Research article

Influence of sustainability in the positioning of the university brand: Study in universities in Medellín-Colombia

Johnatan Castro-Gómez [a],[*], Javier A. Sánchez-Torres [b], Paola Andrea Ortíz-Rendón [c]

[a] *Corporación Universitaria Minuto de Dios- Uniminuto, Bello, Colombia*
[b] *Universidad de Medellín, Medellín, Antioquia, Colombia*
[c] *Universidad Nacional de Colombia, Facultad de Minas, Medellín, Colombia*

A B S T R A C T

The implementation of university sustainability affects brand perceptions by conferring attributes related to commitment and reputation, especially by students. The proper management of sustainability is related to an improvement in the university brand perceived by its stakeholders, including students. For this reason, this research aims to analyse whether university sustainability positively affects brand positioning among university students. For this purpose, a theoretical and quantitative mixed-method investigation is proposed that allows the establishment of a structural model in which the relationships between the dimensions of university sustainability with the dimensions of brand positioning are evident. The empirical analysis found that some dimensions of university sustainability, such as the institutional framework, campus operations and some dimensions of the substantive functions, positively affect brand positioning in university students and generate commitment to the university from both the prestige and reputation of the brand.

1. Introduction

One of the main challenges for organizations of the twenty-first century is to implement sustainability in their strategy, structure and processes [1,2]. This challenge has been raised for universities at the United Nations Conference for Sustainable Development in 2012 (Rio + 20) [3], so it remains a challenge that must transcend the ecocentric perspective and seeks to develop as a model of inclusive social transformation, that encompasses human well-being, environmental care and economic development [4]. In this regard, the university is the main promoter of change in companies and state institutions. In this way, universities are responsible for training citizens and future professionals who will be responsible for implementing ways of working that contribute to Sustainable Development [5]. Consequently, the importance of the present study lies in the fact that sustainability allows universities to achieve better economic results by reducing costs and decreasing the regulatory burden, as well as increasing brand positioning, prestige, and social responsibility actions with the community [6,7]. In addition, it favours competition in obtaining students, sustaining their programmes and obtaining high-level faculty [8].

Thus, this study addresses the existing theoretical gap regarding the relationship between sustainability and university brand positioning, given that in the Colombian context, there are no studies that address this relationship. Although there is research on the implementation of sustainability as an organizational model and models for its evaluation in Colombian universities [9,10], the impact

---

of sustainability on the management of the university brand and its positioning in the context of Higher Education Institutions in Colombia has not yet been developed.

Therefore, sustainable actions can impact the university brand, generating attraction and relevance among interested parties [11, 17]. The sustainable impact on the brand is evidenced in high-quality accreditation processes as a process that demonstrates continuous improvement and constant self-assessment, because it generates a differential value compared to other universities [20]. Said process is defined as the capacity of a higher education institution to demonstrate high levels of quality in each of its missionary functions [21]. Thus, High-Quality Accreditation promotes the fulfilment of sustainable objectives as a requirement of academic and institutional quality, which contributes positively to the positioning of the university [20]. The relationship between sustainability and accreditation fosters perceptions of excellence in graduates, students, and teachers, and favours international visibility [22]. Consequently, universities with High-Quality Accreditation have a greater commitment to Sustainable Development, formalized at the various levels of their governance and internal processes [21].

University sustainability can influence the construction of the university brand, presenting challenges for future research by requiring an estimate of sustainable actions in the incidence of the brand that involves the perspective of various interested parties [23]. Likewise, recent studies on the relationship between sustainability and branding suggest that the analysis of student perceptions regarding university policies and management be expanded [24]. In addition, some researchers have suggested that sustainability affects the university brand mainly in the perception of students, since it links them as co-creators in the implementation of sustainable practices, thus increasing their levels of satisfaction with the university [25]. Likewise, further theoretical development is required regarding the value of the university brand and the way in which it relates to the organizational aspects of universities with the brand [26].

Therefore, the present study aims to establish the impact of sustainability on the positioning of the university brand by addressing the students' perspective. It has been shown that sustainability actions evidence an ethical and socially responsible management of universities by generating competitive advantages in obtaining economic resources, competitive teachers, and high-performance students [11,12]. Likewise, these sustainability actions are a differential factor in their relationship with stakeholders [13,14], which means that sustainability, in terms of brand value, is determined for its financial impact, reputational impact and social reach [14]. Therefore, this study contributes to the literature on the subject by providing theoretical elements that indicate how sustainability contributes to brand positioning in university students, the dimensions of sustainability that most impact positioning, and the brand elements that are most affected when students perceive the institution's sustainable actions. From a managerial perspective, it is a useful tool for university marketing, as it allows the detection of the most attractive and relevant sustainability aspects for students that are generators of positioning and strengthen the communication of the university brand.

Thus, this research is based on sustainability as a holistic organizational model and on the brand as one of the main financial and reputational assets that lead to relevance in society. Thus, university sustainability is understood as the implementation of sustainability discourse in the mission functions, governance, campus and evaluation processes of a university [15]. It seeks compliance with the Sustainable Development Goals through policies and processes in each of its academic and administrative subsystems [16]. This purpose is possible as long as universities establish evaluation models to estimate their progress in achieving sustainability [9]. Consequently, sustainability has become one of the main intangible assets that affect the brand image and reputation of universities [14,17]. Thus, sustainability strategies generate perceptions among university stakeholders, such as positive feelings towards the university brand image and its greater positioning and value [18,19]. In addition, the values of sustainability allow students to develop through ethical and critical approaches to themselves and the common good [19].

For this reason, this paper addresses the issue from the student perspective because it is one of the main performance indicators of the university brand [27]. Thus, the present investigation raises the problem: what is the influence of sustainability in the positioning of the university brand? To this end, this study seeks to analyse from the student perspective how university sustainability affects the brand positioning of universities with high-quality accreditation in Colombia.

In this regard, this research makes a novel contribution to university branding by presenting the theoretical aspects that describe the way in which sustainability from each of its dimensions generates brand positioning in students [27] and the way in which these dimensions affect the constituent factors of positioning, such as perceived quality, image, and brand identity. Consequently, this study is a contribution to the planning of university marketing activities that seek to manage the brand communication from the perspective of sustainability, since this contributes to the evaluation models of perceived quality, image, and brand identity from the student perspective. Thus, the relevance of the present issue lies in the fact that it is a topic of international importance in the implementation of sustainability and the contribution to educational marketing.

The paper is composed, in addition to this section, of a theoretical framework that develops the current state of the question of sustainability and university brand, of the methodology, which provides a theoretical review and quantitative analysis to develop a structural model, the discussion of the results, that analyses the model with the various theoretical proposals, and finally the conclusion.

2. Theoretical framework

2.1. University sustainability

A university is sustainable when, through its master plan and in its various academic and administrative dimensions, it applies the principles of sustainability [28]. Thus, a university is sustainable when its structure, strategy and action plans are aimed at achieving sustainable objectives [29]. Therefore, its main pillars are its Institutional Framework, Campus Operations, Education, Research,

Extension, Campus Experience, and Evaluation and Reports [16,30], as shown in Table 1.

Therefore, the factors that make university sustainability possible are the sustainable approach in the structure and strategy, in the processes within the organization, and external relations [33]. Likewise, each approach must preserve the balance between environmental care, social well-being and economic progress [52], as well as the emerging dimensions: spirituality, mental health, gender equality, global ethics, cooperation for development and the defence of human rights [5]. This emerging focus on the social dimension of university sustainability is based on the fact that the best-ranked universities are related to the transfer of knowledge to industry [42], and this is only possible from a human approach to sustainability, which fosters the social engagement of the student [52]. Likewise, the implementation of technologies that promote the "smart campus" constitute part of the advances in research on university sustainability and its respective evaluation. This includes the adaptation of physical spaces in terms of technology for the development of the academy [36] and the culture of entrepreneurship and innovation, whose axes of development are focused on environmental care, social well-being and economic development, built from the co-creation of the stakeholders of sustainable university projects [2,13]. In addition, the implementation of sustainability in universities is a reputational hallmark that guarantees the quality of the institution [18].

2.2. University brand

The university brand has become a means of organizational survival, so its management must respond in a singular way to the expectations, needs, perspectives and aspirations of the interested parties [53,54]. Thus, the university brand is defined as the perceptions and feelings about the university service and its performance [55,56]. Thus, the university brand must be managed considering the link between its dimensions and students [57]. Likewise, the dimensions of the university brand depend on a comprehensive analysis of the brand environment, the vision and values of the university, and the meaning and identity as dimensions of the university brand.

In this regard, the quality perceptions of the interested parties are focused on the distinctive values of the identity of the university brand from which the benchmark for comparison with the competition arises [58]. Thus, the university experience of students and graduates is taken as a starting point, which becomes a determinant of the reputation of the university [56,59]. The perception of the quality of the university brand identity generates a performance-oriented culture due to an organizational culture of sustainability [8]. Consequently, perceived quality determines brand value from the student's perspective [26,56].

Perceived quality ensures positioning and student retention [60,61] and it also generates competitive advantages [24]. This dimension favours the positioning of the brand because it explains to the interested parties its differential values of the brand identity with respect to the competition [57]. This is because identity is the sum of the organization's unique features [62] and constitutes the university's current understanding of itself [63,64]. Thus, perceived value is linked to brand value as a generator of satisfaction, trust and commitment [58,65], in addition to perceived credibility and reduction of uncertainty in the election processes [66]. Brand identity affects the value of the brand by transmitting its competitive advantages and differential values, which from the student perspective are increasingly focused on intangible values [57], implying the commitment of students to sustainable development [3].

Finally, brand equity has been considered as a fundamental part of branding because it contains the set of assets and liabilities linked to the brand, adding or subtracting value for customers [67]. Also, it is an assessment of the differential aspects of the brand by the customer and the responses it generates in them regarding the offer of a product or service [68]. In addition, there are several models that measure brand value, among which the most accepted is that of [67], which has been considered one of the main references for university branding and its evaluation [56]. This perspective is focused on the student as the centre of the relationship between the brand and the university experience [26,69]. Thus, sustainable actions generate differentiation and identity because they

Table 1
Dimensions of university sustainability.

Dimension	Definition	Supporting bibliography, taken from the following authors
Institutional Framework	Strategic direction of the university to achieve sustainability. It includes the mission, vision, strategic plans and other aspects related to governance.	[30,31] [32,33]
Campus Operations	These are the infrastructure and facilities in which renewable energy, adequate management of natural resources, waste management and sustainable transport are implemented and includes the greening of the campus.	[34,35] [36,37]
Education	This covers curricula, teacher and student training and academic activities. It develops topics such as spirituality, equity, ethics, environmental awareness, among others.	[5,38–40]
Research	This is the interaction of the university with the economic, political and social environment. It encompasses publications, new knowledge products, project funding, events, transformation plans and problem-based learning.	[40–45]
Outreach	University projects with interest groups. This includes extension courses, volunteering, capacity development, public access to the campus and training for companies.	[42,44,45]
Campus Experiences	Actions to raise awareness about sustainability, such as work groups, teaching and administrative policies, visibility in the facilities and activities on sustainability.	[46,47]
Evaluation and Reports	Presentation of sustainability reports, environmental reports, and use of measurement tools and progress on the achievement of sustainable objectives.	[48] [49–51]

Source: Authors.

encourage the participation of stakeholders in the space of students [8] under a behaviour model called "student citizenship behaviour", and are actions for the social and environmental good of students [70].

An example of the above are the branding models proposed by Pinar et al. [56], whose brand dimensions are focused on brand value and developed from the student expectation at a university in Turkey. Their findings raised aspects such as associations, learning environment, trust, perceived quality, emotional environment and reputation. Also, Retamosa et al. [71], based on the same parameters, found aspects of university branding such as loyalty, faculty, brand personality, values, trust, curriculum and facilities. Thus, the efforts to guide university branding towards brand value for sustainability are evident [17]. The categories of perceived quality, identity and brand image affect the positioning of the brand and therefore the student's relationship with the university [53,57].

Perceived quality is a determinant of positioning and influences brand value by shaping the distinctive values with respect to the competition [53,72]. Likewise, perceived quality allows value judgements to be made about the distinctive aspects of the university's own brand with respect to the distinctive values of the competition [58]. Furthermore, perceived quality is related to brand equity as it generates added value and perceived credibility [66]. Thus, it generates student loyalty and trust by increasing brand equity from a financial perspective [11]. Therefore, it is considered that.

