

Embracing sustainable marketing in higher education viewed through service quality

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EMBRACING SUSTAINABLE MARKETING IN HIGHER EDUCATION VIEWED THROUGH SERVICE QUALITY: STUDENTS' PERSPECTIVE

ABSTRACT

Purpose: This paper explores the application of sustainable marketing practices in higher education institutions, focusing in particular on the perspectives and experiences of students as direct users of the service. Given that sustainability has become an important issue globally, integration of sustainable principles into the marketing strategies of educational institutions becomes imperative. It was found that the existing academic literature contains only a very limited number of studies in the area of applying sustainable marketing in public higher education institutions, despite its recognized importance. This study aims to help close this gap.

Methodology: Using a quantitative research methodology, including questionnaires, this study examines student perceptions and attitudes towards the application of sustainable marketing in higher education, focusing on the quality of services. A structural model was tested, the reliability and validity of which had been confirmed previously. Partial least squares structural equation modeling (PLS-SEM) was used to examine the relationships between the constructs.

Results: All direct relationships in the structural model were found to be statistically significant and positive, confirming the hypothesis that sustainable marketing of a higher education institution has a positive impact on the performance of the higher education institution when considering the quality of services.

Conclusion: By highlighting the importance of sustainable marketing in public higher education institutions, this research contributes to the growing sustainability discourse in the academic community and provides actionable insights for educational institutions seeking to improve their marketing strategies in line with environmental and social responsibility goals.

Keywords: Sustainability, sustainable marketing, higher education institutions, students, performance

1. Introduction

In recent years, the sustainability imperative has permeated various sectors, including higher education. The importance of sustainable marketing

in higher education is undisputed. As educational institutions that have an impact on society, universities are responsible for promoting sustainability in all areas of their activities and in society in general. Despite the increasing importance placed on

sustainability in various sectors, there is a notable gap in the academic literature regarding the application of sustainable marketing practices in public higher education institutions. Previous research has been recognized mainly in the field of sustainability in education (Casarejos et al., 2017; Aleixo et al., 2018; Fuchs et al., 2020; Zhou et al., 2020; Budihardjo et al., 2021) and the efficiency and quality of higher education institutions (Barilović et al., 2013; Štimac, 2013; Degtjarjova et al., 2018; Arbula Bleich, 2024). Although the importance of sustainable marketing in higher education is recognized in theory, there are few empirical studies examining its implementation and impact on institutional performance.

Therefore, the research problem addressed in this paper focuses on investigating student perceptions and attitudes towards sustainable marketing initiatives in public higher education institutions, with a focus on service quality. By investigating this research problem, the study aims to fill a gap in the literature and provide empirical evidence of the positive impact of sustainable marketing on the performance of higher education institutions from a service quality perspective. A central focus of this study is to investigate the relationship between sustainable marketing and the performance of HEIs through service quality from the perspective of students as direct users of the service. Through the use of a structural model tested for reliability and validity, this research aims to provide empirical evidence of the positive impact of sustainable marketing practices on HEI performance metrics, particularly in relation to service quality. Students represent an important stakeholder group whose perceptions and attitudes towards sustainable marketing initiatives can provide valuable insights into their effectiveness and impact on the overall success of higher education institutions.

This paper contributes to the academic literature by expanding the understanding of sustainable marketing in higher education and providing practical implications for higher education institutions seeking to improve their marketing strategies in line with sustainability principles. The study highlights the links between sustainable marketing, student perceptions and the performance of higher education institutions, and aims to promote positive change towards a more sustainable future in public higher education institutions. The paper continues with a theoretical background of the research topic, the research methodology and data analysis, the results and discussion, and finally the conclusions and limitations.

2. Theoretical background

Sustainable marketing in higher education encompasses a wide range of activities to promote sustainability principles, practices and initiatives in academic institutions. This approach recognizes the unique position of higher education institutions as catalysts for social change and innovation that can influence not only their own activities, but also broader societal attitudes and behaviors towards sustainability. Sustainable marketing in higher education recognizes the central role of students as key stakeholders in driving sustainability initiatives and fostering a culture of sustainability on campus.

2.1 Sustainable marketing in higher education

Sustainable marketing in higher education is a strategic approach to promoting sustainability principles and practices in academic institutions with the aim of fostering a more environmentally conscious, socially responsible and economically sustainable future for all stakeholders (Fuchs et al., 2020; Budihardjo et al., 2021; Meštrović et al., 2021). The concept of sustainability education is based on the idea that educational institutions play a crucial role in promoting sustainable development and providing students with the knowledge and skills needed to tackle social, environmental and economic challenges (Hübscher et al., 2022). Higher education institutions use various strategies to engage stakeholders and demonstrate their commitment to sustainability (Shawe et al., 2019). These include integrating sustainability into academic curricula across all disciplines, fostering interdisciplinary research collaborations on sustainability-related topics, and implementing sustainability-oriented initiatives in campus operations and facilities management (Annan-Diab & Molinari, 2017).

The adoption of sustainable marketing practices in higher education reflects a broader trend towards corporate social responsibility (Arena et al., 2018). Higher education institutions are increasingly integrating sustainability considerations into their strategic plans, governance structures and operational activities to address environmental challenges and meet stakeholder expectations (Aleixo et al., 2018). Sustainable marketing in higher education has gained importance in response to global environmental challenges and changing societal expectations. As institutions of learning and societal impact, higher education institutions have a unique opportunity and responsibility to promote the principles of sustainability (Casarejos et al., 2017; Zhou et al., 2020).

