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Original article

Towards Green Markets: Strategies for Enhancing Sustainability in Open-air Popular Markets, Zliten, Libya

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Abstract
This study investigates the state of sustainability in open-air popular markets in Zliten city, considering current trends toward establishing green markets that include several environmental aspects. The research originates from a key issue: the limited integration of sustainability standards in organizing these markets, despite their importance in economic and social life. The significance of the study lies in highlighting the vital environmental role of local markets and proposing practical and scientific approaches for their environmental sustainability improvement. The study aimed to assess the current level of sustainability in open-air popular markets, identifying the challenges hindering progress, and suggesting practical strategies for transitioning to green markets, adopting a descriptive-analytical approach. A questionnaire was created, covering three main areas: strategies for enhancing sustainability, the extent to which the green market (sustainability) concept is realized, and the challenges faced in achieving sustainability in open-air popular markets. This tool was distributed to a sample of 100 participants, including vendors, citizens, and regulatory authorities. The statistical analysis results indicated that the state of sustainability remains weak, with the overall average for the sustainability mechanisms dimension at only 2.07 and the average for the realization of the green market concept at 1.91. Administrative and planning challenges, a lack of coordination, and insufficient resources emerged as the main obstacles. The results also confirmed a strong linkage between the availability of environmental infrastructure and the extent of green market realization, compared to the limited influence of awareness programs. The study concluded that adopting integrated strategies to enhance sustainability in open-air popular markets is essential, highlighting the importance of activating coordination and cooperation among stakeholders to ensure a genuine balance between environmental, economic, and social dimensions.
Keywords. Green Markets, Environmental Sustainability, Open-air popular Markets, Environmental Challenges, Sustainability Strategies.

Introduction

Open-air popular markets play a vital role in the economic and social life of local communities, meeting daily needs and strengthening social ties. They are integral to the cultural and economic identity of many regions and significantly contribute to job creation and the informal economy. However, growing populations and shifting consumption patterns have led to environmental and health challenges, such as waste buildup, air and water pollution, and foul odors [1]. Without proper environmental planning, many markets have failed to adapt to urban sustainability requirements, becoming pollution hotspots due to waste leakage and vehicle emissions. This environmental decline poses a serious threat to urban health and safety [2]. This study highlights the need to promote environmental sustainability in open-air markets, with a focus on Zliten. It seeks to apply the concepts of "sustainability" and "green markets" to reduce environmental harm while balancing economic growth with ecological protection. The goal is to minimize waste, enhance air and water quality, and support eco-friendly practices, improving residents' quality of life and ensuring a healthier future.

Open-air Popular Markets

Open-air popular markets are essential to the economic, social, and cultural fabric of societies, particularly in developing countries. Typically located in city centers or old neighborhoods and held on specific days, these markets offer affordable goods such as agricultural produce and handicrafts [3]. They are defined as temporary or permanent gatherings of sellers and buyers in informal settings, serving as cultural and social spaces that reflect local identity and heritage [4]. These markets play a vital role in the informal economy, offering income and employment for many, while promoting local products through low-cost, direct marketing. They also help preserve traditions and foster social interaction [5]. However, they face challenges in organization, infrastructure, and environmental compatibility—necessitating future strategies that maintain their character while aligning with sustainable development [4,5].

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Green Markets Sustainability:

In response to growing environmental challenges, sustainability has emerged as a framework aiming to balance economic growth, environmental protection, and social equity. Within this context, green markets have gained attention as business models that incorporate environmental standards into their practices [7]. Defined as business environments that integrate sustainability—from eco-friendly products to waste management and infrastructure improvements—green markets aim to lower carbon footprints, raise environmental awareness, and promote sustainable production and consumption [8,9]. They support the green economy by generating jobs, encouraging environmental industries, and enhancing urban quality of life, particularly in communities reliant on open-air markets [9,10]. Yet, in developing countries, green markets face challenges such as weak environmental legislation, poor infrastructure, and limited awareness—necessitating comprehensive strategies including sustainable planning, education, and innovation in local supply chains [11].

