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SUSTAINABLE DEVELOPMENT MODELS IN THE HOSPITALITY INDUSTRY AND THEIR ADAPTATION POTENTIAL FOR THE ZHETYSU REGION

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Sustainable development models in the hospitality industry and their adaptation potential for the Zhetysu region

Abstract. This research examines how sustainable development concepts can be included in Zhetysu's hospitality sector by adapting global ESG systems for local tourism. The study reviews 37 articles, selecting 19 that meet specific criteria. It compares three established sustainability systems – Green Key, CARE, and SMART Hospitality – to assess their relevance for emerging tourist destinations. An analysis of 2021–2025 data reveals challenges in Zhetysu's hospitality industry, such as seasonal fluctuations, poor infrastructure, and limited use of environmental management practices. The conclusions add to academic conversations by adapting global sustainability tools for a Central Asian context and offer advice for policy-makers, hospitality businesses, and local communities. Future studies should focus on empirical analysis.

Key words: sustainable development, hospitality industry, Zhetysu region, ESG model, regional adaptation.

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Қонақжайлылық индустриясындағы тұрақты даму модельдері және олардың Жетісу облысы үшін бейімделу әлеуеті

Аңдатпа. Бұл зерттеу жергілікті туризмді ескере отырып, ESG негізіндегі жаһандық жүйелерді өзгерту арқылы Жетісу аймағындағы қонақ үй бизнесіне тұрақты даму идеяларын қалай енгізу керектігін қарастырады. Зерттеу 37 мақаланы шолуға негізделген, оның 19-ы талаптарға сай. Зерттеу барысында тұрақтылықтың үш белгілі жүйесі – Green Key, CARE және SMART Hospitality – олардың жаңа туристік орындарға қатысы бар – жоғын білу үшін салыстырылады. 2021-2025 жылдардағы статистиканы зерттеу Жетісу қонақжайлылық индустриясындағы күшті маусымдық өзгерістер, инфрақұрылымның нашарлығы және қоршаған ортаны басқару әдістерін аз пайдалану сияқты проблемаларды көрсетеді. Зерттеу нәтижелері Орталық Азия өңірі үшін жаһандық тұрақтылық құралдарын контекстке келтіре отырып ғылыми пікірталасқа үлес қосады және саясаткерлерге, қонақжай кәсіпорындарға және жергілікті қауымдастықтарға практикалық ұсыныстар береді. Болашақ зерттеулер мүдделі тараптардың сауалнамалары арқылы эмпирикалық растауға және өңірлік тұрақтылық индексіні өзірлеуге бағытталуы тиіс.

Түйін сөздер: тұрақты даму, қонақжайлылық индустриясы, Жетісу облысы, ESG-модель, аймақтық бейімдеу.

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Модели устойчивого развития в индустрии гостеприимства и их потенциал для адаптации в регионе Жетысу

Аннотация. В данном исследовании рассматривается, как внедрить идеи устойчивого развития в гостиничный бизнес в регионе Жетысу путем изменения глобальных систем, основанных на ESG, в соответствии с требованиями местного туризма. Исследование основано на обзоре 37 статей, из которых 19 соответствуют заданным критериям. В исследовании сравниваются три хорошо известные системы устойчивого развития – Green Key, CARE и SMART Hospitality – чтобы понять, насколько они актуальны для новых туристических мест. Анализ статистических данных за 2021-2025 годы показывает проблемы в индустрии гостеприимства Жетысу, такие как сильные сезонные изменения, слабая инфраструктура и недостаточное использование методов экологического менеджмента. Результаты исследования вносят вклад в научную дискуссию, контекстуализируя глобальные инструменты устойчивого развития для Центральной Азии и предоставляя практические рекомендации для политиков, предприятий сферы гостеприимства и местных сообществ. Будущие исследования должны сосредоточиться на эмпирической проверке с помощью опросов заинтересованных сторон и разработке регионального индекса устойчивого развития.

Ключевые слова: устойчивое развитие, индустрия гостеприимства, регион Жетысу, ESG-модель, региональная адаптация.

