

MODELING THE DETERMINANTS OF SUSTAINABLE COMPETITIVE ADVANTAGE IN PRIVATE UNIVERSITIES USING STRUCTURAL EQUATION MODELING

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Abstract: Private universities in West Java and Banten face intense competition in attracting prospective students due to the proliferation of higher education institutions and changing market demands. This study aims to examine the determinant factors of sustainable competitive advantage, focusing on the roles of product mix and integrated marketing communication strategies. Using a quantitative approach, data were collected through a structured questionnaire distributed to 210 marketing managers and administrative leaders across private universities in the region. Structural Equation Modeling (SEM) was employed to analyze the relationships among variables. The findings reveal that both product mix and integrated marketing communication significantly influence the achievement of sustainable competitive advantage. Specifically, the alignment of academic program diversity with market needs and consistent, targeted communication campaigns contribute to institutional differentiation and long-term competitiveness. Theoretically, this research enriches the literature on strategic marketing in higher education by integrating marketing mix elements and communication frameworks. Practically, the study offers valuable insights for university leaders in developing effective marketing strategies to sustain competitiveness amidst a dynamic educational landscape.

Keywords: sustainable competitive advantage, product mix, integrated marketing communication, higher education marketing

1. INTRODUCTION

Indonesian higher education is now facing major challenges due to globalization, the information technology revolution, and changes in government policies that encourage autonomy and fierce competition between State Universities (PTN) and Private Universities (PTS) [1]. The autonomy of private universities has reduced their market share, exacerbated by the proliferation of new private universities in various regions [2]. Another challenge comes from globalization, which encourages the internationalization of education through cooperation, distance classes, and the opening of foreign university branches.

As one of the regions with the highest number of private universities, West Java and Banten face complex dynamics [3]. Data from Higher Education Service Institution (LLDIKTI) Region IV records that of approximately 2,500 study programs, only around 70% are accredited. Private universities in this region face internal challenges such as suboptimal governance and external ones such as free competition and the existence of established state universities [4]. Nevertheless, private universities still make a great contribution to access to higher education, especially for those who are not accommodated in public universities. Data from Higher Education Database (PDDIKTI) between 2013 and 2025 show that the number of private universities increased until 2023, then declined slightly due to mergers and license revocations [5]. The number of students has also surged again after dropping during the COVID-19 pandemic. The most common study programs are in Engineering & Technology, followed by Economics & Business and Social & Humanities [6]. Although the lecturer-to-student ratio is relatively stable, only about 10% of private universities in the region are accredited A.

To survive and thrive, private universities must implement a strategy of competitive advantage through the marketing mix (7P): product, price, venue, promotion, process, physical proof, and people [7]. Private universities need to position themselves as institutions that are able to answer the needs of the community, establish international collaborations, and develop a reputation through innovation and service quality [8]. The promotion and quality of educational products have proven to play an important role in attracting students.

With increasing competition and self-management demands, private universities need to manage the marketing mix in an integrated manner and oriented to public needs [9]. The right communication and campaign strategies will determine the attractiveness and sustainability of the institution [10]. Private universities are required not only to fulfill moral and ethical obligations of education, but also to become competitive and adaptive institutions in the era of global education.

In the last two decades, Integrated Marketing Communications (IMC) has become increasingly relevant in addressing the challenges of modern communication [11]. Technological changes, media fragmentation, and increasing consumer intelligence are driving organizations to adopt IMC to create consistent and effective messages [12]. In the higher education sector, PTS are facing pressure due to globalization and the transformation of State Universities into Legal Entities. IMC can be a strategic approach to strengthen the competitiveness of private universities through the coordination of various communication channels. In addition, the mix of educational products also plays a role in shaping the perception and added value of services [13]. However, empirical studies on the synergistic influence of IMC and product mix in private universities are still limited. This study aims to examine the influence of the two on the competitive advantage of private universities in West Java and Banten.