2.2 Students as stakeholders

The theoretical background of students as primary stakeholders and direct service users in higher education institutions is based on stakeholder theory, the concept of students as customers and the recognition of students as direct service users (Sandmaung & Ba Khang, 2013). Students are viewed as primary stakeholders and direct service users in higher education institutions, and their needs and preferences should be considered in the design and implementation of sustainable initiatives and programs (Pedro et al., 2020). Higher education institutions are expected to put student interests first and design their programs, services and policies to meet their diverse needs and expectations (Jongbloed et al., 2008).

Students play a diverse role in shaping institutional policy, practice and culture. As consumers of educational services, students influence enrollment decisions, tuition revenue, and institutional reputation (Degtjarjova et al., 2018). Consequently, institutions are expected to adopt a customer-centric approach and focus on providing high-quality services that meet or exceed student expectations (Širola & Mihaljević, 2016). This theoretical view emphasizes the importance of understanding students' needs, preferences and satisfaction and using this information to continuously improve the quality of educational services (Degtjarjova et al., 2018; Meštrović et al., 2021). Research shows that students are increasingly concerned with sustainability issues and expect their universities to take a leadership role in this area (Lozano et al., 2013). They place importance on environmental responsibility, social justice and ethical leadership when evaluating higher education institutions. Therefore, students' perceptions, attitudes and behaviors regarding sustainability have a significant

impact on institutional decision-making and strategic planning (Degtjarjova et al., 2018; Pedro et al., 2020).

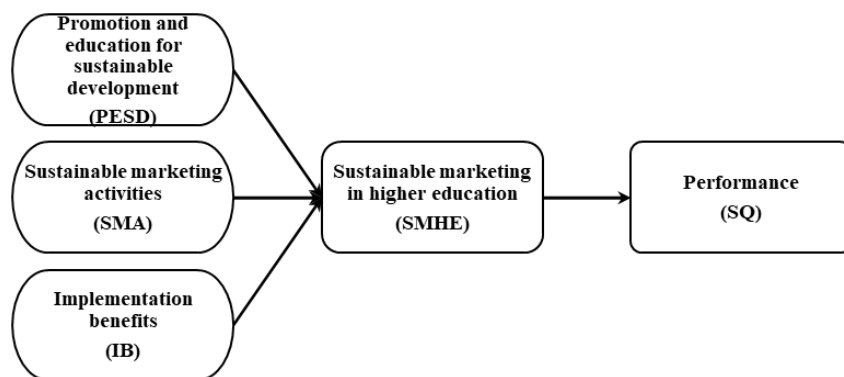
3. Methodology

This section outlines the methodological framework of the empirical study, which is grounded in an extensive literature review and prior research on the relationship between sustainable marketing—operationalized as sustainable marketing orientation—and performance, measured by service quality in the context of higher education.

The academic marketing literature lacks consensus on a widely accepted approach to measuring higher education (HE) performance. However, Pearce et al. (1987) suggest that subjective measures of public organization performance, based on respondents' assessments, can be interpreted as reliable and equivalent to objective indicators. In line with this, students' subjective assessments were chosen as a non-financial performance indicator, following the approach of Teeroovengadum et al. (2016) and Ruiz de Sabando et al. (2018) for evaluating a university's service quality.

To achieve empirical objectives of the study, exploratory primary research was conducted, building on the literature review. This approach is well-suited for exploring the attitudes and perceptions of key stakeholders regarding sustainable marketing in higher education institutions. Based on this, the authors proposed a conceptual model illustrated in Figure 1, that consists of two constructs: (1) sustainable marketing in higher education (SMHE), defined as a multidimensional construct, and (2) performance, assessed as service quality (SQ) of a higher education institution (HEI), treated as a unidimensional construct.

Figure 1 Conceptual model



Source: Authors

The primary quantitative empirical research was conducted using a measurement instrument developed by Meštrović et al. (2021) to capture the attitudes and perceptions of key stakeholders in higher education—specifically students as direct service users—towards sustainable marketing. The instrument for measuring service quality in higher education was adapted from the SERVQUAL scale, previously tested by Leko Šimić and Štimac (2013) and Barilović et al. (2013). Both instruments utilized a 7-point Likert scale. The research took place between 10 and 30 May 2019, using an anonymous online questionnaire via Google Forms, with data collected from a convenience sample, supplemented by the snowballing technique.

Univariate and multivariate statistical analyses were performed using the Statistical Package for Social Sciences (SPSS 24.0) to analyze and organize the collected data. Descriptive statistical analysis was employed

to characterize the research sample. To examine the relationships between the constructs, partial least squares structural equation modeling (PLS-SEM) was applied using SmartPLS 3.3.3. PLS-SEM, a multivariate method widely used in the social sciences (Purwanto & Sudargini, 2021), which integrates factor and regression analysis and does not require the assumption of data normality (Hair et al., 2013).

4. Participants and procedure

A total of 1,663 students, as direct users of college services, completed the questionnaire across 15 components (i.e., faculties) of the University of Rijeka (UNIRI). The sample comprised 1,089 women (66.03%) and 565 men (33.97%), with an average age of 25 years. Table 1 presents the distribution of respondents based on the faculty and degree program they are enrolled in.

