

The leisure attitude, sportive leisure management and SDGs: Evidence from Chaoyang University of Technology, Taiwan

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ABSTRACT

This study examined university students' attitudes about leisure, sport, leisure management with sport, sustainability, the balanced scorecard, and safety climate in relation to the Sustainable Development Goals (SDGs), and their perceptions of how their professional practices might contribute to their achievement. Data were collected from 280 students at Chaoyang University of Technology in Taiwan (67% were male and 33% were female). The structural equation modelling (SEM) method was also used to compare the correlations between the study variables. The measurement model demonstrated acceptable reliability and convergent validity. Leisure attitudes were positively associated with the environmental ($\beta = 0.896$, $p < 0.001$), financial ($\beta = 0.885$, $p < 0.001$), and social perspectives ($\beta = 0.782$, $p < 0.001$). Significant indirect effects of leisure attitudes on SDG achievement were reported through the environmental ($\beta = 0.759$), financial ($\beta = 0.750$), and social perspectives ($\beta = 0.662$; all $p < 0.001$). The financial perspective was negatively associated with SDG achievement ($\beta = -0.210$, $p = 0.004$), whereas the social perspective showed a positive association ($\beta = 0.642$, $p < 0.001$). The model explained 66.6% of the variance in SDG achievement ($R^2 = 0.666$). By integrating sportive leisure management within the sustainability balanced scorecard, this data-driven framework enables university students to identify environmental, financial, and social perspectives, fostering greater awareness of health and sustainability while empowering institutions to make wise strategic decisions.

KEYWORDS

Sport Leisure Attitudes; Sustainability Balanced Scorecard; Safety Climate; Sportive Management; Sustainable Development Goals (SDGs)

1. INTRODUCTION

The seventeen Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development have served as the cornerstone for the creation of policies and the application of tactics to address social, economic, and environmental issues on a worldwide basis since their inception in 2015 (Saha et al., 2024). Higher education institutions, as change agents, play a crucial role in training future leaders who will be essential to achieving these objectives (Zhou et al., 2024). The numerous SDGs must be carefully incorporated into this role's operational strategy and academic programs. It is crucial for the university community to acknowledge the significance of tackling pressing issues such as poverty alleviation, inequality eradication, resource and environmental respect, responsible consumerism, and education promotion. According to Oltra-Badenes et al. (2023), education in this context goes beyond simple comprehension and is in line with the larger goal of giving future graduates the means to have a constructive influence on the communities they serve. This entails giving precise instructions for research and teaching at universities in order to produce experts committed to furthering the SDGs (Masudin et al., 2024).

When used effectively and appropriately, leisure or free time enables people to be alone, live freely, and discover who they are. Effective use of leisure time allows people to express themselves, grow creatively, experience new things, enhance their social surroundings, and become more productive (Cachero et al., 2023). Development and education lead to the prudent use of leisure time (Zhou et al., 2024). In order to succeed, it is crucial to have a mindset on how to use free time. Positive or negative responses or patterns resulting from the accumulation of experiences, emotions, memories, and information on leisure and leisure activities are referred to as leisure attitudes (Zhang et al., 2022). Around the world, people's free time is always evolving and changing. It is clear from analysing a person's behavioural tendencies that lifestyle, education, attitudes, and thoughts are closely related (Cheng et al., 2024). Someone's sentiments, thoughts, and attitudes regarding leisure and recreation activities are all included in their leisure attitude, which is defined differently than the concept of leisure (Tükel, 2020). By observing, learning, and witnessing, people mould their attitudes about leisure. Consequently, either good or negative leisure habits emerge (Rona & Erol, 2020). Its structure is dynamic, meaning that they are always changing. These beliefs seem to follow the evolution of personal traits (Ludvík et al., 2020). According to Belo et al. (2020), there are three types of leisure attitudes: cognitive, affective, and behavioral.

In this regard, managing leisure time with sports means making the best use of free time to perform sports activities that help improve physical and mental health, increase vitality and

cheerfulness, and prevent social harm (Berg et al., 2015; Jetzke & Mutz, 2020). This management includes planning, choosing appropriate activities, and creating a balance between sports activities and other aspects of life (Jetzke & Mutz, 2020).

For recreational advantages to be realized, safety is essential (Cheng et al., 2024). Due to the risks in the underwater environment, diving, which is quite popular all over the world, can result in mishaps that cause injuries or even death. Insufficient gas, entrapment, and equipment issues are common causes of the sequence of events that resulted in the fatalities of scuba divers (Amoadu et al., 2023). It should come as no surprise that this comparatively high accident rate tends to raise concerns about recreational safety among divers (Masudin et al., 2024). Safety considerations also have a significant impact on the travel decisions of all kinds of tourists, including their willingness to visit particular locations and engage in particular activities. Therefore, it can be said that having a safe recreational space is essential for leisure activities.

The low birth rate in recent years has also had a significant impact on Taiwan, which is why this study was conducted. Taiwan's birth rate fell to a record low of only about 130,000 in 2022 and 2023, according to Grande and Haynes (2024); Zhou et al. (2024). Fewer students are enrolling in universities each year as a result of this kind of population shift. As a result, poor enrolment, sustainable operations, and survival crises are issues facing universities across the country. By 2028, there would only be 164,000 university freshmen, down from 270,000 in 2015, according to Masudin et al. (2024). The number of freshmen at universities will drop by almost 100,000 in around ten years (Ministry of Education, 2024). Both the recruitment and survival of leisure management departments are impacted by the low birth rate. Personnel for the tourism, hotel, food service, sports, and leisure sectors are specifically developed by leisure management departments. A more comprehensive performance appraisal system should be in place to identify the critical performance indicators in order to increase the survival rate of leisure management departments (Cheng et al., 2024).