H1.   Perceived quality affects brand identity (H1a) and brand equity (H2b).

In addition, the brand image affects its respective identity by defining the differences and distinctive values of the university's value promise [59]. Also, image as a psychological aspect of stakeholders in terms of the university value proposition, builds brand identity and uniqueness [73]. Moreover, it relates to in-brand equity by favouring institutional reputation and increasing the number of students [74]. Thus, the hypothesis is posed.

H2.   Brand image affects brand identity (H2a) and brand equity (H2b).

As for brand identity, it determines the student's relationship with the institution both in a solid academic background and in financial strength of the institution, thus impacting brand equity [75,76]. It is therefore considered that.

H3.   Brand identity affects brand equity.

2.3. Relationship between sustainability and university brand

The interaction between sustainability and the university brand develops to the extent that the brand is restructured from the values of sustainability, impacting the student's perception of the university's organizational identity [8,77]. In this regard, it communicates relevant knowledge about the environment, society and the economy, which generates a new positioning model based on commitment [78]. This positioning is of a social nature and seeks knowledge and the generation of awareness about sustainability [34, 79]. In addition, it is the main branding strategy as a distinctive element to achieve marketing objectives [80]. Therefore, the values of sustainability contribute in the university's value promise the implementation of novel knowledge and innovation management [17]. Thus, the brand image, understood as the public perception of the university, increases positioning because sustainable actions generate legitimacy and trust [18]. In addition, it affects behaviour after the experience through satisfaction [24] and makes it possible to relate previous experiences with the experience after the service or consumption [80]. With regard to brand identity, sustainability generates affinity among the members of the organization, especially among students [8]. Thus, a singularity is created for the university brand that leads to emotional appeal through cognitive and attitudinal processes [17]. Consequently, student perception determines the student's relationship with the university, which leads to loyalty [75]. From the above, sustainability generates positioning by increasing brand value in students, since sustainability in the university brand generates differential values with respect to the competition and increases the reputation of the institution, which results in a better experience of university life for the student [25]. Thus, social responsibility practices as external expressions of university sustainability, the development of innovation, and the implementation of new pedagogies [27]. In this way, an affective experience that generates loyalty and satisfaction in students is generated [81].

Consequently, the constructs of sustainability affect the brand and generate the transition from symbolism to the relationship between the institution and the students [80]. Likewise, brand management from the values of sustainability also affects the perceived quality because it generates reputation in stakeholders [82,83] and increases the student's positive image of university services [8]. Thus, it is posited in an exploratory manner in the following hypothesis.

H4.   The institutional framework influences the brand image (H4a), the brand identity (H4b) and the perceived quality (H4c).

Likewise, the relationship of the student with the facilities, a green campus, sustainable buildings, contribute to the consolidation of the brand, its uniqueness and competitiveness [25]. Likewise, the implementation of a smart campus [36], the use of renewable energy and in general a sustainable campus, consolidate the university brand [24]. Therefore, it is proposed that.

H5.   Campus operations influence the brand image (H5a), the brand identity (H5b) and the perceived quality (H5c).

Also, educational activities in sustainability and social responsibility, as the implementation of a curriculum to train on the subject and other classroom activities, generate trust, loyalty, and commitment in students with the brand favoring [84,85]. Thus, it is posited that.

H6.   Education influences the brand image (H6a), the brand identity (H6b), and the perceived quality (H6c).

Research is considered to generate reputation and therefore has an impact on positioning [53]. Research allows access to international rankings and the consolidation of academic prestige and the innovation capacity of universities [86]. Thus, research makes it possible to know and respond appropriately to the needs of industry and the community, which generates a positive apperception in stakeholders [8,11,14]. Therefore, it is proposed that.

H7. Research influences the brand image (H7a), the brand identity (H7b) and the perceived quality (H7c).

It is also highlighted that outreach activities generate integration and spaces for co-creation with stakeholders, especially with students, and impact the university brand [86]. Outreach activities reflect social commitment and ethical sense, which impacts the university [26,87]. Thus, it could be considered that.

H8. Outreach activities *influences the brand image (H8a), the brand identity (H8b) and the perceived quality (H8c).*

The perception the university's excellence is provided by student experiences on campus [72,72,88]. Thus, actions to promote sustainability on campus can generate ecological and social awareness, which impacts the perception of the university's reputation [47,89]. Thus, actions on campus make the brand promise tangible and could contribute to generating positioning [69]. Therefore, we hypothesize that.

H9. Campus experiences influence the brand image (H9a), the brand identity (H9b) and the perceived quality (H9c).

In addition, stakeholders demand that universities demonstrate their commitment to sustainability, which has an impact on brand perception [81,81,90]. Therefore, the processes of evaluation and socialization of reports can have an impact on the reputation and attractiveness of the university [62,62]. It is therefore posited that.

H10. Evaluation and reporting influences the brand image (H10a), the brand identity (H10b) and perceived quality (H10c).

The hypotheses developed after being analysed empirically present a relationship scheme that is observed in Fig. 1 in which it is
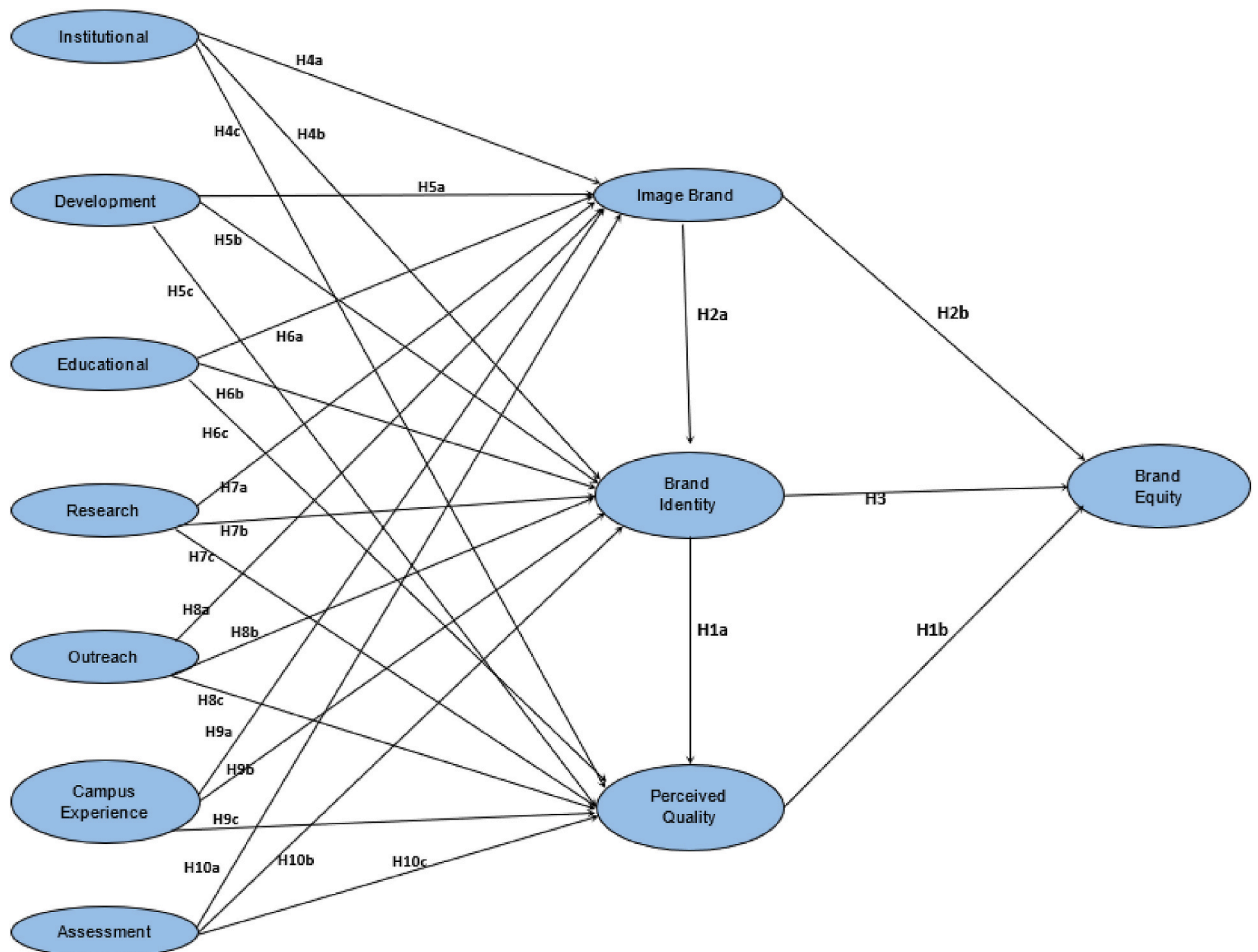

Fig. 1. Approach of the Hypotheses of the Model of the Influence of Sustainability in the Positioning of the University brand.

possible to observe how university sustainability affects brand positioning and its respective dimensions.

3. Methodology

This research empirically explores a model that develops the relationships between university sustainability and brand positioning, based on the proposed hypotheses. Therefore, a mixed methodology was proposed that included several phases: first, the measurement tools for both sustainability and the university brand were developed, for which a theoretical review was initially carried out that allowed the construction and validation of the respective measurement tools, and finally they were tested in the empirical model by means of the method of structural equations using partial least squares (PLS) regression.

3.1. Construction of the measurement tool

A measurement instrument for university sustainability was proposed, for which an adaptation of the proposal of Lozano et al. [30, 91] was made, comprising seven dimensions presented in the theoretical framework. Thus, the adaptation of the Institutional Framework dimension is based on the proposal by Niedlich et al. [31,91] and Bautista-Puig and Sanz-Casado [31] for issues related to governance and the organizational bases of the university. Similarly, authors such as Giovanelli et al. [51,92] and Kapitulčinová et al. [51,93] support issues related to the external strategic approach and relationships with stakeholders. The operations of the campus were adapted following the proposal by Perchinunno and Cazzolle [93], Du et al. [44] and Perera et al. [66,92] regarding the greening of the campus, waste management and welfare of people. The items on renewable energy and smart campus were substantiated by Giovanelli et al. [16,92].

Regarding Education, we started from the proposal by Stough et al. [38] Ceulemans et al. [49] and Leal Filho et al. [44,95] for the items related to curriculum, academic events, and the development of training programmes. The Research dimension was developed based on Du et al. [44,93] and Perchinunno and Cazzolle [93] and focused on academic publications and projects with companies and the public sector. Also, University Extension was adapted following De Hooge and van Dam [45] on the aspects of external relations, cooperation networks, extracurricular training and exchanges. The experiences of the Campus, given that this is an underdeveloped dimension, left out some items from Lozano et al. [30] and the proposal by Gómez et al. [47] to evaluate the work groups, activities on campus, website and outreach campaigns. The last item, Evaluation and Reports, was developed based on Caeiro et al. [48,49], and Ceulemans et al. [49] on reporting and accountability [96].

With regard to the measurement instrument for university brand positioning, this was developed considering the brand identity dimensions raised by Brzaković et al. [53,58] and Dennis et al. [58,87] looking at the aspects related to the differential value of the university and its competitive advantages. The brand image was developed based on the studies by Alcaide-Pulido et al. [59,87] on the perception of excellence regarding the competition and the studies by Panda et al. [59] and Lafuente-Ruiz-de-Sabando et al. [56,86,97] on issues related to graduates, the labour market and institutional prestige. Finally, the perceived quality was based on the studies by Pinar et al. [56]and Erkan et al. [98] on the levels of student satisfaction, teaching and the fulfilment of expectations. The instrument was developed with a Likert scale from 1 to 7 (see Annex 1 and 2).

Once the theoretical review was developed, content validity was carried out through expert judgement of sustainability and branding experts, teachers, and university researchers, where the following were evaluated: a) sufficiency, which estimates whether the item appropriately addresses the construct; b) clarity, which analyses the conceptualization of the construct; c) coherence, which verifies the correspondence of the question to the construct; d) relevance, which verifies the degree of importance of the topic; and e) response induction, which analyses whether or not the items have biases that indicate a certain response [99,100]. The items were analysed on a scale from 1 to 4, with the statistical modes between 3 and 4 being taken as selection criteria. After adjusting the tool according to the analysis of the experts, a pilot test was carried out with university students (n = 12) whose contributions led to editorial modifications, conceptual revisions and the elimination of items, as indicated by the results of the test. The final version of the revised questionnaire was obtained as a result of the pilot test. Therefore, the tool was adjusted to start the fieldwork in universities with high-quality accreditation.