Table 1 Sample - Respondents' faculty and study program level ($n = 1,663$)

| UNIRI Component | Graduate University Study and Specialist Graduate Professional Study - ISCED 7 | Integrated Undergraduate and Graduate University Study - ISCED 7 | Undergraduate University or Professional Study (min. 180 ECTS) - ISCED 6 | Undergraduate Professional Study (less than 180 ECTS) - ISCED 5 | Total Sample Share |
|-----------------|--|--|--|---|--------------------|
| AARTS | 7 (14.90%) | 0 (0%) | 40 (85.10%) | 0 (0%) | 47 (2.80%) |
| BIOTECH | 17 (36.20%) | 0 (0%) | 30 (63.80%) | 0 (0%) | 47 (2.80%) |
| CIVILEN | 47 (43.90%) | 0 (0%) | 54 (50.50%) | 6 (5.60%) | 107 (6.40%) |
| ECON | 1 (33.30%) | 0 (0%) | 2 (66.70%) | 0 (0%) | 3 (0.20%) |
| ENGINEER | 111 (48.10%) | 0 (0%) | 120 (51.90%) | 0 (0%) | 231 (13.90%) |
| HEALTH | 39 (19.50%) | 0 (0%) | 161 (80.50%) | 0 (0%) | 200 (12.00%) |
| HUMAN | 114 (57.60%) | 0 (0%) | 84 (42.40%) | 0 (0%) | 198 (11.90%) |
| INFDT | 31 (39.70%) | 0 (0%) | 47 (60.30%) | 0 (0%) | 78 (4.70%) |
| LAW | 11 (8.10%) | 90 (66.20%) | 24 (17.60%) | 11 (8.10%) | 136 (8.20%) |
| MARIT | 76 (39.60%) | 0 (0%) | 116 (60.40%) | 0 (0%) | 192 (11.50%) |
| MATH | 8 (24.20%) | 0 (0%) | 25 (75.80%) | 0 (0%) | 33 (2.00%) |
| MEDIC | 5 (1.80%) | 211 (76.20%) | 61 (22.00%) | 0 (0%) | 277 (16.70%) |
| PHYS | 12 (35.30%) | 1 (2.90%) | 21 (61.80%) | 0 (0%) | 34 (2.00%) |
| POLY | 0 (0%) | 1 (3.80%) | 25 (96.20%) | 0 (0%) | 26 (1.60%) |
| TEACH | 14 (25.90%) | 13 (24.10%) | 27 (50.00%) | 0 (0%) | 54 (3.20%) |
| Total | 493 (29.60%) | 316 (19.00%) | 837 (50.30%) | 17 (1.00%) | 1,663 (100%) |

Note: AARTS = Academy of Applied Arts, BIOTECH = Faculty of Biotechnology and Drug Development, CIVILEN = Faculty of Civil Engineering, ECON = Faculty of Economics and Business, ENGINEER = Faculty of Engineering, HEALTH = Faculty of Health Studies, HUMAN = Faculty of Humanities and Social Sciences, INFDT = Faculty of Informatics and Digital Technologies, LAW = Faculty of Law, MARIT = Faculty of Maritime Studies, MATH = Faculty of Mathematics, MEDIC = Faculty of Medicine, PHYS = Faculty of Physics, POLY = University of Rijeka, Department of Polytechnics, TEACH = Faculty of Teacher Education.

Source: Authors

Considering the characteristics of the proposed measurement model, the minimum required sample size was calculated using the G*Power 3.1.9.7 application (Faul et al., 2009), based on the guidelines of Hair et al. (2013) and Memon et al. (2020). With the desired statistical power ($1-\beta = 0.95$), effect size ($f^2 = 0.15$), and statistical significance ($\alpha = 0.05$) typical in social science research, the minimum required sample size was determined to be 119 respondents. Kline (2016) notes that for structural equation modeling, a sample of 100 is small but acceptable for simple models, a sample between 100 and 200 is considered medium, and a sample of 200 or more is regarded as large. Therefore, the sample of 1,663 respondents was deemed more than adequate for PLS-SEM analysis.

Table 2 presents the results of descriptive statistical analysis of the Sustainable Marketing in Higher Education (SMHE) construct, which is measured by three dimensions: (1) Sustainable Marketing Activities (SMA), (2) Promotion and Education for Sustainable Development (PESD), and (3) Implementation Benefits (IB). The IB dimension received the high-

est mean score ($\bar{x} = 5.64$, $\sigma = 1.109$), while the SMA dimension had the lowest mean score ($\bar{x} = 5.15$, $\sigma = 1.001$). The PESD dimension was rated with a mean score of 5.48 ($\sigma = 1.211$).

Within the IB dimension, the highest rated item was IB7, "Increasing the visibility of the higher education institution" ($\bar{x} = 5.84$, $\sigma = 1.319$), while the lowest rated item was IB3, "Creating added value for users while considering the long-term interests of society and the environment" ($\bar{x} = 5.42$, $\sigma = 1.419$). For the PESD dimension, the highest rated item was PESD1, "Improving the overall quality of the higher education system" ($\bar{x} = 5.82$, $\sigma = 1.282$), while the lowest rated was PESD3, "Implementation of study programs in sustainable development" ($\bar{x} = 5.18$, $\sigma = 1.603$).

In the SMA dimension, the highest rated item was SMA5, "Partnership with the local community" ($\bar{x} = 5.51$, $\sigma = 1.213$), while the lowest rated was SMA9, "Regularly considering the impact of business decisions on various stakeholders (e.g., employers, students, parents, employees, higher education institutions), natural and financial resources, and society at large" ($\bar{x} = 4.52$, $\sigma = 1.441$).

