such as:

- Energy Management System (ENMS). ISO 50001 (Economic Pillar of Knowledge)
- Environmental Management System (ENVMS). ISO 14001 (Environmental Pillar of Knowledge)
- Knowledge Management System (KMS). ISO 30401 (Social Pillar of Knowledge)

So it is important to know your valuable opinion to compare between the importance between these systems to the knowledge management of climate change (* indicates required question).

1 Email* _____
2 Name* _____
3 Gender* Male Female
4 Age range* <25 25–35 35–45 45–55 >55
5 Company* _____
6 Position* Top Management Middle Management
Section Head Other _____
7 Country* _____
8 Industry* Refining Petrochemicals Natural Gas
Other _____

9 Field of Work* Quality Assurance Operations
Energy Management Health Safety and Environment
Sustainable Development Other _____

10 (1) Regarding to Energy and Environment fields. Which system is more important to the knowledge of climate change?*

[80]

Energy Management System
Environmental Management System

11 In question 1, what is the degree of importance of your chosen system?*

1 2 3 4 5 6 7 8 9

12 (2) If you compare between Energy and Knowledge management fields. Which system is more important to the knowledge of climate change?*

Energy Management System
Environmental Management System

13 In question 2, what is the degree of importance of your chosen system?*

1 2 3 4 5 6 7 8 9

14 (3) Finally, which system is more important to the knowledge of climate change?*

Energy Management System
Environmental Management System

15 In question 3, what is the degree of importance of your chosen system?*

1 2 3 4 5 6 7 8 9

APPENDIX 2: SURVEY 2

Energy	Percentage of employees having awareness sessions of Environment Management System	E1	The ratio of employees aware of the energy management system to the total number of employees.
	Energy intensity	E2	Amount of energy used to produce a given level of output or activity
	Energy efficiency midterm target [%] (3–5 years)	E3	How the company aims to achieve its emissions reduction targets and capture the company's ambition to use energy more efficiently can reduce its energy costs and lower GHG emissions.

Environment	Percentage of employees having awareness sessions of Environment Management System	N1	The ratio of employees aware of the environmental management system to the total number of employees
	Direct and indirect GHG emissions from sources owned or controlled by the company and from the generation of acquired and consumed electricity, steam, heat, or cooling (collectively referred to as 'electricity') (Scope 1 & 2) [tons]	N2	Measuring carbon footprints from direct emissions & emissions from purchased or acquired electricity, steam, heat, and cooling
	All indirect GHG emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions (Scope 3) [tons]	N3	Capturing the thoroughness of companies' accounting processes and understanding how companies analyze their emissions footprints. For most companies, the majority of emissions occur indirectly from value-chain activities
Knowledge	Percentage of employees having Awareness sessions of knowledge Management System	K1	The ratio of employees aware of the Knowledge management system to the total number of employees
	Percentage of climate-related collected ideas from employees	K2	The ratio of climate-related ideas to the total number of collected ideas
	Percentage of climate-related converted knowledge (implicit to explicit)	K3	The ratio of climate-related converted knowledge to the total number of c

[81]

Name
Company
Managerial level
Work field

E1	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	E2
E1	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	E3
E2	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	E3
N1	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	N2
N1	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	N3
N2	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	N3
K1	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	K2
K1	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	K3
K2	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	K3

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IJEMS | SCIENTIFIC ARTICLE

Post-Crisis Analysis of Media Consumption and Perceptions of the COVID-19 Pandemic: A Study of Moroccan Youth in Urban Areas

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This study investigates the impact of media consumption habits on the perceptions of the COVID-19 pandemic among Moroccan youth in urban areas. A quantitative method was employed, combining survey data, chi-square tests, correlation analysis, and regression analysis. In total, 872 responses were collected, and the analyses revealed that digital media consumption by Moroccan youth led them to more critical views of the pandemic's media coverage. The regression analysis showed that the emphasis on the origins of the virus was an important aspect that influenced the respondents' assessment of the coverage. The findings highlight the importance of understanding how different age groups perceive and interpret media coverage during health crises. Effective communication strategies must consider the informational needs and motivations of diverse audiences.

Key Words: media, youth, COVID-19, Morocco, urban areas

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INTRODUCTION

The COVID-19 pandemic outbreak marked this era as one of the most unprecedented phenomena with a global reach. Spreading around the world, COVID-19 affected people's health and also forced governments to impose lockdowns, which impacted economies, education systems,

and the environment. Its global reach, combined with a lack of understanding of its characteristics, made COVID-19 a source of fear, stress, and anxiety.

The media industry played a pivotal role in the crisis management
[84] process by disseminating important information, such as reports on infection rates, public health measures, and analyses of the impact of the crisis on the economy and political decisions (De Coninck et al. 2020). Reports, headlines, and interviews-the media devoted its efforts entirely to coverage of the pandemic. On the other side of the screen, the public was eager to get information; from the records of the first cases in Morocco, fear started spreading, leading people to make unreasonable decisions, like emptying supermarket shelves. The COVID-19 crisis did not just reveal vulnerabilities in health systems around the world; it also exposed the intricacies of media influence, public trust, and the importance of responsible journalism in combating misinformation and fake news (Leicht et al. 2022).

From another perspective, the COVID-19 crisis was also characterized by a complete lockdown, which forced people to stay home, glued to their screensand feeding their craving for information. In this context, social media platforms (Instagram, Facebook, TikTok) played a significant role in disseminating information through viral content that often came from unofficial sources (Hendricks and Mehlsen 2022).

This research aims to analyze the media consumption habits of Moroccans from a retrospective standpoint regarding COVID-19 media coverage. The existing literature on crisis perceptions focuses on how different demographics within the Moroccan population respond to media during crises based on the nature of the information they consume. However, little evidence-based research has been done on the effect of variation in media consumption patterns on crisis perceptions.

This paper aims to address this by exploring the role of media diversity in consumption on the perceived efficacy of media outlets, as well as analyzing the influence of increased digital media consumption compared to traditional media in terms of perceived media efficacy among youth. To do that, we first analyzed the existing literature on perception studies of media communication through a literature review, enabling us to identify the following research question: How do variations in media consumption habits affect perceptions of the COVID-19 pandemic among Moroccan youth from urban areas?

To answer this research question, two hypotheses may be consid-

ered: (H1) the perceived relevance of specific media channels can predict positive or negative assessments of the media coverage of the crisis situation; (H2) the frequency of following digital media during times of crisis and the nature of the content itself may predict youths' positive or negative assessments of the media coverage. [85]

Through this analysis, we will offer insights into the media consumption habits of Moroccan youth and also understand their perception of the COVID-19 crisis as influenced by media coverage.

MEDIA CRISIS COMMUNICATION: THEORETICAL FRAMEWORK

Addressing and understanding the public's perception during and after media coverage is essential for any media studies research (Driedger 2007). Analyzing how individuals respond to and interpret the messages they receive on different platforms allows researchers to understand how the public is influenced by those messages. This is especially important in a context of crisis, where the public is confronted with a large volume of media content, which can raise concerns about the spread of misinformation and misleading narratives (Bode and Vraga 2018; Buturoiu et al. 2021).

From a theoretical perspective, the effects of media on public perception have been widely discussed by the research community. Some theories, such as the hypodermic needle model-which suggests that media messages are directly accepted by the receiver-have been largely criticized (Döveling 2011). However, more robust theories, like the agenda-setting model by Maxwell McCombs and Donald Lewis Shaw, and the two-step flow theory developed by Lazarsfeld and Katz, are more widely accepted in the study of media effects on public opinion.

There is also a growing body of literature that recognizes the significant role of media platforms in shaping public opinion around COVID-19 and related issues, such as its socio-political effects and vaccine efficacy (Cascini et al. 2022; Flew 2021; León et al. 2023). A study conducted on risk perception during the pandemic by Diana Tsoy et al. (2021) proposed the Extended Parallel Process Model (EPPM), which explains the impact of social media on perceived threat and efficacy during the pandemic. This model suggests that individuals will experience fear and anxiety when facing a highly threatening situation, but these sentiments can be reduced if they believe they can take effective actions to mitigate the threat, thereby increasing their willingness to engage in

preventive behavior. Thus, the EPPM suggests that social media can promote preventive behaviors by providing individuals with information that reduces threat perceptions and enhances their perceived efficacy through taking preventive measures (Tsoy et al. 2021).

[86] When discussing the impact of media communication on public perception, it is essential to connect perception with the content itself (McLeod et al. 2017). This often necessitates a qualitative approach to better understand the nature of the content. For example, Buturoiu et al. (2021) conducted a content analysis of both television and online news in Romania. Their research showed that these media primarily discussed topics related to COVID-19, such as government decisions and the effects of the virus, and that the content published in mainstream media often originated from digital sources, creating an intermediate agenda-setting effect.

The Social-Mediated Communication Theory also provides a framework that focuses on the role of social media in crisis communication, seeking to understand how information is shared during crisis management through these platforms. This model emphasizes audience behavior, information sources, credibility, trust, and new communication strategies as key components in the dissemination of crisis-related information (Austin et al. 2012). By highlighting the transformative impact of social media and changes in audience behavior, the Social-Mediated Communication Theory acknowledges that people now have access to a broader and larger volume of information sources. This access allows real-time updates and offers the possibility of interactivity and engagement with the content shared by organizations, crisis management institutions, and authorities (Austin and Jin 2015; 2016).

CRISIS PERCEPTIONS IN MOROCCO

A number of studies have been conducted in the Moroccan context, so it is important for this paper to assess the specific characteristics of the Moroccan public. In media studies, it is well known that individuals are culturally and linguistically affected by the type of media they consume. Indeed, in the context of the COVID-19 pandemic, Hattani and Jai (2022) examined how crisis communication during the pandemic shaped citizens' perceptions and helped them understand and respond to the crisis. This research established that Moroccans judged the crisis communication positively, highlighting its effectiveness in enhancing resilience, prevention, and mitigation.

A similar study conducted by Berni et al. (2021), which monitored

the adoption of safety behaviors related to COVID-19, concluded that the Moroccan population generally complied with the safety measures enforced by authorities. However, high perceived risk, lack of available treatment, and availability of clear information were the factors associated with this compliance, suggesting that feelings of fear about personal health were the motivating reason for adopting safety measures. [87]

From a different perspective, Aboulghazi (2022) assessed that younger Moroccans, from the beginning of the crisis, perceived the authorities' communication strategies negatively, especially because their main source of information was social media. Nevertheless, the older age groups were proven to have a more positive standpoint as they received their information from official political sources and mainstream media. However, the same author, in different research, showed that the official mainstream media failed to debunk misinformation through fact-checking, with media regulators failing to adapt to the specific characteristics of fake news circulating on social media and the Internet (Aboulghazi 2021). Based on a content analysis, Ben Abdelaziz et al. (2021) showed that these deficiencies may be addressed through poor psychosocial support and a lack of strengthening community participation.

Social media, being the main source of information for Moroccan youth during the pandemic, has been shown to foster narratives of fear, distrust, and polarization, especially about scientific uncertainty (Zag and Mifdal, n.d.). This may be explained by many challenges that journalists faced during pandemic coverage, such as restricted access to information, travel restrictions, and increased work overload (Lacroix and Carignan 2020), which in numerous cases accelerated the digitalization of work processes, focusing on digital innovation in gathering and disseminating information, even for traditional media outlets (Matsilele et al. 2022).

So far, we have analyzed the existing body of literature contextualizing both the theoretical framework and the crisis perceptions in the Moroccan case. In the following section, we will provide details about the methodology, the survey content, and the data analysis process.

METHODOLOGY

To understand youths' consumption habits and their perceived understanding of the COVID-19 pandemic, we adopted a quantitative approach based on a survey that gathered 872 responses. The survey was distributed in both physical form to university students at the Euro-

Mediterranean University of Fez and University Ibn Tofail of Kenitra. A digital form was also published on the author's social media accounts (Facebook, Instagram, X, and LinkedIn).

Considering Morocco's linguistic diversity, the survey was available
[88] in three languages: French, English, and Arabic. To ensure minimal translation bias and improve clarity, the survey was translated and cross-verified by two independent peers.

Survey Content

The survey design aimed to collect data on a Likert scale on the following aspects:

- Media consumption behaviors: Frequency, media preferences (digital, television, radio, newspapers), perceived relevance of each media channel.
- Perceived understanding of the pandemic.
- Assessment of media coverage.

Data Analysis

The collected data were then transcribed and analyzed using SPSS software, version 26. Initially, the data analysis included descriptive statistics to provide a basic understanding of the data distribution. Subsequently, a frequency analysis, including cross-tabulation between variables, was initiated to understand patterns in media consumption and perception among the surveyed age groups.

For a detailed analysis of the collected data, chi-square tests were used to assess the independence between age groups and their media channel preferences, as well as their perceived relevance and understanding of the media coverage. A correlation analysis was aimedto examine relationships between age, media preferences, media consumption frequency, and perceived relevance to provide deeper insight into the age differences in media engagement during health crises.

Additionally, to quantify the strength of association and predict trends, a multinomial logistic regression analysis was used to understand how different factors influence respondents' overall assessment of the media coverage.

Demographic Overview

The demographics of our respondents included both genders with a balanced distribution: 50.9% male and 49.1% female. The majority of

the surveyed individuals were predominantly young adults (18 to 35 years), comprising 56.9% of the sample, with smaller representation from other age groups. The majority of the respondents had university-level education, representing 79% of the total sample.

[89]

STUDY RESULTS

Descriptive Statistics

Table 1 provides a cross-tabulation of media channel preferences with age as a dependent variable. Breaking it down, it clearly shows that the distribution of media preferences is very heterogeneous across the age groups. Digital media/Internet and TV, for example, are more preferred by the majority of the 18 to 35 age group ($N = 442$, $N = 431$). Newspapers, on the other hand, are overall less likely to be preferred, especially among respondents under 18 years old.

Chi-Square Test Results:

- Digital Media/Internet: 47.508 ($df = 3$, $p < 0.001$)
- Newspapers: 43.707 ($df = 3$, $p < 0.001$)
- TV: 34.170 ($df = 3$, $p < 0.001$)
- Radio: 227.120 ($df = 3$, $p < 0.001$)

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- Radio: 227.120 ($df = 3$, $p < 0.001$)

Conducting the Chi-square test for independence, we tested if there's a significant association between age groups and media channel preference. The p-value for all media types is 0.000, which is less than the

TABLE 1 Media Channel Preferences by Age Groups

Age	Media Channel				Total
	(1)	(2)	(3)	(4)	
Under 18	24	0	23	1	48
Between 18 and 35	442	95	431	163	1131
Between 36 and 55	280	109	277	218	884
Over 55	51	17	68	68	204
Total	797	221	799	450	2267

NOTES Column headings are as follows: (1) digital media/internet, (2) newspapers, (3) TV, (4) radio.

TABLE 2 Perceived Relevance of Media Coverage by Media Channels

Media Channel	Perceived Relevance				
	(1)	(2)	(3)	(4)	(5)
TV	9	31	345	443	44
Radio	95	256	342	156	23
Newspapers	168	295	197	205	7
Digital Media/Internet	20	208	263	288	93

[90]

NOTES Column headings are as follows: (1) not at all relevant, (2) slightly relevant, (3) relevant, (4) very relevant, (5) extremely relevant.

significance level of 0.05, indicating that the distribution of media preferences differs between the age groups. The table clearly shows digital media as the main source of information for youth; however, it also shows that even with the growing trend of digital media, more traditional channels remain of interest to Moroccan youth (e.g., N(TV) = 431, between 18 and 35).

Chi-Square Test Results:

- TV: 59.260 (df = 12, p < 0.001)
- Radio: 284.857 (df = 12, p < 0.001)
- Newspapers: 221.666 (df = 12, p < 0.001)
- Digital Media/Internet: 303.056 (df = 12, p < 0.001)

The Chi-Square tests presented in table 2 reveal significant associations between age groups and the perceived relevance of media coverage for TV, radio, newspapers, and digital media/Internet. Effect sizes (Cramer's V) are moderate, indicating practical importance. Both youth and older adults show moderate associations, suggesting that age plays a significant role in influencing perceptions of media coverage relevance.

