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Bridging Sustainability Goals and Reality: Inclusivity and Accessibility in USM's SDG Framework
(Merapatkan Jurang Antara Matlamat Kelestarian Dan Realiti: Inklusviti Dan Kebolehcapaian Dalam Kerangka SDG USM)

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ABSTRACT

This case study evaluates the effectiveness of Universiti Sains Malaysia's (USM) sustainable mobility framework in bridging the gap between institutional policy and the daily commuting realities of its community. As the first APEX university in Malaysia, USM has implemented the Low Carbon Campus Blueprint (2019–2025), focusing on SDG 13 (Climate Action). The purpose of this research is to investigate how a transition toward inclusive, low carbon transit can simultaneously reduce carbon footprints and improve safety and accessibility for a diverse population, including students with disabilities. Employing a mixed-methods exploratory sequential design, the study utilises secondary documentary analysis and primary data from a pilot survey (n=30) to measure user satisfaction and behaviour. Main findings reveal a high institutional awareness (96.7%) and strong brand trust (90%) in USM's sustainability leadership. However, a significant "Awareness-Action Gap" exists while 76.67% of respondents utilise climate sensitive shaded walkways, daily bicycle lane usage remains low at 3.33%. The study's significance lies in its proposal of a "Green" Credit System, a circular incentive model that gamifies sustainability to convert awareness into active participation. This research contributes a scalable framework for higher education institutions to transform green branding into a high participation reality through inclusive, human centric design.

Keywords: Sustainable Mobility, Inclusivity and Accessibility, Living Lab, Green Credit System, SDG13

ABSTRAK

Kajian kes ini menilai keberkesanan kerangka mobiliti mampan Universiti Sains Malaysia (USM) dalam merapatkan jurang antara dasar institusi dan realiti perjalanan harian komuniti kampusnya. Sebagai universiti APEX pertama di Malaysia, USM telah melaksanakan Pelan Tindakan Kampus Rendah Karbon (2019–2025) dengan tumpuan kepada SDG 13 (Tindakan Iklim). Tujuan kajian ini adalah untuk meneliti bagaimana peralihan ke arah sistem pengangkutan rendah karbon yang inklusif dapat mengurangkan jejak karbon secara serentak serta meningkatkan keselamatan dan kebolehcapaian bagi populasi yang pelbagai, termasuk pelajar orang kurang upaya (OKU). Kajian ini menggunakan reka bentuk kaedah campuran eksploratori berjujukan, dengan mengaplikasikan analisis dokumentari sekunder dan data primer daripada tinjauan rintis (n=30) bagi mengukur tahap kepuasan dan tingkah laku pengguna. Dapatan utama menunjukkan tahap kesedaran institusi yang tinggi (96.7%) serta kepercayaan jenama yang kukuh (90%) terhadap kepimpinan kelestarian USM. Namun demikian, wujud jurang ketara antara kesedaran dan tindakan, apabila 76.67% responden menggunakan laluan pejalan kaki berbumbung yang sensitif terhadap iklim, tetapi penggunaan harian lorong basikal kekal rendah pada kadar 3.33%. Kepentingan kajian ini terletak pada cadangan Sistem Kredit "Hijau", iaitu model insentif berbentuk kitaran yang menerapkan elemen gamifikasi kelestarian bagi menterjemahkan kesedaran kepada penyertaan aktif. Kajian ini menyumbang satu kerangka berskala yang membolehkan institusi pengajian tinggi menukar penjenamaan hijau kepada realiti penyertaan tinggi melalui reka bentuk inklusif dan berteraskan manusia.

Kata Kunci: Mobiliti Mampan, Inklusiviti Dan Kebolehcapaian, Living Lab, Sistem Kredit Hijau, SDG 13

INTRODUCTION

Universities play a critical role in advancing the Sustainable Development Goals (SDGs) through education, research, and daily campus operations (Leal Filho et al., 2019). Progress toward the SDGs requires clear frameworks, measurable indicators, and systematic evaluation to identify opportunities for improvement (Amaral et al., 2015).

Existing research on sustainable campus mobility often focuses on infrastructure provision or carbon reduction targets. However, less attention has been given to how inclusive design, thermal comfort in tropical climates, and digital mobility systems interact to influence daily behavioural adoption. In particular, the relationship between institutional sustainability branding and actual modal shift among campus users remains underexplored. In other words, a significant research gap exists in understanding the "Awareness Action Gap" within tropical campus environments.