To lay the foundation for this research, we will first provide an overview of the background of password manager security, highlighting the vulnerabilities associated with brute force attacks [14]-[15]. We will then delve into a detailed analysis of the honey encryption algorithm and the high interaction honeypot technique, elucidating their principles and evaluating their effectiveness in preventing unauthorized access. Additionally, we will describe the implementation of the high interaction honeypot technique to create the decoy password manager, along with the strategies employed to engage and deceive attackers, thereby providing valuable intelligence for analyzing and mitigating potential security threats. By addressing the identified gaps in password manager security, this research aims to contribute valuable insights and practical solutions to strengthen the resilience of password managers and protect users' sensitive information from brute force attacks. The findings of this research will facilitate the advancement of password manager security and lay the groundwork for further exploration and enhancement in this critical domain.

2. RELATED WORKS

This research adopts a simplified theoretical foundation consisting of grand theory, middle-range theory, and applied theory [16]. The grand theory refers to contemporary marketing management perspectives, which emphasize value creation, customer-centric strategies, and data-driven decision-making in the digital era. The middle-range theory is grounded in the modern marketing mix framework, focusing on how product, price, place, and promotion interact to shape strategic marketing decisions. At the applied theory level, this study incorporates practical approaches such as integrated marketing communication to ensure coherent message delivery across channels, customer value theory to understand how perceived benefits influence customer decisions, and product mix considerations to align offerings with market needs.

2.1 Competitive Advantage

The study adopts a modern perspective on competitive advantage, emphasizing strategic positioning through cost leadership, differentiation, and market focus. Competitive advantage is evaluated using contemporary frameworks such as the Value, Rarity, Imitability and Organization (VRIO) model, the balanced scorecard, and dynamic capability analysis [17]. In addition, the marketing mix framework is used to explain how product, price, promotion, and distribution elements are managed strategically to align offerings with customer needs and market dynamics. The overall marketing approach highlights a shift toward customer-oriented strategies, where understanding consumer needs becomes the central basis for designing and delivering value.

2.2 Product Mix

One of the key components in this study is the product mix, which refers to the overall structure of products offered by an organization. The product mix is characterized by dimensions such as width, length, depth, and consistency, which together determine how effectively the offerings meet market needs [18]. Contemporary perspectives emphasize that a product mix must create clear customer value and align with consumer preferences to remain competitive. In both service and B2B contexts, strategic integration and product relevance play a crucial role, reflecting the need to design offerings that strengthen competitiveness and build long-term customer loyalty.

2.3 Integrate Marketing Communication

The marketing mix in this study is viewed as a strategic framework that integrates product, price, promotion, and distribution to align business offerings with market needs [19]. Modern marketing emphasizes a customer-centric approach, where understanding consumer expectations becomes the foundation for designing and delivering value. This orientation reflects the shift toward data-driven, customer-focused strategies in today's competitive environment [20].

A core element of the marketing mix is the product mix, which represents the overall structure of products offered by an organization. Its key dimensions, such as width, length, depth, and consistency, determine how effectively a company can meet diverse customer needs. Contemporary perspectives highlight that product mix decisions must prioritize customer value, consumer preferences, and strategic relevance, whether in services, consumer markets, or B2B settings. Thus, the product mix serves not only as an overview of product variety but as a strategic instrument for shaping competitiveness and customer loyalty [21].

By integrating modern marketing management, communication strategies, and customer value perspectives, this study emphasizes that marketing activities must operate cohesively rather than in isolation. Value-oriented product strategies, strong portfolio alignment, and responsiveness to digital transformation are critical to achieving sustainable competitive advantage. To support this, tools such as VRIO, the balanced scorecard, and dynamic capability analysis are essential for evaluating whether the marketing mix effectively strengthens organizational performance in a changing market landscape.

3. METHODOLOGY

This study aims to examine the influence of product mix (PM) and Integrated Marketing Communication (IMC) on competitive advantage in Private Universities (PTS) in the LLDIKTI IV area of West Java and Banten. The object of the research includes all the characteristics of the three main variables found in private universities, while the research subjects are marketing managers and administrative leaders of universities, polytechnics, institutes, and colleges as shown in Table 1.