Chi-Square Test Results:

- Pearson's Chi-Square: 82.475 (df = 12, p < 0.001)
- Likelihood Ratio Chi-Square: 112.161 (df = 12, p < 0.001)
- Linear-by-Linear Association Chi-Square: Not applicable (df = 1, p = 0.991)

Table 3 presents the cross-tabulation of respondents' age groups against their perceived understanding of COVID-19 through media consumption. The chi-square test results indicate a significant association between age groups and the perceived understanding of COVID-19. Both Pearson's and Likelihood Ratio Chi-Square tests yielded p-

TABLE 3 Perceived Understanding of the Crisis by Age Group

Age	Perceived understanding of COVID-19					Total
	(1)	(2)	(3)	(4)	(5)	
Under 18	0	11	2	10	1	24
18–35	4	116	184	131	61	496
36–55	1	72	120	89	2	284
Over 55	0	0	36	32	0	68
Total	5	199	342	262	64	872

NOTES Column headings are as follows: (1) not at all, (2) slightly, (3) moderately, (4) very, (5) completely.

values less than 0.001, suggesting that the distribution of responses is unlikely to be due to random chance. The Linear-by-Linear Association Chi-Square test did not show a significant linear trend in the association between age groups and the perceived understanding of COVID-19.

Chi-Square Test Results:

- Age Group vs. Assessment of Media Coverage: 58.781 (df = 12, p < 0.001)
- Measure of Association (ϕ): 0.260
- Measure of Association (Cramer's V): 0.150

Correlation Analysis

Table 4 presents the results of the association between age group and perception of media coverage of the crisis. The Chi-Square test indicates a significant association between the age of the respondents and their assessment of the media coverage (p < 0.001). However, it was important to calculate the strength of this association; therefore, the Phi

TABLE 4 Cross-Tab between Age Group and the Assessment of the Media Coverage

Age	Overall assessment					Total
	(1)	(2)	(3)	(4)	(5)	
Under 18	0	10	11	2	1	24
18–35	1	156	223	92	23	495
36–55	1	61	147	73	2	284
Over 55	0	0	42	26	0	68
Total	2	227	423	193	26	871

NOTES Column headings are as follows: (1) strongly dissatisfied, (2) dissatisfied, (3) neutral, (4) satisfied, (5) very satisfied.

coefficient (0.260) and Cramér's V (0.150) further confirm a moderate association.

[92] *Age-Related Trends in Media Consumption: Traditional vs. Digital Media Preferences*

A positive correlation between age and the frequency of media follow-up ($r = 0.34$, $p < 0.01$) reveals a gap based on the age of the respondents, with seniors showing more interest in media coverage than youth. There is also a positive correlation between seniors and the perceived relevance of traditional media such as newspapers ($r = 0.31$, $p < 0.01$) and radio ($r = 0.32$, $p < 0.01$), indicating a reliance on these sources of information by seniors. However, youth are more inclined towards digital media, as demonstrated by a significant negative correlation ($r = -0.39$, $p < 0.01$).

The correlation matrix also indicates a positive correlation between the perceived relevance among traditional media consumers, suggesting that individuals who perceive one traditional medium as relevant are more likely to perceive other traditional media as relevant as well. For example, there's a strong positive correlation between the perceived relevance of radio and newspapers ($r = 0.66$, $p < 0.01$) and a moderate correlation between TV and radio ($r = 0.29$, $p < 0.01$). On the other hand, the weak negative correlation between digital media

TABLE 5 Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	1.00									
(2)	0.34	1.00								
(3)	−0.02	0.05	1.00							
(4)	0.32	0.11	0.29	1.00						
(5)	0.31	0.12	0.02	0.66	1.00					
(6)	−0.39	0.06	−0.20	−0.23	0.01	1.00				
(7)	0.11	−0.26	0.13	0.11	0.23	−0.11	1.00			
(8)	0.17	−0.24	0.27	0.31	0.23	−0.15	0.19	1.00		
(9)	−0.16	0.32	0.27	0.07	−0.16	0.03	−0.05	−0.24	1.00	
(10)	0.16	0.09	0.01	0.10	0.14	−0.03	0.30	0.20	−0.19	1.00

NOTES Column/row headings are as follows : (1) age, (2) media follow-up, (3) TV relevance, (4) radio relevance, (5) newspapers relevance, (6) digital media relevance, (7) understanding of COVID-19, (8) awareness measures topic (9) vaccine progress topic (10) overall media assessment.

TABLE 6 Model Fit information

Model	−2 Log Likelihood	χ^2	*df*	Sig.
Constant Only	1678.701	–	–	–
Final Model	1396.343	282.358	76	0.000

and TV relevance (r = −0.02, p < 0.01) suggests that respondents who believe digital media is more relevant may view TV as less relevant.

Table 5 also shows a weak positive correlation between the age of the respondents and their perceived understanding of the crisis, implying that youth felt slightly less informed about COVID-19 compared to the older demographic. Concerning the relevance of specific topics covered during the pandemic, the results show a weak negative correlation, especially with vaccine progress (r = −0.16 with age) and awareness-related topics (r = −0.24 with media follow-up). Finally, there's a moderate positive correlation between the perceived understanding of the crisis and how the respondents assess the media coverage (r = 0.30). In fact, media coverage tends to be rated more favorably if the individual's perceived understanding of the crisis is higher.

Multinomial Regression Analysis

The results of the multinomial logistic regression analysis provide insight into how different factors influence respondents' overall assessment of media coverage during the pandemic. The model fit information, with a final model log likelihood of 1396.343 and a Chi-Square value of 282.358, suggests that the predictors significantly contribute to explaining the variance in the dependent variable (overall assessment of the media coverage). Additionally, the calculated Nagelkerke *R*-Squared of 0.307 indicates that this model accounts for approximately 30.7% of the variance in respondents' overall dissatisfaction with the media coverage.

Results of table 7 show that several variables significantly affect individuals' overall assessment of the media coverage. The perceived role of the media as informative (χ^2 = 40.578), as an instrument of government oversight (χ^2 = 17.599), and as a source of entertainment (χ^2 = 64.422) indicate a strong effect of these variables on overall media assessment. Additionally, variables such as perceived understanding, focus on the most important aspects (χ^2 = 40.369), and emphasis on the origins of the virus (χ^2 = 48.073) highlight the importance of media content itself in shaping youth's perception of the crisis.

TABLE 7 Likelihood Ratio Tests

Effect	−2 Log Likelihood*	χ^2	*df*	Sig.
Constant	1396.343	0.000	0	–
Perceived Role: Advocacy for Collective Action	1405.046	8.703	4	0.069
Perceived Role: Informative	1436.921	40.578	4	0.000
Perceived Role: Government Oversight	1413.942	17.599	4	0.001
Perceived Role: Entertainment	1460.765	64.422	4	0.000
Perceived Understanding	1165.267	–	16	–
Focus on Important Aspects	1436.712	40.369	16	0.001
Emphasis on Origins of Virus	1444.415	48.073	16	0.000
Appropriate Coverage of COVID-19 Crisis	1449.891	53.548	12	0.000

NOTES * Of reduced model.

[94]

TABLE 8 Parameter Estimates for 'Strongly Dissatisfied' Category

Predictor	(1)	(2)	(3)	(4)	(5)
Constant	−7.352	11.638	0.399	0.528	–
Perceived Role: Advocacy	−0.067	3.031	0.000	0.982	0.935
Perceived Role: Informative	−0.576	3.912	0.022	0.883	0.562
Government Oversight	1.022	4.841	0.045	0.833	2.779
Entertainment	2.942	4.774	0.380	0.538	18.950
Perceived Understanding	4.042	4.696	0.741	0.389	56.923
Focus on Important Aspects	2.760	5.935	0.216	0.642	15.794
Emphasis on Origins	3.504	1.321	7.041	0.008	33.246
Appropriate Coverage	−7.893	6.319	1.560	0.212	–

NOTES Column headings are as follows: (1) coefficient (B), (2) tandard error, (3) Wald statistic, (4) significance, (5) exp(B).

Results from table 8 show the relationship between specific predictors and dissatisfaction with media coverage, using dissatisfaction as the reference category. For instance, Moroccan youth are more likely to feel dissatisfied with the media, especially when the origins of the virus were not adequately emphasized (B = 3.504, exp(B) = 33.246, p = 0.008). This finding further supports the likelihood test, indicating that the way the media covered certain crisis-related topics significantly influenced negative assessments. However, it can be observed that the role of media in government oversight (B = 1.022, exp(B) = 2.779, p = 0.833) and entertainment (B = 2.942, exp(B) = 18.950, p = 0.538) are strong predictors of negative assessments, but the high p-values indicate that these associations are not statistically significant.

Hypothesis 1 is accepted, as the perceived relevance of specific media channels does predict positive or negative assessments of media coverage. This is supported by the significant associations between different age groups and the perceived relevance of media channels (TV, radio, digital media, newspapers) presented in table 2 and the correlation analysis heatmap in figure 1, which indicates an increasingly favorable assessment with higher perceived relevance ($r = 0.30$, $p < 0.01$). The regression analysis further supports this hypothesis by showing how the perceived roles (informative, oversight) significantly affect the overall assessment of the media coverage.

Based on the results, Hypothesis 2 is also accepted, as the frequency of following digital media during the pandemic and the nature of the content itself may predict youth's positive or negative assessments of the media coverage. This is supported by results from table 1, which show that digital media is preferred as a source of information by youth, and the correlation analysis in figure 1 demonstrating a positive correlation between age and the frequency of following the media ($r = 0.34$, $p < 0.01$), indicating that the older the respondents are, the more frequently crisis-related content is consumed. Furthermore, the regression analysis in table 8 indicates that specific topics, such as the emphasis on the origin of the virus, significantly influence negative assessments among youth.

DISCUSSION

This study set out with the aim of assessing the influence of media consumption habits in terms of diversity and their impact on the perceived understanding of the crisis, as well as the general satisfaction or dissatisfaction with the media coverage of the crisis. The results of this research show that variations in media consumption patterns influence the perceived efficacy of the COVID-19 coverage. The main findings of the study answer the research question by highlighting different patterns in media consumption and exploring the effect of these habits on perceived understanding and overall assessment.

The analysis aligns with the existing literature regarding the preference for digital media among Moroccan youth compared to their seniors, who rely more on traditional media (Aboulghazi 2022). However, the same results show that in the case of COVID-19, traditional media seems not to be completely ignored by youth, suggesting that Moroccan youth still consume information from these channels in times of crisis,

indicating an inclination towards a diversity of sources, alternating between traditional and digital sources.

Additionally, the results reveal a correlation between youth media engagement and their varied perceptions of the crisis, with seniors
[96] showing stronger engagement with mainstream media narratives and reporting a better understanding of the situation compared to younger respondents. However, youth exhibit more diverse perceptions, suggesting that consuming a broader range of media channels leads to greater variation in perceived efficacy. This may be attributed to the conflicting narratives surrounding COVID-19 virus and the fact that younger generations encounter a wider range of content on the Internet, including misinformation and fake news (Aboulghazi 2021).

Our study, in contrast, distinct generational patterns in media perception, with younger respondents generally expressing a favorable perception of the media coverage, while older individuals – particularly those over 55 – adopted a more cautious and critical stance. Interestingly, a study by Ceccato et al. (2021) on the Italian context reported different findings, indicating that older adults experienced lower levels of negative emotion compared to younger. These contrasting outcomes suggest that generational differences in media perception and emotional response may be shaped by cultural and societal contexts.

When comparing the assessment of media coverage within specific age groups, subtle differences were also identified. Youths' perception tends to be more diverse, expressing both satisfaction and dissatisfaction to a significant extent, which underscores that age is not the only variable that may affect the public's perception. The diverse digital media sources themselves may result in different perceptions of the crisis (Chauhan and Hughes 2020; Wu 2020). These differences may also be explained by varying levels of digital literacy and other socio-cultural factors.

Seniors, particularly those over 55 years old, expressed more polarized views, often conveying stronger negative opinions regarding the depth and accuracy of the coverage. This could be explained by a loss of trust in traditional media sources, greater susceptibility to misinformation, or subjective interpretations of what constitutes appropriate coverage (Tucker et al. 2018; Wagner and Boczkowski 2019).

The correlation analysis highlights interesting results, especially the negative correlations between several topics – such as awareness measures and vaccine progress – and both age and frequency of media

follow-up, indicating both hesitancy towards mainstream media narratives and a sense of information overload among the younger generation. Similar results were found through a qualitative approach by Zimmermann (2024), who observed that in the Swedish case, a higher tendency to express feelings of fatigue and information overload appeared to contribute to growing polarization and societal segmentation in the later stages of the crisis. [97]

The results of the regression analysis further emphasize the role media coverage plays in shaping perceptions of dissatisfaction, indicating that the lack of emphasis on origins of the virus, insufficient government oversight, and limited entertainment value are strong predictors of negative assessments. This suggests that the perceived imbalance in the coverage of certain crisis-related topics was a source of dissatisfaction, leading to varying perceptions of the efficacy of the media's effectiveness. This fluctuation in perception was also observed in other cases where levels of trust appeared to decline as the crisis progressed.

It's crucial to keep in mind that these findings should be approached with caution. The limitations indicate a sampling bias, which could mean that certain demographics are not adequately represented in the sample, thereby affecting the generalizability of the results.

Looking at it from another angle, this study specifically focused on age-related differences in how the media is perceived, without considering important factors that might impact how the Moroccan public views issues such as information quality, trust in the media, or levels of media literacy across different age groups. This study was also conducted at a specific point in time, meaning that it does not take into account potential changes in perceptions or trends.

A longitudinal study would provide more in-depth insight into the evolving perceptions of the COVID-19 crisis by the population, tracking how attitudes change over time in response to evolving events and media narratives, especially during a prolonged crisis like the COVID-19 pandemic.

As a future research avenue, we could complement this research with a qualitative analysis, such as a content analysis of media narratives or by conducting in-depth focus groups and interviews to analyze behaviors that may be more difficult to detect using surveys alone. Technology and data analytics could also offer valuable real-time insights into large-scale datasets on social media, allowing us to explore public sentiment, media framing, and information dissemination during crises.

CONCLUSION

Analyzing Moroccan youth's perception of the COVID-19 pandemic through the lens of Moroccan media coverage reveals the complex interplay between media narratives and public understanding of the
[98] virus. Several key conclusions and implications can be drawn from this research, emphasizing the intricate relationship between media consumption habits and youth perceptions.

The results confirm variations in media channel preferences across Moroccan demographics, highlighting the importance for mainstream media outlets to diversify and adapt their content across a wider range of digital media platforms to effectively reach youth and young adults. The empirical findings of this paper provide valuable insights for Moroccan media organizations regarding public preferences in terms of media consumption and their perceived assessment of the coverage of a globally significant phenomenon. One key implication is the need for targeted communication strategies that address the specific needs and behaviors of different age groups.

While digital media appears to be the main source of information among youth, results indicate that they still rely on traditional media. However, negative perceptions tend to increase when there is a perceived lack of government oversight and in-depth information. This suggests to media organizations that fact-checking, accountability, and adherence to ethical responsibilities are crucial for maintaining public trust and engagement.

Another important aspect highlighted in this research is the growing need for media literacy skills among youth. Misinformation, fake news, and conspiracy theories have been widely shared on digital platforms during and after the COVID-19 pandemic, affecting their understanding. Media education programs and fact-checking workshops may help enhance young people's skills in seeking information online.

Adaptability and agility in crisis response are also key implications of this study. As media consumption patterns evolve during a crisis, media organizations and authorities should adapt their communication strategies based on public feedback and needs. This includes leveraging innovative formats such as podcasts, livestreams, and other interactive content.

The study also underscores the importance of research and interdisciplinary approaches to media coverage during health-related crises. A reasonable approach to addressing this issue would be to emphasize

the need for collaborative efforts among policymakers, media practitioners, public health authorities, and researchers to develop evidence-based strategies for effective crisis communication and public engagement.

REFERENCES

Aboulghazi, H. 2021. 'Moroccan Social Media Platforms and COVID-19 Misinformation.' *International Journal of Linguistics and Translation Studies* 2 (4): 4.