Open-air Popular Markets in Zliten

The city of Zliten boasts several open-air popular markets, which are a prominent feature of daily economic and social activity and serve as major centers for the provision of basic goods and local products. Despite their great importance, these markets face several environmental and health challenges that require serious action from the relevant authorities [11]. These markets represent a source of livelihood for a large number of families and are considered open-air popular landmarks that reflect the cultural character of the city. However, despite their importance, these markets suffer from clear environmental imbalances due to the lack of appropriate environmental planning, poor waste management, and the lack of inadequate health infrastructure. These factors contribute to the deterioration of the general landscape and the spread of various types of pollution. This requires urgent intervention by the relevant authorities to develop sustainable solutions that take into account both the environmental and health dimensions.

Al-Subkha Open-air Popular Market

Al-Subkha Market in Zliten is a major open-air market, particularly active on Sundays and Thursdays. Strategically located near residential areas, it serves as a key center for trading vegetables, fruits, and legumes. Recent municipal interventions have improved its infrastructure by adding a metal roof, permanent shops, and designated paths.

Despite these improvements, the market still faces environmental and health issues, including: Accumulation of organic waste from produce, often left uncollected. Insufficient waste bins, leading to random disposal. Lack of regular health inspections, especially during peak seasons. Poor rainwater drainage, causing water pooling and infrastructure damage.

Al-Subkha represents broader environmental challenges seen in Zliten's traditional markets, highlighting the need for sustained municipal efforts in maintenance, hygiene, and raising environmental awareness.

Figure 1. Al-Subkha Open-air Popular Market.

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Open-air Popular Tuesday Market

The Tuesday Open-air Popular Market is one of the largest and oldest open-air popular markets in Zliten. It is located in the Souk Attulata area, one of the city's eastern suburbs, near the coastal road that connects the eastern and western parts of the country. This market is distinguished by its spaciousness and traditional open-air character, and every Tuesday it attracts hundreds of visitors from within the city and nearby towns. The market is renowned for its wide variety of goods, including most food products such as fresh vegetables and fruits. It also serves as a key hub for the sale of various types of livestock, poultry, animal feed, and other traditional open-air products. This significant diversity has turned it into a vital economic center and a preferred destination for traders and farmers from neighboring cities such as Misurata, Bani Walid, Tarhuna, Msallata, and Al-Khums, thereby reinforcing its role as a major commercial and social hub in central Libya.

Field photographs taken around the open-air Tuesday market reveal the unfortunate environmental conditions affecting the area. Plastic, solid, and organic wastes are scattered randomly around bins designated for plastic collection, reflecting a lack of environmental awareness and poor waste collection and transport practices. The bins appear overflowing and neglected, having become mere garbage dumps rather than effective tools for environmental protection.

Figure 2. Tuesday Open-air Popular Market for Vegetables.

Figure 3. Tuesday's Open-air Popular Market for Livestock, Birds, and Animal Feed.

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The lack of coordination between relevant authorities, including municipalities and sanitation offices, in monitoring waste sorting sites is also evident. This has led to sorting sites being transformed into random dumps, contributing to the distortion of the overall landscape and the spread of foul odors and harmful insects. It is feared that these conditions could contribute to the spread of environmental and health diseases if the situation is not addressed with an urgent waste management plan in this area, illustrated in Figure 4.

Figure 4. The Spread of Waste in the Open-air Popular Tuesday Market.

Majer Open-air Popular Market

The Majer Open-Air Market in southern Zliten is a busy weekly market, especially active on Fridays. Though smaller than the Tuesday market, it shares similar patterns of direct sales from citizens across the area. Field visits revealed several environmental challenges due to overcrowding and limited space, making regulation and cleaning difficult. Key issues include random waste disposal, lack of sanitary facilities and sewage systems, poor cleaning services, and exposure to dust and sand due to its open location. These problems highlight the urgent need for environmental restructuring, waste management, improved infrastructure, and stronger local oversight.