This study addresses this gap by examining whether Universiti Sains Malaysia (USM)'s Low Carbon Campus Blueprint (2019–2025) effectively translates sustainability commitments into inclusive and accessible mobility outcomes. Specifically, the research investigates three dimensions, which are the reduction of low carbon mobility towards private vehicle dependency (SDG 13), equitable accessibility between thermal and physical infrastructure, and the reliability of user towards digital transport systems.

While initiatives for walking and micro mobility have been introduced, their effectiveness is often hindered by tropical weather constraints and infrastructure gaps (Afsar et al., 2015). This case study, "Bridging Sustainability Goals and Reality," examines USM's mobility framework by investigating how a transition toward inclusive, low carbon transit can simultaneously reduce carbon footprints and improve safety outcomes for all students, regardless of their physical ability.

By analysing both policy frameworks and user perceptions, this study evaluates the extent to which sustainable mobility moves beyond institutional aspiration to behavioural reality.

BACKGROUND OF THE STUDY

Universiti Sains Malaysia (USM) is a public research university in Malaysia and the first institution in the ASEAN region to be granted APEX (Accelerated Programme for Excellence) status. The university has been consistently recognised in the Times Higher Education (THE) Impact Rankings, particularly for its contributions to multiple Sustainable Development Goals (SDGs), including SDG 1 (No Poverty), SDG 15 (Life on Land), SDG 16 (Peace, Justice, and Strong Institutions), and SDG 17 (Partnerships for the Goals). USM's institutional vision, *"Transforming Higher Education for a Sustainable Tomorrow,"* reflects its long term commitment to sustainability and its target of achieving carbon neutrality by 2050.

USM operates across three campuses offering programmes in science, engineering, medicine, and related disciplines. The main campus, located on the tropical island of Penang, Malaysia, covers approximately 591.72 acres and accommodates a diverse community of 30,000 students and staff, including individuals with varying physical capabilities. To support its sustainability agenda, USM has implemented the Low Carbon Campus Blueprint (2019–2025), coordinated by several institutional bodies, including the University Sustainability Council (USC), the Centre for Global Sustainability Studies (CGSS), the Campus Wellbeing Secretariat, and the Regional Centre of Expertise (RCE) on Education for Sustainable Development. Within this framework, campus mobility has been identified as a key focus area, with initiatives aimed at promoting low carbon and inclusive transport systems. These initiatives include the introduction of electric buses, bicycle lanes, and selective motor vehicle access restrictions. According to CGSS, the adoption of electric buses was intended to contribute to a reduction in private motor vehicle usage on campus.

Despite the presence of these mobility related initiatives, daily campus activities continue to involve substantial use of private motor vehicles, particularly motorcycles and cars, among students and staff. Even with the 'Blueprint,' studies in Malaysian campuses show a persistent 'culture that encourages driving at every opportunity' due to the perceived speed and flexibility of private transport over shuttle systems (Kaliani Sundram et al., 2021). This high density of private vehicles creates two critical challenges: increased carbon emissions and heightened safety risks, particularly during peak class transitions. In addition, the campus context is shaped by external constraints, including a tropical climate with high temperatures and frequent rainfall, as well as limited spatial capacity. These factors define the complex operational setting in which USM's sustainable mobility initiatives must be evaluated.

ISSUE

USM established the Low Carbon Campus Blueprint (2019–2025) to accelerate the achievement of the Sustainable Development Goals (SDGs). Under the framework of SDG 13 (Climate Action), USM has implemented diverse initiatives, including integrated shuttle services, dedicated bicycle lanes, and extensive shaded walkways. The central focus of this study is the implementation of this blueprint, as it provides a structured roadmap with Key Performance Indicators (KPIs) essential for reaching the university's carbon neutrality targets.

A significant milestone of the Blueprint is the goal to promote sustainable transport by achieving a 100% reduction in private motor vehicle (MV) usage during designated 'MV-Free Days' and expanding shaded pedestrian walkways to cover 50% to 70% of the campus by 2025 (Universiti Sains Malaysia [USM], 2019). Moreover, electric vehicles (EV) such as buses and bicycles were implemented to reduce carbon emissions.