Table 2 Descriptive statistical analysis of the SMHE construct

| Code | Item | Mean | SD |
|---|--|------|-------|
| Sustainable Marketing Activities (SMA) | | | |
| SMA1 | Adjusting business processes to laws and legal regulations while striving to achieve own business goals | 4.64 | 1.327 |
| SMA2 | Concern about environmental and societal long-term benefits while striving to achieve own business goals | 5.18 | 1.264 |
| SMA3 | Dialogue with key stakeholders (e.g., employers, students, prospective students, parents, employees, institutions, ministries, society at large) | 5.20 | 1.303 |
| SMA4 | Partnership with regional and local government bodies | 5.22 | 1.239 |
| SMA5 | Partnership with the local community | 5.51 | 1.213 |
| SMA6 | Partnership with economic entities | 5.17 | 1.244 |
| SMA7 | Partnership with competitors | 5.10 | 1.461 |
| SMA8 | Concern about all employees while striving to achieve own business goals | 5.27 | 1.281 |
| SMA9 | Considering impacts of business decisions on stakeholders (e.g., students, employees, institutions, society at large) | 4.52 | 1.441 |
| SMA10 | Increasing the application of modern ICT in business processes and teaching methods | 5.41 | 1.286 |
| SMA11 | Increasing availability of formal, informal, and non-formal education to all stakeholders | 4.94 | 1.436 |

| Code | Item | Mean | SD |
|---|--|------|-------|
| SMA12 | Anticipating and respecting the needs of the broader community and future generations | 5.32 | 1.263 |
| SMA13 | Transparency and availability of data on contributions to society and efforts to reduce environmental impact | 5.11 | 1.371 |
| SMA14 | Acceptance and application of sustainable development principles as part of business culture | 5.27 | 1.319 |
| SMA15 | Promoting new ideas that contribute to sustainability as a lifestyle and business philosophy | 5.35 | 1.327 |
| Implementation Benefits (IB) | | | |
| IB1 | Creating societal change | 5.60 | 1.289 |
| IB2 | Rationalizing resource usage | 5.68 | 1.312 |
| IB3 | Creating added value for users while considering long-term societal and environmental interests | 5.42 | 1.419 |
| IB4 | Adapting and/or creating new study programs | 5.70 | 1.253 |
| IB5 | Increasing loyalty and satisfaction of users and stakeholders | 5.51 | 1.414 |
| IB6 | Increasing study success | 5.57 | 1.352 |
| IB7 | Increasing the visibility of the higher education institution | 5.84 | 1.319 |
| IB8 | Intensifying internal and external mobility of students and employees | 5.79 | 1.282 |
| IB9 | Increasing ethics, morality, and transparency in procurement and donations | 5.80 | 1.248 |
| IB10 | Education for sustainable development | 5.54 | 1.531 |
| IB11 | Creating benefits for all stakeholders and wider society | 5.68 | 1.403 |
| IB12 | Achieving competitive advantage | 5.56 | 1.467 |
| IB13 | Achieving environmental, societal, and economic goals simultaneously | 5.68 | 1.342 |
| Promotion and Education for Sustainable Development (PESD) | | | |
| PESD1 | Improving the overall quality of the higher education system | 5.82 | 1.282 |
| PESD2 | Enhancing continuous professional development and training of higher education employees | 5.71 | 1.361 |
| PESD3 | Implementing study programs in sustainable development | 5.18 | 1.603 |
| PESD4 | Offering elective courses in sustainable development | 5.37 | 1.412 |
| PESD5 | Reporting efforts and achievements related to sustainable development | 5.29 | 1.405 |
| PESD6 | Promoting sustainable development principles through business practices | 5.53 | 1.424 |

Note: SD = standard deviation.

Source: Authors

The descriptive statistical analysis results of the Service Quality (SQ) construct are shown in Table 3.

Table 3 Descriptive statistical analysis of the SQ construct

| Code | Item | Mean | SD |
|-----------------------------|--|------|-------|
| Service Quality (SQ) | | | |
| SQ1 | Organization of studies | 3.71 | 1.717 |
| SQ2 | Acquired knowledge meets expectations | 3.90 | 1.751 |
| SQ3 | Usefulness of the acquired knowledge | 4.52 | 1.774 |
| SQ4 | Social necessity of the acquired knowledge | 4.84 | 1.649 |
| SQ5 | Quality of the study program | 3.86 | 1.898 |
| SQ6 | The knowledge and skills acquired during the study program will help me find a new job or get promotion in my current position | 4.86 | 1.399 |
| SQ7 | The skills acquired during the study program will significantly impact the efficiency and success of my future work | 5.28 | 1.724 |
| SQ8 | The study program enables personal development | 4.19 | 1.815 |
| SQ9 | The available resources (space, facilities, literature, technical equipment) meet student needs | 4.57 | 1.935 |
| SQ10 | Performance/efficiency of the teaching staff | 4.53 | 1.960 |
| SQ11 | Performance/efficiency of the administrative staff | 4.53 | 2.096 |
| SQ12 | Teaching staff knowledge, experience, and skills | 3.72 | 2.000 |
| SQ13 | Administrative staff knowledge, experience, and skills | 4.24 | 1.768 |
| SQ14 | Courtesy of the teaching staff | 4.78 | 1.583 |
| SQ15 | Courtesy of the administrative staff | 4.44 | 1.551 |
| SQ16 | Reputation/credibility of the teaching staff | 4.52 | 1.972 |
| SQ17 | Reasonable working hours | 5.36 | 1.563 |
| SQ18 | Convenient class schedule | 3.37 | 1.983 |
| SQ19 | Reputation of the study program in the local community | 4.90 | 1.946 |

Note: SD = standard deviation.

Source: Authors

As presented in Table 3, the highest rated item within the SQ construct was SQ17, "Reasonable working hours" ($\bar{x} = 5.36$, $\sigma = 1.563$), followed by SQ7, "The skills acquired during the study program will significantly impact the efficiency and success of my future work" ($\bar{x} = 5.28$, $\sigma = 1.724$). On the other hand, the items with the lowest mean scores were SQ1, "Organization of studies" ($\bar{x} = 3.71$, $\sigma = 1.717$), and SQ18, "Convenient class schedule" ($\bar{x} = 3.37$, $\sigma = 1.983$).

The calculated Cronbach's alpha values for the measurement scales were as follows: 0.938 for SMA, 0.958 for IB, 0.926 for PESD, and 0.939 for the SQ construct. Additionally, all calculated correlations with the associated constructs exceeded the threshold of 0.30 (Hair et al., 2013), confirming the reliability of the measurement scales and the internal consistency of the constructs.