Figure 5. The Spread of Waste in the Open-air Popular Market of Majer.

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Open-air Popular Monday Market

The open-air popular Monday market, known locally as "Souk Al-Qasba," is located in Al-Jumaa district, one of the neighborhoods of Zliten. It is one of the smallest open-air popular markets in terms of area. The market specializes in selling vegetables, fruits, and legumes, along with other activities such as animal feed, grains (such as wheat and barley), and poultry, giving it an agricultural-commercial character that serves the residents of the area and neighboring regions.

Kaam Open-air Popular Market

The Kaam Open-Air Market, active on Saturdays and Wednesdays, plays a key role in trade between Zliten and Al-Khums. However, its location near a busy coastal road causes traffic congestion and safety risks due to the mix of vehicles and pedestrians.

The Al-Huriyyat Market, located in Kadush near the city bridge, is a smaller market with high foot traffic and stalls selling grains, dates, olive oil, vegetables, and fruits.

Practical Strategies for Transitioning into Green Markets

In light of global environmental transformations and growing awareness of the importance of sustainable development, the shift towards green markets has become an urgent necessity to promote responsible consumption and reduce the negative environmental impact of economic activities. Practical strategies serve as tools and implementation plans through which traditional markets can be transformed into environments that are more environmentally compatible, socially, economically, and administratively.

These strategies include several measures, including developing environmentally friendly infrastructure, such as waste management systems, providing renewable energy sources, and adopting green building standards; in addition to enacting environmental legislation that regulates market activities and motivates suppliers and consumers to adopt environmental behaviors [11]. Environmental awareness and education programs are also one of the main pillars for changing consumption patterns and supporting community participation in the transition towards a more sustainable market.

The significance of these strategies lies in their crucial role in bridging the gap between environmental planning and practical implementation, especially in open-air popular markets that face challenges related to weak regulation, the absence of environmental planning, and low levels of awareness. This calls for the adoption of integrated policies based on partnerships between the public and private sectors and civil societies [8]. By systematically employing these strategies, a market environment can be created that conserves natural resources, provides a healthy environment, and supports the local economy through sustainable products and green operating methods.

Methods

This research relied on the descriptive-analytical approach as a methodological framework for studying the reality of sustainability in the open-air popular markets of Zliten.

Data collection and analysis relied on three main tools. The first tool was direct field observation, where several observations were documented regarding the state of public hygiene, waste management mechanisms, and market infrastructure. The second tool was a validated questionnaire designed specifically for this purpose, distributed to a sample of 100 participants, including market vendors, shoppers, and representatives of relevant local authorities.

The questionnaire consisted of three main aspects. The first was "mechanisms for enhancing sustainability in open-air popular markets," which was the independent variable. The second aspect addressed "the extent to which the concept of the green market (sustainability) is achieved," which was the dependent variable. Whilst the third dimension focused on "the challenges facing achieving sustainability in open-air popular markets." The third tool of data collection was a review of secondary sources, through analyzing relevant literature, previous studies, and local and official reports related to traditional market and environmental issues.

The data extracted from the questionnaire were analyzed using the SPSS statistical program to arrive at accurate results that contribute to diagnosing the reality and providing applicable, practical recommendations.

Results and Discussions

First Aspect: Strategies for Enhancing Sustainability in Open-air Popular Markets:

Results from Table No. (1) reveal a difference in the participants' views regarding the extent of availability and activation of sustainability-enhancing strategies in the open-air popular markets of Zliten city, as the general arithmetic mean reached 2.07, which is in the low to medium level on the five-point Likert scale. The general percentage (41.4%) also confirms the limited application of these mechanisms in practical reality. It is noted that the fourth point, which states: "Designing appropriate health facilities within the market reduces the environmental impact," recorded the highest arithmetic mean (2.37) and percentage (47.4%). This indicates a relative awareness of the importance of health infrastructure in supporting

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sustainability efforts. This was followed by the items on supporting municipalities and using reusable bags, which received rates of approximately 46% and 45%, respectively. On the other hand, the sixth point, "Holding workshops and training courses for sellers," came in last place with an arithmetic mean of (1.70) and a percentage of (34%), which indicates a weakness in awareness and educational activities within the markets, which may explain some of the shortcomings in the environmental behaviors of the local commercial community. The standard deviation values, which ranged between 0.40 and 0.72, indicate a relative variance in the responses of the sample members, which reflects a variance in the extent of awareness or personal experience with each of the sustainability axes.