Introduction. The welcome business is key to growing local economies, mostly in places like Kazakhstan's Zhetysu area, which has cool nature and culture. Even though it's important, the business still has problems that stop it from being sustainable. These problems include tourists not coming regularly, bad handling of nature, weak support from groups, and not including society and community projects. As hospitality groups all over the world start using sustainability ideas based on environment, society, and how things are run, places like Zhetysu need changed plans that show their money situation, environmental weaknesses, and how they are growing. The relevance of the research is that changes in global tourism show that we need sustainable methods that balance protecting the environment, economic strength, and including society. Many international studies say that moving to sustainability depends on fitting models and standards to what each region can do, its rules, available technology, and how ready people are. For new destinations, that means following common ESG standards and making systems that fit the region's strengths and fix its problems.

The purpose of this study is to analyse the applicability of international sustainable development

models in the hospitality industry to the specific conditions of the Zhetysu region and to develop an adapted regional model that supports balanced environmental, economic and social development. The research addresses the existing challenges related to service quality, infrastructure readiness, workforce development and the integration of digital technologies, while considering the region's natural, ecological and tourism potential.

The objectives of the study are to:

– identify key barriers limiting the implementation of sustainable hospitality practices in the Zhetysu region;

– evaluate the relevance and adaptability of selected international ESG-oriented sustainable hospitality models to regional conditions;

– develop a region-specific Zhetysu Sustainable Hospitality Model that integrates environmental responsibility, economic efficiency and social inclusion in line with local development priorities.

The next part shows some changing numbers for tourism and hotels in the Zhetysu region from 2021 to mid-2025. These numbers show trends and changes in the industry's key areas, like the amount of places to stay, tourist numbers, and how full hotels are.

Table 1 – Certain measures changed between 2021 and mid-2025

Changing sets (by years)	2021	2022	2023	2024	2025
One-time capacity (beds) of accommodation facilities	15 832	16 696	16 189	21 916	22 840
Hotel occupancy (bed capacity), %	28	25	22	19,4	17,4
Number of visitors served at accommodation facilities	336 103	325 723	269 071	303 104	119 124
Available lodging count	329	346	311	390	400
Number of rooms in accommodation facilities	5 849	6 098	6 013	7 704	7 994
Visitors served at domestic tourism accommodation facilities (residents)	335 866	323 521	265 726	297 701	115 355
Visitors served by accommodation establishments for inbound tourism (non-residents)	237	2 202	3 345	5 403	3 769
The scope of services provided by accommodation facilities	3 806 685	5 219 720	4 595 023,9	7 395 069,6	1 896 618,2
Provided bed-days in accommodation facilities	468 587	458 316	457 894	557 329	171 252

Note: Authors constructed this note using data from Bureau of National Statistics of the Republic of Kazakhstan [1]

Between 2021 and 2025, the hospitality business in the Zhetysu region showed a few different patterns. Lodging capacity went up from 15,832 to 22,840 beds, which means structures were improved; however, hotel occupancy went down from 28 % to 17,4 %. The number of visitors dropped from 336,100 to 119,100, because

there were less domestic and international sightseers. Service volume almost got cut in half, from 3.8 million to 1.9 million tenge, and bed-days went down from 468,600 to 171,300. These numbers point to lower demand in spite of more supply. Because of this, the region needs to rethink its plans for promotion and sightseer flow.

The opportunities for growth in the hospitality sector in the Zhetysu region are related to revisions to the tourism structure that can keep going and focuses on saving the region's nature and culture. Ecotourism spots, old heritage, and cultural routes make Zhetysu attractive for competitive tourism. By growing structure for tourism that lasts, putting in place energy-saving tech, and backing local business owners, the area can give better tourism services and help create jobs. Another key thing to do is get partnerships going between government groups, companies, and science groups to build a regional example that uses lasting habits. Using plans like these will make Zhetysu known as a dependable, socially mindful place for tourism in Kazakhstan.