3.2. Sample

The data were collected from nine universities with High-Quality Accreditation, a quality hallmark granted by the Colombian Ministry of Education given the verification of certain requirements regarding the life and mission of the university. This selection of universities is because the High-Quality Accreditation has, as a requirement, to be granted and for its respective renewal the universities have to implement sustainability actions. The sample size is non-probabilistic for convenience, given the characteristics of accessibility and proximity of the target audience [101], where undergraduate students from various semesters and professions were surveyed. Thus, the number of students was established by quotas according to the total enrolment in order to obtain balanced samples. With a total of 1276 data collected, 72 % of the data correspond to public universities and 28 % to private universities. The survey was disseminated through virtual platforms such as 'Google Forms'distributed by email and by visiting each of the selected universities. After analysing the results of the survey, which made it possible to identify atypical data, such as incomplete answers or answers with the same numerical choice for the whole questionnaire. The total sample for university sustainability was 1199 and for university brand positioning it was 1210.

4. Results

In the exploratory factor analysis carried out using the SPSS software, estimation was used through the maximum likelihood method [102] and the confirmatory analysis confirmed the reliability and validity of the instrument. To test the exploratory model, the partial least squares method was used, this being the most accurate for analysing this type of phenomenon, which is presented in Fig. 2, where the relationships between the constructs and their items are shown (see Table 2).

4.1. Measurement tool

The validity tests of the measurement tool were satisfactory and were verified as follows: the factor loadings of the items are greater than 0.84, being an excellent value to support the permanence of the items according to the criteria of Carmines et al. [103]. Cronbach's alphas were higher than 0.90, as were the composite reliability values, which are well above the threshold of 0.70 recommended by Hair et al. [102] to demonstrate the reliability and internal consistency of the measurements. The convergent validity of the model was calculated from the average variance extracted (AVE) which, according to Hair et al. (2019) [102], must be greater than 0.5 to present adequate convergence. Following this criterion, the AVE values for measuring brand positioning were: perceived quality (PQ) 0.79; brand image (IM) 0.87 and brand identity (BI) 0.89. For university sustainability, the AVE values were in the institutional framework 0.89; campus operations 0.82; education 0.87; research 0.90; extension 0.90; campus experiences 0.91 and evaluation and reports 0.92. Likewise, the AVE values of the dimensions between 0.79 and 0.93 show that the items coherently represent the respective constructs [102,104] (see Table 3). Likewise, multicollinearity is low given that the variance inflation factor (VIF) values were less than 5, even some less than 3, meaning that the items of the constructs behave independently of each other.

Regarding the discriminant validity of the model, it was extracted by analysing the square root of the AVE which, as can be seen in Tables 3 and is presented in the diagonal of the data presented. These values (those on the diagonal) must be higher than the correlations between the other constructs (the data from the rest of the table) according to the criteria of Fornell and Larcker [105] which in the present model are higher than 0.9 value not passed outside the diagonal (see Table 4), which validates the uniqueness of each construct with respect to another.

Through the heterotrait–monotrait matrix (HTMT), the discriminant validity of the correlations between indicators was verified. The values are 0.90, and the confidence interval is less than one (<1) which, according to Henseler et al. and Gold, would validate the model [106] and Gold et al. [107] would validate the model. Consequently, the confidence intervals for the HTMT are lower than the
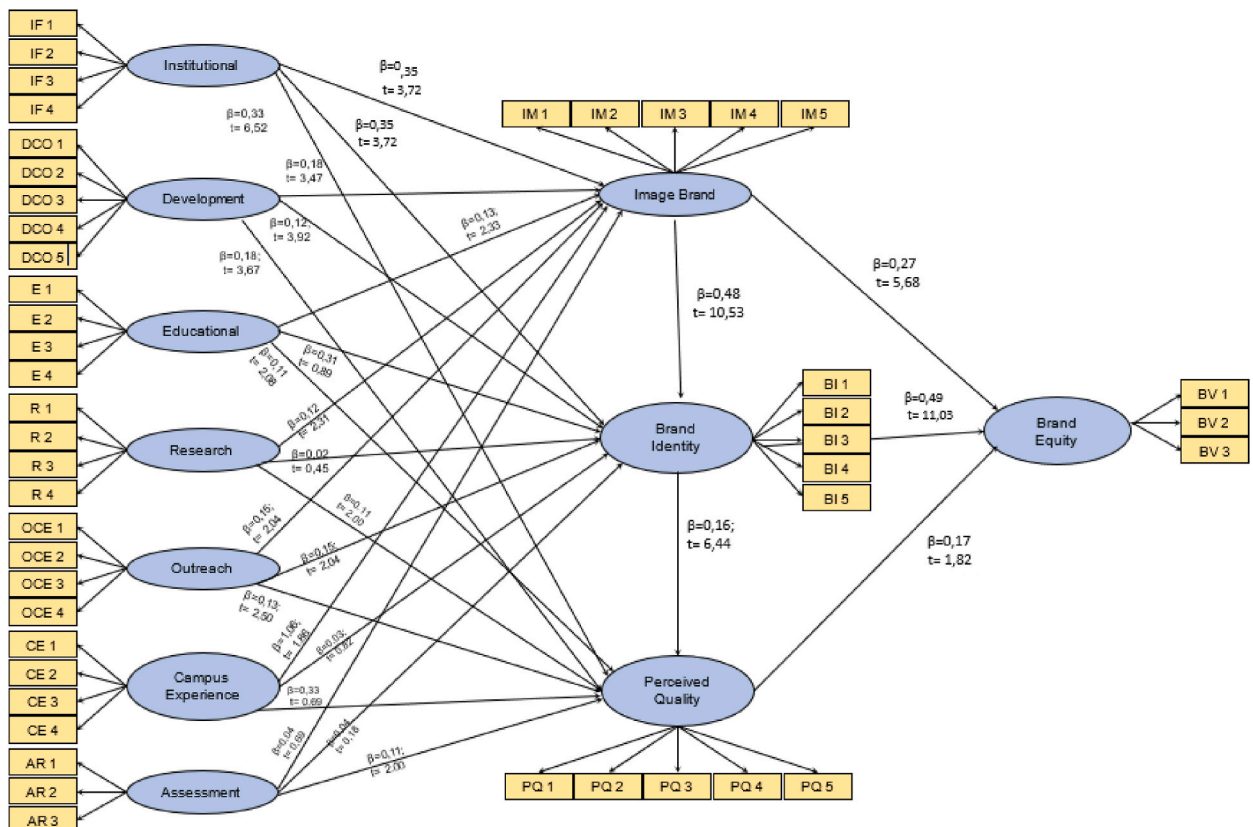

Fig. 2. Estimated model of the relationships between university sustainability and brand positioning.

Table 2
Abbreviations of the model items in Fig. 2.

IF	Institutional Framework
DCO	Campus Operations
E	Education
R	Research
CE	Sustainable Development through On-Campus Experiences
OCE	Outreach and Collaboration
AR	Evaluation and Reports
PQ	Perceived quality
OE	Outreach
IM	Brand Image
BI	Brand Identity
BV	Brand Equity

Source: Authors.

Table 3
Reliability test of the measurement tool.

Item	Loads*	t-statistic	P Values	VIF Values	Variable	Cronbach's alpha	Composite reliability	Composite reliability	Average variance extracted (AVE)
AS1	0.958	270.113	0.000	4.638	Assessment	0.953	0.954	0.970	0.915
AS2	0.964	237.672	0.000	4.531					
AS3	0.947	200.260	0.000	4.609					
BI 1	0.932	164.091	0.000	4.182	Brand Identity	0.972	0.972	0.978	0.898
BI 2	0.949	220.696	0.000	4.918					
BI 3	0.954	216.886	0.000	4.329					
BI 4	0.949	207.177	0.000	4.580					
BI 5	0.954	237.552	0.000	4.180					
BV1	0.960	194.165	0,000	4.740	Brand Equity	0.964	0.964	0.976	0.932
BV2	0.971	321.322	0.000	4.884					
BV3	0.966	278.755	0.000	4.155					
CE1	0.949	207.274	0.000	4.780	Campus Experience.	0.968	0.969	0.977	0.913
CE2	0.950	225.308	0.000	4.018					
CE3	0.960	201.419	0.000	4.392					
CE4	0.963	308.408	0.000	4.883					
DO1	0.836	76.736	0.000	2.588	Development	0.945	0.946	0.958	0.820
DO2	0.932	145.985	0.000	4.877					
DO3	0.934	176.812	0.000	4.500					
DO4	0.913	130.519	0.000	4.825					
DO5	0.909	125.714	0.000	4.361					
ED1	0.922	134.807	0.000	3.958	Educational	0.951	0.951	0.964	0.872
ED2	0.911	110.115	0.000	3.435					
ED3	0.952	211.193	0.000	4.583					
ED4	0.948	227.240	0.000	4.255					
IM1	0.932	215.945	0.000	4605	Image Brand	0.962	0.963	0.971	0.869
IM2	0.954	197.401	0.000	4.218					
IM3	0.883	264.725	0.000	4.311					
IM4	0.942	162.691	0.000	4569					
IM5	0.949	176.529	0.000	4.701					
IF1	0.947	241.733	0.000	4.832	Institutional	0.961	0.961	0.971	0.894
IF2	0.949	87.153	0.000	3.209					
IF3	0.953	198.610	0.000	4.015					
IF4	0.934	229.401	0.000	4.526					
OCE1	0.936	166.692	0.000	4.870	Outreach	0.964	0.964	0.974	0.902
OCE2	0.953	183.562	0.000	4.218					
OCE3	0.957	222.898	0.000	4.315					
OCE4	0.952	197.112	0.000	4.635					
PQ1	0.906	146.458	0.000	4.701	Perceived Quality	0.932	0.935	0.948	0.786
PQ2	0.896	116.352	0.000	4.325					
PQ3	0.859	77.554	0.000	2.690					
PQ4	0.906	134.448	0.000	3.980					
PQ5	0.866	90,311	0.000	3.191					
RE1	0.942	184.174	0.000	4.128	Research	0.963	0.963	0.973	0.901
RE2	0.953	214.543	0.000	4.426					
RE3	0.960	258.434	0.000	4.283					
RE4	0.941	146.441	0.000	4.062					

Source: Authors. PLS. Reliability test.

Table 4
Discriminant validity test according to the fornell–larcker criterion.

	Assessment	Brand Identity	Brand Equity	Campus Expe	Development	Educational	Image Brand	Institutional	Outreach	Perceived Quality
Assessment	0.957									
Brand Identity	0.685	0.948								
Brand Equity	0.664	0.788	0.966							
Campus Expe.	0.772	0.682	0.671	0.956						
Development	0.787	0.755	0.727	0.796	0.905					
Educational	0.793	0.741	0.724	0.788	0.724	0.934				
Image Brand	0.640	0.765	0.763	0.636	0.699	0.698	0.932			
Institutional	0.782	0.786	0.766	0.781	0.729	0.741	0.730	0.946		
Outreach	0.796	0.697	0.676	0.751	0.770	0.799	0.647	0.781	0.950	
Perceived Quality	0.657	0.798	0.715	0.655	0.710	0.707	0.864	0.740	0.678	0.987

Source: Authors. PLS. Discriminant validity.

Table 5
Heterotrait–monotrait matrix (HTMT).

	Assessment	Brand Identity	Brand Equity	Campus expe.	Development	Educational	Image Brand	Institutional	Outreach
Brand Identity	0.711								
Brand Equity	0.693	0.714							
Campus expe.	0.788	0.703	0.695						
Development	0.790	0.784	0.759	0.744					
Educational	0.773	0.771	0.756	0.743	0.870				
Image Brand	0.668	0.794	0.791	0.659	0.730	0.730			
Institutional	0.787	0.794	0.797	0.710	0.769	0.780	0.759		
Outreach	0.791	0.721	0.701	0.881	0.798	0.735	0.672	0.712	
Perceived Quality	0.696	0.767	0.751	0.688	0.754	0.750	0.710	0.781	0.714

Source: Authors. PLS. HTMT matrix.

threshold of 0.90 in all cases (see Table 5), which corroborates the discriminant validity of the model.