Aboulghazi, H. 2022. 'Covid-19 Crisis Communication Management in Morocco: Investigating Male and Female Publics' Perceptions and Assessments of Moroccan Public Authorities' Crisis Response Strategies.' *The Journal of Quality in Education* 12 (19): 19.

Austin, L., B. Fisher Liu, and Y. Jin. 2012. 'How Audiences Seek Out Crisis Information: Exploring the Social-Mediated Crisis Communication Model.' *Journal of Applied Communication Research* 40 (2): 188–207.

Austin, L., and Y. Jin. 2015. 'Approaching Ethical Crisis Communication with Accuracy and Sensitivity: Exploring Common Ground and Gaps between Journalism and Public Relations.' *The Public Relations Journal* 9 (1): 2.

Austin, L., and Y. Jin. 2016. 'Social Media and Crisis Communication: Explicating the Social-Mediated Crisis Communication Model.' In *Strategic Communication: New Agendas in Communication,* edited by A. Dudo and L. A. Kahlor. Routledge.

Ben Abdelaziz, A., N. El Haddad, H. Hannachi, S. Nouira, S. Melki, D. Chebil, S. Chelly, A. Quessar, and N. Boussouf. 2021. 'Qualité des supports de communication de crise lors de la pandémie de la COVID-19 au Grand Maghreb.' *Revue d'Épidémiologie et de Santé Publique* 69 (3): 116–26.

Berni, I., A. Menouni, Y. F. Zegzouti, M.-P. Kestemont, L. Godderis, and S. El Jaafari. 2021. 'MAROCOVID: Snapshot Monitoring of Knowledge and Perceptions of Safety Behaviors during the COVID-19 Outbreak in Morocco.' *International Journal of Environmental Research and Public Health* 18 (11): 11.

Bode, L., and E. K. Vraga. 2018. 'See Something, Say Something: Correction of Global Health Misinformation on Social Media.' *Health Communication* 33 (9): 1131–40.

Buturoiu, R., G. Udrea, D.-A. Oprea, and N. Corbu. 2021. 'Who Believes in Conspiracy Theories about the COVID-19 Pandemic in Romania: An Analysis of Conspiracy Theories Believers' Profiles.' *Societies* 11 (4): 138.

Cascini, F., A. Pantovic, Y.-A. Al-Ajlouni, G. Failla, V. Puleo, A. Melnyk, A. Lontano, and W. Ricciardi. 2022. 'Social Media and Attitudes towards a COVID-19 Vaccination: A Systematic Review of the Literature.' *eClinicalMedicine* 48:101454.

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Ceccato, I., R. Palumbo, A. Di Crosta, P. La Malva, D. Marchetti, R. Maiella, M. C. Verrocchio, A. Marin, N. Mammarella, R. Palumbo, and A. Di Domenico. 2021. 'Age-Related Differences in the Perception of COVID-19 Emergency during the Italian Outbreak.' *Aging & Mental Health* 25 (7): 1305–13.

Chauhan, A., and A. L. Hughes. 2020. 'Trustworthiness Perceptions of Social Media Resources Named after a Crisis Event.' *Proceedings of the ACM on Human-Computer Interaction* 4:44.

De Coninck, D., L. d'Haenens, and K. Matthijs. 2020. 'Perceived Vulnerability to Disease and Attitudes towards Public Health Measures: COVID-19 in Flanders, Belgium.' *Personality and Individual Differences* 166:110220.

Döveling, K., ed. 2011. *The Routledge Handbook of Emotions and Mass Media*. Routledge.

Driedger, S. M. 2007. 'Risk and the Media: A Comparison of Print and Televised News Stories of a Canadian Drinking Water Risk Event.' *Risk Analysis* 27 (3): 775–86.

Flew, T. 2021. 'Trusting and Valuing News in a Pandemic: Attitudes to Online News Media Content during COVID-19 and Policy Implications.' *Journal of Digital Media & Policy* 12:11–26

Hattani, A., and A. Jai. 2022. 'Crisis Communication amid the COVID-19 Pandemic in Morocco.' *Journal of Arab & Muslim Media Research* 15 (1): 45–63.

Hendricks, V. F., and C. Mehlsen. 2022. *The Ministry of Truth: BigTech's Influence on Facts, Feelings and Fictions*. Springer Nature.

Lacroix, C., and M.-È. Carignan. 2020. 'Pandémie de COVID-19: de nouvelles contraintes journalistiques qui menacent le droit à l'information.' *Enjeux et société: approches transdisciplinaires* 7 (2): 271–96.

Leicht, K. T., J. Yun, B. Houston, L. Auvil, and E. Bracht. 2022. 'The Presentation of Self in Virtual Life: Disinformation Warnings and the Spread of Misinformation Regarding COVID-19.' *RSF: The Russell Sage Foundation Journal of the Social Sciences* 8 (8): 52–68.

León, E. de, M. Makhortykh, T. Gil-Lopez, A. Urman, and S. Adam. 2023. 'News, Threats, and Trust: How COVID-19 News Shaped Political Trust, and How Threat Perceptions Conditioned This Relationship.' *The International Journal of Press/Politics* 28 (4): 952–74.

Matsilele, T., L. Tshuma, and M. Msimanga. 2022. 'Reconstruction and Adaptation in Times of a Contagious Crisis: A Case of African News-

rooms' Response to the Covid-19 Pandemic.' *Journal of Communication Inquiry* 46 (3): 268–88.

McLeod, D. M., D. Wise, and M. Perryman. 2017. 'Thinking about the Media: A Review of Theory and Research on Media Perceptions, Media Effects Perceptions, and Their Consequences.' *Review of Communication Research* 5:35–83.

Tucker, J. A., A. Guess, P. Barbera, C. Vaccari, A. Siegel, S. Sanovich, D. Stukal, and B. Nyhan. 2018. 'Social Media, Political Polarization, and Political Disinformation: A Review of the Scientific Literature.' SSRN Scholarly Paper 3144139.

Tsoy, D., D. Godinic, Q. Tong, B. Obrenovic, A. Khudaykulov, and K. Kurpayanidi. 'Impact of Social Media, Extended Parallel Process Model (EPPM) on the Intention to Stay at Home during the COVID-19 Pandemic.' *Sustainability* 14 (12): 7192.

Wagner, M. C., and P. J. Boczkowski. 2019. 'The Reception of Fake News: The Interpretations and Practices That Shape the Consumption of Perceived Misinformation.' *Digital Journalism* 7 (7): 870–85.

Wu, S. (2020). 'When New Media Operates within a State-Mediated Press System: Assessing New Media's Impact on Journalism Crisis Perceptions in Singapore and Hong Kong.' *Information, Communication & Society* 23 (4): 572–87.

Zag, H., and M. Mifdal. (2024). 'Polarized Framing of Scientific Uncertainty during COVID-19 Pandemic in Morocco.' *Atlantic Journal of Communication* 33 (1): 50–70.

Zimmermann, B. M. 'Swiss Residents' Information Behavior Perceptions during the COVID-19 Pandemic: A Longitudinal Qualitative Study.' *Social Science & Medicine* 344:116647.

IJEMS | SCIENTIFIC ARTICLE

Economic Integration of Mediterranean States

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Times of economic crisis are an opportunity for greater integration of the markets of the Mediterranean countries. The chosen method makes it possible to confirm this hypothesis. Unfortunately, this cannot be realized without greater, comprehensive institutional connectivity within he economic space. The greatest role in this can be played by the major members of the Mediterranean basin, which are very important to global trade and through which the effects of major crises are also transmitted most significantly to the economic space of the Mediterranean basin.

Key Words: Mediterranean countries, economic integration, Markov chains

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INTRODUCTION

At first glance, the title of this article and its field of analysis may seem overly optimistic, especially in light of the current geopolitical situation and the ongoing war in the Middle East between two members of the Mediterranean basin – Israel and Palestine. However, we believe that, regardless of the circumstances – or perhaps precisely because of them – it is essential to maintain a degree of optimism and to redouble efforts toward identifying pathways to peaceful coexistence and cooperation for the common good. Our focus, of course, is on economic cooperation. A strong understanding of the past can always help to find better and more lasting solutions for the future.[1]

[1] 'Interestingly, national influences tend to correlate negatively with regional influences, suggesting that national specificities play a somewhat countercyclical role in the Western Mediterranean region (Portugal, Spain, France, Italy)' (Canova and Ciccarelli 2011).

BASIC RESEARCH CONCEPT

This analysis focuses on the general characteristics of international trade among the countries of the Mediterranean basin over a period of nearly a quarter of a century. Our primary interest lies in examining
[104] the current state and nature of mutual trade relations, particularly in terms of their potential for improvement.

Specifically, we concentrate on the level of connectivity or integration of the economies of the Mediterranean countries during the period from 1995 to 2018. From this foundation, however, we move toward a 'what if' type of analysis: what might the future hold if the existing nature of these relationships continues to prevail? We deliberately conclude our analysis before the onset of major external, non-market disruptions such as the COVID-19 pandemic, energy crises, wars, and interventionist state policies. However, the period under review does include the significant global financial and economic crisis that followed the collapse of Lehman Brothers in the United States on September 15, 2008.

STATISTICAL METHODS AND DATA MANAGEMENT

A major problem in conducting a comprehensive and long-term analysis of international trade in goods and services among the twenty-one countries bordering the Mediterranean Sea is the availability and comparability of data. More than a third of these countries, or eight in total, are members of the European Union (EU), and three of them (ranking second, third, and fourth in GDP within the EU, after Germany) also belong to the European Monetary Union (EMU). Consequently, it makes sense to pursue data consistency by relying on European statistical standards and methodologies. Setting aside considerable heterogeneity of these economies – whose past cooperation we seek to examine over an extended period to inform future possibilities for deeper integration – we should concentrate on the relative shares of mutual trade, expressed as a percentage of each country's GDP.

In light of the above, we concluded that the most useful database is provided by the European Central Bank (ECB) through its public data portal. In the context of international relations and in view of current geopolitical, environmental, demographic, and other external factors, the ECB has emphasized a strong need to jointly address the major challenges of our time, including, or especially, with the rest of the Mediterranean countries outside the EMU (Lagarde 2023).

We aim to estimate the minimum, average and maximum levels of cooperation, or economic integration, in the past by analyzing the available 24-year time series of the aforementioned data on international trade in goods, covering the period from 1995 to 2018. These scenarios – representing low (minimum), typical (average), and high (maximum) levels of cooperation – serve as the foundation for constructing and applying matrices of integration rates among individual countries in the Mediterranean basin, with a view toward potential future collaboration. To explore long-term established relationships, we employ methods of forecasting and extrapolation. [105]

The integration stage can be understood as the degree of import or export interdependence among the countries of the Mediterranean basin. For the purpose of this analysis, we focus exclusively on one-sided trade flows – exports. The most appropriate measure is the double export weight, which reflects the degree of competitiveness of an exporting country within a particular market. This indicator accounts for the exporting country's relative share in total exports, its market position relative to other exporters in the same market and competition from domestic suppliers, in other words, all relevant market competitors. In our analysis, the competitive position of each Mediterranean country in the market of another Mediterranean country is represented by the rows of a square matrix (square matrix row), while the competitive positions of other Mediterranean countries within the market of the country under consideration are represented by the columns (square matrix column). Thus, exports are illustrated as flows from the *i*-th row to the *j*-th column. Conversely, the reverse direction of the matrix reflects the import activity of each Mediterranean country from the other members of the basin.

Methodologically, we aim to extrapolate the available data using the quantitative Markov chain method, as it allows for the possibility of establishing an equilibrium distribution over time. The association for the use of this method stems from its relevance to the gravitational model commonly used to study mutual trade relations among countries (UNCTAD 2012).[2]

[2] 'It has been known since the seminal work of Jan Tinbergen (1962) that the size of bilateral trade flows between any two countries can be approximated by a law called the 'gravity equation' by analogy with the Newtonian theory of gravitation. Just as planets are mutually attracted in proportion to their sizes and proximity, countries trade

The *concept of double-weighted trade* often involves *using a gravity model* to analyze trade flows. The gravity model in international trade is analogous to Newton's law of gravitation and is typically expressed as:

[106]

$$T_{ij} = D_{ij} \times A \times Y_i \times Y_j, \quad (1)$$

where T_{ij} is the trade flow between country (i) and country (j), A is a constant, Y_i and Y_j are the economic sizes (usually GDP) of countries $Y_j(i)$ and (j), respectively, and D_{ij} is the distance between the two countries, which can also include other factors like trade barriers.

To apply the Markov chain method, we require a square transition matrix in which each row sums to one (and, where appropriate, symmetry is maintained). This approach is well suited to our study because Markov chains are 'memoryless' – they depend only on the most recent state – which aligns perfectly with our characterization of 'bad,' 'mediocre,' and 'promising' trade periods. Since the sum of the probability of transition from a single row to all columns of the matrix must be equal to 1, we will use import probabilities to define our baseline scenarios, and for each scenario, we then compute the average of each column in the transition matrix to serve as the last known state of the Markov chain – effectively quantifying the export attractiveness of each Mediterranean country to its counterparts (Hudoklin-Božič 1999).

As a unit of measure, we use a relative measure expressed in hundredths of a percent of double-weighted exports, i.e. in percentages to four decimal places, because the competitive position of each country in question, assuming the absence of major crises, usually changes over time with very small relative changes in its market position.

Example of the time series dimension of the relative market share of Slovenian exports of goods and services on the Algerian market: 'WTS.A.SI.DZ.ZOZ.XO.T.TMS.F, Slovenia, Annual:'

- WTS: This likely stands for 'World Trade Statistics.'
- A: Indicates that the data is annual.
- SI: Refers to Slovenia as the reference area.
- DZ: Represents Algeria.

in proportion to their respective GDPs and geographic closeness. Initially, the gravity equation was thought of merely as a representation of an empirically stable relationship between the size of economies, their distance and the volume of their trade.' UNCTAD (2012).

- ZOZ: This part is not immediately clear without additional context, but it could be related to specific trade categories or products.
- XO: Indicates that it's a double export weight.
- T: The unit of measurement is in hundredths of a percent.
- TMS: Possibly related to total manufactured products (SITC 5 to 8).
- F: The frequency of data collection is annual.

The Standard International Trade Classification (SITC) distinguishes four main groups of industrial goods: (i) chemicals (SITC 5) – this category includes chemical products and industrial goods classified mainly by material, (ii) manufactured goods (SITC 6) – that is, goods made mainly from special materials, such as textiles, wood, paper, and cork (iii) machinery and transport equipment (SITC 7) – this group includes machinery, equipment, and vehicles, (iv) miscellaneous manufactured articles (SITC 8) – products that do not fall into other categories are classified here. This classification also includes the service component of trade, where transport, commerce, tourism, and financial services have historically played leading roles. Significant progress has been made in the latter since 2013, but there remains substantial closure in the sector, often due to dominant state ownership of financial institutions. The less developed countries of the Mediterranean basin tend to focus excessively on low-value-added activities, are relatively less open to international markets, their mutual trade is lower and their dependence on trade with EU countries is significantly higher (Ayadi 2013; Giovannetti 2013)

Table 1 highlights the problematic nature of data availability in the desired comparison of twenty-one countries. 'Shadow' countries do not provide data on the relative strength of mutual international trade. The statistical principles of data availability and transparency are not met. As a result, the planned analysis can focus on the twelve non-shadowed countries listed in table 1 – essentially, a good half of the total. High statistical standards are maintained by all EU and EMU members. The opposite is true for members in the Middle East, with the exception of Israel. From a representational standpoint, it is encouraging that we have harmonized data from two North West African countries: Morocco and Algeria.