Table 1. Measurement Model Analysis result

Private Universities	Total (People)	
	Rector/ Chairman/ Director	Marketing Manager
University	134	134
Institute	25	25
High School	148	148
Academy	63	63
Polytechnic	51	51
Community Academy	2	2
Sum	423	423

Using a quantitative approach, data was collected through a structured questionnaire distributed to 210 marketing managers and administrative leaders across private universities in the region. The SEM is used to analyze the relationships between variables. This study is descriptive-verified, using an explanatory survey method with a variant-based SEM approach. The main variables consist of PM and BMI as independent variables, besides alternately PM and IMC as intervention or bound variables, and CA as bound variables. Data was collected through a Likert scale questionnaire and supported by interviews and documentation. The population includes 423 private universities with a sample of 210 respondents selected through the Simple Stratified Proportional Random Sampling technique. Data processing is carried out using WMS for description and SEM for hypothesis testing. The test was carried out with statistics F and t to see the simultaneous and partial influence between variables. This research can provide a comprehensive picture in improving the competitiveness of private universities in the era of fierce competition for universities in Indonesia, especially West Java and Banten.

4. RESULT AND DISCUSSION

4.1 RESULT

The results of the Measurement Model Analysis show that most of the indicators in the model have good convergent validity, characterized by a loading factor value that is generally above 0.70. This shows that these indicators are able to explain the measured construct quite well. Some indicators such as IRHE (0.954) and AoAS (0.959) even show very high loading values, which indicates a very strong contribution to its construct. However, there are several indicators that have loading values below 0.70, such as DMSA (0.594), WOMM (0.621), PS (0.631), AEA (0.506), and AD (0.551). Although still within the minimum tolerance limit in exploratory studies, these values suggest that these indicators have a weaker contribution to the constructs they represent. Especially AEA and AD need special attention because of their low loading and R^2 values, which means that the contribution to the construct is not too large and the error rate is high.

In terms of statistical significance, all indicators show a t value higher than the critical limit of 1.96, which means that the relationship between the indicator and its construct is statistically significant. This is reinforced by the "Ket" column which states "Ho Reject" on all indicators, indicating that all loading factors are statistically significant and statistically acceptable inferentially. The R^2 value of most indicators is also quite good, indicating that the proportion of variance described by the construct is quite high. Indicators with R^2 above 0.5 are considered good, while some indicators such as AEA, AD, and SLS have values below that, which suggests that these indicators only explain a small fraction of the variation of the construct in question. The magnitude of the variance error in these indicators is also high, reinforcing indications that their contribution is not optimal.

Overall, this measurement model is quite good, with most indicators showing adequate validity and reliability. However, some indicators with low loading values and R^2 need to be further evaluated, both for revision and for consideration for their removal if they do not support the overall suitability of the model. Further validation by looking at the AVE (Average Variance Extracted), CR (Composite Reliability), and structural model results will go a long way in ensuring that the construct used is truly robust and trustworthy. The results of statistical calculation using the Lisrel 10.2 Application show the magnitude of the influence of Product Mix and BMI on Competitive Advantage, both partially and simultaneously, presented in Table 2.

This Figure 1 illustrates a structural equation model showing how two green latent variables—PM (Performance Measurement) and IMC (Integrated Marketing Communication)—influence the yellow latent variable CA (Customer Attitude). Each latent variable is measured by multiple observed indicators, represented by rectangles with their respective factor loadings. The arrows show the directional relationships: PM and IMC both have positive effects on CA, with IMC having a stronger influence (loading .668) than PM (.477). Additionally, CA is strongly predicted by an external factor (loading .894). The measurement model shows generally strong indicator loadings, suggesting reliable measurement of each construct. Overall, the model depicts how organizational performance measurement and integrated marketing communication contribute to shaping customer attitudes.