4.2. Validity of the empirical model

First, the predictive power of the model was examined by analysing the relationships between the constructs (see Table 6). These converge in the associations of the hypothetical model, with the coefficient of determination (R^2) obtaining values that oscillated between 0.58 (brand image) and 0.82 (brand identity), which confirms the high predictive quality of the constructs, given their proximity to 1.0 (perfect prediction) [102].

As can be seen in Table 7, the beta values are significant in the H1a hypothesis ($\beta = 0.161$), where the perceived quality affects the brand identity since the differentiation of the educational service is given thanks to the levels of perceived quality, and likewise in H1b ($\beta = 0.176$) the incidence of perceived quality in the value of the brand is observed since the perceived quality is a determinant of brand equity and they are inseparable. Also, H2a ($\beta = 0.478$) shows the incidence of the brand image in the brand value, since the image is constitutive of the brand and its positioning. Because they determine the singularity and differentiation of the educational offer, H2b is also verified ($\beta = 0.273$); the image generates differentiation by capturing the perceptions of the interested parties and the adequate orientation of the communicative processes. In addition, H3 was also met ($\beta = 0.493$) as the identity determines the value of the brand since it allows both a psychological and economic estimation of branding actions by linking the aspects of the emotional and cognitive aspects of the student to the differential value of the brand focused on their identity. It should be noted that the present investigation addressed the value of the brand as a moderating variable – that is, as a second independent variable whose estimation can modify the relationships between the initial independent variable and the dependent variable [102]. Thus, the value of the brand was analysed in the relationships on the other dimensions of the brand, but it was not found that it generated a moderating role on the dimensions of university sustainability evaluated from the student's perspective.

Regarding the hypothesis H4a ($\beta = 0.354$), it conceptualizes the influence of the institutional framework that affects the brand image since the relations between the strategic orientation of the university and its governance affect brand image. Likewise, H4b ($\beta = 0.176$), which posits the influence of the institutional framework on identity, is met. H4c ($\beta = 0.330$), which posited the influence of the institutional framework in the perception of quality, for which the fulfilment of value promises and transparent and participatory management are developed, was supported. Also, the hypothesis that maintains that the management of the components of the institutional framework is decisive in brand positioning. Likewise, H5a ($\beta = 0.180$), H5b ($\beta = 0.124$) and H5c ($\beta = 0.178$) deal with the influence of campus operations on the dimensions that determine positioning, where significant results are observed. Given the focus of the research only considers the student's perspective, it is highlighted that the levels of satisfaction and the reputation of the university brand are closely related to the campus and the physical facilities and are considered as determinants of the positioning from the image, identity and quality perceived. Thus, the campus makes tangible the universities' brand promises and guarantees the experience of its differential value. With regard to H6a ($\beta = 0.126$), the relationship between education and brand image are fulfilled and generate positioning. Also, H6c ($\beta = 0.105$) supports the relationship between education and perceived quality, whereby the student's interaction with the university brand is centred on verifying the promise of brand from the academy and the perception of excellence of performance in the classroom on sustainability issues. In H6b ($\beta = 0.031$), the relationship between education and brand identity was rejected since prestige is focused on the corporate brand and no consideration is given to individual careers in particular

Table 6
R-squared values.

	R-squared	R-squared adjusted
Brand Identity	0.815	0.814
Brand Equity	0.652	0.650
Image Brand	0.577	0.574
Perceived Quality	0.602	0.598

Source: Authors. PLS. R-squared.

Table 7
Test of validity of the empirical model.

Hypothesis	Validity	Original Sample (β)	T-statistic	P Values
H1a: Perceived quality - > Brand Identity	Supported	0.161*	3.721	0.000
H1b: Perceived quality - > Brand Equity	Supported	0.176*	1.828	0.018
H2a: Image brand - > Brand Identity	Supported	0.478*	10.532	0.000
H2b: Image brand - > Brand Equity	Supported	0.273*	5.683	0.000
H3: Brand Identity - > Brand Equity	Supported	0.493*	11.027	0.000
H4a: Institutional - > Image Brand	Supported	0.354*	6.436	0.000
H4b: Institutional - > Brand Identity	Supported	0.176*	4.946	0.000
H4c: Institutional - > Perceived Quality	Supported	0.330*	6.527	0.000
H5a: Development - > Image Brand	Supported	0.180*	3.468	0.001
H5b: Development - > Brand Identity	Supported	0.124*	3.915	0.000
H5c: Development - > Perceived Quality	Supported	0.178*	3.666	0.000
H6a: Educational - > Image Brand	Supported	0.126*	2.332	0.020
H6b: Educational - > Brand Identity	Not supported	0.031	0.887	0.375
H6c: Educational - > Perceived Quality	Supported	0.105*	2.081	0.038
H7a: Research - > Image Brand	Supported	0.123*	2.315	0.021
H7b: Research - > Brand Identity	Not supported	0.017	0.448	0.654
H7c: Research - > Perceived Quality	Supported	0.112*	2.002	0.045
H8a: Outreach - > Image Brand	Supported	0.153*	2.043	0.027
H8b: Outreach - > Brand Identity	Supported	0.152*	2.035	0.011
H8c: Outreach - > Perceived Quality	Supported	0.133*	2.500	0.012
H9a: Campus expe - > Image Brand	Supported	1.061*	1.855	0.043
H9b: Campus expe - > Brand Identity	Not supported	0.027	0.821	0.411
H9c: Campus expe - > Perceived Quality	Supported	1.062*	1.876	0.040
H10a: Assesment - > Image Brand	Not supported	0.036	0.685	0.0493
H10b: Assesment - > Brand Identity	Not supported	0.006	0.175	0.861
H10c: Assesment - > Perceived Quality	Not supported	0.033	0.698	0.485

(Note: *Significant: T-statistic >1.76, P-value <0.05).
Source: Authors. PLS. Validity of the empirical model.

and its relationship with positioning.

H7a (β = 0.123), which relates research and brand image, is supported and this is due to the prestige and reputation of the universities for their contribution to scientific progress and society, as indicated in the literature review. Likewise, H7c (β = 0.112) shows the same trend as the previous hypothesis, where image and perceived quality are related to research because this dimension is considered as part of the dissemination of knowledge that meets the needs of industry and society. H7b (β = 0.017), which establishes the relationship between research and identity, was rejected. This is due to the need to further expand studies on the implementation of sustainability in the research, although this missionary function is considered a determinant of the positioning and reputation of the university. With regard to the hypotheses H8a (β = 0.153), which deals with the impact of the extension on the image, H8b (β = 0.152), the impact of extension on identity, and H8c (β = 0.133), the impact of university extension on perceived quality, all were approved in the model and valued significantly as determinants of university brand positioning. It is considered that the university extension fosters spaces for participation, co-creation and interaction with the interested parties, which favours the experience of the brand and therefore contributes to the positioning. In addition, the hypotheses H9a (β = 1.061) and H9c (β = 1.062) validated the relationships between experiences of the students' campus and the impact on the image and perceived quality, although the relationship between the dimension and brand identity H9b (β = 0.027) was ruled out.

Since the experiences of the campus are focused on the promotion and generation of sustainability visibility through actions and activities, it is linked to the image and the perceived quality as constitutive of the positioning. On the other hand, the hypotheses H10a (β = 0.036), H10b (β = 0.006) and H10c (β = 0.033) were not supported, therefore, the validation of the presentation of evaluation and sustainability reports does not have an impact on the dimensions of the university brand from the perspective of the students. This is because students do not participate in the accountability of university governments or there are no communication mechanisms for these reports in a way that links them to the students' attention (see Tables 6 and 7). As presented in the literature review, university management does not communicate sustainability reports to students and students have little involvement in the evaluation process.

5. Discussion

The objective of this study was to establish the impact of sustainability on the positioning of the university brand from the perspective of students in the Colombian context. To achieve this, two measurement models were proposed: one to estimate sustainability and another for brand positioning. This approach was made based on the scientific literature on the current state of both topics and the instruments were empirically and quantitatively validated. Subsequently, in the structural model, the causal relationships between the dimensions of the central constructs were raised to analyse and validate their respective supposed relationships. Thus, the model presented significant relationships between the dimensions of sustainability, except in evaluation and reports, and the positioning of the university brand. Initially, the model presents the dimensions of brand positioning: perceived quality, image and identity of the brand as a determinant of the attitudes and perception of students towards the university that determine the added

and differential value of the university [56].

H1. *Perceived quality affects brand identity (H1a) and brand equity (H2b)*. Perceived quality was shown to be associated with students' perception of the university's historical heritage, reputational heritage, employability and social prestige [66,108]. Thus, the model presents the value of the brand conceptualized as an added value in which the meaning, image, identity and perception of quality of a specific good affect the student's perception [109,110]. Thus, from the student's perspective the differential values of the university brand are established [66,88]. Consequently, the dimensions of the university brand, image, identity and perceived quality are directly linked to the value of the brand as they act as determinants of the choice of the university by students, since they constitute the basis of reputation, trust and the preference of one university over another [26,57,88]. Considering the above, it can be stated that perceived quality determines brand value because it relates student expectations to their levels of satisfaction [71]. In this way, perceived quality develops brand value in students because it is based on knowledge of the institution, familiarity with the brand and strong associations that lead to prestige and trust [26].

H2. *Brand image affects brand identity (H2a) and brand equity (H2b)*. Likewise, the image affects the value of the brand from the student perspective because it fulfils a marketing function that contributes to positioning by encompassing sensory, symbolic and corporate aspects [69,111]. This is that in the brand value the image has a differential effect of the knowledge of the university that generates the associations that lead to student loyalty [112].

H3. *Brand identity affects brand equity*. Likewise, identity fulfils the function in the brand value of singling out and identifying the value proposition [64]. This differentiation capacity is the basis of positioning [77] because the university brand is evaluated according to the student's experience simultaneously [54]. Identity favours choice criteria, preference over competitors and highlights the superiority of the institution's intangible values [57].

H4. *The institutional framework influences brand image (H4a), brand identity (H4c) and perceived quality (H4c)*. The institutional framework is one of the main drivers of university sustainability [113]. Thus, current studies reveal that management and leadership levels generate perceptions, attitudes and behaviours that commit students to sustainable development, linking them with the image and brand identity with the values of the sustainability. Likewise, it affects the perceived quality because this dimension fosters the structure for the implementation of sustainability, guaranteeing transparency and compliance with the standards of excellence [33, 114,115].

H5. *Campus operations influences brand image (H5a), brand identity (H5b) and perceived quality (H5c)*. With regard to campus operations, this includes understanding aspects related to energy, infrastructure, waste, water management, transportation, soil, food and contribution to combating climate change [37]. It was found that this dimension of sustainability strongly impacts the three dimensions of brand positioning because it encourages students to be co-creators of professional proposals that cause social and business change towards sustainability [41]. This finding is consistent with previous research that relates the campus infrastructure and experience to perceived quality and brand image [71], as well as considering the elements that make up campus experiences as causes of positioning [116].

H6. : *Education influences brand image (H6a) and perceived quality (H6c)*. With regard to the relationships between education and brand, the path coefficients coincide with the theoretical findings that relate perceived quality and brand image to academic activities, faculty, academic programmes and other aspects concerning this item [98]. The educational experience for sustainability affects the cognitive, conative and affective dimensions of the university brand image in students and the development of a new meaning of professional work [84,117]. Education does not influence brand identity (H6b). The model did not confirm the relationships between education and brand identity; this is consistent with the studies that relate the biases between own identity and the brand identity of the university with regard to the values of sustainability [54] and the need for pedagogies that transcend the curriculum to the needs of students [39].

H7. *Research influences brand image (H7a) and perceived quality (H7c)*. Similarly, the model presented the relationships between research and the brand, which, as seen in Fig. 2, shows the influence of research actions on the generation of brand image and perceived quality. This is because research is the starting point for the university's relationship with industry and the public sector [41, 118], which influences rankings and reputation [70,87,119]. Likewise, it was found that this dimension is related to social innovation and economic sustainability, which makes the university a unit of sustainable and responsible entrepreneurship with society and the environment [2]. Research does not influence brand identity (H7b); the model did not validate this relationship. This may be possible since identity is implicit in the generation of positioning from brand image management and some authors only consider the university brand image and research as reputational references [69,87].