While these initiatives reflect USM's proactive commitment to environmentally responsible mobility, an important opportunity exists to strengthen inclusivity and accessibility. Variations in travel needs among students, staff, persons with disabilities (PWDs), and off campus commuters suggest that sustainability measures must be continuously evaluated to ensure they are universally accessible and user centered (Amaral et al., 2015). Consequently, this study utilises primary feedback from the USM community to evaluate the perceived inclusivity of these systems.

By aligning the Blueprint with the physical and digital infrastructure required for a tropical climate, USM has successfully transitioned from policy to a functional, low carbon ecosystem, serving as a leading regional model for higher education sustainability.

The Implementation of the "Green" Infrastructure

Translating these strategic targets into physical reality, USM has deployed a multimodal technical infrastructure designed specifically for the tropical climate. A key feature is the launching of EV shuttle buses, which offer zero-emission transit across the campus. To enhance system reliability, USM integrated smart mobility tools which is USM Bus Tracker, featuring real time GPS tracking of the shuttle service, allowing commuters to monitor the exact location of the shuttle service and receive accurate Estimated Times of Arrival (ETA). This proves that USM has created a "Living Lab" that effectively bridges the gap between high level sustainability policy and the daily commuting needs of its community. Furthermore, according to the Low Carbon Campus Blueprint, USM aims to achieve 50% to 70% shaded coverage of all pedestrian routes by 2025. This wish comes to reality. By real observation, USM did extended shaded walkways. These structures are technically designed to provide a "thermal buffer," protecting pedestrians from the high solar radiation and heavy tropical rainfall typical of Penang.

By combining physical shading with digital tracking and green propulsion, USM has effectively bridged the gap between high level sustainability policy and the daily commuting needs of its community. This integrated approach not only reduces private motor vehicle (MV) dependency but also positions USM as a regional leader in climate resilient urban planning.

Institutional Commitment to Inclusive Mobility

Beyond environmental goals, USM's mobility framework is deeply rooted in social equity and the support of specialty students. In alignment with the USM Inclusive Education Policy for Marginalized Students 2025, the university has ensured its infrastructure is barrier free to enhance inclusive practice (USM, 2025). As of 2024, USM has established a total of 147 accessible facilities, including 64 dedicated wheelchair lanes and tactile walkways that make the disability students' mobility easier (USM, 2025). By integrating these inclusive features, USM demonstrates that a sustainable campus must be universally accessible, ensuring that the transition to low carbon transport serves all members of the community, regardless of physical ability.

THEORY OF ANALYSIS

This case study is classified as Mixed Methods Research (exploratory sequential design) because it seeks to bridge the gap between high level policy and the real life experience of the campus community. Rather than testing a preexisting hypothesis, this study explores how the technical infrastructure implemented by USM influences the daily mobility of a diverse user base. The pilot study has been taken, focused on a sample of 30 respondents (n=30), which meets the widely recognized threshold in social science research for achieving a normal distribution under the Central Limit Theorem. This sample size is sufficient to identify meaningful trends and provide reliable feedback from the USM community's perception of campus mobility.

Secondary Data Collection

The research began with the collection of secondary data from official university repositories. The main source of refrigeration is The Low Carbon Campus Blueprint (2019-2025), the USM Inclusive Education Policy and the USM Sustainability Portal. While documentary analysis was used to extract Key Performance Indicators (KPIs), such as the target for 70% shaded walkway coverage.

Primary Data Collection

To validate the secondary data, primary data (Table 1) was gathered through direct observation and a targeted pilot survey. For field observation, a technical "walk-through" was conducted to verify the functionality of the USM Bus Tracker and the physical condition of the 64 wheelchair lanes. The primary data was collected using Google Forms. Primary data was exported from a purposive sample of 30 respondents (n=30). This group included USM students from different schools (faculties) to ensure a diverse range of perspectives. For the methodology part, a structured questionnaire using a 5 point Likert Scale was used to measure user satisfaction regarding transport reliability, thermal comfort, and inclusivity. Extent of the current research objectives required a highly specialised set of inquiries that existing scales could not provide. Consequently, an original instrument was designed to align precisely with the operational definitions used in this study.