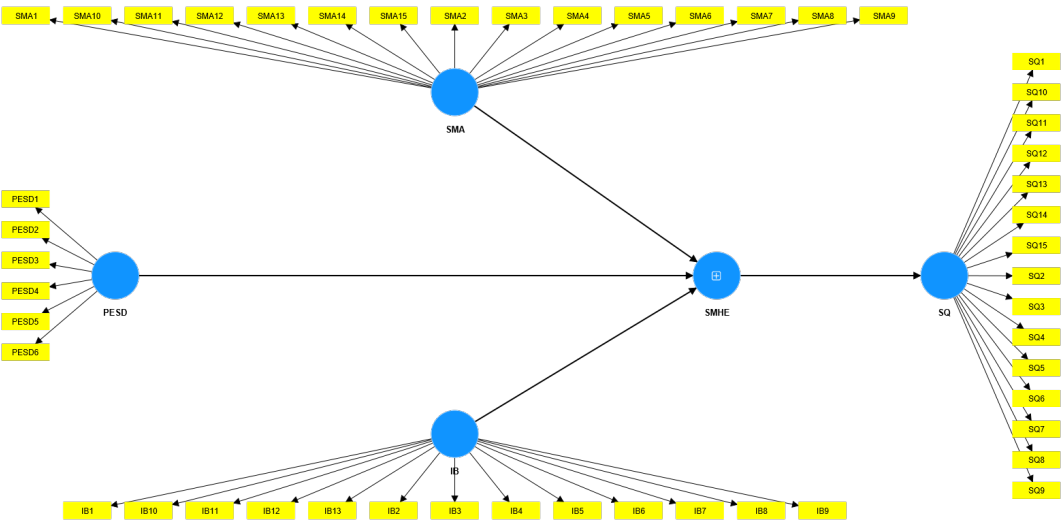
5. Results

Following the recommendations of Hair et al. (2013), Confirmatory Factor Analysis (CFA) was

conducted before developing the structural model SMHE-SQ, as shown in Figure 2. This model outlines the relationship between SMHE and SQ, with SMHE defined as an exogenous higher-order construct composed of three lower-order constructs: (1) SMA, (2) PESD, and (3) IB, and SQ as the endogenous latent construct. The SMHE higher-order construct was modeled as a reflective-formative Type II construct (Jarvis et al., 2003; Sarstedt et al., 2019).

In line with the recommendations of Sarstedt et al. (2019) and Hair et al. (2020), the evaluation of the higher-order constructs was performed using the PLS-SEM method with a two-stage approach. This method allows for different numbers of indicators across lower-order constructs (Becker et al., 2012). The first stage involved assessing the reflective measurement model of the lower-order constructs, followed by the evaluation of the structural model.

Figure 2 Structural and measurement model SMHE-SQ



Source: Authors

This section of the paper presents the results of both the outer (measurement) model evaluation and the inner (structural) model evaluation. The higher-order exogenous construct, SMHE (reflective-formative Type II), comprising three lower-order reflective constructs (SMA, PESD, IB), and the endogenous construct, SQ, determined by reflective variables, were analyzed using the PLS-SEM method. Following Hair et al. (2013), which recommends this approach for models with higher-order constructs, the path weighting scheme was applied with the “A” setting for formative construct indicator weighting. This approach allows for a maximum of 300 iterations with a stop criterion of 10^{-7} (Becker et al., 2012).

The evaluation of the reflective measurement model included assessing indicator reliability, internal consistency, as well as discriminant and convergent validity, following the guidelines of Sarstedt et al. (2019) and Hair et al. (2020). All indicators in the SMHE-SQ model had standardized factor loadings above the 0.70 threshold (Hair et al., 2019), except for SMA1, SMA15, IB10, IB12, and PESD1, which were removed. However, the removal of SMA3, SMA10, SQ6, and SQ7, which also had loadings below 0.70, did not result in the expected improvement in composite reliability (CR) and average variance extracted (AVE) values, so they were retained for further analysis.

Table 4 Reflective measurement model reliability, internal consistency and validity analysis

| Construct | Item | Standardized factor loading | Cronbach α | Rho_A | CR | AVE |
|-----------|-------|-----------------------------|-------------------|-------|-------|-------|
| SMA | SMA10 | 0.673 | 0.940 | 0.943 | 0.947 | 0.581 |
| | SMA11 | 0.729 | | | | |
| | SMA12 | 0.832 | | | | |
| | SMA13 | 0.808 | | | | |
| | SMA14 | 0.768 | | | | |
| | SMA2 | 0.799 | | | | |
| | SMA3 | 0.669 | | | | |
| | SMA4 | 0.809 | | | | |
| | SMA5 | 0.772 | | | | |
| | SMA6 | 0.806 | | | | |
| | SMA7 | 0.719 | | | | |
| | SMA8 | 0.776 | | | | |
| | SMA9 | 0.725 | | | | |
| IB | IB1 | 0.760 | 0.921 | 0.923 | 0.939 | 0.718 |
| | IB11 | 0.823 | | | | |
| | IB13 | 0.886 | | | | |
| | IB2 | 0.782 | | | | |
| | IB3 | 0.805 | | | | |
| | IB4 | 0.820 | | | | |
| | IB5 | 0.849 | | | | |
| | IB6 | 0.800 | | | | |
| | IB7 | 0.860 | | | | |
| | IB8 | 0.812 | | | | |
| | IB9 | 0.835 | | | | |
| PESD | PESD2 | 0.856 | 0.918 | 0.927 | 0.939 | 0.755 |
| | PESD3 | 0.774 | | | | |
| | PESD4 | 0.886 | | | | |
| | PESD5 | 0.920 | | | | |
| | PESD6 | 0.901 | | | | |
| SQ | SQ1 | 0.752 | 0.946 | 0.950 | 0.952 | 0.573 |
| | SQ10 | 0.807 | | | | |
| | SQ11 | 0.791 | | | | |
| | SQ12 | 0.653 | | | | |
| | SQ13 | 0.695 | | | | |
| | SQ14 | 0.782 | | | | |
| | SQ15 | 0.757 | | | | |
| | SQ2 | 0.830 | | | | |
| | SQ3 | 0.803 | | | | |
| | SQ4 | 0.689 | | | | |
| | SQ5 | 0.815 | | | | |
| | SQ6 | 0.641 | | | | |
| | SQ7 | 0.640 | | | | |
| | SQ8 | 0.814 | | | | |
| | SQ9 | 0.797 | | | | |