H8. *Extension influences brand image (H8a), brand identity (H8b) and perceived quality (H8c)*. Studies have shown that outreach activities favour the co-creation and integration of stakeholders to achieve university sustainability projects [117,120]. Sustainable actions towards the community strengthen the brand image, consolidating its reputation, generate differential values in society and thus contribute to the sense of belonging to the institution. These actions give credibility to the institution, which strengthens the brand [25,32,85]. It is emphasized that the reputation generated by extension actions are a determinant of positioning [59].

H9. *Campus experiences influence brand image (H9a) and perceived quality (H9c)*. Similarly, the results of the model show that campus experiences are an important factor in strengthening the university brand image. This corresponds to the conceptualization that has been made of the campus experiences, such as activities to promote sustainability, policies, work practices for students, the formation

of work groups for sustainability projects [30] and the promotion of citizen values and healthy living [40,87]. Likewise, it is high-lighted that the campus is one of the main aspects that affect the institutional image, to the point of being considered as a dimension of the university brand image [121]. This dimension observes the student's experience in terms of university sustainability [40], which is consistent with the fact that it contributes to the brand image insofar as the campus experience is part of the university brand promise [119]. Consequently, the experiences of the campus on sustainability affect the perceived quality of the students since quality, as a constitutive aspect of the brand promise, is defined by the student's experience, determined in the first instance by the opportunities offered by the campus [122]. The model presented that on-campus experiences do not influence brand identity (H9b). The reason is that studies have shown that this dimension is related to image and perceived quality. The reason the model did not confirm this relationship may be that brand identity may be understood more as a psychological category that is forged subsequent to the experience [123].

H10. *Evaluation and reporting influence the brand image (H10a), the brand identity (H10b) and perceived quality (H10c).* The findings could not establish the influence of sustainability evaluation and reporting on the dimensions of brand positioning. The reason could be because universities must transcend ecocentric sustainability approaches and link students more, not only through the curriculum, but also in the communication of actions in favour of sustainability [4,28,51]. Likewise, some actions link evaluation and reports with governance actions indicating that this dimension is central to sustainability management [44,51,118]. Regarding the positioning of the university brand, participation and reciprocity in the sustainability evaluation processes guarantee the levels of student satisfaction [53]. In this way, the fulfilment of the promise of value and the co-creation of shared meaning of the university brand can be ver-ifiedbrand [124]. Thus, the positioning of the university brand is linked to the other dimensions of sustainability in which the student is more directly involved, such as the campus, missionary functions of the university, and relations with industry.

6. Conclusions

To conclude, the main theoretical and managerial implications are presented, as well as the limitations and future research on the issue.

6.1. Theoretical implications

The previous sections have developed the empirical contribution of the analysis of the proposed model for which theoretical as-sumptions were validated or refuted. However, this research addressed an analysis of the positioning of the university brand for which some dimensions were proposed that were not clearly defined and which are also consistent with the advances in university branding studies [53,60,72]. In addition, the incidence of sustainability as an organizational model on the positioning of the university brand is addressed, where a satisfactory validation of the dimensions of sustainability was addressed and the results of the analysis of its in-fluence on identity, image and perceived quality were found, as constitutive of the positioning of the university brand. The studies on the issue evidenced the existence of a gap in the conceptualization of the determinants of positioning in university branding. Thus, theoretical and empirical demonstrations of identity, image and perceived quality as dimensions of this construct and its impact on the commitment to institutional support for sustainability are a recent theoretical contribution to the issue. The present research makes a contribution to university branding by establishing the way in which the dimensions of sustainability are generators of brand posi-tioning in students. Thus, it was possible to establish that the dimensions of sustainability, such as institutional framework, campus operations, education, research and extension, are determinants of prestige, uniqueness and relevance over the competition. There-fore, they are aspects that influence the choice of the university by the students and at the same time are elements that affect the loyalty and satisfaction of the brand promise. Likewise, a theoretical contribution was made that had not been addressed, by establishing how the dimensions of sustainability affected the constituent elements of positioning, such as perceived quality, image and identity of the university brand, in being able to propose the central aspects of sustainability in the management of the university brand.

6.2. Practical and business implications

This study presents three practical and managerial implications for high-quality accredited universities. First, high-quality accredited universities need to consider educational marketing beyond advertising and address an effective way to convey their value proposition to various stakeholders, especially students. Thus, this research is a benchmark for university brand management for the analysis of brand positioning and the evaluation of alternatives that generate impact and, above all, economic sustainability. It provides a base for/a base to the most significant aspects of university life that favour the choice of one institution over another and thus define their respective competitive advantage. As a second implication, it supports university marketing communications from a non-traditional perspective that considers the current needs of university applicants, university students and the university envi-ronment, from a perspective of social, environmental and economic sustainability. Thus, it is a tool for marketing activities that allows the adaptation of student recruitment strategies to the new social needs posed by sustainability in the education sector. The third implication is that as a management tool, it favours accreditation and re-accreditation processes by directing and evaluating progress in terms of sustainability and relationships with interested parties.

6.3. Limitations and future lines of research

Although this research deals in a new way with the situation of university branding and sustainability from the student perspective in the Colombian context, it presents some limitations for a broader vision of the relationships between sustainability and university brand positioning. In the first place, it only addresses the student perspective and for a strategic understanding of the scope of sustainability in the positioning of the university brand, knowledge of the perspectives of key actors in university branding, such as parents, candidates for the university, companies and state institutions, is required. In addition, some aspects, such as the economic and employability perspective, enrolment rate, the sense of belonging of employees and other aspects that affect the relationships between sustainability and university brand positioning were not addressed. Therefore, the need to address university brand issues by analysing external university parties, such as the perspective of industry, parents and university candidates, is proposed as future research. Likewise, a study is suggested to compare the current state of sustainability and university branding in Latin America.

Ethics declarations

All participants provided informed consent to participate in the study.

Data availability statement

The data is confidential.
Research participants are over 18 years of age.

CRediT authorship contribution statement

Johnatan Castro-Gómez: Investigation. **Javier A. Sánchez-Torres:** Investigation. **Paola Andrea Ortíz-Rendón:** Investigation.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interestsJavier A Sanchez-Torres reports administrative support and article publishing charges were provided by .Universidad de Medellín. Javier A Sanchez-Torres reports a relationship with Universidad de Medellín that includes: employment. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Annex 1. Measuring instrument for university brand

With a result KMO = 0.967.
The total explained variance was calculated with an accumulated percentage of 82.4 %.
Bartlett's sphericity test was used to assess adequacy, which resulted in a chi-square approximation of 24,865.

Construct	Items	Authors
Perceived Quality	PQ 1: I consider that university professors have optimal knowledge in their teaching fields.	[26]
	PQ 2: I think that professors have scientific and academic prestige and are benchmarks for their research and scientific production.	[56]
		[98]
	PQ 3: I consider that the university has a sufficient number of professors.	
	PQ 4: I believe that the university has an adequate infrastructure that favours academic development.	
	PQ 5: I consider that the university has state-of-the-art technological resources and fast access to the Internet.	
University Brand Image	IM1: I perceive that the university is a respected institution in society.	[73]
	IM2: I consider that the university has high academic standards.	[125]
	IM 3: I believe that the university gives importance to the integral development (emotional, intellectual, spiritual and interpersonal) of the students.	
	IM4: I believe that the university provides the labour market with well-trained graduates.	
	IM5: I would recommend the university as it has a better image than its competitors.	
University Brand Identity	BI 1: I consider that the mission and vision are admirable and outstanding.	[58]
	BI 2: I consider that the brand is unique, original and differs from the brands of other universities.	[53]
	BI 3: I believe that the signs and symbols of the university identify the unique value of the brand.	
	BI 4: I perceive that the brand of the university is motivating and easy to remember.	
	BI 5: I consider that the university brand creates a clear image in the mind, easily differentiating it from the competition.	
Brand Equity	BV1: It makes sense to prefer this university to any other.	[26,
	BV2: I prefer this university, even if there are other similar universities.	126]
	BV3: Preferring this university was the right thing to do.	

Measurement instrument for university sustainability

Exploratory factor analysis:

With a KMO = 0.98 measure,

The Bartlett sphericity test with a chi-square of 50082.93.

Likewise, the total explained variance yielded an accumulated percentage of 83.38 %, exceeding the minimum threshold of 60 % [102].

Construct	Items	Authors
Institutional Framework	IF 1: I consider that the university has implemented sustainability in the Institutional Pedagogical Project and in the Institutional Policies.	[47]
	IF 2: I consider that the university has a written commitment (agreement) to support sustainability and is known to the students.	[91]
	IF 3: I consider that the university has sustainable work policies to generate greater benefits for its employees.	[92]
	IF 4: I consider that the university has employment policies that are respectful of diversity, disability and ethnic minority issues.	
Campus Operations	DCO 1: I perceive that the university has enough outdoor spaces, and favourable areas for vegetation, trees and biodiversity.	[16]
	DCO 2: I perceive that the institution has policies and actions for the use of renewable energies.	[127]
	DCO 3: I consider that the institution has programmes to reduce paper and plastic on campus.	[44]
	DCO 4: I perceive that the institution promotes sustainable mobility, policies to limit the use of motor vehicles and encourages the use of bicycles and pedestrian paths.	[92]
	DCO 5: I consider that the institution applies the water conservation programme.	[93]
		[128]
		[129]
Education	E 1: I consider that the institution participates in the organization of specific events focused on sustainability.	[49]
	E 2: I consider that the credits of the sustainability courses are important in the curriculum.	[38]
	E 3: I consider that there is a presence of sustainability issues in the competences of the courses.	[94]
	E 4: I perceive that the subjects promote critical thinking about sustainability.	
Research	R 1: I think that the university favours the publication of articles, books and academic material on sustainability.	[49]
	R 2: I perceive that the university supports research on sustainability with a budget, funds, scholarships and incentives.	[44]
	R 3: I consider that the research projects in sustainability of the university have favoured, and have been applied in, environmental, commercial and social projects.	[128]
	R 4: I consider that sustainability research involves students.	
Outreach and Collaboration	OCE 1: I consider that there is collaborative work with other universities to contribute to the construction of a sustainable campus.	[49]
	OCE 2: I think that the university cooperates with other universities and national and foreign companies in terms of sustainability.	[30]
	OCE 3: I consider that the university promotes extracurricular courses related to sustainability.	[16]
	OCE 4: I observe that the university collaborates with other universities in projects and extension courses on sustainability.	[128]
SD through On-Campus Experiences	CE 1: I observe that sustainability disclosure campaigns are carried out on campus.	[40]
	CE 2: I consider that the university has a website to promote sustainability.	[30]
	CE 3: I perceive that there are working groups at the university to promote sustainability.	[47]
	CE 4: I consider that awareness-raising activities on sustainability issues are carried out on campus.	
Assessment and Reporting	AR 1: I consider that sustainability is included	[1,31,49, 130]
	AR 2: I consider that the institution carries out sustainability assessments.	
	AR 3: I think that the university does not publicly present sustainability evaluations.	
	AR 4: I think the university presents environmental reports.	

Annex 2

Matrix of factor loadings and Cronbach's coefficient. University brand

Factor		Factor loading	Cronbach's α	Item
BI 5	1	0.79	0.97	I consider that the brand of the university creates a clear image in the mind, easily differentiating it from the competition.
BI 4		0.78		I perceive that the university's brand is motivating and easy to remember.
BI 3		0.78		I believe that the signs and symbols of the university identify the unique value of the brand.
BI 2		0.73		I consider that the brand is unique, original and differs from the brands of other universities.
BI 1		0.68		I consider that the mission and vision are admirable and outstanding.
IM 2	2	0.77	0.96	I think the university has high academic standards.
IM 1		0.74		I perceive that the university is a respected institution in society.
IM 5		0.69		I would recommend the university as it has a better image than its competitors.
IM 4		0.68		I believe that the university provides the labour market with well-trained graduates.
IM 3		0.55		I believe that the university gives importance to the integral development (emotional, intellectual, spiritual and interpersonal) of the students.