As a result, we use the most popular business instrument, the Balanced Scorecard (BSC), to manage leisure management departments. The department's strengths can be prioritized based on the examination of these indicators, which will promote its long-term growth (Grande & Haynes, 2024). The four general views of the Balanced Scorecard financial, customer, internal processes, and learning and growth are the foundation of this study, which aims to thoroughly evaluate the management efficacy of the Leisure Management Department and foster its advancement and potential for future expansion. In order to better suit the researchers have started creating performance measuring systems based on the balanced scorecard (BSC) idea (Fatima & Elbanna, 2023; Mio et al., 2022; Tan & Sitikarn, 2019). Although hotels can benefit financially from BSC

implementation (Giannoukou & Beneki, 2018), there is a research vacuum because the standard BSC ignores important stakeholders like society and the environment. Different sustainability BSC structures that take into account these underutilized stakeholders in different ways were developed by Zhang et al. (2022).

According to signaling theory, we suggest that when recreationalists are completely aware of the SBC signals at the dive site, the leisure attitude aspects of diving will be maximized (Connelly et al., 2011). Therefore, the sustainability balanced scorecard plays a mediating function in the relationship between leisure attitude and reaching SGDs from (a) an environmental perspective, (b) a financial perspective, and (c) a social perspective. As a result, we anticipate that the safety climate will play a moderating role in the sustainability balanced scorecard, which includes (a) environmental, (b) financial, and (c) social perspectives, as well as achieving SGDs. In particular, we postulate that the relationships between BSC (the mediator) and leisure attitude (the independent variable) influence safety climate (the moderator), which influences the achieving of SGDs (the dependent variable).

1.1. Literature Review

Signaling Theory

Signaling theory (Connelly et al., 2011) modelled the signaling role of education using the labour market. In order to communicate their quality and lessen information asymmetries, the candidates therefore acquire education. Since less qualified applicants wouldn't be able to handle the demands of college, this is probably a trustworthy indication. Because Spence downplays the importance of education in raising worker productivity and instead emphasises education as a way to convey otherwise invisible qualities of a job candidate, his model runs counter to theory. It was founded on management, psychological, and anthropological aspects (Giannoukou & Beneki, 2018). In our daily lives, we are surrounded with signals. Individuals communicate through their speech, body language, and interactions. Effective communication is hampered by the frequent occurrence of information imbalance during the communication process. According to (Tan & Sitikarn, 2019), the party sending the signals is always initially better informed than the party receiving them; nevertheless, successful signal transmission lessens this initial information imbalance. A less knowledgeable party, such as the recreationists in this study, may be given safety information by an informed party, or one with greater knowledge, like the recreation operators in this study (Lee et al., 2019). The less knowledgeable side receives safety signals, which improves communication and reduces information asymmetry.

Crucially, the behaviour of the receivers is also impacted by active signal hunting (Afroz & Ilham, 2020). In order to provide diving operators with techniques to overcome their fear of diving during the activity, we turn to signaling theory (Connelly et al., 2011). This is due to signals' potential to lower diver uncertainty and increase diving activity participation as perceivable markers of otherwise concealed attributes that receivers may interpret and act upon. It should be noted that we use the term "signal" to refer to those stimuli that the dive operators want to use for deliberate communication. This refers to the service provider's intentional dissemination of positive information in an attempt to communicate desired, undetectable qualities. Financial perspective to illustrate these broad correlations. For example, they have proposed that dividends (Zhang et al., 2022) and corporate debt are indicators of firm quality. These models state that only superior companies are able to pay dividends and interest over an extended period of time. Low-quality businesses, on the other hand, won't be able to afford such payments. As a result, these signals affect how outside observers (such lenders and investors) view the quality of the company. Many of the fundamental ideas and constructions of signaling theory emerged from the literatures on environmental perspective, financial perspective and social perspective (Cachero et al., 2023; Lee et al., 2019). Safety research is increasingly using signaling theory (Luo, 2020). In the context of recreational diving activities, the current research conceptualizes BSC as a safety signal and poses the following question: How do operators transmit safety signals to recreational divers, and how do divers receive them? More precisely, we looked into the recipients' level of acceptance of it as a safety climate in addition to the relationship between the sustainability balanced scorecard, leisure attitude, and SGDs.

Leisure Attitude and Sustainability Balanced Scorecard

According to Belo et al. (2020), leisure activities was positively correlated with leisure attitude and SGDs. Additionally, a positive attitude towards leisure might boost involvement in leisure activities, which in turn leads to an increase in leisure pleasure (Ludvík et al., 2020). Rona and Erol (2020), which showed that people's happiness with leisure activities is correlated with their favourable attitudes towards them. Three components make up leisure attitude, according to Tükel (2020): cognitive, affective, and behavioural components. Engaging in recreational activities has long been a research topic, and it reflects the body of knowledge that has grown steadily over time (Zhang et al., 2022). The benefits of engaging in leisure activities have received particular attention in recent years (Ayhan & Özel, 2020; Belo et al., 2020; Ludvík et al., 2020; Rona & Erol, 2020). Currently, attitudes are defined in the literature as a concept that originates from people's experiences and as having the qualification of motivating people to take action (Cheng et al., 2024). A new structure is