Note: Removed items SMA1, SMA15, IB10, IB12, PESD1.

Source: Authors

As shown in Table 4, the standardized factor loadings for all variables in the reflective SMHE-SQ model ranged from 0.640 to 0.920, while the Cronbach's alpha coefficients, ranging from 0.918 to 0.946, indicated a high level of reliability for the latent construct measures. The Rho_A coefficients, ranging from 0.923 to 0.950, further confirmed the stability and consistency of the model. Additionally, Composite Reliability (CR) values between 0.939 and 0.952 verified the reliability of the indicators, while Average Variance Extracted (AVE) values, all exceeding the 0.50 threshold (ranging from 0.573 to 0.755), confirmed the internal consistency and

convergent validity of the SMHE-SQ model. These findings satisfied the necessary criteria for both validity and reliability across all constructs in the outer measurement model (Hair et al., 2019).

Furthermore, discriminant validity of the measurement model was assessed following Henseler et al. (2015) and Hair et al. (2020), using three methods: (1) standardized cross-loadings, (2) the Fornell-Larcker criterion, and (3) the Heterotrait-Monotrait ratio (HTMT). The first criterion for discriminant validity was satisfied as all outer factor cross-loadings were greater than their loadings on other indicators, as highlighted in bold in Table 5.

Table 5 Standardized cross-loadings of items of the reflective measurement model

| Item/Construct | SMA | IB | PESD | SQ |
|----------------|-------|-------|-------|-------|
| SMA10 | 0.673 | 0.435 | 0.276 | 0.250 |
| SMA11 | 0.729 | 0.336 | 0.264 | 0.265 |
| SMA12 | 0.832 | 0.543 | 0.389 | 0.224 |
| SMA13 | 0.808 | 0.597 | 0.456 | 0.272 |
| SMA14 | 0.768 | 0.470 | 0.277 | 0.127 |
| SMA2 | 0.799 | 0.624 | 0.568 | 0.276 |
| SMA3 | 0.669 | 0.522 | 0.393 | 0.204 |
| SMA4 | 0.809 | 0.627 | 0.613 | 0.345 |
| SMA5 | 0.772 | 0.565 | 0.496 | 0.209 |
| SMA6 | 0.806 | 0.582 | 0.620 | 0.379 |
| SMA7 | 0.719 | 0.364 | 0.239 | 0.158 |
| SMA8 | 0.776 | 0.437 | 0.355 | 0.276 |
| SMA9 | 0.725 | 0.412 | 0.372 | 0.260 |
| IB1 | 0.671 | 0.760 | 0.563 | 0.246 |
| IB11 | 0.492 | 0.823 | 0.777 | 0.426 |
| IB13 | 0.603 | 0.886 | 0.812 | 0.340 |
| IB2 | 0.490 | 0.782 | 0.593 | 0.219 |
| IB3 | 0.512 | 0.805 | 0.619 | 0.254 |
| IB4 | 0.580 | 0.820 | 0.614 | 0.230 |
| IB5 | 0.577 | 0.849 | 0.708 | 0.337 |
| IB6 | 0.508 | 0.800 | 0.614 | 0.146 |
| IB7 | 0.550 | 0.860 | 0.730 | 0.377 |
| IB8 | 0.520 | 0.812 | 0.623 | 0.133 |

| Item/Construct | SMA | IB | PESD | SQ |
|----------------|-------|-------|-------|-------|
| IB9 | 0.547 | 0.835 | 0.659 | 0.216 |
| PESD2 | 0.528 | 0.812 | 0.856 | 0.431 |
| PESD3 | 0.377 | 0.546 | 0.774 | 0.190 |
| PESD4 | 0.449 | 0.609 | 0.886 | 0.380 |
| PESD5 | 0.513 | 0.743 | 0.920 | 0.327 |
| PESD6 | 0.525 | 0.781 | 0.901 | 0.458 |
| SQ1 | 0.273 | 0.129 | 0.264 | 0.752 |
| SQ10 | 0.207 | 0.202 | 0.336 | 0.807 |
| SQ11 | 0.151 | 0.246 | 0.421 | 0.791 |
| SQ12 | 0.147 | 0.022 | 0.142 | 0.653 |
| SQ13 | 0.262 | 0.171 | 0.265 | 0.695 |
| SQ14 | 0.309 | 0.334 | 0.359 | 0.782 |
| SQ15 | 0.348 | 0.332 | 0.339 | 0.757 |
| SQ2 | 0.256 | 0.147 | 0.290 | 0.830 |
| SQ3 | 0.174 | 0.273 | 0.408 | 0.803 |
| SQ4 | 0.308 | 0.353 | 0.278 | 0.689 |
| SQ5 | 0.204 | 0.103 | 0.215 | 0.815 |
| SQ6 | 0.258 | 0.212 | 0.167 | 0.641 |
| SQ7 | 0.258 | 0.348 | 0.379 | 0.640 |
| SQ8 | 0.210 | 0.194 | 0.277 | 0.814 |
| SQ9 | 0.199 | 0.221 | 0.374 | 0.797 |

Source: Authors

The second discriminant validity criterion – Fornell-Larcker criterion, was also confirmed, as shown in Table 6, since all the dimensions' calculated square root AVE values are greater than its correlations with other model's dimensions.