TABLE 1. Questionnaire

Questions	Indicators	Measurement	Metric	Insights/Outcome/Results
Your role in Universiti Sains Malaysia (USM)	Undergraduate students	-	-	-
	Postgraduate students			
Campus Residency	In campus (hostel)	Transport Reliability	-	-
	Outside campus			
Your primary mode of transport to move within campus	Private car	Transport Reliability/ Thermal Comfort	Utilisation Rate	-
	Motorcycle			
	Shuttle bus/ Rapid Penang			
	Walking			
	Bicycle			
What is your primary reason for choosing the bus, walking or cycling?	Cost saving	Inclusivity	Utilisation Rate	-
	Weather protection			
	Environmental contribution			
	Exercise			
How often do you use the following USM mobility features? [Shaded walkways]	Likert Scale	Transport Reliability	Utilisation Rate	76.67%

How often do you use the following USM mobility features? [USM bus tracker]	Likert Scale	Transport Reliability	Utilisation Rate	53.33%
How often do you use the following USM mobility features? [Bicycle lane]	Likert Scale	Transport Reliability	Utilisation Rate	3.33% - Bicycle lane opportunity
Do you aware that USM has implemented electric bus?	Yes/No	-	EV Bus Awareness	96.70% High visibility of green tech
The shaded walkways makes me able to walk comfortable even during hot/rainy weather	Likert Scale	Thermal Comfort	-	-
The USM bus tracker makes me easier to plan my commute	Likert Scale	Transport Reliability	-	-
The presence of SDG initiatives has reduced my use of private car/ motorcycle	Likert Scale	-	Modal Shift	90.00% SDG initiatives effectively reduce car/motorcycle use.
I am proud to share to everyone that USM is an SDG leading university	Likert Scale	-	Brand Perception	90.00% Strong community trust in USM's sustainability leadership.

TABLE 2. Implications of the USM "Living Lab" Model

Metric	Result	Strategic Insights
EV Bus Awareness	96.70%	High visibility of green tech
Modal Shift	90.00%	SDG initiatives effectively reduce car/motorcycle use.
Brand Perception	90.00%	Strong community trust in USM's sustainability leadership.
Utilisation Rate (Daily)	76.67% uses shaded walkways 53.33% uses USM bus tracker 3.33% uses bicycle lane	The bicycle lane opportunity

RESEARCH IMPLICATION AND RECOMMENDATION

Research Implication

The result from the google form carries significant implications for the USM Living Lab model in the future. A successful modal shift has been confirmed when 90% of the respondent's credit SDG initiatives for reducing their private vehicle use, which indirectly proves that infrastructure influences student behaviour.

From a social equity perspective, USM's "Green" transition is perceived as both inclusive and economically beneficial to the student body. By executing a campus wide fleet of shuttle and electric buses, USM effectively reduces mobility barriers

for students who do not own private vehicles, a demographic that includes international students, those from lower-income backgrounds, and specialty students. The 96.7% awareness rate of EV buses and the heavy utilisation of shaded walkways (23 out of 30 respondents) serve as empirical proof that these initiatives are not just environmental "green washing" but essential social services. Consequently, USM's infrastructure ensures that the transition to a low carbon campus does not marginalize students based on their financial or physical status, but instead provides universal access to the university's academic and social life.

The contrast between usage of shaded walkways (76.67%) and usage of bicycle lanes (3.33%) shows that sustainability policies that focus only on active transport such as cycling or walking without shading are likely to face low adoption rates. Despite the data indirectly showing students awareness towards green facilities, however awareness does not equal behaviour change. A massive gap between Awareness (96.7%) and Active Participation (3.33%) implies that "Education and Branding" have reached their limit. The university has successfully convinced students that being green is good (Brand Perception: 90%), but it has not yet made being green convenient or rewarding enough to change physical habits. The research suggests a shift from information-based strategies to incentive-based strategies is required.

Regression Analysis

As part of this case study, a regression analysis was conducted to examine the relationship between real time tracker usage and perceived ease of commuting within the campus transport system. According to Table 3, a positive and statistically significant effect of tracker usage on commuting ease ($\beta = 0.294$, $p < 0.05$), suggesting that access to real time information enhances transport reliability by reducing uncertainty and improving predictability. This evidence highlights the importance of digital mobility solutions as an effective and scalable strategy to improve transport reliability, particularly in large institutional settings such as university campuses. By reducing uncertainty in commuting, the bus tracker strengthens confidence in low carbon public transport alternatives, thereby directly supporting SDG 13 (Climate Action) through by facilitating a shift away from private vehicle dependency.