As the chosen method requires full methodological comparability

TABLE 1 Availability of Comparable Data within a Symmetric Matrix

	MA	DZ	**TN**	**LY**	**EG**	**PS**	IL	**LB**	**SY**	TR	CY	MT	GR	**AL**	**ME**	**BA**	HR	SI	IT	FR	ES
MA			•	•	•	•		•	•					•	•	•					
DZ			•	•	•	•		•	•					•	•	•					
TN	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
LY	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
EG	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PS	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
IL			•	•	•	•		•	•					•	•	•					
LB	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•
SY	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•
TR			•	•	•	•		•	•					•	•	•					
CY			•	•	•	•		•	•					•	•	•					
MT			•	•	•	•		•	•					•	•	•					
GR			•	•	•	•		•	•					•	•	•					
AL	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•
ME	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•
BA	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•
HR			•	•	•	•		•	•					•	•	•					
SI			•	•	•	•		•	•					•	•	•					
IT			•	•	•	•		•	•					•	•	•					
FR			•	•	•	•		•	•					•	•	•					
ES			•	•	•	•		•	•					•	•	•					

NOTES MA – Morocco, DZ – Algeria, TN – Tunisia, LY – Libya, EG – Egypt, PS – Palestine, State of, IL – Israel, LB – Lebanon, SY – Syrian Arab Republic, TR – Turkey, CY – Cyprus, MT – Malta, GR – Greece, AL – Albania, ME – Montenegro, BA – Bosnia and Herzegovina, HR – Croatia, SI – Slovenia, IT – Italy, FR – France, ES – Spain. We used a concept of the Union for the Mediterranean, which, for our analytical purposes, includes only all the coastal Mediterranean countries (European Parliament 2014). Based on data from the ECB Data Portal (https://data.ecb.europa.eu).

[108]

of the data, we unfortunately only need to focus on 12 of the 21 countries of the Mediterranean basin (table 1). As can be seen from table 1, a Mediterranean country is defined for our analysis by its location on the Mediterranean Sea. For these twelve, we have a time series of methodologically completely comparable data for the period up to and including 2018, i.e., for the period before the outbreak of the COVID-19 crisis and the Ukrainian war or the energy crisis, all of which significantly affect international trade flows by disrupting transport routes and constraining supply chains. Subsequent disruptions include the war in Gaza and the trade war resulting from US tariff policy through 2025. Nevertheless, despite the limitations in comparative integrity across all twenty-one Mediterranean countries, focusing on a subset of twelve with the highest statistical standards underscores the importance of data quality as the foundation for analysis. In the future, harmonization of statistical monitoring under international (European) statistical standards should be a prerequisite for improved economic cooperation and, consequently, a higher degree of integration.

TABLE 2 Average Values of Double-Weighted Exports from the Country in Row (*i*) of the Table to the Country in Column (*j*) of the Table for the Period 1995–2018, Relative to the GDP of the Exporting Country

	DZ	HR	CY	FR	GR	IL	IT	MT	MA	SI	ES	TR	∑
DZ		0.0022	0.0013	0.0956	0.0112	0.0044	0.0737	0.0007	0.0190	0.0022	0.0518	0.0164	0.2784
HR	0.0010		0.0014	0.0928	0.0112	0.0060	0.0739	0.0008	0.0022	0.0023	0.0504	0.0137	0.2556
CY	0.0006	0.0025		0.0393	0.0598	0.0116	0.0349	0.0039	0.0013	0.0020	0.0133	0.0067	0.1759
FR	0.0076	0.0015	0.0006		0.0053	0.0049	0.0695	0.0008	0.0073	0.0026	0.0583	0.0140	0.1725
GR	0.0034	0.0020	0.0241	0.0534		0.0085	0.0669	0.0018	0.0020	0.0021	0.0231	0.0220	0.2092
IL	0.0010	0.0014	0.0006	0.0400	0.0047		0.0318	0.0006	0.0016	0.0010	0.0208	0.0139	0.1172
IT	0.0037	0.0044	0.0010	0.0924	0.0115	0.0054		0.0012	0.0032	0.0049	0.0441	0.0177	0.1895
MT	0.0005	0.0040	0.0021	0.0734	0.0082	0.0054	0.0693		0.0016	0.0019	0.0234	0.0136	0.2033
MA	0.0030	0.0019	0.0013	0.0917	0.0117	0.0053	0.0695	0.0009		0.0020	0.0511	0.0161	0.2544
SI	0.0013	0.0445	0.0008	0.0641	0.0037	0.0042	0.1008	0.0005	0.0012		0.0213	0.0126	0.2549
ES	0.0051	0.0013	0.0008	0.1168	0.0063	0.0050	0.0668	0.0006	0.0093	0.0021		0.0150	0.2291
TR	0.0068	0.0024	0.0011	0.0712	0.0090	0.0109	0.0582	0.0006	0.0049	0.0021	0.0389		0.2062
$\bar{x}$	0.0031	0.0062	0.0032	0.0755	0.0130	0.0065	0.0650	0.0011	0.0049	0.0023	0.0360	0.0147	0.2122

NOTES Based on data from the ECB Data Portal (https://data.ecb.europa.eu).

Since 1996, the EU has provided technical assistance to Mediterranean countries in this area in five packages under the MEDSTAT program, which ends in 2025 (Eurostat 2022).

Based on the basic methodological data framework outlined above, we have selected the Markov chain method to estimate the potential degree of integration, assuming the exclusion of major external crisis factors (i.e., the analysis covers the period up to 2018).

We have constructed a data warehouse that enables the preparation of a content-complete and comparable square matrix for twelve Mediterranean countries. For the entire period under consideration, from 1995 to 2018, we calculate minimum, average and maximum values, in accordance with the three predefined scenarios. Since double-weighted exports are expressed as a percentage of each country's total exports, we present the baseline average values for the twelve selected Mediterranean countries over the observed period.

In table 2, we observe that the countries with the largest average market shares of exports of goods and services – by each of the other eleven Mediterranean countries under consideration – on world markets are: France (7.55%), Italy (6.5%), Spain (3.6%), Turkey (1.47%) and Greece (1.3%). Israel falls somewhere in the middle (0.65%). On the other hand, the markets of the smaller Mediterranean members appear more diversified in terms of international trade. Exporters from non-Mediterranean countries are clearly present in greater proportions in these smaller markets. While caution is warranted due to data limita-

tions – the remaining nine Mediterranean countries are not included in the table – this pattern *may* be generalized to the broader group of twenty-one Mediterranean countries. The calculated average ($\bar{x}$) of each column represents the degree of import integration of each country within the Mediterranean basin into this common market (import integration as an export attraction for other members). For example, Algeria is integrated at a rate of 0.31%, meaning that, on average, other countries of the Mediterranean basin will export to the Algerian market with such an average probability. Similarly, the Moroccan market is integrated into the Mediterranean basin at a rate of 0,49 %. As shown in table 2, the most integrated or desirable export markets within the Mediterranean basin are those of France (7.55%), Italy (6.5%), Spain (3.6%), Turkey (1.47%), and Greece (1.3%). For all the Mediterranean markets listed, the integration rate (i.e., the column average) exceeds 1 %, indicating a relatively high level of market integration into the Mediterranean basin, measured against the global economy.

[110]

If we examine the rows of the square matrix, following the approach described above, we can identify a significant variation in the export presence of each member country in the markets of other comparable countries. In the Algerian market (first column), France (0.76%), Turkey (0.68%), and Spain (0.51%) demonstrate a relatively higher export interest compared to other Mediterranean countries – highlighting the methodological importance of using double-weighted exports. If we read the matrix row by row, then the average probability, taking into account its total world exports and the entire period considered (1995–2018), that France will export to the Algerian market is 0.76 %. During the same period, Spain exported to the markets of the other (eleven) Mediterranean countries with a probability of almost 23 % (sum of the line; 22.91 %), accounting for the predominant share of the probability of its world exports to France (11.68 %) and Italy (6.68 %). Even at the level of world trade, the matrix reveals relatively strong competitive presences in certain Mediterranean markets. For example, Greece exports to Cyprus with a 2.41% probability, while Slovenia exports to Croatia with a 4.45% probability – both figures indicating meaningful regional trade dynamics within the Mediterranean basin. It is therefore useful to narrow the analytical scope from the level of total global exports to the subset of exports within the Mediterranean countries under consideration. Let us make the same calculation as in table 2 for the minimum and maximum values of the relative data of the

TABLE 3 Square Matrix of Markov Properties for Transition Probabilities Based on *Minimum Values* of Double-Weighted Exports among a Sample of Mediterranean Countries, for the Period 1995–2018, Relative to the GDP of the Exporting Member

	DZ	HR	CY	FR	GR	IL	IT	MT	MA	SI	ES	TR	Σ
DZ	0.0000	0.0075	0.0050	0.3731	0.0380	0.0170	0.2502	0.0020	0.0554	0.0100	0.2043	0.0375	1.00
HR	0.0018	0.0000	0.0046	0.3963	0.0371	0.0197	0.2769	0.0023	0.0073	0.0092	0.1973	0.0476	1.00
CY	0.0027	0.0081	0.0000	0.2029	0.3582	0.0628	0.2002	0.0054	0.0063	0.0126	0.0996	0.0413	1.00
FR	0.0402	0.0099	0.0030	0.0000	0.0258	0.0288	0.3980	0.0045	0.0470	0.0167	0.3457	0.0804	1.00
GR	0.0030	0.0085	0.0953	0.3054	0.0000	0.0401	0.3497	0.0043	0.0049	0.0085	0.1026	0.0777	1.00
IL	0.0073	0.0104	0.0042	0.3873	0.0355	0.0000	0.2443	0.0031	0.0084	0.0094	0.1764	0.1138	1.00
IT	0.0143	0.0220	0.0052	0.5143	0.0422	0.0292	0.0000	0.0065	0.0149	0.0266	0.2348	0.0901	1.00
MT	0.0022	0.0153	0.0051	0.4135	0.0385	0.0196	0.2827	0.0000	0.0058	0.0102	0.1170	0.0901	1.00
MA	0.0045	0.0081	0.0050	0.3995	0.0413	0.0156	0.2589	0.0030	0.0000	0.0086	0.2045	0.0509	1.00
SI	0.0026	0.1597	0.0031	0.2676	0.0159	0.0149	0.4073	0.0015	0.0036	0.0000	0.0832	0.0406	1.00
ES	0.0136	0.0049	0.0033	0.5510	0.0256	0.0229	0.2921	0.0027	0.0283	0.0093	0.0000	0.0463	1.00
TR	0.0355	0.0120	0.0057	0.3722	0.0380	0.0507	0.2644	0.0032	0.0152	0.0114	0.1915	0.0000	1.00
$\bar{x}$	0.0106	0.0222	0.0116	0.3486	0.0580	0.0268	0.2687	0.0032	0.0164	0.0110	0.1631	0.0597	1.00

NOTES Based on data from the ECB Data Portal (https://data.ecb.europa.eu).

double-weighted exports of the selected countries at the world level. In the 'total' column and the 'average' row of table 2, we can see that, on average, during the period under consideration, trade in goods among the twelve countries under consideration accounted for almost 22% of their total world exports (21.22%)

Depending on the chosen analytical method (Markov chains) we construct a square matrix in tables 3 to 5 that represents the transition probabilities from each row country to each column country – that is, the probability of mutual trade among a selected sample of Mediterranean countries. The matrices are constructed to ensure that all conditions required for a Markov chain are satisfied, specifically that the sum of each row equals 1.

When converting basic matrices such as that in table 2 to Markov-type transition probability matrices (tables 3 to 5), it is not to be expected that the probability data for the minimum, average, or maximum values will maintain a similar relationship overall. This is because we must satisfy the condition that the sum of the probability of state transitions in the row is equal to 1.

The last row of averages in tables 3 to 5 represents the average probabilities of the degree of market integration over the period under study for each country represented in the columns of the matrix, taking into account the closed trade system of the twelve countries in question. Let's call it an initial matrix of *states of the first order* of 1×12. We have

TABLE 4 Square Matrix of Markov Properties for Transition Probabilities Based on the *Average Values* of Double-Weighted Exports among a Sample of Mediterranean Countries, for the Period 1995–2018, Relative to the GDP1of the Exporting Member

[112]

	DZ	HR	CY	FR	GR	IL	IT	MT	MA	SI	ES	TR	Σ
DZ	0.0000	0.0079	0.0045	0.3435	0.0402	0.0157	0.2648	0.0026	0.0681	0.0080	0.1860	0.0588	1.00
HR	0.0037	0.0000	0.0053	0.3633	0.0437	0.0236	0.2892	0.0030	0.0087	0.0090	0.1971	0.0535	1.00
CY	0.0036	0.0140	0.0000	0.2232	0.3401	0.0661	0.1986	0.0224	0.0072	0.0111	0.0754	0.0382	1.00
FR	0.0441	0.0085	0.0037	0.0000	0.0308	0.0285	0.4032	0.0048	0.0423	0.0149	0.3381	0.0812	1.00
GR	0.0163	0.0094	0.1152	0.2552	0.0000	0.0405	0.3197	0.0087	0.0094	0.0101	0.1104	0.1051	1.00
IL	0.0084	0.0116	0.0049	0.3415	0.0397	0.0000	0.2710	0.0048	0.0138	0.0086	0.1773	0.1183	1.00
IT	0.0195	0.0233	0.0055	0.4877	0.0605	0.0285	0.0000	0.0063	0.0166	0.0257	0.2327	0.0936	1.00
MT	0.0023	0.0195	0.0104	0.3612	0.0402	0.0266	0.3409	0.0000	0.0079	0.0092	0.1150	0.0668	1.00
MA	0.0119	0.0075	0.0052	0.3604	0.0460	0.0209	0.2730	0.0034	0.0000	0.0077	0.2008	0.0631	1.00
SI	0.0052	0.1744	0.0031	0.2516	0.0146	0.0166	0.3953	0.0018	0.0045	0.0000	0.0834	0.0494	1.00
ES	0.0221	0.0057	0.0035	0.5099	0.0274	0.0218	0.2918	0.0026	0.0407	0.0092	0.0000	0.0654	1.00
TR	0.0330	0.0116	0.0055	0.3454	0.0436	0.0529	0.2823	0.0031	0.0238	0.0100	0.1888	0.0000	1.00
$\bar{x}$	0.0142	0.0245	0.0139	0.3202	0.0606	0.0285	0.2775	0.0053	0.0202	0.0103	0.1587	0.0661	1.00

NOTES Based on data from the ECB Data Portal (https://data.ecb.europa.eu).

TABLE 5 Square Matrix of Markov Properties for Transition Probabilities Based on the *Maximum Values* of Double-Weighted Exports among a Sample of Mediterranean Countries, for the Period 1995–2018, Relative to the GDP of the Exporting Member

	DZ	HR	CY	FR	GR	IL	IT	MT	MA	SI	ES	TR	Σ
DZ	0.0000	0.0088	0.0040	0.3026	0.0390	0.0141	0.2551	0.0037	0.1049	0.0064	0.1837	0.0778	1.00
HR	0.0055	0.0000	0.0058	0.3397	0.0492	0.0294	0.2820	0.0051	0.0103	0.0089	0.2105	0.0537	1.00
CY	0.0044	0.0342	0.0000	0.1855	0.4028	0.0659	0.1660	0.0355	0.0085	0.0085	0.0625	0.0260	1.00
FR	0.0434	0.0080	0.0038	0.0000	0.0307	0.0269	0.4170	0.0061	0.0382	0.0142	0.3354	0.0764	1.00
GR	0.0312	0.0101	0.1198	0.2204	0.0000	0.0468	0.3000	0.0105	0.0113	0.0109	0.1077	0.1311	1.00
IL	0.0088	0.0122	0.0054	0.3227	0.0421	0.0000	0.2846	0.0088	0.0149	0.0075	0.1719	0.1209	1.00
IT	0.0232	0.0254	0.0058	0.4748	0.0628	0.0316	0.0000	0.0062	0.0165	0.0245	0.2370	0.0922	1.00
MT	0.0017	0.0343	0.0166	0.2757	0.0506	0.0294	0.4376	0.0000	0.0084	0.0079	0.0939	0.0439	1.00
MA	0.0161	0.0077	0.0050	0.3438	0.0458	0.0211	0.2682	0.0053	0.0000	0.0065	0.2032	0.0774	1.00
SI	0.0090	0.2019	0.0035	0.2342	0.0152	0.0206	0.3794	0.0019	0.0055	0.0000	0.0781	0.0506	1.00
ES	0.0327	0.0059	0.0033	0.4857	0.0301	0.0219	0.2781	0.0033	0.0557	0.0089	0.0000	0.0743	1.00
TR	0.0309	0.0112	0.0052	0.3206	0.0458	0.0619	0.2788	0.0040	0.0333	0.0096	0.1985	0.0000	1.00
$\bar{x}$	0.0173	0.0300	0.0149	0.2921	0.0678	0.0308	0.2789	0.0076	0.0256	0.0095	0.1569	0.0687	1.00

NOTES Based on data from the ECB Data Portal (https://data.ecb.europa.eu).

three such matrices depending on the calculated historical minimum, average, or maximum trade participation of the twelve countries considered in the period 1995–2018.