Table 1. Measurement Model Analysis result

Dimension	Standardized Solution (Loading Factor)			<i>t</i> Value	<i>R</i> ²	Error	Information
	PM	IMC	CA				
AP	.749			17.618	.561	.439	H ₀ Reject
NAP	.737			16.139	.543	.457	H ₀ Reject
FI	.757			16.903	.573	.427	H ₀ Reject
QAP	.706			9.064	.498	.502	H ₀ Reject
DSPS	.763			13.696	.582	.418	H ₀ Reject
IRHE	.954			15.192	.910	.090	H ₀ Reject
FTSQ	.723			13.543	.523	.477	H ₀ Reject
AoAS	.959			14.340	.920	.080	H ₀ Reject
Ad		.840		15.815	.706	.294	H ₀ Reject
SP		.809		14.743	.654	.346	H ₀ Reject
DM		.914		17.179	.835	.165	H ₀ Reject
DMSA		.594		9.143	.353	.647	H ₀ Reject
WOMM		.621		10.626	.386	.614	H ₀ Reject
PS		.631		5.113	.398	.602	H ₀ Reject
AD			.551	8.902	.304	.696	H ₀ Reject
SE			.761	11.366	.579	.421	H ₀ Reject
AEA			.506	7.142	.256	.744	H ₀ Reject
SLS			.587	9.258	.345	.655	H ₀ Reject
GS			.766	7.258	.587	.413	H ₀ Reject

Information: PM=Product Mix; AP=Academic Programs; NAP=Non-Academic Programs; FI=Facilities & Infrastructure; QAP=Quality of Academic Programs; DSPS=Diversification of Study Programs and Services; ILM= Innovation in Learning Methods; IRHE=Image and Reputation of Higher Education; AAS=Academic & Administrative Services; FTSQ=Faculty & Teaching Staff Quality ; AoAS=Advantages of Additional Services; IMC=Integrated Marketing Communication; Ad=Advertising=SP=Sales; Promotion; PRP=Public Relations & Publicity; DM= Direct Marketing; DMSA= Digital Marketing & Social Media; WOMM= Word-of-Mouth Marketing; PS=Personal Selling; CA=Competitive Advantage; AD=Academic Differentiation; IPI= Institutional Reputation & Image; SE= Service Excellence; ITA= Innovation & Technology Adoption; AEA= Affordability & Economic Value; SLS= Student Loyalty & Satisfaction; GS=Graduate Competitiveness