Table 6 Reflective measurement model discriminant validity - Fornell-Larcker criterion

| | SMA | IB | SQ | PESD |
|------|-------|-------|-------|-------|
| SMA | 0.762 | | | |
| IB | 0.632 | 0.847 | | |
| SQ | 0.328 | 0.300 | 0.757 | |
| PESD | 0.553 | 0.766 | 0.417 | 0.869 |

Source: Authors

As shown in Table 7, all calculated HTMT values were lower than the threshold of 0.90, thus confirming the third discriminant validity criterion according to Henseler et al. (2015).

Table 7 Reflective measurement model discriminant validity - HTMT ratio of correlations

| | SMA | IB | SQ | PESD |
|------|-------|-------|-------|------|
| SMA | | | | |
| IB | 0.670 | | | |
| SQ | 0.330 | 0.305 | | |
| PESD | 0.574 | 0.820 | 0.420 | |

Source: Authors

Finally, all calculated reflective model's path coefficients were found to be statistically significant and positive, while SMA had the highest calculated statistically positive relationship with SMHE (β

= 0.565), as shown in Table 8, while the effects of lower construct weight values on higher value construct SMHE are shown in Table 9.

Table 8 Reflective measurement model path coefficients

| | Path coefficient | SD | t | p |
|-------------|------------------|-------|--------|-------|
| SMA → SMHE | 0.565 | 0.008 | 72.162 | 0.000 |
| IB → SMHE | 0.307 | 0.005 | 61.441 | 0.000 |
| PESD → SMHE | 0.269 | 0.006 | 41.801 | 0.000 |

Source: Authors

Table 9 Reflective measurement model lower construct weight value effects on the higher value construct

| Higher-order construct | Lower-order construct | Weight value | t-value | p-value |
|------------------------|-----------------------|--------------|---------|---------|
| SMHE | SMA | 0.352 | 31.214 | 0.000 |
| | IB | 0.329 | 30.115 | 0.000 |
| | PESD | 0.459 | 33.932 | 0.000 |

Source: Authors

The calculated weight values for all lower-order constructs were statistically significant at the 1% level ($p < 0.01$), thereby confirming the third criterion for discriminant validity. This indicates that SMHE in the proposed conceptual model can be composed of three dimensions (SMA, IB, and PESD), with PESD being the most significant, with a weight value of 0.459. Discriminant validity of the higher-order formative construct was assessed through the correlation between the constructs, with the calculated correlation value of 0.406, well below the threshold of 0.7, confirming its discriminant validity.

The evaluation of the inner (formative) structural model involved assessing the relationships between the constructs and the model predictive capability (Hair et al., 2013). This included the following: (1) estimating indicator collinearity by checking the variance inflation factors (VIF) of the latent constructs, (2) testing the significance and relevance of structural model relationships by calculating path

coefficients, which represent the hypothesized relationships, using a nonparametric resampling method, (3) assessing predictive significance through the coefficient of determination (R^2), evaluating effect size using the coefficient of influence (f^2), and calculating the blindfolding-based cross-validated redundancy measure (Q^2), and (4) evaluating the structural model quality using the standardized root mean square residual (SRMR).

For the first evaluation criterion, collinearity was assessed by examining the VIF values of the latent constructs in the SMHE-SQ model (Figure 3), which resulted in a VIF value of 1.000, confirming no collinearity between the constructs (Hair et al., 2013).

The significance and relevance of the structural model relationship between SMHE and SQ were evaluated by calculating the path coefficient representing the hypothesized relationship (H1). As shown in Table 10, the results indicated that at a 5% significance level, the calculated t-value (22.335) exceeded the threshold of 1.96. This confirmed that

the relationship between SMHE and SQ in the SMHE-SQ structural model is both statistically significant and positive, thereby supporting the proposed hypothesis.

cant and positive, thereby supporting the proposed hypothesis.

Table 10 Hypothesis testing - examining the direct relationship in structural model SMHE-SQ