Overall, the results of this axis show that the implementation of sustainability-enhancing strategies in open-air popular markets remains below the desired level. This requires a multi-dimensional intervention that includes improving infrastructure, raising environmental awareness, and empowering local communities to participate in market management under sustainable development standards.

Table 1. Strategies for Enhancing Sustainability in Open-air Popular Markets.

Point	Average	Relative Percentage (%)	Standard Deviation	Rank
The presence of awareness campaigns within markets promotes positive environmental behavior among sellers and consumers.	1.86	37.2%	0.49	7
Providing designated waste sorting containers helps reduce pollution within markets.	2.23	44.6%	0.72	4
Using reusable bags is an important step towards sustainability.	2.28	45.6%	0.59	3
Designing appropriate sanitary facilities within the market reduces the environmental impact.	2.37	47.4%	0.66	1
Supporting municipalities in developing the market contributes to creating a sustainable market environment.	2.32	46.4%	0.71	2
Holding workshops and training courses for sellers to contribute to improving environmental awareness.	1.70	34.0%	0.50	8
Involving the local community in market management enhances the effectiveness of sustainability programs.	1.92	38.4%	0.44	5
Introducing greenery and landscaping elements into markets contributes to improving the market environment.	1.89	38.8%	0.40	6
Mean	2.07	41.4%	0.28	

Second Aspect: The Extent to which the Concept of the Green Market (Sustainability) is Achieved

The results of Table (2) indicate that the level of realization of the green market concept in the open-air Popular markets of Zliten city are still weak, as the general arithmetic mean reached (1.91) out of 5, which reflects a low level of evaluation according to the five-point Likert scale, and indicates a clear deficiency in activating environmental sustainability practices within the market. The sixth point, "The market is regularly monitored by competent environmental authorities," recorded the highest arithmetic mean among the points (2.48) with a relative weight of (49.6%), which suggests a relative awareness of the importance of regular environmental monitoring, but it is still below the desired level to achieve a sustainable market environment. The two points on designing the market in a way that allows movement (2.46) and providing a healthy environment (2.42) came in second and third place, respectively, which reflects some partial efforts in the organizational aspects and spatial structure.

In contrast, the first item, "The market has an effective waste management system," came in last (mean 1.12, percentage 22.4%), the lowest value among all items. This reflects a severe weakness in the environmental infrastructure associated with waste management, which poses a direct threat to achieving any move towards green markets. The health facilities (1.40) and reliance on environmentally friendly resources (1.51) items also recorded low percentages, confirming that the environmental foundations necessary for the green market are not sufficiently available.

The standard deviation values range between (0.38) and (0.96), indicating a moderate variation in the participants' opinions, as the higher values reflect the presence of noticeable differences in individuals'

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perception of some environmental aspects, which may be attributed to the variation in experiences or the general weakness of environmental awareness among vendors and visitors.
In general, these results demonstrate that the level of implementation of the green market concept in Zliten's open-air popular markets is still in its early stages and faces clear challenges in terms of infrastructure, oversight, community awareness, and the efficient use of environmental resources. Therefore, promoting sustainability requires systematic institutional interventions that include: establishing an effective waste management system, providing adequate sanitation facilities, reducing reliance on plastics, and intensifying awareness campaigns on sustainable environmental behavior.