created by events that combine, interact, and link, and it can change as a result of fresh and unique learning opportunities (Ayhan & Özel, 2020). Furthermore, it has been discovered that attitudes regarding leisure activities can be among the key factors influencing inclinations or desire to engage in leisure activities (Zhou et al., 2024). Therefore, our attitude towards knowledge and beliefs, emotions, and leisure-related behaviour patterns influence our propensity or predisposition to engage in leisure activities, claim Afroz and Ilham (2020). Because it allows for a focus on a variety of factors, including human resources, the intangibility of assets, and inconsistent service delivery, the sustainability balanced scorecard idea is a good fit for educational institutions (Mio et al., 2022). Additionally, the idea of a sustainability balanced scorecard is not new; educational administration has successfully applied it despite certain difficulties (Cachero et al., 2023). According to Fatima and Elbanna (2023), a leisure attitude is now characterised as either good or negative reactions or inclinations whose thoughts, feelings, and behaviours towards leisure and leisure activities are established by balancing experience, emotions, memories, and information. Thus, the focus of leisure studies is on behavioural, affective, and cognitive attitudes towards leisure (Oltra-Badenes et al., 2023). Additionally, studying attitudes towards leisure gives insight into how people view their leisure time, how leisure activities impact people's lives, and how much they participate in these activities (Zhou et al., 2024). As a result, the leisure attitude influences on sustainability balanced scorecard as (a) environmental perspective, (b) financial perspective and (c) social perspective.

H1: *There is significant relationship between leisure attitude and sustainability balanced scorecard as (a) environmental perspective, (b) financial perspective and (c) social perspective.*

Sustainability Balanced Scorecard and achieving SGDs

More and more perspectives are being added to sustainability balanced scorecards to enhance their performance as SGDs. For example, Zhou et al. (2024) thought about including SGDs as an extra viewpoint for the sustainability balanced scorecard, but ultimately expanded on the current viewpoints to include the SGDs approach in an integrated scorecard. Another adjusted sustainability balanced scorecard that takes social, environmental, and economic concerns into account (Masudin et al., 2024). Saha et al. (2024) expand on the idea of a sustainability balanced scorecard since it is consistent with the triple bottom line method of SGD conceptualization, given the concurrent inclusion of society and the environment in the suggested scorecards. Three dimensions were used by Oltra-Badenes et al. (2023) to develop a typology of sustainability balanced scorecard architectures: 1) viewpoints on the environment and 2) viewpoints on finances 3) social viewpoint. Additionally, depending on the institution's sustainability strategy, metrics for sustainability can be added as an

add-on perspective for dismissive sustainability tactics or fully integrated into standard sustainability balanced scorecard and three perspectives for accommodating sustainability strategies (Fatima & Elbanna, 2023; Yuan et al., 2021). Universities are unquestionably one of the major players in promoting the accomplishment of the SDGs, given the ability of education to change society. Numerous experiences have been developed in order to incorporate the SDGs into teaching activities in higher education (Chien, 2022). Securing a sustainable, peaceful, prosperous, and equitable life on Earth for present and future generations is the goal of the SDGs (Cachero et al., 2023). In order to achieve sustainable development, all nations that have ratified the 2030 Agenda, along with their people and organisations, must acknowledge their obligations and act quickly (Yuan et al., 2022). Students' understanding of sustainable development and the SDGs must be raised in order to achieve the goals. One way to achieve the SDGs is by incorporating ESD into upper secondary school curricula and textbooks. This will guarantee that students acquire not only fundamental skills but also transferable competencies Afroz and Ilham (2020), like advocacy, problem-solving, critical thinking, and conflict resolution, which will help them grow up to be responsible global citizens. In 2003, the government established sustainable development as an official discourse by proposing the Scientific Outlook on Development as its national development policy (Cachero et al., 2023; Mio et al., 2022; Yuan et al., 2022). The emphasis on ESD has been seen as a crucial component in achieving sustainability, in line with the national policy (Saha et al., 2024; Zhou et al., 2024). As a result, the sustainability balanced scorecard as (a) environmental perspective, (b) financial perspective and (c) social perspective link and promote sustainable development.

H2: *There is significant relationship between sustainability balanced scorecard as (a) environmental perspective, (b) financial perspective and (c) social perspective with achieving SGDs.*

The Mediating role of Sustainability Balanced Scorecard

A promising framework for monitoring, controlling, and disclosing the outcomes of reaching SGDs with the encouragement of a leisure mindset is the sustainability balanced scorecard (Tan & Sitikarn, 2019). The sustainability balanced scorecard framework was introduced in order to add measures pertaining to other significant corporate aspects, such as customers, internal processes, and learning and growth, to the traditional financial measures, taking into account a wide range of current corporate challenges. With sustainability and eco-efficiency as the primary strategic goals, Mio et al. (2022) introduced a cascading sustainability balanced scorecard that includes a set of factors regarded as references in accomplishing SGDs. In their subsequent work, Fatima and Elbanna (2023) modified the sustainability balanced scorecard methodology by formulating and implementing it at the