In addition, tables 3 to 5 provide three transition matrices *P*, one for each individual scenario. For example, to try to find out how the states or probabilities of the transition matrix gravitate across n periods from 2019 onwards, we convert the last row (tables 3, 4 or 5) to a matrix of size 1 × 12 and we can multiply it by the previous matrix of size 12x12 of

the probability of transitions according to the expected scenario in the future by n number of periods.

$$S^n_{kl_{ij}} = I_{k_{ij}} \times P^n_{l_{ij}}, \tag{2}$$

whereby [113]

- $k = 3$, in the case of initial matrices also $I_{k_{ij}}$ of the order 1×12 and $l = 3$ in the case of transient matrices $P^n_{k_{ij}}$ of order 12×12, and their set of values is: min, avg, max, since they arise from the same 'history,'
- therefore, there are two *variables* k and l with the same sets of values, and given their chosen combination, i.e. the chosen base state I and the selected transition matrix P, we can obtain nine combinations of Markov matrices S;
- the matrix S, due to the characteristics of the Markov chain that they depend only on the last known state, is decisively influenced by the selection of the scenario l in the future: thus, we obtain three calculations of matrices for the pessimistic scenario (l = min), the baseline scenario (l = avg) and the best case – optimistic scenario (l = max) of the values of the probability of transition after $S^n_{kl_{ij}}$ – n number of periods in the future.

In the following approach, we attempt to determine the dynamics of further economic integration among Mediterranean countries by calculating transitional matrices of order of 1×12 in the n-th years. In such a simplified model, based on equation 1 or the logic of the gravitational model, the baseline states at a given point in time can be adjusted due to the influence of various external factors (variable $S^n_{kl_{ij}} D_{ij}$ in equation 1) on trade relations between two countries (e.g. changed tariffs). Alternatively, a different initial matrix of states I may be applied within the closed group of countries to reflect such changes.

HYPOTHESIS

The average level of integration (the average of each column) was expressed, within the selected sample of Mediterranean countries, as the probability of transition (export likelihood) from other Mediterranean countries in the sample to each country in the sample (i.e., transition from row to column in the table). We aim to determine the range of the integration rates for individual countries in the Mediterranean sample over the long-term period of cooperation. Thus, the

transitional – initial matrix (table 4), based on average values (the baseline scenario) indicates probabilities of 1.42% for Algeria, 2.02% for Morocco, and 32.02%, 27.75% and 15.87% for France, Italy and Spain respectively. The matrix of minimum values of the probability of tran-
[114] sition (table 3) is constructed using the lowest relative GDP shares of total (global) double-weighted exports for each country from any year within the 1995–2018 period. It therefore represents the worst-case scenario of economic cooperation or integration. In contrast, table 5, is based on the maximum observed relative shares in GDP of bilateral double-weighted exports over the period and represents the best-case scenario for economic cooperation or integration among the Mediterranean basin countries, drawn from various years depending on each bilateral trade relationship.

The trade-cooperation probabilities (the likelihood that exports flow from a country in a row to a country in a column of the matrix) within our selected sample of Mediterranean countries are therefore based on each country's total trade with the world during the study period and then translated into the three scenarios described. We examine a 24-year period of methodologically consistent data up to 2018, that is, before the onset of major external crises that have significantly affected mutual trade relations worldwide (COVID-19 pandemic, the Ukraine-Russia war and energy crisis, and tariff wars). We then hypothetically extrapolate the normal long-term cooperation of the Mediterranean countries and establish equilibrium matrices of cooperation for the three scenarios described, assuming that external factors would not occur. We are therefore interested in the trend of economic integration of Mediterranean countries during downturns, average periods, and upswings in global goods trade. In this way, we explore the nature of long-term cooperation and the potential for its improvement, while remaining aware of the significant risks of the present time. Hypothetically, we expect that favorable conditions would enhance the levels of economic integration for the less developed Mediterranean countries within the basin's internal trade.

In our case, we are dealing with a Markov process with discrete states in discrete time, which means that we are dealing with Markian chains that are homogeneous, since the conditional probability of being in a given state depends only on the length of the time interval – the year, and not on the specific time – period. Conditional probabilities over a longer period can be expressed in terms of the conditional probabilities

over shorter intervals. In a Markov process – or in our extrapolation – the conditional probability distribution of a random variable depends only on the most recent state, not on its previous history. The latest situation is created on the basis of three selected scenarios for the entire considered period and is obtained in the average of the column of [115] calculated transitional matrices for different scenarios (the degree of integration of each country into the Mediterranean market). We then multiply such states by the selected transitional matrix for each scenario six times ($n = 6$), covering the period from 2019 to 2024. Although this period has passed and data are not yet fully comparable, it is characterized by major external crises. Theory predicts that, over long time horizons, the properties of these Markov chains cause the state probabilities to converge to a stationary distribution. This limit distribution allows us to determine the equilibrium probabilities for each state.

Thus, for each projected year studied in the future under each scenario, we can calculate a transitional matrix representing the probabilities of occupying each state. However, our primary interest lies in whether there is a matrix of equilibrium states for each scenario. This depends on the nature of the individual states (i.e.,the probability of transition for a particular country). An analysis of the properties of the states of the Markov chain under consideration confirms that the conditions for the existence of a matrix of equilibrium states are met. This means that, regardless of the initial probabilities of occupying the states, i.e. the initial level of economic integration of an individual member of the Mediterranean basin, there exists a long-term equilibrium probability of integration, which reflects the dynamics and patterns of cooperation observed during the historical period under study. The key question, however,is how external factors on one hand, and economic and integration policies on the other, can influence changes in equilibrium distributions (Hudoklin-Božič 1999).

Positively recurrent, associated, non-periodic states reflect the traditional Mediterranean trade established over the centuries, each state represented by an individual country (table 6) is related to another state and, theoretically, can return in one step. Therefore, these are interconnected, non-periodic states. All countries were, to varying degrees, engaged in international trade of goods with one another, conducted across or along the Mediterranean basin (Lagarde 2023).

However, we are dealing with a closed set of conditions within a sample of Mediterranean countries. On the one hand, we do not have com-

TABLE 6 Properties of the Markov Chain of States under Consideration

State	Type	Class num.	State	Type	Class num.
Algeria (DZ)	Recurrent	1	Italy (IT)	Recurrent	1
Croatia (HR)	Recurrent	1	Malta (MT)	Recurrent	1
[116] Cyprus (CY)	Recurrent	1	Morocco (MA)	Recurrent	1
France (FR)	Recurrent	1	Slovenia (SI)	Recurrent	1
Greece (GR)	Recurrent	1	Spain (ES)	Recurrent	1
Israel (IL)	Recurrent	1	Turkey (TR)	Recurrent	1

NOTES Own calculations using POM QM (Weiss 2005).

prehensive data for all 21 countries of the Mediterranean basin, and on the other hand, Palestine is effectively isolated or excluded from economic activities in 2024 and 2025. Hypothetically, if comparable data were available for all twenty-one, we would be faced with a disconnected chain and an absorbing state. In that case, stochastic processes would more accurately reflect the current reality, which is not captured by our analysis based on the available data (1995–2018). Our Markov chain is therefore irreducible in nature, finite, and composed of nonperiodic states. As a result, there exist equilibrium distributions that are invariant for state occupation.

Thus, for example, the average level of economic cooperation (matrix I, k = avg) observed during the period 1995 to 2018 can, under the influence of major structural crises in the following 6 years, be multiplied by the matrix P, which represents the worst-case scenario (l = min). However, we begin by assuming consistent scenarios for both the past and the future. Accordingly, the average initial cost I in the baseline scenario is multiplied by the transition matrix for the transverse transition states P to the desired power (n) or the number of transitions (transitions) and similar in the other two scenarios (an example of the calculation in the appendix). Using a 'what if' type analysis, we can simulate how trade in goods might have continued from 2019 to 2024 under normal conditions. Over the long term – or in the limit – this approach yields an equilibrium distribution that reflects the stable probabilities of mutual trade among the countries.

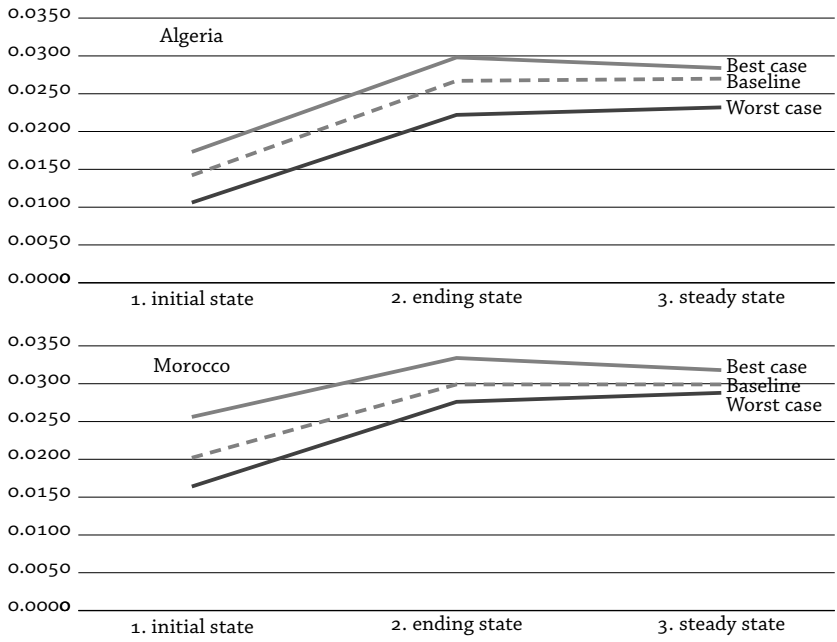
A major advantage of the transition matrices developed for the worst- and best-case scenarios lies in the method of selecting the minimum or maximum values from the 24-year dataset for each country in the sample. These scenarios establish an estimated corridor of minimum and maximum levels of economic cooperation among the coun-

tries of the Mediterranean basin effectively outlining the lower and upper bounds of potential economic integration. Such a corridor can be assessed or extrapolated over a six-year horizon, or extended to determine its long-term equilibrium state. The key question, however, is how the EU's economic and integration policies might alter this dynamic [117]
for the better and influence the transitional matrices in the context of creating scenarios for the future development of the Mediterranean basin.

RESULTS AND ANALYSIS

In particular, in the selected sample of Mediterranean countries, we highlight two African countries or countries in the south of the Mediterranean basin, Algeria and Morocco, recognizing that the European integration processes have strongly linked all Mediterranean EU members in international trade. From the perspective of examining the degree of economic integration across the entire Mediterranean basin, we believe that both countries could serve as important indicators of general trends in the EU's trade relationship with the North African countries of the Mediterranean basin. Unfortunately, there are no comparable data available for Tunisia, Libya and Egypt.

We observe that in all selected scenarios, the degree of economic integration of Algeria and Morocco into the Mediterranean basin increases, but to a much higher level in the optimistic scenario and to a lower level in the pessimistic scenario (table 7). The integration processes in the southern Mediterranean basin are therefore occurring regardless of major external crises, such as the global financial and economic crisis during the period under consideration. On the other hand, when using data from the best or worst individual years of economic participation by individual members in the transitional matrix of minimum probabilities for occupying states and the transitional matrix of maximum probabilities for occupying states, we can conclude that the levels of integration for these countries are much stronger and higher in the absence of crises. This is determined by analyzing a 'what-if' scenario in which we extrapolate these integration rates over the next six years (2019–2024), to the present day (ending), and further into the steady state. We use the Markov chains method, the properties of which allow us to calculate a matrix of equilibrium states. We find that their levels of integration, measured by the attractiveness of their market to other Mediterranean members during both bad and good



Own calculations using POM QM (Weiss 2005). The degree of economic integration of a country in the Mediterranean basin is defined as the degree of export attractiveness of its market for other members of the Mediterranean basin. The initial states for Algeria are represented by the first value of the matrix of the first order of magnitude 1 × 12, and the ninth value corresponds for Morocco. The Ending states for n = 6 and for n = the limit value in the equilibrium matrix (Steady) are shown in the examples in figure 1 and correspond to the same positions (the first value for Algeria and the ninth for Morocco) in the matrix S.

FIGURE 1 Degree of Economic Integration of the Markets of Algeria and Morocco with Other Mediterranean Countries under the Selected Scenario, Shown for the Initial (2018), Final (2024) and Equilibrium Phases (Steady State)

times of world trade, increase more significantly during favorable periods than during unfavorable ones.

Table 7 shows the aggregate results of the calculations for all three selected scenarios for the sample of Mediterranean countries, based on the assumption that the scenario of initial cooperation simply continues. The central, or baseline, scenario – based on the average values, shows that the final probabilities for the occupation of states after 6 iterations (transitions) for each individual member are very similar to, or even identical with, the long-term equilibrium probabilities for the occupation of states. his suggests that the number of iterations already approximates the limiting number of iterations quite well. This observation is reminiscent of the gravitational model. It is very clear that the economic Mediterranean basin is dominated by the three largest

TABLE 7 Rates of Economic Integration for a Sample of Mediterranean Countries

	DZ	HR	CY	FR	GR	IL	IT	MT	MA	SI	ES	TR
Pessimistic												
(a)	0.0106	0.0222	0.0116	0.3486	0.0580	0.0268	0.2687	0.0032	0.0164	0.0110	0.1631	0.0597
(b)	0.0222	0.0142	0.0070	0.3223	0.0332	0.0280	0.2505	0.0043	0.0276	0.0160	0.2068	0.0680
(c)	0.0232	0.0148	0.0073	0.3355	0.0346	0.0292	0.2614	0.0045	0.0288	0.0167	0.2158	0.0709
Base line												
(a)	0.0142	0.0245	0.0139	0.3202	0.0606	0.0285	0.2775	0.0053	0.0202	0.0103	0.1587	0.0661
(b)	0.0267	0.0144	0.0089	0.3038	0.0410	0.0282	0.2517	0.0047	0.0299	0.0149	0.2012	0.0746
(c)	0.0267	0.0144	0.0089	0.3038	0.0410	0.0282	0.2517	0.0047	0.0299	0.0149	0.2012	0.0746
Optimistic												
(a)	0.0173	0.0300	0.0149	0.2921	0.0678	0.0308	0.2789	0.0076	0.0256	0.0095	0.1569	0.0687
(b)	0.0298	0.0154	0.0095	0.2921	0.0432	0.0296	0.2505	0.0057	0.0334	0.0142	0.2000	0.0765
(c)	0.0284	0.0147	0.0090	0.2780	0.0412	0.0281	0.2384	0.0055	0.0318	0.0135	0.1904	0.0728
Optimistic – Pessimistic												
(a)	0.0066	0.0078	0.0032	−0.0564	0.0098	0.0040	0.0102	0.0043	0.0092	−0.0015	−0.0062	0.0090
(b)	0.0076	0.0012	0.0025	−0.0302	0.0100	0.0016	0.0000	0.0014	0.0058	−0.0018	−0.0068	0.0085
(c)	0.0052	−0.0001	0.0017	−0.0575	0.0066	−0.0011	−0.0230	0.0010	0.0030	−0.0032	−0.0254	0.0019

NOTES Row headings are as follows: (a) initial, (b) ending, (c) steady. Own calculations using POM QM (Weiss 2005).