Table 2. Green Market (Sustainability) Achievement

No.	Point	Average	Relative Percentage (%)	Standard Deviation	Rank
1.	The market has an efficient waste management system.	1.12	22.4%	0.38	8
2.	The market has facilities that ensure public hygiene and environmental health.	1.40	28.0%	0.57	7
3.	The market relies on eco-friendly resources.	1.51	30.2%	0.54	6
4.	The general behavior of sellers and consumers is consistent with the principles of sustainability.	1.97	39.4%	0.48	4
5.	The market is designed to allow for flexible movement and reduce congestion.	2.46	49.2%	0.91	2
6.	The market is regularly monitored by competent environmental authorities.	2.48	49.6%	0.96	1
7.	The use of plastic materials in the market is reduced.	1.97	39.4%	0.59	4
8.	The market provides a clean and healthy shopping environment for visitors.	2.42	48.4%	0.74	3
Mean		1.91	38.8%	0.37	

Third Aspect: Challenges Facing Sustainability in Open-air Popular Markets
The results of Table 3 indicate the existence of major challenges facing the achievement of sustainability in the open-air popular markets of Zliten, as the general arithmetic mean of these challenges reached 3.90, which reflects a high level, indicating the difficulty of the environmental situation and the urgent need for reform interventions. The data show that challenges related to the planning and organizational dimension prevail over other areas. The point “Lack of environmental planning in market design” is the highest rated with an average of 4.35 and a relative weight of 87.0%. This shows that the lack of sustainable planning is the primary and most important challenge, according to participants. The "lack of mechanisms to evaluate the environmental performance of markets" ranked second, with an average score of 4.29 and a relative weight of 85.8%, indicating weak monitoring and follow-up of environmental performance as a major factor in weak sustainability. The points "Weak coordination among regulatory bodies regarding market management" and "Lack of financial resources allocated to market improvement" scored 4.26 and 4.21, respectively, confirming that the lack of institutional integration and adequate financial support are fundamental obstacles to achieving green market principles. In the same context, the point "Weak infrastructure such as drainage and ventilation" received a score of 4.12, indicating a deficiency in the physical structure that supports sustainability practices. On the other hand, it was noted that “low environmental awareness among shop owners and sellers” and “absence of periodic environmental monitoring” achieved the lowest averages (2.87 and 2.92, respectively). This suggests that the challenges related to awareness and control may be less pressing compared to those related to planning, regulation, and financing, although this does not diminish their overall importance in achieving sustainability goals.
Moderate standard deviation values (ranging from 0.77 to 0.95) show significant variation in sample responses, reflecting different perspectives on each challenge. However, the overall results confirm that the planning and regulatory issues are one of the most prominent barriers that must be addressed to transform popular markets into sustainable environments.
Testing the Study Hypotheses:
First Hypothesis:
Null Hypothesis (H0): There is no statistically significant effect at the significance level ($\propto \leq 0.05$) of environmental awareness programs on the positive application of sustainability concepts within markets.

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Alternative Hypothesis (H1): There is a statistically significant effect of sustainability promotion mechanisms on the implementation of the green market concept in the open-air popular markets of Zliten.
Second Hypothesis:
Null Hypothesis (H0): There is no statistically significant relationship between the presence of environmentally friendly infrastructure and the transformation of traditional markets into green markets.
Alternative Hypothesis (H1): There is a statistically significant relationship between the presence of environmentally friendly infrastructure and the transformation of traditional markets into green markets.
Third Hypothesis:
Null Hypothesis (H0): Environmental and administrative challenges do not constitute a statistically significant obstacle to the realization of the green market concept in Zliten.
Alternative Hypothesis (H1): Environmental and administrative challenges constitute a statistically significant obstacle to the realization of the green market concept in Zliten.
To test the first hypothesis, a simple regression test was used to test the positive impact of environmental awareness programs on the application of sustainability concepts within markets. The results are shown in Table 4.

Table 3. Challenges Facing Sustainability in Open-air Popular Markets.