operations plan level, thereby integrating sustainable indicators into a firm's business strategy. The other three viewpoints include non-financial indicators that allow businesses to track their progress in building the competencies and intangible assets necessary for future growth and financial performance, while financial metrics provide the outcomes of earlier activities (Giannoukou & Beneki, 2018; Grande & Haynes, 2024). In order to provide the data required for feed-forward control, the sustainability balanced scorecard is an open system that takes into account the interests of various stakeholders and strikes a balance between immediate and long-term issues as well as leading and lagging indicators. In order to ensure that advancements in one area do not come at the expense of another, it also addresses sub-optimisation by requiring senior management to assess all the important measures collectively (Mio et al., 2022). Three components of leisure attitudes have been identified in the literature: behavioural, affective, and cognitive (Ludvík et al., 2020). Tükel (2020) described these factors: The broad information and opinions people have regarding leisure activities are included in the cognitive component of attitudes towards leisure. Additionally, it conveys the connection between one's career, health, happiness, and leisure, as well as understanding of its advantages for the individual. The assessment of experiences gained from leisure activities is referred to as the affective element (Zhang et al., 2022). It conveys whether or not one enjoys the activity or the feelings experienced while engaging in it. Conversely, the behavioural factor represents the frequency of participation in previous or present leisure activities as well as an individual's behavioural preferences. Measuring attitudes towards leisure is crucial in this context because it adds to the body of knowledge regarding socio-cognitive processes linked to the advantages of leisure activities (Cheng et al., 2024). The sustainability balanced scorecard is a strategic control and performance monitoring tool that converts a company's strategic objectives into a list of logical steps and doable tasks. It is a comprehensive framework that gives equal weight to financial and non-financial metrics, lagging and leading indicators, and tangible and intangible assets (Zhou et al., 2024). Furthermore, in order to effectively incorporate corporate sustainability strategies into core management systems, Belo et al. (2020) changed the sustainability balanced scorecard. They used a pluralistic stakeholder management system to demonstrate the structural changes required to address the sustainability balanced scorecard's conceptual flaws. Administrators can better comprehend how their organisations operate by using strategy maps to analyse causality in sustainability balanced scorecards (Fatima & Elbanna, 2023; Grande & Haynes, 2024). In order to establish the cause and effect chains of the sustainability balanced scorecard (a) environmental perspective, (b) financial perspective, (c) social perspective views, as mediating role among leisure attitude and achieving SGDs.

H3: *There is significant mediating role of sustainability balanced scorecard as (a) environmental perspective, (b) financial perspective, (c) social perspective relationship between leisure attitude and achieving SGDs.*

The Moderating role of Safety Climate

The common understanding of organisational safety-related values, beliefs, and practices is known as the safety atmosphere (Masudin et al., 2024). In educational institutions, safety in research and academic labs is of utmost importance. This problem is currently getting a lot of attention, which may be because of the numerous tragic mishaps that have occurred in academic institutions' laboratories worldwide. Universities have learnt their lesson from these incidents (Kalthé et al., 2021). The Balanced Scorecard approach comprises four perspectives: internal processes, learning and growth, customers, and finances. Based on the literature on the Balanced Scorecard, researchers have categorized different strategic topics under each of the four viewpoints (Giannoukou & Beneki, 2018; Grande & Haynes, 2024). Three strategy topics were updated under the financial perspective: aggressively pursuing funds from several industries, efficiently overseeing management budgets, and improving the effectiveness of money utilisation (Amoadu et al., 2023). Under the customer viewpoint, three strategic themes were reformulated: boosting student satisfaction with the department, building the department's reputation, fostering positive faculty-student connections, and offering a variety of learning opportunities with unique services (Cheng et al., 2024). Three strategy themes—creating unique courses, constructing resources (like assets and equipment), improving the composition of faculty (like foreign academics and exchanges), and integrating with unique industries—were changed in the internal process view. Three strategic topics were revised under the learning and growth perspective: thorough instruction and training, proper departmental vision planning, establishing effective channels of communication with the public and media, and enhancing internal self-worth. According to Luo (2020), safety climate emphasises the importance that educational institution directors place on prevention awareness and should motivate instructors and students to work towards the stability and safety of educational institutions. In this regard, He et al. (2020) noted that employees emulate the behaviour they observe in directors. Additionally, this favourable attitude spreads to other institution members when they stress the significance of implementing preventive measures, such as organising campaigns on safety training. In recent years, there have been several ways to assess the development trends of higher education, including forecasts or analyses based on shifts in the population and human capital. A number of studies have looked at university social responsibility as well as the different international rankings and

competitions brought about by globalization (Amoadu et al., 2023; Cheng et al., 2024; Syed-Yahya et al., 2022). Concurrently, there is a movement to investigate how to reflect and how to properly and methodically approach university governance, on-campus teaching, and learning with sustainability values at their center (Syed-Yahya et al., 2022). Because of Taiwan's special international status, policymakers there rarely consider echoing the propaganda of any international organisation while making choices. Teachers and students at every level literally concentrate more on classroom knowledge than on gaining access to international involvement because of the low degree of global engagement. Suggestions for raising awareness, such as incorporating SDG themes into extracurricular activities, were made after an analysis of students' knowledge and behaviour regarding the SDGs. Furthermore, Amoadu et al. (2023) found that even environmental programs exhibit gaps in terms of sustainability and the environment, so they advised higher education institutions to include SDG concepts in the university curriculum in addition to concentrating on SGD learning objectives. However, safety climate in educational institutions play moderate the role among sustainability balanced scorecard as (a) environmental perspective, (b) financial perspective and (c) social perspective and achieving sustainable development goals.

H4: *There is significant moderating role of safety climate among sustainability balanced scorecard as (a) environmental perspective, (b) financial perspective, (c) social perspective and achieving SGDs.*

The given hypotheses form the basis of the first research model, which is displayed in Figure 1. As observable variables, leisure attitude and sustainability balanced scorecard are represented in this model as (a) environmental perspective, (b) financial perspective, and (c) social perspective, as well as achieving SGDs. It is also possible to analyse the moderating effects of the safety climate on the sustainability balanced scorecard and attaining SGDs.