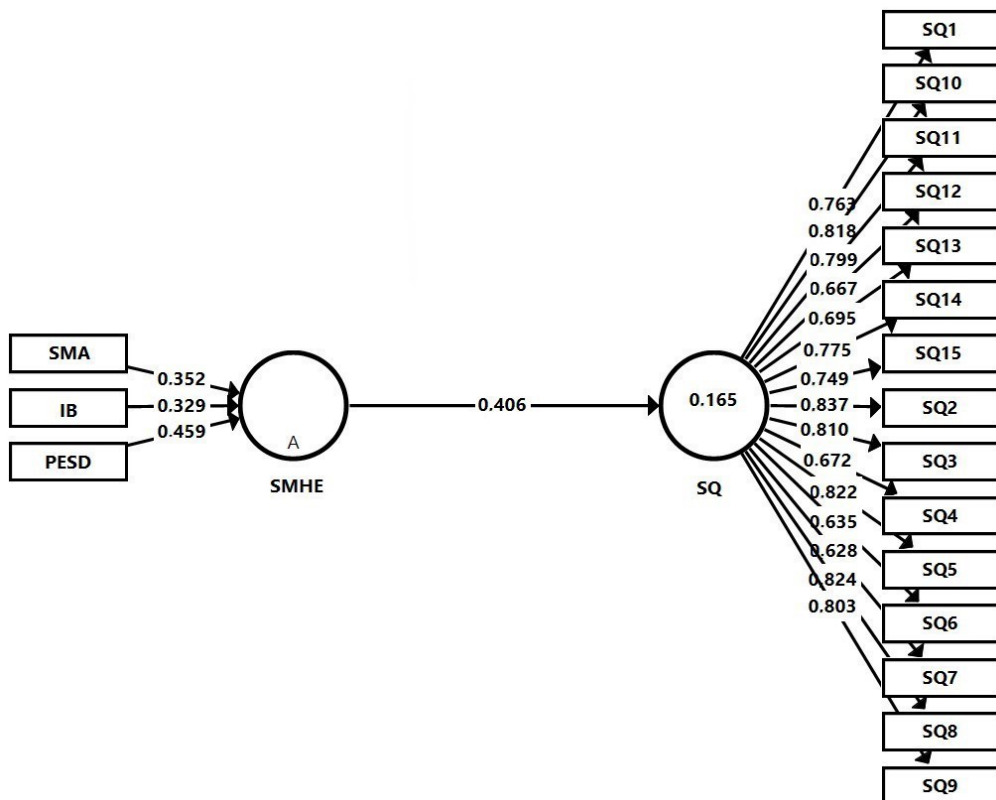
| Hypothesis | | Original sample β | t - value | p - value | 95% confidence interval | confirmation |
|------------|-----------------------|-------------------------|-----------|-----------|-------------------------|--------------|
| H1 | SMHE \rightarrow SQ | 0.406 | 22.335 | 0.000 | 0.372 – 0.443 | + |

Source: Authors

As shown in Table 10, the proposed hypothesis H1—"Sustainable marketing statistically significantly, directly, and positively impacts performance, assessed as higher education institution service quality" ($\beta = 0.406$, t-value = 22.335, p-value = 0.000)—was confirmed. The empirical relationship between the constructs in the proposed model was statistically significant at the 5% level ($p < 0.05$) and strong, with a 95% confidence interval for the population estimate ranging from 0.372 to 0.443.

Predictive significance, the second criterion for evaluating the structural model, was assessed by calculating the coefficient of determination (R^2), the effect size (f^2), and the cross-validated redundancy measure (Q^2). The R^2 values for the dependent constructs were derived using the corresponding path coefficients and standardized factor loadings for the reflective construct SQ, along with the weighting values for the higher-order formative construct SMHE.

Figure 3 Structural model SMHE-SQ



Source: Authors

Figure 3 shows that, according to Ritchey (2008, cited in Figueroa-García et al., 2018), the calculated R^2 value for the dependent variable SQ ($R^2 = 0.165$), though relatively low, falls within an acceptable range. This indicates that the SMHE-SQ model explains 16.5% of the variance in the dependent construct SQ. The calculated effect size (f^2) for the SMHE-SQ structural model was 0.198, which represents a moderate influence of the exogenous latent construct SMHE on the endogenous variable SQ, based on Hair et al. (2013).

The Stone-Geisser coefficient (Q^2) for the endogenous construct SQ was 0.495, which is greater than zero, confirming the predictive relevance of the SMHE-SQ model, as suggested by Hair et al. (2019).

Finally, the overall quality of the model was evaluated using the standardized root mean square residual (SRMR). Since the recommended threshold for SRMR is below 0.10 (Garson, 2016), the obtained value of 0.085 indicates an acceptable quality level for the proposed SMHE-SQ structural model.

6. Conclusion

This paper highlights the importance of sustainable marketing in higher education, focusing specifically on students as key stakeholders. Sustainable marketing is a function of sustainable economic development, which is basically a management tool. As a business and management function, marketing should help to improve the management processes of organizations by aligning products and services with the needs of target markets, future generations and society as a whole.

The main findings of this research are reflected in the answers to the research questions obtained based on the results of the research conducted on a sample of 1,663 students from the University of Rijeka. By applying the PLS-SEM method, which is suitable for testing new research theories, with the aim of further developing the existing theoretical framework using structural models that include one or more formative constructs and their relationships (Hair et al., 2019). A structural model of the relationship between sustainable marketing and business success was developed and tested. After analysis, all direct relationships in the structural model were found to be statistically significant and

positive, confirming the hypothesis: Sustainable marketing of a university has a positive and statistically significant effect on university performance, seen as service quality ($\beta = 0.406$, $t\text{-value} = 22.335$, $p = 0.000$), with the empirical relationship between the two observed constructs being statistically significant and strong at the $p < 0.05$ level, with a population estimation interval of 0.372 to 0.443 at the 95% confidence level. A model of sustainable marketing of HEIs was developed and tested, which can serve as a stimulus or starting point for HEI managers to evaluate and improve existing measures or identify specific groups of key activities and appropriate ways to implement sustainable marketing. By understanding student perceptions, attitudes and behaviors regarding sustainable marketing, HEIs can develop more effective strategies that align with student values and contribute to the promotion of sustainability goals.

This research has certain limitations that do not diminish the significance of the findings and conclusions if interpreted appropriately, while providing opportunities for improvement in future research. Empirical research has shortcomings and limitations related to the research approach, the research process and the processing and analysis of data collected with regard to the application of the quantitative approach. The conducted research has limitations related to its implementation at only one public university and the inability to compare it with related previous research, as it primarily focuses on the profit sector and mostly covers only one of the three dimensions of sustainable development. Since the research results based on the proposed model are not considered in a temporal perspective, but exclusively in the context of the given situation, and sustainable marketing necessarily involves a long-term perspective, it is necessary to consider it appropriately in the future and examine the impact of sustainable marketing on the performance of HEIs over certain periods of time (longitudinal research).

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