No.	Point	Average	Relative Percentage (%)	Standard Deviation	Rank
1.	Lack of environmental planning when designing markets.	4.35	87.0%	0.80	1
2.	Poor coordination among regulatory bodies regarding market management.	4.26	85.2%	0.77	3
3.	Lack of financial resources allocated to improve markets.	4.21	84.2%	0.82	4
4.	Low environmental awareness among shop owners and sellers.	2.87	57.4%	0.92	8
5.	Lack of periodic environmental monitoring.	2.92	58.4%	0.95	7
6.	Poor infrastructure, such as drainage and ventilation.	4.12	82.4%	0.82	6
7.	The spread of irresponsible behaviors, such as random littering.	4.20	84.0%	0.85	5
8.	Lack of mechanisms to evaluate the environmental performance of markets.	4.29	85.8%	0.81	2
Mean		3.90	78.1%	0.84	

Based on the regression test results shown in the table, the calculated (F) value of 8.335 exceeds the table value of 3.94 at a significance level of 0.05 and degrees of freedom (1.99), which indicates the presence of statistical significance that supports the model used to explain the relationship between environmental awareness programs and the application of sustainability concepts within Zliten's popular markets. The probability value associated with the test (p = 0.005) is less than the specified significance level, which supports the rejection of the null hypothesis that denies the existence of an effect, and confirms the acceptance of the alternative hypothesis that acknowledges the existence of a positive effect of awareness programs. In addition, the correlation coefficient value (r = 0.280) indicates the presence of a moderate direct relationship between the two variables, while the coefficient of determination (R^2 = 0.078) indicates that environmental awareness programs explain 7.8% of the change in the level of application of sustainability concepts within the markets, which is a statistically significant contribution despite being limited. As for the t-test, it reached 2.887, which confirms the significance of the regression coefficient (β = 0.280). Therefore, it can be said that the statistical model used has a reasonable degree of validity in explaining the relationship under study, which strengthens the recommendation of the necessity of activating environmental awareness programs as one of the effective inputs in promoting sustainability within Zliten's popular markets.
To test the second hypothesis, Pearson's regression test was used to test the relationship between the presence of environmentally friendly infrastructure and the transformation of traditional markets into green markets. The results are shown in Table No. (4).

Table 4. Testing the Positive Impact of Environmental Awareness Programs on the Application of Sustainability Concepts within Zliten's Popular Markets.

Variable	(r)	(R2)	Calculated F	Tabular F	D.f	Sig	t-test	β	Discission
First Hypothesis	0.280	0.78	8.335	3.94	1 98 99	0.005	2.887	0.280	H0 is rejected

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A Pearson correlation coefficient test was conducted to measure the relationship between the dimension of "mechanisms for promoting sustainability in popular markets," which represents an indicator of the presence of environmentally friendly infrastructure, and the dimension of "the extent to which the concept of the green market (sustainability) is achieved," to determine the extent of the mutual influence between the two variables in the context of traditional markets.

The results of Table 5 showed a very strong and positive correlation between the two variables, with the correlation coefficient reaching (r = 0.825), a value indicating a strong correlation. The probability value (Sig. = 0.000), which is much lower than the accepted significance level (α = 0.05), indicates that the relationship is statistically significant. Therefore, we reject the null hypothesis that there is no correlation between environmental infrastructure and the realization of the green market, and we accept the alternative hypothesis that there is a statistically significant positive relationship between them.

This finding reflects that enhancing infrastructure within markets, through the provision of sanitary facilities, designated waste containers, and environmentally responsive designs, plays a fundamental role in improving sustainability and achieving the concept of a green market. It also indicates that the efforts made in this framework directly contribute to the transition towards a sustainable market environment and support the efforts of municipalities and relevant authorities towards green development. This finding reinforces the importance of adopting development policies based on concepts of spatial sustainability and the integration of institutional roles to ensure a balance between environmental, economic, and social aspects within popular markets. Accordingly, these results underscore the importance of adopting a comprehensive vision based on sound environmental planning, institutional integration, and the integrated and systematic activation of environmental infrastructure, as these are essential elements for any effective shift toward green markets in traditional environments.