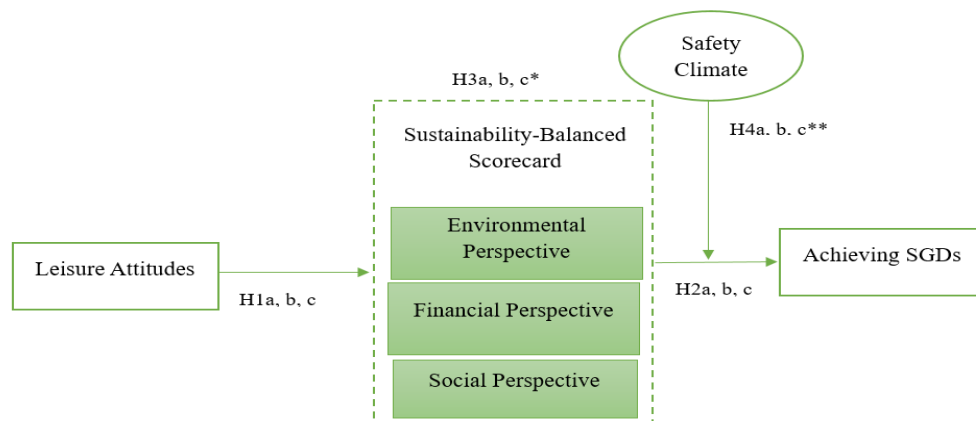


Figure 1. Research Model

Leisure Management with Sport

Some of the documented aspects of sportive management of youth leisure are listed below:

Physical health: Regular exercise in sportive management of leisure helps strengthen muscles, increase flexibility, improve cardiovascular function, control weight, and prevent chronic diseases (Zhang, 2023).

Mental health: Exercise reduces stress, anxiety, and depression, increases self-confidence, and improves mood (Huang et al., 2023).

Social skills: Participating in Group/team sports activities helps to strengthen communication skills, teamwork and a spirit of cooperation (Deng, 2024).

Improving the quality of life: Proper management of leisure time with exercise increases life satisfaction, creates a sense of purpose and improves performance in other areas (Tokay Argan & Mersin, 2021).

How can we manage our leisure time with exercise?

Planning: Determine specific times for exercise during the week and choose sports activities that are appropriate to your ability and interest (Çerez et al., 2021).

Diversity: Performing a variety of sports activities to prevent fatigue and increase motivation.

Balance: Balancing sports activities and other aspects of life, such as work, education, social relationships, and rest.

If necessary, consult with sports professionals to choose the right plans and avoid possible injuries. The most important thing in managing leisure time with sports is to continue doing sports activities and create an active lifestyle (Mutz et al., 2021).

2. METHODS

2.1. Participants

Adapted from existing research, the sustainability balanced scorecard is still in its infancy at Chaoyang University of Technology Taiwan (Saha et al., 2024; Zhou et al., 2024). Similar to the first demographic stage described, we created a perceptual sustainability balanced scorecard and solicited input from academics and administrative specialists. The second phase involved gathering the primary survey research data and conducting an empirical evaluation of the measurement and structural model using the partial least squares structural equation modelling (PLS-SEM) approach.

For this study, a sample of Chaoyang University of Technology Taiwan students was selected. As a result, information was gathered from students actively involved in SDG activities,

leisure management, and leisure attitude. A qualified market researcher produced and approached a sample frame of 310 students. A high response rate of almost 90% was achieved by using the 280 useable responses from the 310 students who were the target of the survey. The final sample's characteristics are listed in greater detail in Table 1. Under the researchers' guidance, a skilled and knowledgeable group of experts gathered data from respondents. Respondents had to be (1) enrolled at Taiwan's Chaoyang University of Technology and (2) had awareness of their university's SGDs. This validated the respondents' relevance and guaranteed the legitimacy of the data collection's content (Hair et al., 2024). The questionnaire, which is frequently used for data collecting in various institutions, was created and distributed in English.

Table 1. Respondents' demographic characteristics

Characteristics	Frequencies %
Gender	
Male	67%
Female	33%
Educational Level	
Bachelor's Degree	43%
Master's Degree	28%
PhD	12%
Diploma	17%
Departments	
Social Sciences	38%
Arts	22%
Agriculture	19%
Computer Sciences	21%

2.2. Instruments and Procedures

Scale Selection and Development

Purposive sampling, which ensured the selection of pertinent individuals whose consultation guided the research with justified changes, was employed to ensure high-quality input. In addition to the aforementioned academic specialists, executives and university administration in Chaoyang, Taiwan, were contacted to offer feedback on the suggested scale by responding to the survey and offering ideas for additional development. As will be covered next, a number of changes were made to the suggested measuring indicators in light of the input we got from professionals and academics to better fit the University of Chaoyang in Taiwan situations. There were 35 indicators in the final questionnaires, six for each perspective.

Leisure Attitude

Eight items that were taken from Ragheb and Beard (1982) were used to measure SGDs. For example, the items included are "Leisure activities increase one's happiness", "I give my leisure high priority among other activities" and "My leisure activities provide me with delightful experiences".

Sustainability Balanced Scorecard

To provide a logical scale for the Sustainability balanced scorecard, we conducted a thorough examination of relevant literature (Giannoukou & Beneki, 2018; Mio et al., 2022; Tan & Sitikarn, 2019). Four indicators that were modified from Giannoukou and Beneki (2018) were used to gauge the financial perspective. Items include "Gross operating profit" and "Return on sale". Three measuring indicators that were modified from Mio et al. (2022) made up the social perspective. Items include "Complying with social regulations" and "Limiting negative social impact beyond compliance". Five indicators that were modified from Giannoukou and Beneki (2018); Mio et al. (2022) were used to evaluate the environmental perspective. Items include "Increases in products with environmentally friendly design" and "Awareness and understanding of current trends in environmental regulations".

Safety Climate

The nine safety climate-related items were taken from He et al. (2020). Items include "The instructor is able to inform me in detail about necessary safety matters, providing me with guidelines to follow", "The operator has a legitimate license to practice, making me feel reassured" and "I will notify the relevant personnel when I see others do something unsafe".

Achieving SGDs

Six items that were taken from Yuan et al. (2022) were used to measure SGDs. For instance, the items included are "I try to reduce the amount of waste at the workplace by using sharing economy practices", "I conserve the use of electrical energy at the workplace" along with "I am aware of my responsibility towards the environment".