When residency location is introduced as a control variable (Table 4), tracker usage remains positively and statistically significant ($\beta = 0.304$, $p < 0.05$), while residency itself shows no significant effect on commuting ease. This indicates that real time tracking improves transport reliability across different residential contexts, reducing uncertainty for users irrespective of location. The findings highlight digital information systems as an inclusive and scalable solution to enhance commuting experiences.

According to Table 5, the regression analysis shows that thermal comfort while walking is significantly affected by the choice of primary transport mode ($\beta = -0.571$, $p<0.05$), whereas walking frequency has no significant effect ($p=0.433$). This indicates that active transport users (walkers, cyclists) experience greater thermal discomfort compared to private vehicle users, because they depend on pedestrian infrastructure during campus mobility. In tropical environments, thermal comfort becomes a structural determinant of sustainable transport adoption. The findings highlight that achieving SDG 13 requires climate sensitive pedestrian design, as discomfort during walking segments may discourage low carbon transport use. From a campus sustainability perspective, these findings highlight that thermal comfort is a critical enabling factor for sustainable mobility, where all campus transport modes involve walking segments, and discomfort during these segments can discourage the use of low carbon modes such as walking, cycling, or public transport. Therefore, thermally comfortable pedestrian environments are essential to promote inclusive, climate adaptive, and sustainable transport on campus.

According to Table 6, the result confirms the inclusive design of USM's infrastructure. Linear regression testing demographic predictors of thermal comfort revealed no statistically significant differences based on campus residency status ($\beta=0.133$, $p>0.05$) or economic motivation ($\beta=0.217$, $p>0.05$), with an insignificant interaction effect ($p=0.565$). The absence of statistically significant demographic disparities suggests that shaded pedestrian infrastructure provides relatively equitable benefits across residency and economic groups. This supports the argument that universal design principles are essential in sustainable campus planning. The consistently high average comfort rating of 4.87/5, with minimal variance explained by demographic factors ($R^2=0.082$), confirms that thermal comfort is universally accessible, neither favouring on campus residents over commuters nor economically advantaged students over those constrained by cost. This pattern aligns with SDG 10 (Reduced Inequalities) that emphasis on reducing inequalities through infrastructure that serves diverse populations equally.

TABLE 3. Regression Analysis on Transport Reliability

Dependent Variable: EASIERCOMMUTE
Method: Least Squares
Date: 12/30/25 Time: 13:48
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.328063	0.443644	7.501658	0.0000
TRACKERUSE	0.294466	0.106972	2.752743	0.0103

R-squared	0.212988	Mean dependent var	4.466667
Adjusted R-squared	0.184880	S.D. dependent var	0.973204
S.E. of regression	0.878648	Akaike info criterion	2.643475
Sum squared resid	21.61660	Schwarz criterion	2.736888
Log likelihood	-37.65212	Hannan-Quinn criter.	2.673358
F-statistic	7.577595	Durbin-Watson stat	2.626651
Prob(F-statistic)	0.010255		

TABLE 4. Regression Analysis on Transport Reliability (Residency Included)

Dependent Variable: EASIERCOMMUTE
Method: Least Squares
Date: 12/30/25 Time: 14:09
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.517588	0.712647	4.935950	0.0000
TRACKERUSE	0.304020	0.112202	2.709573	0.0116
RESIDENCY	-0.130653	0.380496	-0.343376	0.7340

R-squared	0.216410	Mean dependent var	4.466667
Adjusted R-squared	0.158366	S.D. dependent var	0.973204
S.E. of regression	0.892824	Akaike info criterion	2.705784
Sum squared resid	21.52261	Schwarz criterion	2.845904
Log likelihood	-37.58676	Hannan-Quinn criter.	2.750609
F-statistic	3.728391	Durbin-Watson stat	2.608870
Prob(F-statistic)	0.037171		

TABLE 5. Regression Analysis on Thermal Comfort

Dependent Variable: COMFORTWALK
Method: Least Squares
Date: 12/30/25 Time: 14:28
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.117647	0.556727	9.192383	0.0000
WALKUSE	0.088235	0.110903	0.795610	0.4332
PRIMEUSE	-0.570588	0.190546	-2.994489	0.0058