[119]

EU and EMU members, namely France, where the average long-term equilibrium probability of economic integration (defined as the attractiveness of its market for the export from other Mediterranean countries) into the Mediterranean basin is equal to 30.38%, Italy 25.17% and Spain 20.12%. These large markets are undoubtedly the great export potential for the rest of the Mediterranean countries in the sample. Other markets also show a fairly high equilibrium level of economic integration into the Mediterranean basin, with Turkey at (7.46%), followed by Greece (4.1%), Morocco (2.99%), Israel (2.82%), Algeria (2.67%), Slovenia (1.47%), Croatia (1.44%), Cyprus (0.89%) and Malta (0.47%).

The differences between the optimistic and pessimistic scenarios (last section of table 4) show that after six iterations, or in the long-term equilibrium probability of the distribution of stocks, the rates of economic integration into the Mediterranean basin increase the most for Greece (from 3.32% to 4.32% after 6 iterations, and from 3.46% to 4.12% at equilibrium rates, followed by Algeria (from 2.22% to 2.98% and from 2.32% to 2.84%) and Morocco (from 2.76% to 3.34% and from 2.88% to 3.18%, respectively). The strong global economic situation allows these countries to import more from other Mediterranean partners. Long-term equilibrium levels of integration are also slightly increased for Turkey (by 0.19 percentage points), Cyprus (by 0.17 percentage points) and Malta (by 0.1 percentage points). The equilibrium distribution remains almost unchanged in Croatia (down 0.01 p.p.),

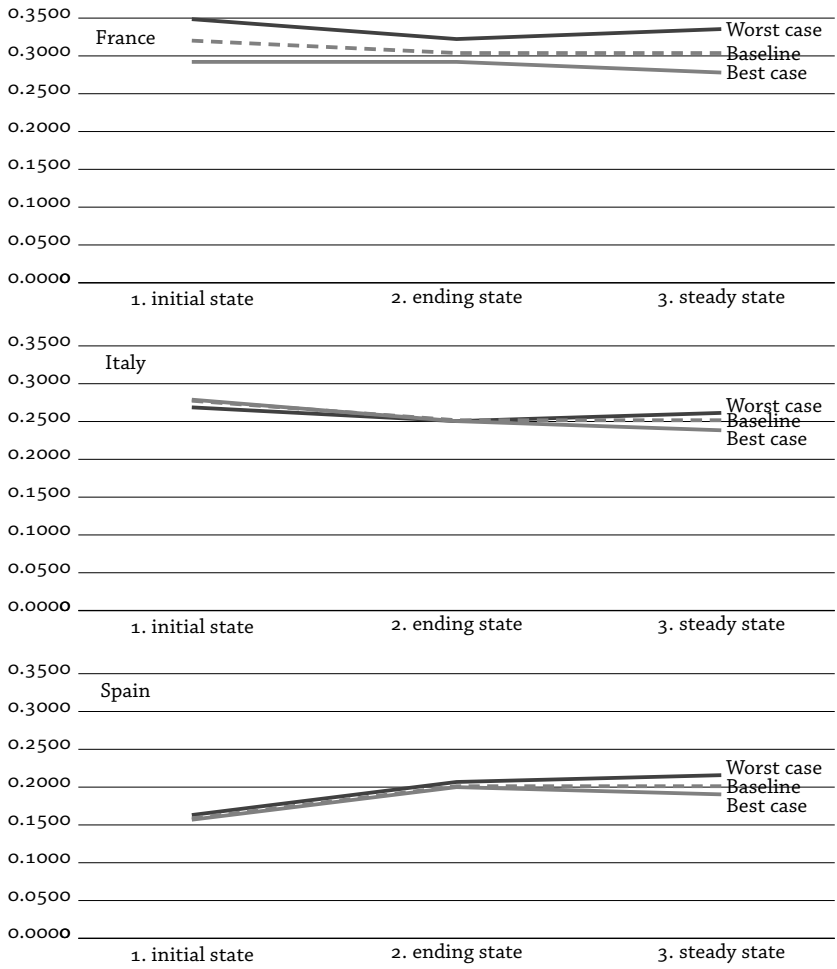


FIGURE 2 Degree of Economic Integration of the Markets of France, Italy and Spain with Other Mediterranean Countries under the Chosen Scenario, Shown for the Initial (2018), Final (2024) and Equilibrium Phases (Steady State)

slightly decreasing in Israel (by 0.11 p.p.) and Slovenia (by 0.32 p.p.).

The differences in the initial levels of integration between the optimistic and pessimistic scenarios are strongly negative for France and Spain, but not for Italy, where this difference is positive. The latter indicates that in the baseline optimistic scenario for Italy, we expect an increase in its level of integration, as hypothesized. However, as we shall see, this is not the case.

After six iterations (Ending State), Italy's integration rate declines,

in the optimistic scenario, by almost 3 percentage points and is nearly identical (central graph in figure 2) across all three scenarios at the final time at $n = 6$ (Ending state). In equilibrium, the attractiveness of its market for other Mediterranean countries in the sample increases in the pessimistic scenario and decreases in the optimistic scenario, in [121]
both cases by almost 2 percentage points. Similarly, Spain's equilibrium level of integration decreases in the optimistic scenario and increases in the pessimistic scenario, by approximately one percentage point (third graph in figure 2), or by almost 2.5 percentage points when compared to the optimistic scenario. The degree of integration, or export attractiveness, of its market for other members of the Mediterranean basin increases over 6 iterations through 2024 in all scenarios by nearly 4 percentage points. Conversely, during this extrapolated period up to 2024, integration rates decline across all scenarios for Italy, and for both the baseline and pessimistic scenarios for France. France's initial degree of integration in the optimistic scenario is lower than the initial level of integration in the pessimistic scenario by as much as 5.64 percentage points, and in the case of long-term equilibrium distributions, by slightly more, 5.75 percentage points.

The integration processes of the Mediterranean basin are significantly dependent on the economic policies of its three largest members: France, Spain and Italy, as they (table 2) absorb an average of 13.2% of the annual global exports of the other Mediterranean basin countries studied during the period from 1995 to 2018. The transition from the final stage (2. Ending State, 2024) to the equilibrium distribution (3. Steady State) for all three countries shows roughly the same pattern in terms of the ratios of the probabilities of occupying each state across different scenarios. Their rates of integration into the Mediterranean basin ((i.e., the export attractiveness of their markets for other Mediterranean members) increase significantly in the pessimistic scenario and, conversely, decrease significantly in the optimistic scenario, while remaining roughly stable relative to 2024 (2. Ending State) under the baseline scenario. Thus, periods of global economic crisis, which have a major impact on the global export capacity of the three largest Mediterranean economies, may represent an opportunity for an increase in exports and mutual trade by other Mediterranean members to these markets. The hypothesis that this opportunity arises in optimistic scenarios can generally be rejected. Is this opportunity being realized in pessimistic scenarios?

TABLE 8 Relative Shares of Global Double-Weighted Exports for Algeria in the Period 1995–2018 within a Sample of Mediterranean Countries

	HR	CY	FR	GR	IL	IT	MT	MA	SI	ES	TR
1995	0.0016	0.0010	0.1044	0.0103	0.0034	0.0846	0.0004	0.0155	0.0022	0.0440	0.0075
1996	0.0016	0.0010	0.1044	0.0103	0.0034	0.0846	0.0004	0.0155	0.0022	0.0440	0.0075
[122] 1997	0.0016	0.0010	0.1044	0.0103	0.0034	0.0846	0.0004	0.0155	0.0022	0.0440	0.0075
1998	0.0015	0.0013	0.1107	0.0123	0.0042	0.0912	0.0006	0.0132	0.0022	0.0537	0.0085
1999	0.0015	0.0013	0.1107	0.0123	0.0042	0.0912	0.0006	0.0132	0.0022	0.0537	0.0085
2000	0.0015	0.0013	0.1107	0.0123	0.0042	0.0912	0.0006	0.0132	0.0022	0.0537	0.0085
2001	0.0015	0.0015	0.1140	0.0147	0.0035	0.0961	0.0006	0.0111	0.0023	0.0648	0.0094
2002	0.0015	0.0015	0.1140	0.0147	0.0035	0.0961	0.0006	0.0111	0.0023	0.0648	0.0094
2003	0.0015	0.0015	0.1140	0.0147	0.0035	0.0961	0.0006	0.0111	0.0023	0.0648	0.0094
2004	0.0017	0.0015	0.1034	0.0144	0.0038	0.0840	0.0005	0.0395	0.0023	0.0692	0.0149
2005	0.0017	0.0015	0.1034	0.0144	0.0038	0.0840	0.0005	0.0395	0.0023	0.0692	0.0149
2006	0.0017	0.0015	0.1034	0.0144	0.0038	0.0840	0.0005	0.0395	0.0023	0.0692	0.0149
2007	0.0019	0.0014	0.0848	0.0126	0.0044	0.0685	0.0005	0.0281	0.0024	0.0544	0.0206
2008	0.0019	0.0014	0.0848	0.0126	0.0044	0.0685	0.0005	0.0281	0.0024	0.0544	0.0206
2009	0.0019	0.0014	0.0848	0.0126	0.0044	0.0685	0.0005	0.0281	0.0024	0.0544	0.0206
2010	0.0032	0.0012	0.0803	0.0086	0.0053	0.0590	0.0007	0.0144	0.0023	0.0409	0.0189
2011	0.0032	0.0012	0.0803	0.0086	0.0053	0.0590	0.0007	0.0144	0.0023	0.0409	0.0189
2012	0.0032	0.0012	0.0803	0.0086	0.0053	0.0590	0.0007	0.0144	0.0023	0.0409	0.0189
2013	0.0033	0.0011	0.0928	0.0091	0.0051	0.0564	0.0014	0.0148	0.0021	0.0459	0.0219
2014	0.0033	0.0011	0.0928	0.0091	0.0051	0.0564	0.0014	0.0148	0.0021	0.0459	0.0219
2015	0.0033	0.0011	0.0928	0.0091	0.0051	0.0564	0.0014	0.0148	0.0021	0.0459	0.0219
2016	0.0028	0.0011	0.0747	0.0076	0.0052	0.0501	0.0010	0.0150	0.0020	0.0413	0.0293
2017	0.0028	0.0011	0.0747	0.0076	0.0052	0.0501	0.0010	0.0150	0.0020	0.0413	0.0293
2018	0.0028	0.0011	0.0747	0.0076	0.0052	0.0501	0.0010	0.0150	0.0020	0.0413	0.0293

NOTES Based on data from the ECB Data Portal (https://data.ecb.europa.eu).

For the entire period studied, the finding that the integration process is present, whether in its negative or positive form, is supported by the use of Markov, which track changes in the probability of occupying states and focus exclusively on relations within the Mediterranean basin (i.e., the selected sample of countries). However, it is necessary to revisit the analysis and examine the time dynamics of the source data on global export trade over time. If we consider Algeria and Morocco, both of which have generally increased their levels of integration into the Mediterranean basin (becoming more attractive destinations for exports from other Mediterranean countries, including each other), in relation to the three largest countries, which, according to our findings, can significantly influence integration processes, we have to analyze the time periods corresponding to minimum, average and maximum levels of economic cooperation (the method of creating matrix I at k = min or k = max, or the P matrices at l = min or l = max) taking into account the source data on the relative share of their world exports.

Table 8 which presents data for Algeria, and similarly table 9 for

TABLE 9 Relative Shares of Global Double-Weighted Exports for Morocco in the Period 1995–2018 within a Sample of Mediterranean Countries

	DZ	HR	CY	FR	GR	IL	IT	MT	SI	ES	TR
1995	0.0029	0.0016	0.0012	0.1110	0.0119	0.0031	0.0866	0.0006	0.0020	0.0496	0.0117
1996	0.0029	0.0016	0.0012	0.1110	0.0119	0.0031	0.0866	0.0006	0.0020	0.0496	0.0117
1997	0.0029	0.0016	0.0012	0.1110	0.0119	0.0031	0.0866	0.0006	0.0020	0.0496	0.0117
1998	0.0009	0.0016	0.0013	0.1013	0.0124	0.0044	0.0829	0.0007	0.0020	0.0530	0.0101
1999	0.0009	0.0016	0.0013	0.1013	0.0124	0.0044	0.0829	0.0007	0.0020	0.0530	0.0101
2000	0.0009	0.0016	0.0013	0.1013	0.0124	0.0044	0.0829	0.0007	0.0020	0.0530	0.0101
2001	0.0014	0.0025	0.0016	0.0945	0.0135	0.0055	0.0792	0.0006	0.0020	0.0585	0.0111
2002	0.0014	0.0025	0.0016	0.0945	0.0135	0.0055	0.0792	0.0006	0.0020	0.0585	0.0111
2003	0.0014	0.0025	0.0016	0.0945	0.0135	0.0055	0.0792	0.0006	0.0020	0.0585	0.0111
2004	0.0023	0.0020	0.0015	0.0923	0.0147	0.0053	0.0784	0.0006	0.0021	0.0656	0.0129
2005	0.0023	0.0020	0.0015	0.0923	0.0147	0.0053	0.0784	0.0006	0.0021	0.0656	0.0129
2006	0.0023	0.0020	0.0015	0.0923	0.0147	0.0053	0.0784	0.0006	0.0021	0.0656	0.0129
2007	0.0033	0.0019	0.0015	0.0861	0.0148	0.0052	0.0673	0.0007	0.0021	0.0582	0.0155
2008	0.0033	0.0019	0.0015	0.0861	0.0148	0.0052	0.0673	0.0007	0.0021	0.0582	0.0155
2009	0.0033	0.0019	0.0015	0.0861	0.0148	0.0052	0.0673	0.0007	0.0021	0.0582	0.0155
2010	0.0052	0.0021	0.0013	0.0834	0.0096	0.0061	0.0583	0.0008	0.0017	0.0419	0.0187
2011	0.0052	0.0021	0.0013	0.0834	0.0096	0.0061	0.0583	0.0008	0.0017	0.0419	0.0187
2012	0.0052	0.0021	0.0013	0.0834	0.0096	0.0061	0.0583	0.0008	0.0017	0.0419	0.0187
2013	0.0043	0.0018	0.0010	0.0856	0.0085	0.0061	0.0514	0.0017	0.0017	0.0406	0.0234
2014	0.0043	0.0018	0.0010	0.0856	0.0085	0.0061	0.0514	0.0017	0.0017	0.0406	0.0234
2015	0.0043	0.0018	0.0010	0.0856	0.0085	0.0061	0.0514	0.0017	0.0017	0.0406	0.0234
2016	0.0040	0.0018	0.0012	0.0793	0.0082	0.0068	0.0516	0.0013	0.0020	0.0413	0.0250
2017	0.0040	0.0018	0.0012	0.0793	0.0082	0.0068	0.0516	0.0013	0.0020	0.0413	0.0250
2018	0.0040	0.0018	0.0012	0.0793	0.0082	0.0068	0.0516	0.0013	0.0020	0.0413	0.0250

NOTES Based on data from the ECB Data Portal (https://data.ecb.europa.eu).

Morocco, shows strong relative shares of exports to the three large Mediterranean EU members, particularly in the early years of the period under review, from 1995 until the onset of the great global financial and economic crisis in 2007. These years account for their maximum export shares, which form the basis for the optimistic scenario in the transition matrices. However, after 2007, a gradual cooling occurred, followed by a sharp decline in the relative export presence of Algeria and Morocco in France, Spain and Italy. The pessimistic scenario is thus grounded in these developments, with the selected minimum values coming primarily from the post-crisis years – especially the final years of the period under consideration.

The patterns of minimum, average and maximum periods of export competitiveness in the markets of the EU's Big Three Mediterranean countries are similar to those of Algeria and Morocco as they are for

other members of the selected sample of Mediterranean countries, particularly Turkey and Cyprus. Slovenia, Greece and Malta significantly increased their export competitiveness on the Spanish market during the post-crisis period. Greece and Croatia also managed to maintain a
[124] high level of export competitiveness in the French market, and to some extent in Israel as well. Greece was able to increase its export competitiveness in the Mediterranean basin after the post-crisis period by relatively maintaining its export share in the Italian market. The EU's support for Greece during the peak of the crisis is also reflected in a rise in its level of integration (measured as the attractiveness of the Greek market to other Mediterranean members), when considering the entire period from 1995 to 2018. This trend also highlights the institutional strength of the large Mediterranean members of the euro area in supporting integration processes.