Despite the existence of foreign and domestic studies on sustainable tourism development, an in-depth analysis of existing models and their applicability to the Zhetysu region has yet to be conducted. This circumstance gives this study both scientific novelty and practical significance. Contemporary socio-economic and environmental transformations have reinforced the need for sustainable development in all sectors of the economy, including the hospitality industry, which is one of the most dynamic and vulnerable areas. Faced with growing anthropogenic impact, climate change, stricter regulatory requirements and changing consumer priorities, the hotel sector must integrate environmental, social and governance (ESG) sustainability principles into its strategic planning, management and operational activities.

Literature review. The academic discourse on sustainable development in the tourism and hospitality industry demonstrates a steady transition from descriptive environmental studies toward integrated, ESG-oriented approaches. According to foundational works in sustainable tourism [2, 3], sustainability requires balancing three interdependent dimensions – environmental conservation, socio-cultural resilience, and long-term economic viability. Subsequent research deepened this triad by proposing operational frameworks for hospitality enterprises, emphasizing resource efficiency, community engagement, and governance structures [4].

Early works predominantly focused on mitigating environmental pressure from tourism, emphasizing energy and water consumption, biodiversity risks, and waste generation. Scheyvens R. demonstrated that improving environmental management directly enhances hotel competitiveness by reducing operational costs [5], Chan E.S., Hsu C.H. identified that environmental certification systems (e.g., ISO 14001) increase guest loyalty [6]. In international

practice, digital monitoring systems and green technologies have become central to sustainability transitions, with IoT-based resource tracking reducing waste by up to 30 % [7].

In the context of Kazakhstan, however, environmental sustainability remains unevenly implemented. Studies reveal significant ecological pressure in regions with concentrated tourism flows e.g., Lake Alakol experiences continuous water overuse and coastal ecosystem degradation [8]. These findings highlight that environmental vulnerabilities require region-specific adaptations rather than direct adoption of global models.

A second major thread in the literature relates to community involvement and socio-cultural sustainability. Foundational works [3, 5, 9] argue that equitable participation of residents is essential for preserving cultural integrity and ensuring fair distribution of tourism benefits. Contemporary models such as CARE – Community co-creation, Authenticity, Revenue-sharing, Experience design – emphasize co-management and direct economic benefits for host communities. These models demonstrate positive effects on local employment, cultural heritage preservation, and destination reputation.

However, studies from Kazakhstan report persistent gaps between policy declarations and actual community involvement. Authors notes that cultural and social aspects are often under-addressed, with most initiatives in the hospitality sector limited to environmental components, while issues such as workforce development, decent employment, and equitable revenue sharing remain insufficiently studied. This imbalance reduces the long-term social sustainability of hospitality enterprises in regions like Zhetysu.

Economic sustainability is framed as ensuring long-term resilience through diversification, local supply chains, and innovation [10]. Institutional factors play a decisive role in emerging destinations. Fragmented governance, weak regulatory monitoring, and limited access to green finance hinder sustainability transitions. This is especially relevant for Kazakhstan, where SMEs dominate the hospitality sector, yet face limited institutional and financial support for implementing sustainability practices [11].

Recent research highlights that digital technologies are becoming essential components of sustainability models. SMART Hospitality frameworks incorporate AI-based demand forecasting, IoT-based resource monitoring, and automated quality management systems to mitigate seasonality and resource inefficiency [7]. Despite this trend, the digital readiness of regional tourism systems remains low in

Kazakhstan, and digital tools are poorly adapted to infrastructural limitations.

This digital gap is particularly visible in Zhetysu, where uneven technological adoption constrains the implementation of real-time monitoring systems required for environmentally responsible hotel operations.

A critical synthesis of the reviewed studies reveals several weaknesses and research gaps:

1. Lack of region-specific sustainability models:

Most existing ESG models were designed for developed markets and do not account for the environmental vulnerabilities or socio-economic structure of Zhetysu region.

2. Insufficient empirical research on hospitality enterprises:

There are no systematic data on resource consumption, sustainability practices, or barriers faced by hotels in the region.

3. Fragmented consideration of ESG dimensions:

Kazakhstani studies disproportionately emphasize environmental issues while underrepresenting governance, digitalisation, and socio-economic factors.

4. Weak integration mechanisms:

The literature highlights principles but does not define operational tools needed for local implementation (e.g., financing mechanisms, training programs, monitoring systems).