R-squared	0.256456	Mean dependent var	4.866667
Adjusted R-squared	0.201379	S.D. dependent var	0.434172
S.E. of regression	0.388001	Akaike info criterion	1.039021
Sum squared resid	4.064706	Schwarz criterion	1.179141
Log likelihood	-12.58532	Hannan-Quinn criter.	1.083847
F-statistic	4.656295	Durbin-Watson stat	1.768085
Prob(F-statistic)	0.018308		

TABLE 6. Regression Analysis on Inclusivity

Dependent Variable: COMFORTWALK
Method: Least Squares
Date: 12/31/25 Time: 00:25
Sample: 1 30
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.866667	0.978934	4.971394	0.0000
RESIDENCY	0.133333	0.549806	0.242510	0.8103
ECONOMICNEED	0.216667	0.668579	0.324070	0.7485
RESIDENCY*ECONOMICNE...	-0.216667	0.371860	-0.582656	0.5651

R-squared	0.082317	Mean dependent var	4.866667
Adjusted R-squared	-0.023569	S.D. dependent var	0.434172
S.E. of regression	0.439259	Akaike info criterion	1.316112
Sum squared resid	5.016667	Schwarz criterion	1.502938
Log likelihood	-15.74168	Hannan-Quinn criter.	1.375879
F-statistic	0.777409	Durbin-Watson stat	1.954153
Prob(F-statistic)	0.517239		

Recommendations: The “Green” Credit System

To bridge the gap between existing infrastructure and student adoption, USM should implement a "Green” Credit System designed as a socioeconomic win-win for the campus community. By integrating the bike share program into the official university digital ecosystem, students can earn "Green Points" for every kilometres cycled, directly addressing the cost saving motivation identified in the primary data. This creates a dual benefit loop, where students receive tangible rewards such as discounts at campus cafeterias or extracurricular merit points, while the university achieves a measurable increase in active mobility and a decrease in carbon emissions. This strategy transforms the bicycle from a neglected asset into a high value tool for student welfare, effectively "gamifying" sustainability and ensuring that the transition to a low carbon campus is both economically accessible and personally rewarding for every student.

By transforming sustainable mobility from a policy requirement into an economically rewarding student experience, USM is redefining the “Living Lab” by proving that when we bridge the gap between green infrastructure and human behaviour, we create a campus that is as socially inclusive as it is environmentally resilient.

CONCLUSION

This study set out to evaluate whether USM’s Low Carbon Campus Blueprint effectively translates sustainability policy into inclusive and behaviourally adopted mobility practices. Specifically, the research examined whether sustainable mobility initiatives reduce private vehicle dependency (SDG 13), whether physical infrastructure promotes equitable accessibility and thermal comfort (SDG 10), and whether digital transport systems enhance perceived commuting reliability.

The findings confirm that while institutional awareness (96.7%) and positive brand perception (90%) are high, behavioural adoption remains uneven. Evidence suggests that shaded pedestrian infrastructure significantly supports climate adaptive mobility, while digital tools such as the USM Bus Tracker enhance perceived transport reliability across user groups. However, bicycle lane utilisation remains low (3.33%), highlighting the persistence of the awareness action gap.

Research Contributions

These results demonstrate that infrastructure provision alone is insufficient to ensure sustained modal shift. Instead, sustainable campus mobility requires the integration of climate sensitive design, digital reliability systems, and incentive based behavioural mechanisms. Hence, the proposed Green Credit System operationalises this integration, offering a scalable model for higher education institutions seeking to align sustainability commitments with measurable participation outcomes.

The primary contribution of this study is the development of a "Win-Win" Circular Incentive Model. By proposing a Green Credit System, this research offers a solution to bicycle utilisation. It bridges the gap between the university’s carbon reduction KPIs and the student’s primary motivation of cost saving. This study contributes to a scalable framework for other higher education institutions, proving that "Active Mobility" can be achieved by gamifying sustainability and rewarding users with tangible benefits like cafeteria discounts and academic merit points.

Ultimately, this case study confirms that bridging sustainability goals and daily realities requires not only environmental ambition, but structured behavioural design grounded in inclusivity and accessibility principles.

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