To test the third hypothesis, a one-sample t-test was used to test the relationship between the presence of environmentally friendly infrastructure and the transformation of traditional markets into green markets.

Table 5. Testing the Relationship between the Presence of Eco-Friendly Infrastructure and the Transformation of Traditional Markets into Green Markets.

Variables		**Mechanisms for enhancing sustainability in popular markets**	**The extent to which the concept of the green market (sustainability) is achieved**
Mechanisms for enhancing sustainability in popular markets	Pearson's regression	1	0.825
	Sig. (2-tailed)	-	0.000
	Sample size	100	100
The extent to which the concept of the green market (sustainability) is achieved	Pearson's regression	0.826	-
	Sig. (2-tailed)	0.000	-
	Sample size	100	100

To test the third hypothesis, which states that "environmental and administrative challenges constitute an obstacle to achieving the concept of the green market in the city of Zliten," a one-sample t-test was used. It was tested whether the overall mean of participants' assessments of the challenges facing achieving sustainability exceeded the neutral (assumed) value on the Likert scale, indicating the presence of actual obstacles. The results of Table 6 indicate that the average assessment of challenges reached (3.90), which is much higher than the assumed average value (3). The value of t = 14.570 was also statistically significant, with a significance level of Sig. = 0.000, indicating that the differences are highly statistically significant at the level of (α ≤ 0.05).

The confidence interval for the mean differences (95%) also shows that the value of the true difference lies between (0.779) and (1.025), which are all positive, which strengthens the validity of the hypothesis that challenges represent an obstacle to achieving green market concepts in the popular markets of Zliten city.

Based on these results, the null hypothesis, which assumes no significant challenges, can be rejected, and the alternative hypothesis, which confirms the existence of actual environmental and administrative obstacles that negatively impact efforts to transition towards sustainable markets, can be accepted. These obstacles include weak infrastructure, lack of environmental planning, lack of institutional coordination, and low community awareness, as shown by the results of the detailed analysis in Table No. (3).

These results underscore the importance of adopting a multi-dimensional strategy that includes enhancing environmental governance, developing infrastructure, and activating environmental monitoring and assessment to overcome challenges and achieve the desired sustainability in traditional markets.

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Table 6. Testing whether Environmental and Administrative Challenges Constitute an Obstacle to the Realization of the Green Market Concept in Zliten.

Dimension	Average Differences	Standard Deviation	t-test	Sig.	95% Confidence Interval of the Differences	
					less	more
Challenges	3.90	0.619	14.570	0.000	0.779	1.025

Conclusions

Based on the results of the analysis and discussion that included the opinions of a diverse sample of stakeholders in the city of Zliten, it can be concluded that achieving sustainability in popular markets faces multifaceted structural and behavioral challenges. The study revealed significant weaknesses in implementing sustainability-enhancing mechanisms and a low level of adoption of the green market concept, along with substantial administrative and planning obstacles. The results showed that the lack of prior environmental planning when designing markets, weak institutional coordination, and a lack of financial resources constitute the most significant structural challenges hindering the transition to sustainable markets. On the behavioral level, low environmental awareness and the prevalence of haphazard waste disposal practices emerge as factors negatively impacting the market environment. Hypothesis tests confirmed a statistically significant positive effect of environmental awareness programs on the implementation of sustainability concepts, and a strong correlation between the presence of environmentally friendly infrastructure and the realization of a green market. The study also demonstrated that environmental and administrative challenges pose a real obstacle to achieving sustainability in Zliten markets. Incorporating environmental planning into the design and development of popular markets: Stakeholders should adopt a strategic vision that integrates environmental sustainability criteria into the early planning stages of establishing or developing markets. This approach should consider the design of adequate sanitation facilities, the provision of green spaces, and effective waste management systems. Encourage active participation of vendors, consumers, and local residents in proposing, implementing, and evaluating sustainability initiatives to ensure effectiveness and long-term sustainability.

Conflict of interest. Nil

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