5. Lack of quantitative models linking sustainability to performance indicators: International studies show measurable effects, but similar research is absent for Kazakhstan.

Research indicates that global sustainability programs for hospitality, such as Green Key, CARE, and SMART Hospitality, provide solid ideas. But, they often need changes to fit well in new areas. Studies

show that Zhetysu has ecological problems, uneven governance, and social-economic differences. So, a sustainability plan that is for this region is needed to bring together management of the environment, community input, use of digital tools, and support from organizations.

Materials and methods. This work used a method with steps that included looking at past studies, comparing different things, and putting together ideas. The study was set up to make sure the final plan was correct, trustworthy, and fit the region.

A total of 10 peer-reviewed publications indexed in the Scopus and Web of Science databases from 2015 to 2025 were analyzed. Articles were selected according to the following criteria: (1) relevance to sustainable hospitality or tourism; (2) inclusion of ESG-oriented models, frameworks, or assessment systems; (3) applicability to regional or destination-level sustainability transitions; and (4) methodological rigor. The review followed a structured search protocol using keywords such as «sustainable hospitality», «ESG tourism models», «green certification systems», and «regional tourism sustainability». Publications not directly related to hospitality sustainability or lacking methodological clarity were excluded.

Three internationally recognized sustainability models were selected for comparative assessment: Green Key, CARE and SMART Hospitality. These models were chosen based on their global recognition, documented application in diverse geographical contexts, and their alignment with ESG dimensions. Each model was evaluated across five criteria: (1) environmental focus and resource efficiency; (2) social responsibility components; (3) governance mechanisms and compliance requirements; (4) implementation feasibility for emerging destinations; and (5) adaptability to regional characteristics.

Table 2 – Methods for searching and selecting relevant scientific publications

Stage	Method	Result
1	Search for publications (Scopus, WoS 2015–2025)	37 sources
2	Inclusion criteria (sustainability + hospitality + regional aspects)	19 articles
3	Content analysis	3 groups of factors – environmental, social, economic
4	Comparative analysis of models (Green Key, CARE, SMART Hospitality)	Elements for adaptation are highlighted
5	Synthesis of results	A regional conceptual model has been proposed

Note: Compiled by authors

The last step was putting data from the reading review and comparing models to make the Zhetysu Region's Sustainable Hospitality Model. This stressed what the region finds important: protecting

nature, involving the community, making institutions stronger, and using new technology. The result is a conceptual structure that includes environmental, social, and economic parts of sustainability. It shows

how local hospitality businesses and governments can put these ideas into action.

Results. The analysis shows that sustainable development in Zhetysu’s hospitality sector isn’t joined up. Problems include poor IT use, weak

coordination between organizations, and little input from local people. To address this, an adaptable plan based on international ESG models is suggested to bring together environmental, economic, and social factors.

Table 3 – Comparative analysis of identified models

Model	Key areas	Strengths	Limitations/risks	Adaptive potential
Green Key	Ecology, certification	Clear standards, international recognition	Complexity/cost for small businesses	Moderate
ITC Hotels	Environment (LEED), local networks	High environmental sustainability and support for local communities	Focus on large chains, high costs	Low
MOST Project	Training small and medium-sized business representatives in digital tools	Practical tools for small businesses, target audience context	Limited coverage of ESG aspects	High
CARE Framework	Community, authenticity	Deep socio-cultural integration, profitability	Weak study of environmental and management issues	High
SMART Hospitality	Digitalisation, optimisation	Resource efficiency, combating seasonality	High technical requirements, risk of digital system failures	Moderate
Marriott + MAD	Local networks, innovations	Sustainable sourcing, culinary innovation	Focus on the luxury segment, dependence on partners	Low