Annex 2 (*continued*)

Factor		Factor loading	Cronbach's α	Item
PQ 1	3	0.54	0.93	I consider that the university's professors have optimal knowledge in their fields of education.
PQ 2		0.53		I think that the professors have scientific and academic prestige and are benchmarks for their research and scientific production.
PQ 4		0.76		I believe that the university has an adequate infrastructure that favours academic development.
PQ 5		0.78		I consider that the university has state-of-the-art technological resources and fast access to the Internet.
PQ 3		0.69		I consider that the university has a sufficient number of professors.

Matrix of factor loadings and Cronbach coefficient. University sustainability.

	Factor loadings	Factor loadings	Cronbach's α	Item
1	IF 3	0.69	0.96	I consider that the university has sustainable work policies to generate greater benefits for its employees.
	IF 2	0.69		I consider that the university has a written commitment (agreement) to support sustainability and it is known to the students.
	IF 1	0.68		I consider that the university has implemented sustainability in the Institutional Pedagogical Project and in the Institutional Policies.
	IF 4	0.67		I consider the university has employment policies that are respectful of diversity, disability and ethnic minority issues.
2	DCO 4	0.69	0.94	I perceive that the institution promotes sustainable mobility, policies to limit the use of motor vehicles and encourage the use of bicycles and pedestrian paths.
	DCO 5	0.68		I consider that the institution applies the water conservation programme.
	DCO 3	0.67		I consider that the institution has programmes to reduce paper and plastic on campus.
	DCO 2	0.59		I perceive that the institution has policies and actions for the use of renewable energies.
3	R 2	0.67	0.96	I perceive that the university supports research on sustainability with budget, funds, scholarships and incentives.
	R 1	0.66		I consider that the university favours the publication of articles, books and academic material on sustainability.
	R 3	0.65		I consider that the research projects in sustainability of the university have favoured, and have been applied in, environmental, commercial and social projects.
	R 4	0.65		I consider that sustainability research involves students.
	OCE 4	0.69	0.96	I observe that the university collaborates with other universities in projects and extension courses on sustainability.
	OCE3	0.66		I consider that the university promotes extracurricular courses related to sustainability.
	OCE 2	0.66		I consider that the university cooperates with other universities and national and foreign companies in terms of sustainability.
	OCE 1	0.62		I consider that there is collaborative work with other universities to contribute to the construction of a sustainable campus.
5	AR 2	0.69	0.87	I consider that the institution carries out sustainability assessments.
	AR 1	0.63		I consider that sustainability is included in the strategic plans of the university.
	AR 4	0.62		I think the university submits environmental reports.
6	CE 4	0.61	0.97	I consider that awareness-raising activities on sustainability issues are carried out on campus.
	CE 3	0.60		I perceive that at the university there are working groups to promote sustainability.
	CE 2	0.59		I consider that the university has a website to promote sustainability.
	CE 1	0.57		I am aware that there are sustainability outreach campaigns on campus.
7	E 3	0.63	0.95	I consider that there is a presence of sustainability issues in the competencies of the courses.
	E 4	0.59		I perceive that the subjects promote critical thinking about sustainability.
	E 2	0.52		I consider sustainability course credits to be important in the curriculum.

References

[1] P.J. Ramísio, L.M.C. Pinto, N. Gouveia, H. Costa, D. Arezes, Sustainability strategy in higher education institutions: Lessons learned from a nine-year case study, J. Clean. Prod. 222 (2019) 300–309, https://doi.org/10.1016/j.jclepro.2019.02.257.

[2] Y. Cai, I. Ahmad, From an Entrepreneurial university to a sustainable Entrepreneurial university: conceptualization and evidence in the contexts of European university Reforms, High Educ. Pol. 36 (2023) 20–52, https://doi.org/10.1057/s41307-021-00243-z.

[3] G. Nicolino, S.R.S. Barros, An Enhanced Data-Analyses Method for the Graphical Assessment of Universities' Sustainability Image (GAUSI) Instrument: A Case Study in Federal University in Brazil, 2020, pp. 563–583, https://doi.org/10.1007/978-3-030-30306-8_34.

[4] A. Disterheft, S.S. Caeiro, W. Leal Filho, U.M. Azeiteiro, The INDICARE-model - measuring and caring about participation in higher education's sustainability assessment, Ecol. Indicat. 63 (2016) 172–186, https://doi.org/10.1016/j.ecolind.2015.11.057.

[5] V. Morales-Baños, F.J. Borrego-Balsalobre, A. Díaz-Suárez, J.M. López-Gullón, Levels of sustainability awareness in Spanish university students of Nautical activities as future Managers of Sports and active Tourism programmes, Sustainability 15 (2023) 2733, https://doi.org/10.3390/su15032733.

[6] E. de J. Lopes, C.R. Colombo, V.P. Da Silva, Measuring commitment to sustainability: proposal of performance indicators for a public university in Northeast Brazil, Rev. Gestão Soc. e Ambiental 18 (2023) e04372, https://doi.org/10.24857/rgsa.v18n2-025.

[7] A. Redman, A. Wiek, M. Barth, Current practice of assessing students' sustainability competencies: a review of tools, Sustain. Sci. 16 (2021) 117–135, https://doi.org/10.1007/s11625-020-00855-1.

[8] A.-N. El-Kassar, D. Makki, M.A. Gonzalez-Perez, V. Cathro, Doing Well by Doing Good: Why Is Investing in University Social Responsibility a Good Business for Higher Education Institutions Cross Culturally?, vol. 30, Cross Cultural & Strategic Management, 2023, pp. 142–165, https://doi.org/10.1108/CCSM-12-2021-0233.

[9] P.M. Hernández-Diaz, J.A. Polanco, M. Escobar-Sierra, W. Leal Filho, Holistic integration of sustainability at universities: Evidences from Colombia, J. Clean. Prod. 305 (2021), https://doi.org/10.1016/j.jclepro.2021.127145.

[10] P.M. Hernandez-Diaz, J.-A. Polanco, S.A. Osuna-Ramírez, E. Jaillier-Castrillón, T. Molina-Velasquez, M. Escobar-Sierra, Incidence of sustainability in university performance: evidence of stakeholders' perceptions at Colombian private higher education institutions, Int. J. Sustain. High Educ. (2023), https://doi.org/10.1108/IJSHE-08-2022-0264.

[11] D. Amani, Internal corporate social responsibility and university brand legitimacy: an employee perspective in the higher education sector in Tanzania, Soc. Responsib. J. 19 (2023) 611–625, https://doi.org/10.1108/SRJ-12-2021-0540.

[12] K.O. Amoako, E.O. Marfo, E.K. Akwaa-Sekyi, N. Amaning, N. Yankey, Stakeholder perceptions of sustainability reporting on the websites of technical universities in Ghana, Benchmark Int. J. 30 (2023) 4248–4284, https://doi.org/10.1108/BIJ-02-2022-0104.

[13] G. Lăzăroiu, Is there an absence of capability in sustainable development in universities? Educ. Philos. Theor. 49 (2017) 1305–1308, https://doi.org/10.1080/00131857.2017.1300023.

[14] R. Yadav, A. Shiva, S. Narula, Exploring private university attractiveness from students' perspective to ensure sustainable institutes: an empirical investigation from Indian perspective, Asia-Pacific, J. Bus. Adm. 16 (2024) 170–203, https://doi.org/10.1108/APJBA-04-2021-0165.

[15] S. Sterling, L. Maxey, H. Luna, S. Parkin, The Sustainable University: Progress and Prospects, Taylor and Francis, 2013, https://doi.org/10.4324/9780203101780.

[16] R. Dagiliūtė, G. Liobikienė, A. Minelgaitė, Sustainability at universities: students' perceptions from green and non-green universities, J. Clean. Prod. 181 (2018) 473–482, https://doi.org/10.1016/j.jclepro.2018.01.213.

[17] M.D. Aledo-Ruiz, E. Martínez-Caro, J.M. Santos-Jaén, The influence of corporate social responsibility on students' emotional appeal in the <scp>HEIs</scp> : the mediating effect of reputation and corporate image, Corp. Soc. Responsib. Environ. Manag. 29 (2022) 578–592, https://doi.org/10.1002/csr.2221.

[18] C. Del-Castillo-Feito, A. Blanco-González, R. Delgado-Alemany, The relationship between image, legitimacy, and reputation as a sustainable strategy: students' versus Professors' perceptions in the higher education sector, Sustainability 12 (2020) 1189, https://doi.org/10.3390/su12031189.

[19] G. Lazaroiu, Besley on Foucault's discourse of education, Educ. Philos. Theor. 45 (2013) 821–832, https://doi.org/10.1080/00131857.2013.785092.

[20] L. Portocarrero-Sierra, J.A. Restrepo-Morales, J.E. Arias-Calderón, Evaluación del impacto de la acreditación de alta calidad en las instituciones públicas de educación superior de Colombia, Formación Universitaria 13 (2020) 37–50, https://doi.org/10.4067/S0718-50062020000600037.

[21] C.H. González-Campo, D. Ico-Brath, G. Murillo-Vargas, Integración de los objetivos de desarrollo sostenible (ODS) para el cumplimiento de la agenda 2030 en las universidades públicas colombianas, Formación Universitaria 15 (2022) 53–60, https://doi.org/10.4067/S0718-50062022000200053.

[22] F. Andrés, M. Lozano, M. Natalia, O. Cifuentes, La evaluación en educación superior con fines de acreditación de alta calidad a través de un modelo sistémico con teoría de redes Assessment in higher education for high quality accreditation purpose through a systemic model with network theory, 2016.

[23] G. Payne, A. Blanco-González, G. Miotto, C. del-Castillo, Consumer Ethicality perception and legitimacy: competitive advantages in COVID-19 Crisis, Am. Behav. Sci. (2021), https://doi.org/10.1177/00027642211016515, 000276422110165.

[24] S.R. Manzoor, J.S.Y. Ho, A. Al Mahmud, Revisiting the 'university image model' for higher education institutions' sustainability, J. Market. High Educ. 31 (2021) 220–239, https://doi.org/10.1080/08841241.2020.1781736.

[25] D.-C. Dabija, V. Campian, L. Stanca, A. Tiron-Tudor, Generating students' loyalty towards the sustainable university during the later COVID-19 pandemic, Int. J. Sustain. High Educ. 24 (2023) 1858–1876, https://doi.org/10.1108/IJSHE-11-2022-0372.

[26] T. Girard, M. Pinar, An empirical study of the dynamic relationships between the core and supporting brand equity dimensions in higher education, J. Appl. Res. High Educ. 13 (2020) 710–740, https://doi.org/10.1108/JARHE-04-2020-0097.

[27] M.I. Ishaq, E. Di Maria, Sustainability countenance in brand equity: a critical review and future research directions, J. Brand Manag. 27 (2020) 15–34, https://doi.org/10.1057/s41262-019-00167-5.

[28] A. Berzosa, M.O. Bernaldo, G. Fernández-Sanchez, Sustainability assessment tools for higher education: an empirical comparative analysis, J. Clean. Prod. 161 (2017) 812–820, https://doi.org/10.1016/j.jclepro.2017.05.194.

[29] R. Lozano, M. Barreiro-Gen, A. Zafar, Collaboration for organizational sustainability limits to growth: developing a factors, benefits, and challenges framework, Sustain. Dev. 29 (2021) 728–737, https://doi.org/10.1002/sd.2170.

[30] R. Lozano, K. Ceulemans, M. Alonso-Almeida, D. Huisingh, F.J. Lozano, T. Waas, W. Lambrechts, R. Lukman, J. Hugé, A review of commitment and implementation of sustainable development in higher education: results from a worldwide survey, J. Clean. Prod. 108 (2015) 1–18, https://doi.org/10.1016/j.jclepro.2014.09.048.

[31] N. Bautista-Puig, E. Sanz-Casado, Sustainability practices in Spanish higher education institutions: an overview of status and implementation, J. Clean. Prod. 295 (2021), https://doi.org/10.1016/j.jclepro.2021.126320.

[32] I. Žalėnienė, P. Pereira, Higher education for sustainability: a global perspective, Geography and Sustainability 2 (2021) 99–106, https://doi.org/10.1016/j.geosus.2021.05.001.