DISCUSSION AND IMPLICATIONS

A study of the long-term trade relations among 12 members of the Mediterranean basin, out of a total of 21 countries geographically bordering the Mediterranean Sea, focused on measuring the dynamics of their degree of integration, particularly for North African countries, initially suggests a general trend of increased integration during the period under review. A more detailed analysis reveals that the global financial and economic crisis had a significant impact on the mutual relations between the three large EU countries and the other Mediterranean nations during the same period. Their global market power is so substantial that each Mediterranean country's level of integration, is heavily influenced by the export competitiveness of these major players on world markets. There has been a notable substitution effect, where other Mediterranean markets have partly replaced the dominant markets of the larger EU countries, as countries such as Algeria and Morocco attempt to maintain or enhance their level of integration. However, despite these efforts, it is difficult to ignore the trend indicated by the prevailing pessimistic scenario when forecasting integration processes for the period already elapsed (2019–2024), for which reliable data are not yet available. A 'what if' analysis, based on Markov chains and extrapolation of historical relations, surprisingly provides optimistic projections for a possible greater integration within the Mediterranean basin, particularly under a pessimistic global scenario, and thereby challenges the basic hypothesis that global trade

booms necessarily lead to greater regional integration . The gravitational analysis method, used to determine equilibrium distributions of trade within a sample of twelve Mediterranean countries suggests that a weaker global economic climate may offer a better opportunity for deeper economic integration of the Mediterranean basin than a [125] strong one. This conclusion is supported by similar findings in research conducted by the European Central Bank, using a different methodological approach (Canova and Ciccarelli 2011). Several broad factors may explain this trend: a greater incentive to share resources and markets during economic downturns, cost reductions through economies of scale, a stronger foundation for diversification and resilience to economic shocks, enhanced political stability, and improved access to international funding and aid through closer economic cooperation.

On the other hand, the last period studied, from 2007 to 2018, highlights the impact of the Great Financial Crisis on the stance of the three EU members of the Mediterranean basin towards the other members, indicating a reduced commitment to the region's integration processes. This trend is particularly concerning in light of major external crises that have occurred since 2019.

On the one hand, the analysis highlights the potential strength of the EU in enabling greater integration of Mediterranean markets and, on the other hand, underscores its necessity or even urgency. In an increasingly uncertain geopolitical environment, the EU should urgently pursue an agenda for deeper integration of the Mediterranean basin. If we further emphasize this key finding and focus on the importance and role of France, Spain and Italy in advancing economic integration in the region, then the data underpinning our analysis – double-weighted exports in total world trade in goods – show that under globally favorable conditions, as these countries' exports to the rest of the world increase, their integration rates within the Mediterranean basin actually decline, even in an optimistic scenario. In other words, during favorable phases of the economic cycle, the relative importance of other Mediterranean economies to the Big Three economies of the Mediterranean basin is relatively smaller (table 7). Conversely, under less favorable global economic conditions, the relative interconnectedness of their markets with other countries of the Mediterranean basin becomes significantly more important. Unfortunately, the original post-crisis data (see tables 8 and 9 for Algeria and Morocco, for example) do not yet reflect actual developments in this direction. The most notable exception

is the positive trend observved in the Spanish market. Other Mediterranean countries have mostly compensated for the decline in the share of exports to the three major Mediterranean economies during crises through mutual trade in goods (Lagarde 2023).

[126] Therefore, the crises that occurred from 2019 to 2024 certainly cannot have a positive impact on increasing the economic integration of the Mediterranean basin by themselves, and not without urgent and more decisive integration policies, especially from the major European economies of the region. It is thus a fundamental conclusion that major crises represent a significant opportunity to deepen economic integration in the Mediterranean basin (as shown by pessimistic scenarios and steady-state distributions). However, this opportunity cannot be realized without more systemic, regionally focused, and less bilateral financial support, along with stronger integration efforts from EU institutions,[3] which, despite numerous initiatives, have not materialized over the past decade. Currently, the EU's enlargement agenda for 2025 is focused on Ukraine, Moldova, and the Western Balkan countries. Some of these Western Balkan countries are also part of the Mediterranean basin considered in this analysis: Bosnia and Herzegovina, Montenegro and Albania.

REFERENCES

Canova, F., and M. Ciccarelli. 2011. 'Cyclical Fluctuations in the Mediterranean Basin.' ECB Working Paper Series 1367. European Central Bank.

European Parliament. 2014. *Regional Integration in the Mediterranean: Ipact and Limits of Community and Bilateral Policies*. European Union.

Eurostat. 2022. 'MEDSTAT Programme.' https://ec.europa.eu/eurostat/statistics-explained/index.php?title=MEDSTAT_programme

Giovannetti, G. 2013. 'Trade Relations among Mediterranean Countries.' *IEMed Mediterranean Yearbook,* 238–43.

Hudoklin-Božič, A. 1999. *Stohastični procesi*. Moderna oganizacija.

Lagarde, C. 2023. 'A Mediterranean Odyssey: From Ancient Origins to Future Strength.' Speech at the Mediterranean Meetings, Marseille, 21 September.

Ayadi, R., E. Arbak, and W. P. De Groen. 2013. 'Convergence and Integration of Banking Sector Regulations in the Euro-Mediterranean Area

[3] 'The overall institutional system is complicated, and the division of tasks is unclear' (European Parliament 2014).

Trends and Challenges.' MEDPRO Technical Report 34. European Commission.

Tinbergen, J. 1962. *Shaping the World Economy: Suggestions for an International Economic Policy*. Twentieth Century Fund.

UNCTAD. 2012. *A Practical Guide to Trade Policy Analysis*. United Nations Publications.

Weiss, H. J. 2005. *POM-QM for Windows Software for Decision Sciences: Quantitative Methods, Production and Operations Management*. Pearson Education.

Résumés

Musiciens, un pilier essentiel du tourisme rural en Méditerranée

ALEKSANDRA GOVEDARICA, NATAŠA KRALJEVIĆ, DARKO LACMANOVIĆ, URŠA LAMUT, PREDRAG LJUBOTINA, ANDREJ RASPOR, BOJAN ROJKO, AND AJDA SRDIĆ

Cet article examine le rôle significatif des musiciens dans l'enrichissement de l'offre touristique en milieu rural. Le tourisme rural constitue l'un des principaux piliers du développement économique et de la préservation culturelle, car il permet la création d'emplois, améliore la qualité de vie locale et soutient la restauration des sites historiques. Grâce à leur créativité, les musiciens protègent et valorisent le patrimoine culturel immatériel, tel que la musique et la danse traditionnelles, ce qui influence positivement la performance financière des acteurs du tourisme rural. Les festivals et événements musicaux organisés à la campagne représentent également une source importante de tourisme rural. Ils génèrent des revenus substantiels et contribuent à la construction d'une image positive de la destination. Les événements organisés dans des zones défavorisées attirent les visiteurs en diversifiant l'offre touristique et en favorisant le développement régional. Toutefois, leur réussite dépend d'une planification rigoureuse et d'une bonne organisation. Cette étude analyse l'impact de facteurs tels que le soutien de l'État, la proactivité, la satisfaction professionnelle, la chance et les traits de personnalité sur le succès et l'évolution des musiciens dans les pays méditerranéens, en particulier en Slovénie et au Monténégro. Il a été démontré que l'intégration des ressources culturelles dans les stratégies touristiques rend les zones rurales plus attractives et compétitives. Les études empiriques sur le tourisme rural suggèrent que les musiciens jouent un rôle clé dans le tourisme culturel en attirant les visiteurs, en préservant le patrimoine local et en stimulant la croissance économique, contribuant ainsi au développement durable des zones rurales.

Mots clés : musiciens, tourisme rural, région méditerranéenne, soutien de l'État, confiance en soi
IJEMS 18 (1): 9–29

Comment les entraîneurs de gymnastique serbes prennent-ils leurs décisions ?

EDVARD KOLAR, SAŠA VELIĆKOVIĆ, RADO PIŠOT, MARIJO MOŽNIK, AND MATEJ TUŠAK

[130]

Différents auteurs affirment que l'entraînement est fondamentalement un processus de prise de décision (ci-après : PD), et la PD des entraîneurs a été identifiée comme un élément clé de leur pratique. Dans cette étude, nous avons examiné le comportement décisionnel des entraîneurs de gymnastique serbes. L'échantillon était composé de 53 entraîneurs (âge : 40,96 ± 13,04 ans). Le comportement décisionnel manifeste a été mesuré lors du séminaire national d'entraînement à l'aide de l'Inventaire général des styles de PD, qui comprend cinq styles de PD définis comme : rationnel, intuitif, dépendant, spontané et évitant. Des analyses factorielles ont été réalisées pour révéler la structure des styles de PD. Le coefficient de corrélation de Pearson a été utilisé pour identifier l'association entre les styles de PD, les caractéristiques démographiques et professionnelles, et une ANOVA a permis de détecter les différences entre les entraîneurs les plus expérimentés et les moins expérimentés. Les résultats ont montré que les entraîneurs utilisent une combinaison des cinq styles pour prendre des décisions, mais privilégient les styles rationnel et dépendant. Sur la base de la structure moyenne découverte, nous pouvons conclure que les entraîneurs de gymnastique serbes sont principalement des décideurs rationnels qui renforcent leur rationalité en sollicitant les conseils, les avis et les connaissances de leurs collègues. De plus, les entraîneurs les plus expérimentés prennent des décisions de manière plus autonome et plus rapide, notamment dans des situations urgentes ou limitées dans le temps.

Mots clés : entraîneurs de gymnastique serbes, styles de prise de décision, structure, caractéristiques démographiques, caractéristiques professionnelles, expérience
IJEMS 18 (1): 31–52

Indice de gestion des connaissances pour une meilleure gestion du changement climatique : étude de cas dans le secteur pétrolier égyptien

ALY A. AHMED, MOHAMED SHALTOUT, MOHAMED SALAHELDIN, AND AHMED ELSHAZLY

Le changement climatique présente d'importants défis pour les organisations, nécessitant des stratégies d'adaptation et d'atténuation fondées sur la connaissance climatique et l'innovation technologique. Le secteur pétrolier fait face à des pressions réglementaires et environnementales croissantes.

En réponse, cette étude introduit l'Indice de Gestion des Connaissances Climatiques (CKI), un nouvel indicateur conçu pour évaluer la préparation des organisations en matière de gestion des connaissances climatiques en intégrant les systèmes de gestion de l'énergie, de l'environnement et de la connaissance. Le CKI fournit un cadre standardisé permettant d'évaluer comment les organisations pétrolières gèrent, structurent et appliquent les connaissances liées au climat dans la prise de décision stratégique. L'indice a été appliqué à deux compagnies pétrolières égyptiennes ayant des approches différentes en matière de gestion des connaissances, révélant des différences notables en termes de résilience climatique. L'entreprise dotée de pratiques formelles de gestion des connaissances a obtenu un score de 0,283, démontrant une meilleure intégration, de plus faibles émissions et des décisions climatiques mieux informées, tandis que l'entreprise de comparaison a obtenu un score de 0,133. Les deux résultats ont été comparés à une valeur optimale de référence fixée à 0,606. Ces résultats soulignent le rôle essentiel de la gestion structurée des connaissances dans le renforcement de la résilience climatique et le soutien des choix stratégiques dans les secteurs à fortes émissions. Le CKI fournit aux décideurs un outil pratique pour évaluer et améliorer la gouvernance des connaissances, en particulier dans les économies en développement. Sa capacité diagnostique offre des conseils précieux pour les secteurs en transition vers des opérations plus durables.

Mots clés : gestion du changement climatique, indice de gestion des connaissances, prise de décision stratégique, systèmes de gestion de l'énergie, systèmes de management environnemental, secteur pétrolier
IJEMS 18 (1): 53–82

Analyse post-crise de la consommation des médias et de la perception de la pandémie de COVID-19 : une étude sur la jeunesse marocaine en milieu urbain

ANOIRE EL ATTARI, HIND BELAZIZ, ABDERRAHMAN TENKOUL, AND NOUHAILA BOURASS

Cette analyse explore l'influence des habitudes de consommation des médias sur les perceptions des jeunes Marocains de milieu urbain concernant la pandémie du COVID-19. Une approche quantitative a été mise en place via les données recueillies d'un questionnaire, combinant ensuite des test chi-carré, une analyse de corrélation et une analyse de régression. L'analyse des du total des réponses (872) révèle que la consommation des médias digitaux par les jeunes les amène à avoir des positions plus critiques par rapport à la couverture médiatique. De plus, l'analyse de régression montre que l'accentuation sur les origines du virus a été un aspect important de la couverture. Ces résultats, soutiennent que connaitre comment les différentes tranches d'âges

de la société consomment, perçoivent et interprétèrent les médias pendant des situation d'urgence sanitaire. Pour cela, des stratégies de communications d'urgence doivent prendre en compte les besoins et motivations informationnelles de leurs audiences.

[132] *Mots clés :* communication médiatique, perceptions des jeunes, COVID-19, couverture médias, médias Marocains, jeunes Marocains, zones urbaines
IJEMS 18 (1): 83–101

Intégration économique des États méditerranéens

JANEZ FABIJAN, JAKA VADNJAL, AND DRAŠKO VESELINOVIČ

Les périodes de crise économique représentent une opportunité pour une plus grande intégration des marchés des pays méditerranéens. La méthode choisie, celle des chaînes de Markov, permet de confirmer cette hypothèse. Pour cette analyse, nous nous concentrons sur les données relatives aux parts du commerce mutuel par rapport au produit intérieur brut national, et nous avons trouvé que la base de données de la Banque centrale européenne (BCE) était la plus utile. Malheureusement, cette intégration souhaitée ne peut être réalisée sans une connectivité institutionnelle plus large et plus complète de l'espace économique. Les grands pays du bassin méditerranéen peuvent jouer un rôle majeur dans ce processus, car ils occupent une place importante dans le commerce mondial et sont les principaux vecteurs de transmission des effets des grandes crises dans l'espace économique méditerranéen.

Mots clés : pays méditerranéens, degré d'intégration économique, chaînes de Markov
IJEMS 18 (1): 103–127

Povzetki

Glasbeniki kot pomemben gradnik sredozemskega podeželskega turizma

ALEKSANDRA GOVEDARICA, NATAŠA KRALJEVIĆ, DARKO LACMANOVIĆ, URŠA LAMUT, PREDRAG LJUBOTINA, ANDREJ RASPOR, BOJAN ROJKO, AND AJDA SRDIĆ

Ta članek preučuje pomembno vlogo glasbenikov pri izboljšanju ponudbe podeželskega turizma. Podeželski turizem je eden glavnih stebrov gospodarskega razvoja in ohranjanja kulture, saj je orodje, ki zagotavlja delovna mesta, izboljšuje lokalno kakovost življenja in podpira obnova zgodovinskih znamenitosti. Glasbeniki s svojo ustvarjalnostjo varujejo in promovirajo nesnovno kulturno dediščino, kot sta tradicionalna glasba in ples, kar pozitivno vpliva na finančno uspešnost podjetnikov v podeželskem turizmu. Glasbeni festivali in dogodki na podeželju so tudi odličen vir kmečkega turizma. Ustvarjajo znatne prihodke in pomagajo oblikovati ugodno podobo destinacije. Dogodki na območjih z manj možnostmi so pritegnili obiskovalce z diverzifikacijo turistične ponudbe in spodbujanjem regionalnega razvoja. Vendar je njihov uspeh odvisen od skrbnega načrtovanja in pravilne organizacije. Raziskava raziskuje vpliv dejavnikov, kot so državna podpora, proaktivnost, zadovoljstvo z delom, sreča in osebnostne lastnosti na uspeh in razvoj glasbenikov v sredozemskih državah, zlasti v Sloveniji in Črni gori. Pokazalo se je, da je z vključevanjem kulturnih virov v turistične strategije podeželje privlačnejše in konkurenčnejše. Empirične študije o podeželskem turizmu kažejo, da imajo glasbeniki pomembno vlogo v kulturnem turizmu, saj privabljajo obiskovalce, ohranjajo lokalno dediščino in spodbujajo gospodarsko rast, s čimer podpirajo trajnostni razvoj podeželja.