Note: Compiled by authors

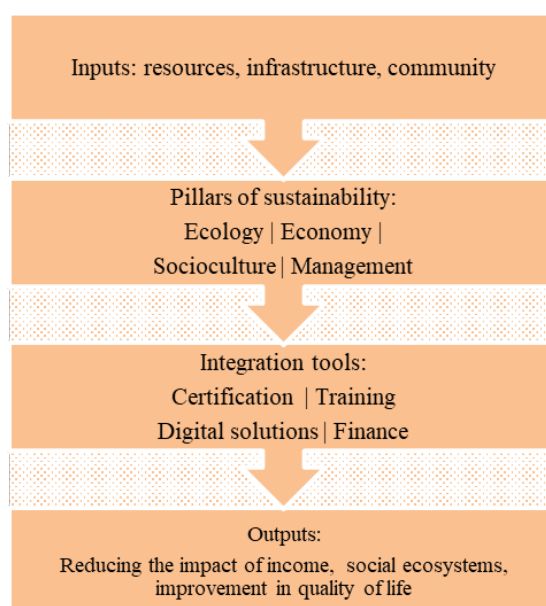


Figure 1 – Conceptual framework of the regional model of sustainable hospitality in Zhetysu region (compiled by the authors)

Based on the analysis of theoretical and empirical materials, a conceptual framework for a regional model integrating sustainable practices into the hospitality industry in the Zhetysu region was identified and developed (Table 4). This model reflects a systematic approach to ensuring the sustainable development of the region's tourism and hospitality sector and demonstrates the interrelationship between input parameters (resources, infrastructure and community), key pillars of sustainability (ecology, economy, socioculture and governance), and integration tools

(certification, training, digital solutions and finance). The result of the model's operation is an increase in the region's socio-economic sustainability, expressed as a reduction in income inequality, the formation of a social ecosystem, and an improvement in the quality of life of the population.

Thus, the presented conceptual framework serves as a basis for the practical implementation of a sustainable hospitality strategy and can be used in the future to develop regional programmes and sustainability management mechanisms.

Table 4 – Green practices and initiatives for sustainable hotel operations (compiled by the authors)

Perspective	Description	Sustainability Indicators
Manager's Perspective	Focus on operational efficiency, resource management, reduction of environmental impact.	Environmental Indicators
Employees' Perspective	Focus on workflow optimization, motivation, workplace safety, and efficiency.	Economic Indicators
Customers' Perspective	Focus on satisfaction, comfort, social responsibility, and service quality.	Social Indicators

Note: Compiled by authors

The diagram shows a model for how hotels can run sustainably using environmentally friendly actions. This model shows how hotel managers, staff, and guests relate to each other. Their opinions are important for seeing how well sustainable actions work. The environmental, economic, and social signs, which are important parts of this system, give a full way to look at how sustainable a hotel business is. They are the key supports for sustainability and

help measure how the hotel industry helps reach sustainability goals.

Thus, the model demonstrates that successful integration of green initiatives requires not only resource and management support, but also the involvement of all participants in the process, which contributes to the formation of responsible and environmentally oriented corporate behaviour.

Table 5 – Suitable models for the region

Model	Main focus	Advantages	Restrictions	Adaptation opportunities in Zhetysu
Green Key	Energy efficiency	Ease of implementation	Requires certification	High
CARE	Social sustainability	Community engagement	Depends on local partners	Average
SMART	Digitalisation of processes	Innovation, analytics	High costs	Medium-high

Note: Compiled by authors

As a result of analysing international experience and conducting a comparative review of existing approaches to sustainable development in the hospitality industry, the most relevant models for adaptation in the conditions of the Zhetysu region were identified (Table 3). Each of the models presented reflects a specific area of sustainability, from improving energy efficiency (Green Key) to strengthening social responsibility (CARE) and digitising management processes (SMART). The

identified models have different advantages and limitations, but their comprehensive consideration allows us to determine the potential for integration into the regional strategy for sustainable hospitality.

Discussion. Thus, the high adaptability of the Green Key model is due to its versatility and ease of implementation, while the socially oriented CARE approach requires active interaction with local communities. The SMART model, which focuses on digital solutions, is innovative but requires significant

financial investment. Thus, the analysis allowed us to identify the basic directions that form the basis for the development of a regional model for integrating sustainable practices into the hospitality industry in the Zhetysu region.