2.3. Data Analysis

A structural equation modelling (SEM) technique that examines cause-and-effect linkages for latent variables is used to test the suggested framework (see Fig. 1). Given the complexity of this conceptual model, SEM is recommended since it allows for the simultaneous study of every variable. SEM also takes into consideration data fluctuations caused by unobserved exogenous variables, or "errors," which are acknowledged but not incorporated in the model; instead, their relationships to the other variables are evaluated quantitatively. Additionally, because the goal of this research study is

to experimentally validate the Sustainability Balanced Scorecard and SGDs framework, PLS-SEM was used. PLS-SEM is hence the better option because the theory formation and predicting constructs (Hair et al., 2024). Regarding route model analysis or estimate, the PLS-SEM consists of the measurement model and structural model.

3. RESULTS

Measurement Model

Prior to proceeding to the second stage of structural model analysis, the included constructs in the measurement model must be evaluated for validity and reliability (Hair et al., 2024). The evaluation approach to evaluate reflective measurement models is carried out because the indicators used to operationalize each Sustainability Balanced Scorecard and SGDs perspective are complimentary in nature and reflect the core construct. First, the outer loadings of each perspective's indicators were examined in order to test the six viewpoints' convergent validity. Indicators with outer loadings between 0.4 and 0.7 and those with outer loadings less than 0.4 were eliminated if doing so improved the composite reliability or AVE score for the related Sustainability Balanced Scorecard and SGDs perspective (Hair et al., 2024). Table 2 contains the final list of indicators together with their corresponding outer loadings.

Table 2. Results of confirmatory factor analysis.

Code	Perspectives					
	Environmental Perspective	Financial Perspective	Leisure Attitude	Safety Climate	Achieving SGDs	Social Perspective
EP1	0.774					
EP2	0.876					
EP3	0.894					
EP4	0.809					
EP5	0.826					
FP1		0.757				
FP2		0.857				
FP3		0.899				
FP4		0.765				
LA1			0.778			
LA2			0.837			
LA3			0.816			
LA4			0.741			
LA5			0.792			
LA6			0.772			
LA7			0.748			
LA8			0.703			

SC1	0.813	
SC2	0.793	
SC3	0.743	
SC4	0.778	
SC5	0.790	
SC6	0.812	
SC7	0.827	
SC8	0.718	
SGDs1		0.793
SGDs2		0.843
SGDs3		0.824
SGDs4		0.743
SGDs5		0.770
SGDs6		0.795
SP1		0.879
SP2		0.730
SP3		0.771

Second, the views' composite reliability values were examined in order to assess their internal consistency. The reliability and validity values of the six viewpoints are listed in Table 3, which also shows acceptable values for AVE (≥ 0.5) and composite reliability (≥ 0.7) (Fornell & Larcker, 1981).

Table 3. Construct validity and reliability

	Number of Indicators	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Achieving SGDs	6	0.856	0.893	0.584
Environmental Perspective	5	0.892	0.921	0.700
Financial Perspective	4	0.838	0.892	0.676
Leisure Attitude	8	0.888	0.911	0.564
Safety Climate	9	0.926	0.938	0.629
Social Perspective	3	0.707	0.837	0.633

Additionally, given the short sample size, we used the liberal criterion of values ≤ 1 as the threshold and evaluated the discriminant validity using the HTMT criterion (see Table 4). Although most academics agree that the conventional criterion of 0.85 is appropriate, we point out that some of the constructs in our model such as social viewpoint and environmental perspective, among others do not meet this threshold, which is a drawback. In general, we tested our structural model in the next section since our measurement model satisfied the different requirements of validity, reliability, and internal consistency (Fornell & Larcker, 1981).

Table 4. Discriminant validity (HTMT criterion).

	1	2	3	4	5	6
Achieving SGDs	0.764					
Environmental Perspective	0.752	0.837				
Financial Perspective	0.708	0.642	0.822			
Leisure Attitude	0.518	0.804	0.721	0.751		
Safety Climate	-0.711	-0.788	-0.650	-0.721	0.793	
Social Perspective	0.567	0.536	0.662	0.609	-0.496	0.796

Structural Model

Relationship testing is possible with the structural models. However, we first performed tests for endogeneity, common method bias, non-response bias, and collinearity before examining the associations. Initially, we looked at the variance inflation factor (VIF) values to check for multi-collinearity; values greater than 5 indicated the presence of multi-collinearity (Hair et al., 2024). Multi-collinearity was absent since none of the six viewpoints' VIF values were higher than 5. Secondly, late responses were compared to early responses in order to test for non-response bias. Since late respondents are thought to be comparable to non-respondents, they are employed as stand-ins for non-respondents. Following that, following the guidelines provided by Hair et al. (2024) for PLS, we used the unmeasured latent method construct test to look for common method bias. The absence of common method bias in our model was implied by our results, which showed that all loadings on the method construct were negligible and that the substantial construct's average variance (0.53) was much higher than the method construct's (0.34). R² values for environmental, financial, and social viewpoints and reaching SGDs were 0.803, 0.783, 0.611, and 0.666, respectively, indicating a significant prediction of the overall model.