[33] N. Roos, R. Sassen, E. Guenther, Sustainability governance toward an organizational sustainability culture at German higher education institutions, Int. J. Sustain. High Educ. (2022), https://doi.org/10.1108/IJSHE-09-2021-0396.

[34] G. Sonetti, M. Sarrica, L.S. Norton, Conceptualization of sustainability among students, administrative and teaching staff of a university community: an exploratory study in Italy, J. Clean. Prod. 316 (2021), https://doi.org/10.1016/j.jclepro.2021.128292.

[35] M.D.M. Alonso-Almeida, F. Marimon, F. Casani, J. Rodriguez-Pomeda, Diffusion of sustainability reporting in universities: current situation and future perspectives, J. Clean. Prod. 106 (2015) 144–154, https://doi.org/10.1016/j.jclepro.2014.02.008.

[36] T. Shenkoya, E. Kim, Sustainability in higher education: Digital transformation of the Fourth Industrial Revolution and its impact on open knowledge, Sustainability 15 (2023) 2473, https://doi.org/10.3390/su15032473.

[37] A.R. Amaral, E. Rodrigues, A.R. Gaspar, Á. Gomes, A review of empirical data of sustainability initiatives in university campus operations, J. Clean. Prod. 250 (2020), https://doi.org/10.1016/j.jclepro.2019.119558.

[38] T. Stough, K. Ceulemans, W. Lambrechts, V. Cappuyns, Assessing sustainability in higher education curricula: a critical reflection on validity issues, J. Clean. Prod. 172 (2018) 4456–4466, https://doi.org/10.1016/j.jclepro.2017.02.017.

[39] J.C. Sanchez-Carrillo, M.A. Cadarso, M.A. Tobarra, Embracing higher education leadership in sustainability: a systematic review, J. Clean. Prod. 298 (2021), https://doi.org/10.1016/j.jclepro.2021.126675.

[40] F. Findler, N. Schönherr, R. Lozano, B. Stacherl, Assessing the impacts of higher education institutions on sustainable development-an analysis of tools and indicators, Sustainability 11 (2019), https://doi.org/10.3390/su11010059.

[41] W. Horan, B. O'regan, Developing a practical framework of sustainability indicators relevant to all higher education institutions to enable meaningful international rankings, Sustainability 13 (2021) 1–15, https://doi.org/10.3390/su13020629.

[42] E. De La Poza, P. Merello, A. Barberá, A. Celani, Universities' reporting on SDGs: using the impact rankings to model and measure their contribution to sustainability, Sustainability 13 (2021) 1–30, https://doi.org/10.3390/su13042038.

[43] S. Fissi, A. Romolini, E. Gori, M. Contri, The path toward a sustainable green university: the case of the University of Florence, J. Clean. Prod. 279 (2021), https://doi.org/10.1016/j.jclepro.2020.123655.

[44] Y. Du, M.H. Arkesteijn, A.C. den Heijer, K. Song, Sustainable assessment tools for higher education institutions: Guidelines for developing a tool for China, Sustainability 12 (2020), https://doi.org/10.3390/su12166501.

[45] I.E. De Hooge, Y.K. van Dam, Reach out and touch: student training community projects for sustainability - a case study, Int. J. Sustain. High Educ. 20 (2019) 1278–1289, https://doi.org/10.1108/IJSHE-11-2018-0222.

[46] C. Smaniotto, C. Battistella, L. Brunelli, E. Ruscio, A. Agodi, F. Auxilia, V. Baccolini, U. Gelatti, A. Odone, R. Prato, S. Tardivo, G. Voglino, F. Valent, S. Brusaferro, F. Balzarini, M. Barchitta, A. Carli, F. Castelli, C. Coppola, G. Iannelli, M. Milazzo, B. Rosina, C. Salerno, R. Siliquini, S. Sisi, Sustainable development goals and 2030 agenda: awareness, knowledge and attitudes in nine Italian universities, 2019, Int. J. Environ. Res. Publ. Health 17 (2020) 1–18, https://doi.org/10.3390/ijerph17238968.

[47] F.U. Gómez, C. Sáez-Navarrete, S.R. Lioi, V.I. Marzuca, Adaptable model for assessing sustainability in higher education, J. Clean. Prod. 107 (2015) 475–485, https://doi.org/10.1016/j.jclepro.2014.07.047.

[48] S. Caeiro, U.M. Azeiteiro, Sustainability assessment in higher education institutions, Sustainability 12 (2020), https://doi.org/10.3390/SU12083433.

[49] K. Ceulemans, I. Molderez, L. Van Liedekerke, Sustainability reporting in higher education: a comprehensive review of the recent literature and paths for further research, in: J Clean Prod, Elsevier Ltd, 2015, pp. 127–143, https://doi.org/10.1016/j.jclepro.2014.09.052.

[50] P. Arroyo, A new taxonomy for examining the multi-role of campus sustainability assessments in organizational change, J. Clean. Prod. 140 (2017) 1763–1774, https://doi.org/10.1016/j.jclepro.2015.08.100.

[51] D. Kapitulčinová, A. AtKisson, J. Perdue, M. Will, Towards integrated sustainability in higher education – Mapping the use of the Accelerator toolset in all dimensions of university practice, J. Clean. Prod. 172 (2018) 4367–4382, https://doi.org/10.1016/j.jclepro.2017.05.050.

[52] G. Al-Zohbi, M.A.E. Pilotti, Contradictions about sustainability: a case study of college students from Saudi Arabia, Sustainability 15 (2023) 3483, https://doi.org/10.3390/su15043483.

[53] A. Brzaković, T. Brzaković, P. Brzaković, The determinants of brand positioning in higher education – what dominantly influences students' satisfaction? Croat. J. Educ. 21 (2019) 407–436, https://doi.org/10.15516/cje.v21i2.3136.

[54] F. Naheen, T.H. Elsharnouby, You are what you communicate: on the relationships among university brand personality, identification, student participation, and citizenship behaviour, J. Market. High Educ. (2021) 1–22, https://doi.org/10.1080/08841241.2021.1992814.

[55] J. Mampaey, V. Schtemberg, J. Schijns, J. Huisman, A. Wæraas, Internal branding in higher education: dialectical tensions underlying the discursive legitimation of a new brand of student diversity, High Educ. Res. Dev. 39 (2020) 230–243, https://doi.org/10.1080/07294360.2019.1674252.

[56] M. Pinar, T. Girard, C. Basfirinci, Examining the relationship between brand equity dimensions and university brand equity: an empirical study in Turkey, Int. J. Educ. Manag. 34 (2020) 1119–1141, https://doi.org/10.1108/IJEM-08-2019-0313.

[57] O.L. Rua, C. Santos, Linking brand and competitive advantage: the mediating effect of positioning and market orientation, European Research on Management and Business Economics 28 (2022) 100194, https://doi.org/10.1016/j.iedeen.2021.100194.

[58] C. Dennis, S. Papagiannidis, E. Alamanos, M. Bourlakis, The role of brand attachment strength in higher education, J. Bus. Res. 69 (2016) 3049–3057, https://doi.org/10.1016/j.jbusres.2016.01.020.

[59] S. Panda, S.C. Pandey, A. Bennett, X. Tian, University brand image as competitive advantage: a two-country study, Int. J. Educ. Manag. 33 (2019) 234–251, https://doi.org/10.1108/IJEM-12-2017-0374.

[60] T. Fumasoli, J. Huisman, Strategic Agency and System diversity: Conceptualizing institutional positioning in higher education, Minerva 51 (2013) 155–169, https://doi.org/10.1007/s11024-013-9225-y.

[61] T. Fumasoli, G. Barbato, M. Turri, The determinants of university strategic positioning: a reappraisal of the organisation, High Educ. 80 (2020) 305–334, https://doi.org/10.1007/s10734-019-00481-6.

[62] Y. Stukalina, D. Pavlyuk, Using customer-based brand equity model in the higher education context: Simulating the current university's brand, Business, Management and Economics Engineering 19 (2021) 272–288, https://doi.org/10.3846/bmee.2021.14692.

[63] C. Coman, M.C. Bularca, A. Repanovici, Constructing and communicating the visual identity of a university. Case study: Visual identity of transilvania university of brasov, Sustainability 13 (2021), https://doi.org/10.3390/su13137145.

[64] Y.Q. Wu, C.Y.M. Cheong, Corporate branding of academic institutions: semiotic communication of logos and names, J. Market. High Educ. (2021) 1–23, https://doi.org/10.1080/08841241.2021.1989544.

[65] S.-C. Chen, University branding: student experience, value perception, and consumption journey, J. Market. High Educ. (2022) 1–20, https://doi.org/10.1080/08841241.2022.2109092.

[66] C.H. Perera, R. Nayak, L.T. Van Nguyen, The impact of subjective norms, eWOM and perceived brand credibility on brand equity: application to the higher education sector, Int. J. Educ. Manag. 35 (2021) 63–74, https://doi.org/10.1108/IJEM-05-2020-0264.

[67] D.A. Aaker, The value of brand equity, J. Bus. Strat. 13 (1992) 27–32, https://doi.org/10.1108/eb039503.

[68] K.L. Keller, Strategic Brand Management : Building, Measuring, and Managing Brand Equity, Pearson/Prentice Hall, 2008.

[69] M. Ostojić, M. Leko Šimić, Students' perceptions of public vs. Private higher education institution brand value in Croatia, Sustainability 13 (2021), https://doi.org/10.3390/su13179767.

[70] T.H. Elsharnouby, Student co-creation behavior in higher education: the role of satisfaction with the university experience, J. Market. High Educ. 25 (2015) 238–262, https://doi.org/10.1080/08841241.2015.1059919.

[71] M. Retamosa, Á. Millán, M. Moital, Does the type of degree Predict different levels of satisfaction and loyalty? A brand equity perspective, Corp. Reput. Rev. 23 (2020) 57–77, https://doi.org/10.1057/s41299-019-00073-1.

[72] Ö. Kethüda, Positioning strategies and rankings in the HE: congruence and contradictions, J. Market. High Educ. (2021), https://doi.org/10.1080/08841241.2021.1892899.

[73] P. Alcaide-Pulido, H. Alves, B. Gutiérrez-Villar, Development of a model to analyze HEI image: a case based on a private and a public university, J. Market. High Educ. 27 (2017) 162–187, https://doi.org/10.1080/08841241.2017.1388330.

[74] T. Khoshtaria, D. Datuashvili, A. Matin, The impact of brand equity dimensions on university reputation: an empirical study of Georgian higher education, J. Market. High Educ. 30 (2020) 239–255, https://doi.org/10.1080/08841241.2020.1725955.

[75] J. Hemsley-Brown, T.C. Melewar, B. Nguyen, E.J. Wilson, Exploring brand identity, meaning, image, and reputation (BIMIR) in higher education: a special section, J. Bus. Res. 69 (2016) 3019–3022, https://doi.org/10.1016/j.jbusres.2016.01.016.

[76] J. Polcyn, O. Lyulyov, T. Pimonenko, V. Vovk, An Attempt at a Simplified determination of the brand value of a university, Forum Scientiae Oeconomia 11 (2023) 53–67, https://doi.org/10.23762/FSO_VOL11_NO3_3.

[77] T. Agasisti, J. Berbegal-Mirabent, Cross-country analysis of higher education institutions' efficiency: the role of strategic positioning, Sci. Publ. Pol. 48 (2021) 66–79, https://doi.org/10.1093/scipol/scaa058.

[78] G. Miotto, M.P. López, J.R. Rodríguez, Gender equality and UN sustainable development goals: Priorities and correlations in the top business schools' communication and legitimation strategies, Sustainability 11 (2019), https://doi.org/10.3390/su11020302.

[79] G. Sonetti, P. Lombardi, L. Chelleri, True green and sustainable university campuses? Toward a clusters approach, Sustainability 8 (2016) 1–23, https://doi.org/10.3390/su8010083.

[80] I.A. Montoya-Restrepo, J.A. Sánchez Torres, S.P. Rojas Berrio, A. Montoya-Restrepo, Lovemark effect: analysis of the differences between students and graduates in a love brand study at a public university, Innovar 30 (2020) 43–56, https://doi.org/10.15446/innovar.v30n75.83256.

[81] D.-C. Dabija, V. Câmpian, A. Tiron-Tudor, L. Stanca, The path of universities to sustainability: students perspectives during the COVID-19 pandemic, Heliyon 9 (2023) e14813, https://doi.org/10.1016/j.heliyon.2023.e14813.