Ključne besede: glasbeniki, kmečki turizem, sredozemska regija, državna podpora, samozavest
IJEMS 18 (1): 9–29

Kako se srbski gimnastični trenerji odločajo?

EDVARD KOLAR, SAŠA VELIĆKOVIĆ, RADO PIŠOT, MARIJO MOŽNIK, AND MATEJ TUŠAK

Različni avtorji trdijo, da je treniranje v bistvu proces odločanja (v nadaljnjem besedilu: DM), medtem ko je bil trenerjev DM opredeljen kot ključni element trenerjeve prakse. V tej študiji smo preučili DM vedenje srbskih trenerjev gimnastike. Vzorec je sestavljalo 53 avtobusov (starost: 40,96±13,04

leta). Manifestirano vedenje DM je bilo izmerjeno na nacionalnem seminarju treniranja z uporabo General DM Style Inventory, ki vključuje pet DM stilov, ki so opredeljeni kot racionalni, intuitivni, odvisni, spontani in izogibajoči se DM. Pearsonov korelacijski koeficient je bil uporabljen za ugotavljanje povezave med slogi DM, demografskimi in profesionalnimi značilnostmi, ANOVA pa je bila uporabljena za odkrivanje razlik med bolj izkušenimi in manj izkušenimi trenerji. Rezultati so pokazali, da trenerji pri sprejemanju odločitev uporabljajo kombinacijo vseh petih stilov DM, večinoma pa uporabljajo racionalne in odvisne sloge DM. Na podlagi odkrite povprečne strukture stilov DM lahko sklepamo, da so srbski trenerji gimnastike večinoma racionalni odločevalci, ki svojo racionalnost povečujejo tako, da pri odločanju iščejo nasvete, mnenja in znanje sodelavcev. Poleg tega lahko bolj izkušeni trenerji sprejemajo odločitve bolj samostojno in tudi hitreje, ko je situacija nujna ali časovno omejena.

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Ključne besede: srbski trenerji gimnastike, stili odločanja, struktura, demografske značilnosti, strokovne značilnosti, izkušnje
IJEMS 18 (1): 31–52

Indeks upravljanja znanja za boljše obvladovanje podnebnih sprememb: študija primera v egiptovskem naftnem sektorju

ALY A. AHMED, MOHAMED SHALTOUT, MOHAMED SALAHELDIN, AND AHMED ELSHAZLY

Podnebne spremembe predstavljajo velike izzive za organizacije, ki zahtevajo strategije prilagajanja in blažitve podnebnih sprememb, ki temeljijo na podnebnem znanju in tehnoloških inovacijah. Naftni sektor se sooča z vse večjimi regulativnimi in okoljskimi pritiski. V odgovor na to ta študija uvaja indeks upravljanja znanja o podnebju (KKI), nov kazalnik, namenjen ocenjevanju pripravljenosti organizacij na upravljanje znanja o podnebju z vključevanjem energetskih, okoljskih in sistemov upravljanja znanja. CKI zagotavlja standardiziran okvir za ocenjevanje, kako naftne in plinske organizacije upravljajo, strukturirajo in uporabljajo znanje, povezano s podnebjem, pri strateškem odločanju. Indeks je bil uporabljen za dve egiptovski naftni družbi z različnimi pristopi k upravljanju znanja, kar je razkrilo opazne razlike v smislu odpornosti na podnebne spremembe. Podjetje s formalnimi praksami upravljanja znanja je doseglo 0,283, kar kaže na boljšo integracijo, nižje emisije in bolje informirane podnebne odločitve, medtem ko je primerjalno podjetje doseglo 0,133. Oba rezultata sta bila primerjana z optimalno referenčno vrednostjo 0,606. Ti rezultati poudarjajo ključno vlogo strukturiranega upravljanja znanja pri krepitvi odpornosti proti podnebnim spremembam in podpiranju političnih odločitev v sektorjih z visokimi emisijami.

CKI zagotavlja oblikovalcem politik praktično orodje za ocenjevanje in izboljšanje upravljanja znanja, zlasti v gospodarstvih v razvoju. Njegove diagnostične zmogljivosti ponujajo dragocene nasvete za sektorje, ki prehajajo na bolj trajnostno poslovanje.

Ključne besede: obvladovanje podnebnih sprememb, indeks upravljanja znanja, strateško odločanje, sistemi upravljanja z energijo, sistemi ravnanja z okoljem, naftni sektor
IJEMS 18 (1): 53–82

Pokrizna analiza medijske potrošnje in dojemanja pandemije COVID-19: študija maroške mladine v mestnih območjih

ANOIRE EL ATTARI, HIND BELAZIZ, ABDERRAHMAN TENKOUL, AND NOUHAILA BOURASS

Ta študija raziskuje vpliv potrošniških navad medijev na dojemanje pandemije COVID-19 med maroško mladino na mestnih območjih. Uporabljena je bila kvantitativna metoda, ki združuje anketne podatke, hi-kvadrat teste, korelacijsko analizo in regresijsko analizo. Skupaj je bilo zbranih 872 odgovorov, analize pa so pokazale, da uporaba digitalnih medijev maroške mladine vodi do bolj kritičnega dojemanja medijske pokritosti pandemije. Regresijska analiza je pokazala, da je bil poudarek na izvoru virusa pomemben vidik, ki je vplival na oceno anketirancev o pokritosti. Ugotovitve poudarjajo pomen razumevanja, kako različne starostne skupine dojemajo in interpretirajo medijsko poročanje med zdravstvenimi krizami. Učinkovite komunikacijske strategije morajo upoštevati informacijske potrebe in motivacije različnih občinstev.

Ključne besede: medijsko komuniciranje, dojemanje mladih, COVID-19, medijska pokritost, maroški mediji, maroška mladina, mestna območja
IJEMS 18 (1): 83–101

Gospodarsko povezovanje sredozemskih držav

JANEZ FABIJAN, JAKA VADNJAL, AND DRAŠKO VESELINOVIČ

Časi gospodarske krize so priložnost za večje povezovanje trgov sredozemskih držav. Izbrana metoda Markovljevih verig omogoča potrditev takšne hipoteze. Pri analizi se osredotočamo na podatke o relativnih (glede na nacionalni bruto domači proizvod) deležih medsebojne trgovine, pri čemer smo ugotovili, da bi bila najbolj uporabna podatkovna baza Evropske centralne banke (ECB). Žal tega želenega povezovanja ni mogoče uresničiti brez večje celovite institucionalne povezljivosti gospodarskega prostora. Največjo vlogo pri tem lahko igrajo velike članice sredozemskega bazena, ki so zelo

pomembne v celotni svetovni trgovini in prek katerih se učinki velikih kriz v največji meri prenašajo tudi na gospodarski prostor sredozemskega bazena.

Ključne besede: sredozemske države, stopnja gospodarske integracije, Markovske verige

ملخصات

الموسيقيون كعنصر أساسي في السياحة الريفية في منطقة البحر الأبيض المتوسط

تتناول هذه الورقة الدور الهام الذي يلعبه الموسيقيون في تعزيز عروض السياحة تُعدّ السياحة الريفية من الركائز الأساسية للتنمية الاقتصادية والحفاظ على .الريفية الثقافة، إذ توفّر فرص عمل، وتحسّن جودة الحياة المحلية، وتدعم ترميم المواقع من خلال إبداعهم، يساهم الموسيقيون في حماية وتعزيز التراث الثقافي .التاريخية غير المادي مثل الموسيقى والرقص التقليدي، مما يؤثر إيجابياً على الأداء المالي كما تُعدّ المهرجانات والفعاليات الموسيقية في المناطق .لروّاد السياحة الريفية الريفية مصدراً هاماً للسياحة الريفية، حيث تدرّ دخلاً كبيراً وتساهم في تشكيل صورة وقد نجحت الفعاليات في المناطق الأقل حظاً في جذب .إيجابية للوجهة السياحية إلا أن نجاح هذه .الزوار من خلال تنويع العروض السياحية وتعزيز التنمية الإقليمية تدرس هذه الورقة تأثير عوامل .الفعاليات يعتمد على التخطيط الدقيق والتنظيم الجيد مثل دعم الدولة، والمبادرة الذاتية، والرضا الوظيفي، والحظ، والسمات الشخصية على نجاح وتطور الموسيقيين في دول البحر الأبيض المتوسط، وخاصة في سلوفينيا وقد أظهرت النتائج أن دمج الموارد الثقافية في استراتيجيات .والجبل الأسود وتشير الدراسات التجريبية في .السياحة يجعل المناطق الريفية أكثر جاذبية وتنافسية السياحة الريفية إلى أن الموسيقيين يلعبون دوراً مهماً في السياحة الثقافية من خلال جذب الزوار، والحفاظ على التراث المحلي، وتحفيز النمو الاقتصادي، وبالتالي دعم .التنمية المستدامة في المناطق الريفية

الكلمات المفتاحية: الموسيقيون، السياحة الريفية، منطقة البحر الأبيض المتوسط، دعم الدولة، الثقة بالنفس

كيف يتخذ مدربو الجمباز الصرب قراراتهم؟

ويشار إليه)يؤكد عدد من الباحثين أن التدريب هو في جوهره عملية اتخاذ قرار ، وقد تم تحديد اتخاذ القرار لدى المدربين كعنصر أساسي في (اتخاذ القرار :لاحقًا بـ في هذه الدراسة، قمنا بتحليل سلوك اتخاذ القرار لدى مدربي الجمباز .ممارساتهم

تم .(سنة 13.04 ± 40.96 :متوسط العمر)مدربًا 53تكونت العينة من .الصرب قياس سلوك اتخاذ القرار أثناء الندوة الوطنية للمدربين باستخدام مقياس أنماط اتخاذ العقلاني، الحدسي، التابع، العفوي، :القرار العامة، الذي يشمل خمسة أنماط كما استُخدم .تم إجراء تحليلات عاملية للكشف عن بنية هذه الأنماط .والمتجنب [138]
معامل الارتباط لبيرسون لتحديد العلاقة بين أنماط اتخاذ القرار والخصائص لاكتشاف الفروقات بين ANOVAالديموغرافية والمهنية، واُستخدم اختبار أظهرت النتائج أن المدربين يستخدمون مزيجًا .المدربين الأكثر خبرة والأقل خبرة وبناءً على .من الأنماط الخمسة، لكنهم يميلون أكثر إلى النمطين العقلاني والتابع البنية المتوسطة المكتشفة، نستنتج أن مدربي الجمباز الصرب هم في الغالب من أصحاب القرارات العقلانية الذين يعززون قراراتهم بالاستعانة بنصائح وآراء علاوة على ذلك، يتمكن المدربون الأكثر خبرة من اتخاذ .ومعارف زملائهم قراراتهم بشكل أكثر استقلالية وسرعة، خاصة في الحالات الطارئة أو عند ضيق .الوقت

الكلمات المفتاحية: مدربو الجمباز الصرب، أنماط اتخاذ القرار، البنية، الخصائص الديموغرافية، الخصائص المهنية، الخبرة

دراسة حالة :مؤشر إدارة المعرفة لتعزيز مواجهة التغيرات المناخية في القطاع البترولي المصري

تفرض التغيرات المناخية تحديات كبيرة على المؤسسات، مما يتطلب استراتيجيات للتكيف معها والتخفيف من آثارها مستندة إلى المعرفة المتعلقة بالمناخ والابتكار استجابة لذلك، .ويواجه قطاع البترول ضغوطًا تنظيمية وبيئية متزايدة .التكنولوجي ، وهو مقياس (CKI)تقدم هذه الدراسة مؤشر إدارة المعرفة للتغيرات المناخية مبتكر مصمم لتقييم مدى استعداد المؤسسات لإدارة تلك المعرفة من خلال دمجها .الأنظمة القياسية لإدارة الطاقة، والإدارة البيئية
إطارًا موحدًا لتقييم كيفية إدارة وتنظيم وتطبيق المعرفة المتعلقة CKIيوفر مؤشر .بالمناخ ضمن عمليات اتخاذ القرار الاستراتيجي في المؤسسات البترولية
تم تطبيق المؤشر على شركتين من قطاع البترول المصري تختلفان في ممارسات إدارة المعرفة، مما كشف عن فروق ملحوظة في مستوى المرونة في مواجهة فقد حققت الشركة التي تطبق ممارسات قياسية في إدارة معرفة .التغيرات المناخية ، مما يدل على تكامل أقوى، وانبعاثات أقل، واتخاذ قرارات أكثر 0.283درجة .0.133وعيا للتكيف مع التغيرات المناخية، بينما سجلت الشركة المقارنة درجة

.0.606وقد تم قياس النتائج مقارنةً بقيمة معيارية مثالية تبلغ
تؤكد هذه النتائج على الدور الحيوي لإدارة المعرفة المنظمة في تعزيز مرونة مواجهة التغيرات المناخية ودعم الخيارات الاستراتيجية في القطاعات عالية لصناع القرار أداة عملية لتقييم وتحسين حوكمة CKIيوفر مؤشر .الانبعاثات [139]
كما توفر قدرته التشخيصية إرشادات قيمة .المعرفة، لا سيما في الاقتصادات النامية .للقطاعات التي تنتقل نحو عمليات أكثر استدامة

الكلمات المفتاحية: إدارة التغيرات المناخية، مؤشر إدارة المعرفة، اتخاذ القرار الاستراتيجي، أنظمة إدارة الطاقة، أنظمة الإدارة البيئية، قطاع البترول

ـتحليل ما بعد الأزمة لاستهلاك وسائل الإعلام وتصور جائحة كوفيد دراسة حول الشباب المغربي :19

تستكشف هذه الدراسة تأثير عادات استهلاك وسائل الإعلام على تصورات الشباب تم اعتماد منهج كمي من .19-المغربي في الوسط الحضري بشأن جائحة كوفيد خلال البيانات التي جُمعت بواسطة استبيان، ثم تم الجمع بين اختبار مربع كاي، (N=872)تكشف نتائج تحليل إجمالي الإجابات .وتحليل الارتباط، وتحليل الانحدار أن استهلاك وسائل الإعلام الرقمية من قِبل الشباب يدفعهم إلى اتخاذ مواقف أكثر علاوة على ذلك، يُظهر تحليل الانحدار أن التركيز على .نقداً تجاه التغطية الإعلامية تدعم هذه النتائج أهمية فهم .أصول الفيروس كان جانباً مهماً في التغطية الإعلامية كيفية استهلاك الفئات العمرية المختلفة لوسائل الإعلام، وكيفية إدراكهم وتفسيرهم ولهذا، يجب أن تأخذ استراتيجيات الاتصال في .لها خلال حالات الطوارئ الصحية .حالات الطوارئ بعين الاعتبار احتياجات ودوافع الجمهور المعلوماتية

الكلمات المفتاحية: كوفيد، تصورات الشباب، التواصل الإعلامي، 19- التغطية ، المناطق الحضرية الإعلامية، الإعلام المغربي، الشباب المغربي

التكامل الاقتصادي لدول البحر الأبيض المتوسط

تُعدّ فترات الأزمات الاقتصادية فرصة لتعزيز تكامل أسواق دول البحر الأبيض وتُتيح طريقة سلاسل ماركوف المستخدمة في هذا التحليل تأكيد هذه .المتوسط

وقد ركّزنا على بيانات نسب التجارة المتبادلة بالنسبة إلى الناتج المحلي .الفرضية هي (ECB)الإجمالي الوطني، ووجدنا أن قاعدة بيانات البنك المركزي الأوروبي .الأنسب لهذا الغرض
[140] لكن للأسف، لا يمكن تحقيق هذا التكامل المنشود دون وجود ترابط مؤسسي شامل ويمكن أن تلعب الدول الكبرى في حوض .وواسع النطاق في الفضاء الاقتصادي المتوسط دورًا رئيسيًا في هذا الجانب، نظرًا لأهميتها في التجارة العالمية، ولكونها أيضًا من أبرز القنوات التي تُنقل عبرها آثار الأزمات الكبرى إلى الفضاء .الاقتصادي في منطقة المتوسط

الكلمات المفتاحية: دول البحر الأبيض المتوسط، درجة التكامل الاقتصادي، سلاسل ماركوف


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