Using the bootstrapping technique, test the direct relationship between leisure attitude and sustainability balanced scorecard as environmental perspective (H1a, $\beta = 0.896$, $p = 0.00$), financial perspective (H1b, $\beta = 0.885$, $p = 0.00$) and social perspective (H1c, $\beta = 0.782$, $p = 0.00$). Furthermore, test the direct relationship between leisure attitude and sustainability balanced scorecard as environmental perspective (H2a, $\beta = 0.847$, $p = 0.00$), financial perspective (H2b, $\beta = -0.210$, $p = 0.04$) and social perspective (H2c, $\beta = 0.642$, $p = 0.00$). However, test the mediating & indirect relationship of sustainability balanced scorecard as environmental perspective (H2a, $\beta = 0.759$, $p = 0.00$), financial perspective (H2b, $\beta = 0.750$, $p = 0.00$) and social perspective (H2c, $\beta = 0.662$, $p = 0.00$) between leisure attitude and achieving SGDs. However, test the moderating & indirect relationship of safety climate on sustainability balanced scorecard as environmental

perspective (H2a, $\beta = 0.896$, $p = 0.00$), financial perspective (H2b, $\beta = 0.885$, $p = 0.00$) and social perspective (H2c, $\beta = 0.782$, $p = 0.00$) and achieving SGDs.

Table 5. Bootstrapping: direct and indirect relationship

Hypothesis & Relationships	Path Coefficient	t value	p value
H1a: Leisure Attitude -> Environmental Perspective	0.896	71.418	0.000
H1b: Leisure Attitude -> Financial Perspective	0.885	74.110	0.000
H1c: Leisure Attitude -> Social Perspective	0.782	28.896	0.000
H2a: Environmental Perspective -> Sustainability-Balanced Scorecard	0.847	45.280	0.000
H2b: Financial Perspective -> Achieving SGDs	-0.210	2.922	0.004
H2c: Social Perspective -> Achieving SGDs	0.642	8.417	0.000
H3a: Leisure Attitude -> Environmental Perspective -> Achieving SGD	0.759	34.314	0.000
H3b: Leisure Attitude -> Financial Perspective -> Achieving SGDs	0.750	41.477	0.000
H3c: Leisure Attitude -> Social Perspective -> Achieving SGDs	0.662	24.345	0.000
H4a: Safety Climate* Environmental Perspective -> Achieving SGDs	0.896	77.683	0.000
H4b: Safety Climate* Financial Perspective-> Achieving SGDs	0.885	73.717	0.000
H4c: Safety Climate* Social Perspective-> Achieving SGDs	0.782	29.291	0.000

4. DISCUSSION

This study examined how the safety climate influenced the sustainability balanced scorecard's (a) environmental, (b) financial, and (c) social perspectives as well as the achievement of SGDs. Next, the SEM technique was used to set up and analyse the system level model that connected the safety climate, leisure attitude, sustainability balanced scorecard, and reaching SGDs. The reliability test and fit index findings showed that the model was reasonably resilient. Climate action, gender equality, excellent health and well-being, decent work, and economic growth are the SDGs that the world's population is most concerned about. It suggests that people are more likely to focus on objectives that are directly tied to their interests. The public has paid less attention to SDGs that need for specific subject knowledge, such life on land and life below water. Therefore, it is recommended that individuals give greater thought to all of the SDGs with an eye towards the future. Using Taiwan

University as an example, students' top concerns are gender equality, high-quality education, less inequality, poverty, hunger, and good health and well-being. In contrast, their most neglected goals are partnerships for the goals, life on land, and responsible consumption and production. University students also give gender equality and health a lot more thought than they do when compared to global concerns (Cheng et al., 2024; Fatima & Elbanna, 2023; Yuan et al., 2022). Thus, it is evident that these are the two objectives that require improvement and about which people are generally concerned. The existence of other species and the collaborations for the objectives as a shared vision in attaining sustainable development are thus often overlooked by university students (Grande & Haynes, 2024).

Rona & Erol (2020) found a lack of correlation between the year variable and university students' leisure attitude levels. But according to (Ayhan & Özel, 2020), students of all years were able to closely acquire attitudes from leisure activities, even if there was no discernible difference between the year variable and leisure attitudes. Consequently, a lot of research in the literature supports our findings, although it cannot be said that leisure attitude will establish a distinct attitude level for each year. At the same time, leisure attitudes and sustainability balanced scorecard are significant, according to Giannoukou & Beneki (2018); Grande & Haynes (2024). In. However, studies in the literature indicate that there is no statistically significant difference between leisure attitude and the sustainability balanced scorecard. One of these is the leisure attitudes of the participants in the study conducted by Belo et al. (2020). In terms of the determinants, the comprehensive research demonstrates how important sustainability strategy is to bolstering the usage of the sustainability balanced scorecard, which influences the sustainability performance of businesses. The use of the sustainability balanced scorecard is typically seen as a component of a larger process that begins with sustainability initiatives and strategies and culminates in the application of the scorecard to increase SGDs and integrate sustainability into the general leisure attitude. Furthermore, earlier research shows that the sustainability balanced scorecard is a tool that can be customised for business divisions as well as used for the entire company. Additionally, the findings indicate that the literature on the sustainability balanced scorecard usage drivers focusses most on environmental issues, implying that environmental activities, strategies, and metrics serve as the foundation for sustainability objectives.