[82] G. Miotto, C. Del-Castillo-Feito, A. Blanco-González, Reputation and legitimacy: key factors for Higher Education Institutions' sustained competitive advantage, J. Bus. Res. 112 (2020) 342–353, https://doi.org/10.1016/j.jbusres.2019.11.076.

[83] P.L. Tan, S.M. Rasoolimanesh, G. Manickam, How corporate social responsibility affects brand equity and loyalty? A comparison between private and public universities, Heliyon 8 (2022) e09266, https://doi.org/10.1016/j.heliyon.2022.e09266.

[84] P. Sultan, H.Y. Wong, How service quality affects university brand performance, university brand image and behavioural intention: the mediating effects of satisfaction and trust and moderating roles of gender and study mode, J. Brand Manag. 26 (2019) 332–347, https://doi.org/10.1057/s41262-018-0131-3.

[85] V. Kaushal, N. Ali, University Reputation, Brand attachment and brand personality as Antecedents of student loyalty: a study in higher education context, Corp. Reput. Rev. 23 (2020) 254–266, https://doi.org/10.1057/s41299-019-00084-y.

[86] A. Lafuente-Ruiz-de-Sabando, J. Forcada, P. Zorrrrillallalla, The university image: a model of overall image and stakeholder perspectives, Cuadernos de Gestion 19 (2019) 63–86, https://doi.org/10.5295/CDG.160720AL.

[87] P. Alcaide-Pulido, H. O'Sullivan, C. Chapleo, The application of an innovative model to measure university brand image. Differences between English, Spanish and Portuguese undergraduate students, J. Market. High Educ. (2021) 1–18, https://doi.org/10.1080/08841241.2021.1977450.

[88] S.M. Noor, K.A. Manan, H.M.A. Kuthoos, Assessing corporate brand equity of public universities, Jurnal Komunikasi, Malaysian Journal of Communication 35 (2019) 283–299, https://doi.org/10.17576/JKMJC-2019-3503-17.

[89] S.M. Rasoolimanesh, P.L. Tan, M. Nejati, A. Shafaei, Corporate social responsibility and brand loyalty in private higher education: mediation assessment of brand reputation and trust, J. Market. High Educ. (2021), https://doi.org/10.1080/08841241.2021.1973645.

[90] R.E. Cramarenco, M.I. Burcă-Voicu, D.-C. Dabija, Student perceptions of online education and Digital technologies during the COVID-19 pandemic: a systematic review, Electronics (Basel) 12 (2023) 319, https://doi.org/10.3390/electronics12020319.

[91] S. Niedlich, M. Bauer, M. Doneliene, L. Jaeger, M. Rieckmann, I. Bormann, Assessment of sustainability governance in higher education institutions—a systemic tool using a governance equalizer, Sustainability 12 (2020) 1–17, https://doi.org/10.3390/su12051816.

[92] L. Giovanelli, F. Rotondo, A. Ezza, Business models for integration of sustainability in universities: an explorative analysis of Italian state universities, J. Clean. Prod. 324 (2021), https://doi.org/10.1016/j.jclepro.2021.129227.

[93] P. Perchinunno, M. Cazzolle, A clustering approach for classifying universities in a world sustainability ranking, Environ. Impact Assess. Rev. 85 (2020), https://doi.org/10.1016/j.eiar.2020.106471.

[94] W. Leal Filho, F. Frankenberger, A.L. Salvia, U. Azeiteiro, F. Alves, P. Castro, M. Will, J. Platje, V.O. Lovren, L. Brandli, E. Price, F. Doni, M. Mifsud, L.V. Ávila, A framework for the implementation of the Sustainable Development Goals in university programmes, J. Clean. Prod. 299 (2021), https://doi.org/10.1016/j.jclepro.2021.126915.

[95] W. Leal Filho, Universities, sustainability and society: a SDGs perspective, in: World Sustainability Series, Springer Science and Business Media Deutschland GmbH, 2021, pp. 555–560, https://doi.org/10.1007/978-3-030-63399-8_35.

[96] S. Caeiro, L.A.S. Hamón, R. Martins, C.E.B. Aldaz, Sustainability assessment and benchmarking in higher education institutions-a critical reflection, Sustainability 12 (2020), https://doi.org/10.3390/su12020543.

[97] A. Lafuente-Ruiz-de-Sabando, P. Zorrilla, J. Forcada, A review of higher education image and reputation literature: knowledge gaps and a research agenda, European Research on Management and Business Economics 24 (2018) 8–16, https://doi.org/10.1016/j.iedeen.2017.06.005.

[98] I. Erkan, S. Unal, F. Acikgoz, What affects university image and students' supportive attitudes: the 4Q Model, J. Market. High Educ. (2021) 1–18, https://doi.org/10.1080/08841241.2021.1927933.

[99] P. Robles Garrote, M. Del, C. Rojas, R. Garrote, P.Y. Rojas, La validación por juicio de expertos: dos investigaciones cualitativas en Lingüística aplicada Validation by expert judgements: two cases of qualitative research in Applied Linguistics, n.d..

[100] J. Escobar-Pérez, Á. Cuervo-Martínez, VALIDEZ DE CONTENIDO Y JUICIO DE EXPERTOS: UNA APROXIMACIÓN A SU UTILIZACIÓN, 2008.

[101] T. Otzen, C. Manterola, Técnicas de Muestreo sobre una Población a Estudio Sampling Techniques on a Population Study, 2017.

[102] J.F. Hair, W.C. Black, B.J. Babin, R.E. Anderson, Multivariate Data Analysis, eighth ed., 2019. www.cengage.com/highered.

[103] E. Carmines, R. Zeller, Reliability and Validity Assessment, SAGE Publications, Inc., Thousand Oaks California 91320 United States of America, 1979, https://doi.org/10.4135/9781412985642, 2455 Teller Road.

[104] J. Moral de la Rubia, Revisión de los criterios para validez convergente estimada a través de la Varianza Media Extraída, Psychologia 13 (2019) 25–41, https://doi.org/10.21500/19002386.4119.

[105] C. Fornell, D.F. Larcker, Evaluating structural equation models with Unobservable variables and measurement Error, J. Market. Res. 18 (1981) 39, https://doi.org/10.2307/3151312.

[106] J. Henseler, C.M. Ringle, M. Sarstedt, A new criterion for assessing discriminant validity in variance-based structural equation modeling, J Acad Mark Sci 43 (2015) 115–135, https://doi.org/10.1007/s11747-014-0403-8.

[107] A.H. Gold, A. Malhotra, A.H. Segars, Knowledge management: an organizational Capabilities perspective, J. Manag. Inf. Syst. 18 (2001) 185–214, https://doi.org/10.1080/07421222.2001.11045669.

[108] A. Mirzaei, E. Siuki, D. Gray, L.W. Johnson, Brand associations in the higher education sector: the difference between shared and owned associations, J. Brand Manag. 23 (2016) 419–438, https://doi.org/10.1057/bm.2016.14.

[109] D.A. Aaker, Managing Brand Equity, 1991.

[110] K.L. Keller, Strategic Brand Management : Building, Measuring, and Managing Brand Equity, Pearson/Prentice Hall, 2008.

[111] M. Mourad, H. Meshreki, S. Sarofim, Brand equity in higher education: comparative analysis, Stud. High Educ. 45 (2020) 209–231, https://doi.org/10.1080/03075079.2019.1582012.

[112] R.L. Williams, M. Omar, How branding process activities impact brand equity within Higher Education Institutions, J. Market. High Educ. 24 (2014) 1–10, https://doi.org/10.1080/08841241.2014.920567.

[113] N. Blanco-Portela, J. Benayas, L.R. Pertierra, R. Lozano, Towards the integration of sustainability in Higher Eeducation Institutions: a review of drivers of and barriers to organisational change and their comparison against those found of companies, J. Clean. Prod. 166 (2017) 563–578, https://doi.org/10.1016/j.jclepro.2017.07.252.

[114] N.A. Rieg, B.C.M. Gatersleben, I. Christie, Organizational change management for sustainability in higher education institutions: a systematic quantitative literature review, Sustainability 13 (2021), https://doi.org/10.3390/su13137299.

[115] N. Roos, E. Guenther, Sustainability management control systems in higher education institutions from measurement to management, Int. J. Sustain. High Educ. 21 (2020) 144–160, https://doi.org/10.1108/IJSHE-01-2019-0030.

[116] K. Çati, Ö. Kethüda, Y. Bilgin, Positioning strategies of universities: an investigation on universities in Istanbul, Egitim ve Bilim 41 (2016) 219–234, https://doi.org/10.15390/eb.2016.2723.

[117] C. Bien, R. Sassen, Sensemaking of a sustainability transition by higher education institution leaders, J. Clean. Prod. 256 (2020), https://doi.org/10.1016/j.jclepro.2020.120299.

[118] E. Verhulst, W. Lambrechts, Fostering the incorporation of sustainable development in higher education. Lessons learned from a change management perspective, in: J Clean Prod, Elsevier Ltd, 2015, pp. 189–204, https://doi.org/10.1016/j.jclepro.2014.09.049.

[119] J. Pringle, S. Fritz, The university brand and social media: using data analytics to assess brand authenticity, J. Market. High Educ. 29 (2019) 19–44, https://doi.org/10.1080/08841241.2018.1486345.

[120] R. Budowle, E. Krszjzaniek, C. Taylor, Students as change agents for community–university sustainability transition partnerships, Sustainability 13 (2021), https://doi.org/10.3390/su13116036.

[121] P. Alcaide-Pulido, B. Gutiérrez-Villar, M. Carbonero-Ruz, H. Alves, Four key variables for determining the image of higher education institutions: a cross-national analysis based on undergraduate students, J. Market. High Educ. (2022) 1–19, https://doi.org/10.1080/08841241.2022.2056671.

[122] J. Abbas, HEISQUAL: a modern approach to measure service quality in higher education institutions, Stud. Educ. Eval. 67 (2020), https://doi.org/10.1016/j.stueduc.2020.100933.

[123] P.A. Rauschnabel, A.C. Ahuvia, You're so lovable: Anthropomorphism and brand love, J. Brand Manag. 21 (2014) 372–395, https://doi.org/10.1057/bm.2014.14.

[124] P. Clark, C. Chapleo, K. Suomi, Branding higher education: an exploration of the role of internal branding on middle management in a university rebrand, Tert. Educ. Manag. 26 (2020) 131–149, https://doi.org/10.1007/s11233-019-09054-9.

[125] W. Schlesinger, A. Cervera-Taulet, W. Wymer, The influence of university brand image, satisfaction, and university identification on alumni WOM intentions, J. Market. High Educ. (2021), https://doi.org/10.1080/08841241.2021.1874588.

[126] I. Buil, E. Martínez, L. de Chernatony, Brand equity measurement from a formative approach, Cuadernos de Gestión 10 (2010) 167–196, https://doi.org/10.5295/cdg.100204ib.

[127] D. De Filippo, L.A. Sandoval-Hamón, F. Casani, E. Sanz-Casado, Spanish Universities' sustainability performance and sustainability-related R & D+I, Sustainability 11 (2019), https://doi.org/10.3390/su11205570.

[128] J.M. Pereira Ribeiro, L. Hoeckesfeld, C.B. Dal Magro, J. Favretto, R. Barichello, F.C. Lenzi, L. Secchi, C.R. Montenegro de Lima, J.B. Salgueirinho Osório de Andrade Guerra, Green Campus Initiatives as sustainable development dissemination at higher education institutions: students' perceptions, J. Clean. Prod. 312 (2021), https://doi.org/10.1016/j.jclepro.2021.127671.

[129] D. Crotti, D. Grechi, E. Maggi, Reducing the carbon footprint in college mobility: the car commuters' perspective in an Italian case study, Environ. Impact Assess. Rev. 92 (2022), https://doi.org/10.1016/j.eiar.2021.106702.

[130] A.M. Aleixo, S. Leal, U.M. Azeiteiro, Conceptualization of sustainable higher education institutions, roles, barriers, and challenges for sustainability: an exploratory study in Portugal, J. Clean. Prod. 172 (2018) 1664–1673, https://doi.org/10.1016/j.jclepro.2016.11.010.