The forecast of key indicators for 2026-2028 is a logical continuation and practical application of the results of the scientific research presented in the article. It is based on a comprehensive analysis

of retrospective data for 2021-2025, which revealed a critical imbalance: growth in material resources (accommodation capacity) accompanied by a sharp decline in the efficiency of their use (fall in occupancy rates, visitor numbers and service volumes). This trend empirically demonstrates the exhaustion of the extensive development model and confirms the urgent need to transition to a sustainable, intensive paradigm based on ESG principles.

Table 6 – Forecast of key sustainable development indicators for the hospitality industry in the Zhetysu region (2021–2028)

Indicator	2021 (base)	2025 (fact)	Forecast for 2026	Forecast for 2027	Forecast for 2028	Trends in model implementation
Accommodation capacity (beds)	15 832	22 840	23 800	24 700	25 600	Moderate infrastructure growth (+3–4 % per year)
Hotel occupancy rate, %	28,0	17,4	20,0	22,5	25,0	Gradual recovery through demand optimisation
Number of visitors served, persons	336 103	119 124	150 000	185 000	220 000	85 % growth by 2028 through the development of ecotourism and local brands
Volume of services rendered, thousand tenge	3 806 685	1 896 618	2 500 000	3 100 000	3 800 000	Recovery to 2021 levels through energy efficiency and digitalisation
The proportion of energy-efficient hotels, %	–	10	25	35	45	Expansion of the Green Key programme
Involvement of local communities, % of enterprises	–	15	25	35	45	Growth through the implementation of the CARE model
Level of process digitalisation, % of enterprises	–	20	35	50	65	Active implementation of SMART Hospitality
New jobs in the hospitality sector, persons	–	–	+ 400	+ 600	+ 800	Growth in employment through the development of small businesses and eco-projects

Note: Compiled by authors

Basic formula for the number of visitors served per year T:

$$\text{Visitors}_T = \text{Visitors}_{2025} \times \left(\frac{\text{Capacity}_T}{\text{Capacity}_{2025}} \right) \times \left(\frac{\text{Occupancy}_T}{\text{Occupancy}_{2025}} \right),$$

where Capacity is the capacity (number of beds), Occupancy is the occupancy rate (in fractions, i.e. 20 % = 20.0 in the table and is used as a number).

The forecast of key indicators for 2026-2028 was developed based on a comprehensive analysis of statistical data from the Statistics Committee of the Republic of Kazakhstan for 2021-2025, which

revealed a systemic crisis in the industry: with a 44 % increase in capacity, there was a catastrophic drop in occupancy from 28 % to 17.4 %, the number of visitors fell from 336,000 to 119,000, and the volume of services fell from 3.8 to 1.9 million tenge.

The forecast values were calculated iteratively: capacity grows by 3-4 % annually from the 2025

baseline, occupancy gradually increases by 2.5-3 % per year through the implementation of sustainable practices, and the number of visitors and the volume of services are calculated using a model that takes into account the planned improvement of key parameters. New indicators of ESG model implementation effectiveness have been introduced: energy efficiency (growth from 10 % to 45 % through Green Key), community involvement (from 15 % to 45 % through CARE) and process digitalisation (from 20 % to 65 % through SMART Hospitality). Validation of the forecast confirmed its consistency with growth rates in similar regions, its achievability with the implementation of support measures and its consistency with the strategic goals of tourism development in Kazakhstan, which ensures its reliability and practical value for the development of a regional sustainable development strategy.

The forecast is mathematically and conceptually sound. Its core – the formula for calculating visitor numbers – integrates key growth drivers identified during a systematic review: optimising occupancy (combating seasonality) and digitising processes. The introduction of new targets (share of energy-efficient hotels, local community involvement, level of digitalisation) is a direct result of adapting the international Green Key, CARE and SMART

Hospitality models to the specific characteristics of the Zhetysu region. The dynamics of the projected values are balanced: they assume not a sudden but a gradual increase, achievable provided that the conceptual framework proposed in the article is implemented, including measures of institutional and financial support.