4.1. Limitations and Future Research

It is important to recognise some of this study's errors. First, although if the idea of safety is universal, care should be used when extrapolating our findings to other areas because the data

collection was limited to a specific area of Taiwan's university students. Second, even while dive providers can use our signaling-theory-based framework, we haven't tried to identify the characteristics of signals that make them easier to observe or the contextual elements that influence whether or not recreationalists would pay attention to them. This is significant since any signal's interpretation is subjective and delicate; also, a signal's potency may be diminished when it functions in conjunction with other signal types (Connelly et al., 2011). There were problems with discriminant validity in our research model. When using the normal threshold of 0.85 instead of the more severe criterion of ≤ 1 , the HTMT criterion was not met for some items (Hair et al., 2024). Although the data passed the Fornell-Larcker test of discriminant validity, caution should be used going forward when extrapolating the findings of this study. Therefore, before completing the primary study, researchers who are extending the SBS scale to different situations can use a pilot test to check for discriminant validity. Furthermore, future use of the updated SBS scale with modified markers and the added health and safety viewpoint could potentially get around the study's discriminant validity issues. Any study that uses cross-sectional data has inherent constraints that restrict the ability to draw conclusions about causality from the study's findings. After controlling for endogeneity, we discovered that it had no effect on our model. Future investigations must, however, speculatively determine whether the results of the investigation may be used in different research contexts. In order to evaluate the framework created in this study and further investigate the causality of the Sustainability-Balanced Scorecard, future research can investigate the possibility of gathering longitudinal data. Even though we took a number of steps to guarantee that our study produced high-quality findings that could be used in more general settings, it still has a number of shortcomings that point to potential directions for further investigation. Furthermore, the results may not be very generalizable because the study's focus is limited to Taiwan University Chaoyang. They are applicable to Chaoyang University of Technology Taiwan, nevertheless. Since the goal of this study was to investigate Signaling from a theoretical perspective, internal validity was determined before external validity. Future studies can evaluate the generated scale and conceptual model in different geographic and academic contexts to increase external validity.

5. CONCLUSIONS

Over time, Taiwan University's study on achieving SGDs has been evolving. Although the idea of a sustainability balanced scorecard has been actively researched by academics, SGDs have not been heavily involved. Only two studies have looked at the idea of a sustainability balanced scorecard for university students thus far (Tan & Sitikarn, 2019; Yuan et al., 2022). These studies,

however, evaluated an alternative sustainability balanced scorecard architectural framework that added leisure as a perspective to the strictly stacked traditional three perspectives of the environment, finances, and social context (Giannoukou & Beneki, 2018; Grande & Haynes, 2024). Crucially, this paper bridges a major theoretical gap by demonstrating that leisure cannot be analyzed as a passive concept; instead, it must be framed through "Sportive Leisure Management". Our findings theoretically expand the cognitive, affective, and behavioral dimensions of leisure attitudes by proving that regular physical exercise and active lifestyles serve as driving forces to achieve specific SDGs, such as Good Health and Well-being (SDG 3) and Quality Education (SDG 4).

Additionally, by looking at Taiwanese university students, we contribute to the expanding body of research on the less studied Asian economies, especially when it comes to the sustainability balanced scorecard, which takes into account (a) environmental perspectives, (b) financial perspectives, and (c) social perspectives (Zeng & Luo, 2013). Research investigating how the safety climate affects the use of the sustainability balanced scorecard, which was first developed as a means of accomplishing SGDs, from the perspectives of the environment, finances, and society (Arzahan et al., 2022; He et al., 2020). In this scenario, the safety climate acts as a vital moderator not just for high-risk recreational activities like diving, but for the broader sportive management infrastructure within universities. We establish that when a university provides a safe, structured environment for sports and exercise, students' leisure attitudes shift positively. This structural synergy enhances their interaction with the Sustainability-Balanced Scorecard, raising awareness of environmental and social sustainability through active physical participation.

Consequently, this study, which is more appropriate for the Taiwanese university setting, lays the groundwork for the development of comparable scorecards for developing nations where context matters. We think our work is the first to apply the theory of signaling to the safety climate within a sportive management context. Sportive leisure activities send powerful signals regarding institutional safety and wellness. When these sportive and safety signals are high, students experience maximized physical, mental, and social benefits, boosting their alignment with global sustainability goals; conversely, when these sports-safety signals are low or neglected, the developmental advantages of leisure are heavily diminished. In the end, our suggested sustainability balanced scorecard contributes theoretically to the paucity of research on SGDs and sustainability balanced scorecards among college students, particularly by examining causality between its viewpoints and providing empirical evidence supporting the existence of a complex partially mediated moderated model. Future studies can look more closely at how SGDs are implemented differently in this institution than in others, as BSC research at the university is still in its early phases.

Because of SGD's significant contribution to our research framework, we advise universities to do the following. First, our research showed that when students are less conscious of safety-climate cues, it is difficult for them to display a positive sportive leisure attitude. Activity planners and university sports departments should so verify that there are adequate safety precautions in their recreation and athletic routines. For instance, we advise operators and sports instructors to conduct safety training prior to, during, and following their sportive programs and courses. Physical education curriculums must design specific lesson plans that explicitly link physical exercise with sustainability education (ESD), teaching students how teamwork in sports fosters social cooperation (SDG 17) and how active lifestyles prevent chronic diseases (SDG 3).

University administration can assess their SGDs using the sustainability balanced scorecard, which has been validated and tested empirically. Leisure management departments should adopt the four perspectives of our adapted Balanced Scorecard to evaluate their sports programs. Financially, they can track the efficiency of sports budget utilization; internally, they can monitor the creation of unique, safe green-sport courses; and from a learning perspective, they can enhance student satisfaction by offering diverse and inclusive physical activities.

Three perspectives environmental, economical, and social have been used to test the proposed sustainability balanced scorecard. Furthermore, institutions can transparently view the impact of each constituent (individuals, processes, or systems) on the resulting perspectives (environmental, financial, and social) by comprehending causal linkages in a SGDs model. They can also easily communicate this knowledge throughout institutions, learn to explore other ways to improve the safety climate, and make appropriate SGDs, as stated by sustainability balanced scorecard scholars like (Chien, 2022). Additionally, the SBS's leisure sport mindset, safety climate, and perspective can help university students foster resilience, improve their physical and mental health, and strive towards the suggested indicators to create a clean and safe environment for both students and staff.

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CONFLICTS OF INTEREST

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