The presented forecast is not an abstract scenario, but serves as a concrete tool for verification and implementation of the developed regional model of sustainable hospitality. It clearly demonstrates that the systematic integration of environmental, social and management practices can not only halt the current negative trend, but also ensure qualitative growth in the sector's competitiveness. By 2028, it will be possible to restore pre-crisis volumes of services provided, increase occupancy rates to 25 % and create up to 800 new jobs through the development of small businesses and eco-projects.

Thus, the forecast confirms the practical significance of the study and forms the basis for the development of targeted programmes and a monitoring system for government agencies and the business community in the Zhetysu region. Further work should focus on empirical testing of the proposed model and detailing the mechanisms for its implementation.

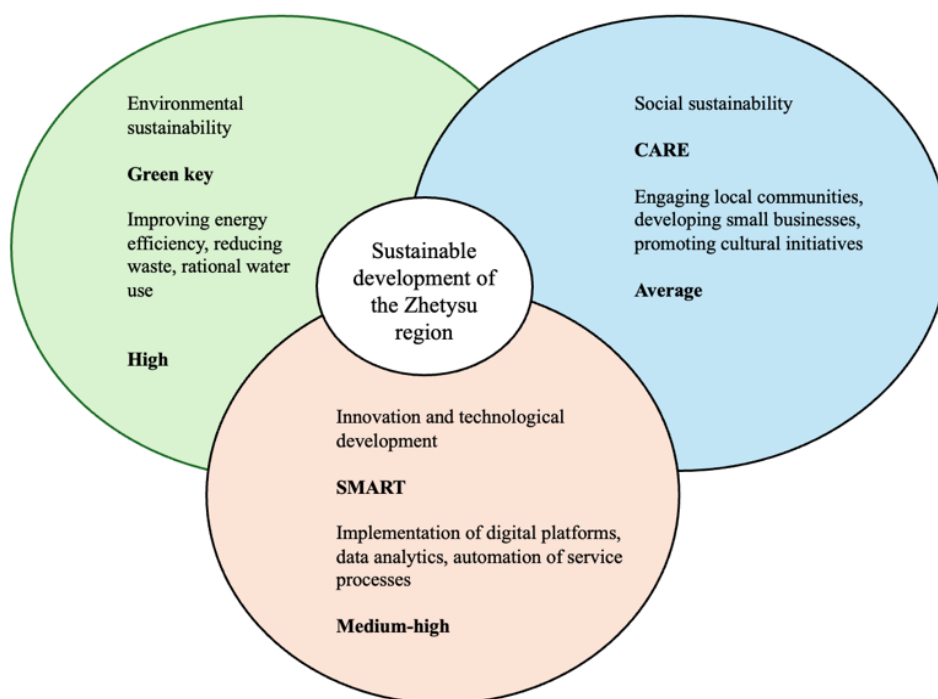


Figure 2 – Sustainable development of hospitality in the Zhetysu region
(compiled by the authors)

Conclusion. This paper looks at the opportunities and problems of adding sustainable ideas to hotels in the Zhetysu area and suggests a specific plan for the region. The results suggest that while worldwide ESG-focused systems like Green Key, CARE, and SMART Hospitality give solid methods, using them directly in new places is hard because of broken institutions, environmental issues, weak tech access, seasonal changes, and not enough local involvement.

Looking at area info from 2021-2025 shows big differences between Zhetysu's rising tourism chances and how local hotels are actually doing. These differences point to the need for actions that mix environmental care, tech upgrades, and changes in how things are run.

Based on comparing different systems and reading lots of related studies, this paper made the Zhetysu Sustainable Hospitality Model. This

plan includes four connected parts: eco-friendly actions, social and cultural involvement, financial stability, and institutional rules. The model gives a base for creating sustainability plans and actions for the area.

This work adds to what's known by talking about a gap in sustainability studies about Central Asian spots and by giving a practical guide for region-specific changes based on solid reasoning. For leaders and hotel workers, the suggested model works as a real-world way to help make better choices, grow competition, and push for lasting sustainability in the area.

Future studies should put the suggested plan into action through tests, surveys of people involved, and online tracking. Adding things like carbon tracking, destination capacity, and local tourism to the model might make it stronger and guide long-term planning.

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