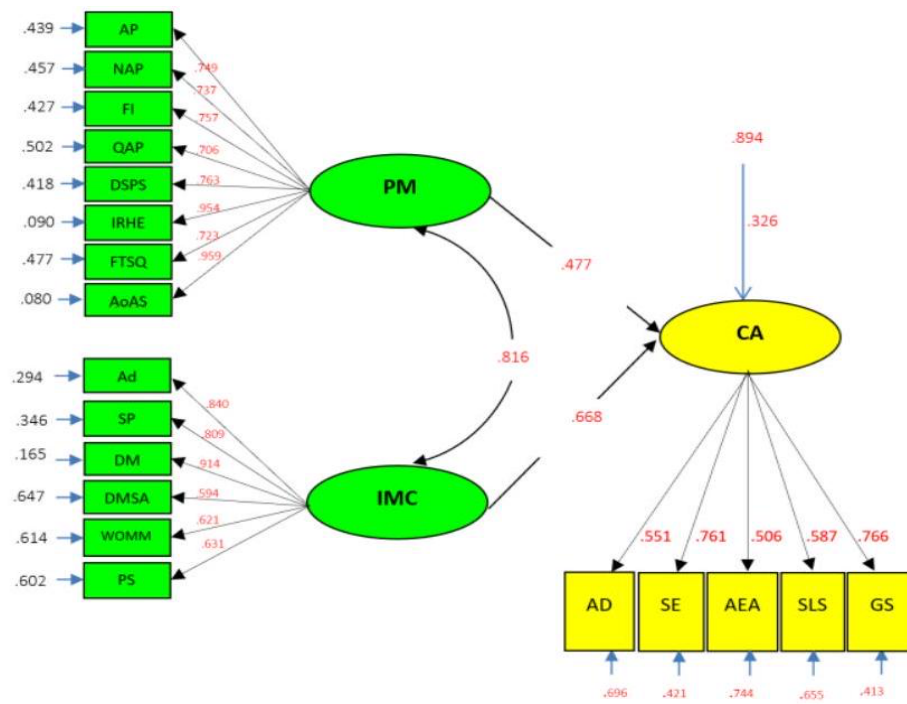


Figure 1. Determinants of Sustainable Competitive Advantage Model

Based on the Table 3, it can be concluded that the product mix (PM) and Integrated Marketing Communication (IMC) have a significant influence on competitive advantage (CA), both partially and simultaneously. First, the direct influence between PM on CA shows a path coefficient of 0.477 with an R^2 value of 0.228, which means that 22.8% variation in competitive advantage can be explained by the product mix. A very small p-value (0.000) indicates strong statistical significance so the null (H_0) hypothesis is rejected. This indicates that the product strategy run by private universities makes an important contribution in building competitiveness.

Table 2 Result of the Testing of the Effect of Product Mix and BMI on Competitive Advantage

Latent Variable	Path Coeff	R^2	p-value	Conclusion
PM → CA	.477	.228	.000	H_0 Reject
PM → IMC → CA	.088	.008	.081	H_0 Not Reject
Total PM → CA	.055	.235	.000	H_0 Reject
IMC → CA	.688	.473	.000	H_0 Reject
IMC → PM → CA	.088	.119	.028	H_0 Reject
Total IMC → CA	.231	.481	.000	H_0 Reject
PM & IMC → CA	.846	.716	.000	H_0 Reject
Total Influence = 0.894		Residue = 0.106		

Meanwhile, when the influence of PM on CA was analyzed indirectly through IMC, the results showed that the effect was relatively small and insignificant. The path coefficient of 0.088 and the R^2 value of only 0.008 indicate that these indirect paths do not make a significant contribution to CA, as shown by a p-value of 0.081 that exceeds the significance limit of 0.05. This means that although the product mix has a direct influence on competitive advantage, it becomes weak when mediated by the IMC. However, when viewed in total, the influence of PM on CA remains significant with a total coefficient of 0.055 and a p-value of 0.000. This reinforces the conclusion that although the indirect influence is weak, overall PM is still relevant in shaping the competitive advantage of private universities.

In contrast to PM, IMC shows a stronger direct influence on competitive advantage. A path coefficient of 0.688 with an R^2 of 0.473 suggests that almost half of the variation in competitive advantage can be explained by the effectiveness of the IMC. A very significant p-value (0.000) reinforces that IMC is the dominant factor that determines the competitiveness of private universities. In addition, IMC also has a significant indirect influence on CA through PM, although the contribution is smaller, with a coefficient of 0.088, R^2 of 0.119, and a p-value of 0.028. Thus, IMC not only influences CA directly, but also provides a boost to product development which ultimately contributes to competitive advantage. When viewed in total, the influence of IMC on CA remains significant with a total coefficient of 0.231 and a p-value of 0.000, indicating that an effective communication strategy, both directly and indirectly, can improve the overall competitive position of private universities.

Simultaneous testing of the influence between PM and IMC on CA showed that the two variables together contributed very significantly to competitive advantage, with a path coefficient of 0.846 and an R^2 value of 0.716. This means that 71.6% of the variation in competitive advantage can be explained by the combination of these two factors, and the remaining 10.6% (residue) is likely to come from other variables not included in this model. Overall, this research model is relatively strong with a total influence of 0.894. These findings provide an understanding that in the context of competition between private universities, success in building competitiveness is largely determined by a combination of good product management and effective marketing communication strategies. IMC proved to be the most dominant factor, while PM retained an important role, especially if it was strategically improved and aligned with the right communication channels.

4.2 Discussion

This study adopts a multi-level theoretical framework consisting of grand theory, middle-range theory, and applied theory to explain the influence of product mix (PM) and integrated marketing communication (IMC) on competitive advantage in PTS. At the grand theory level, the analysis is grounded in contemporary marketing management perspectives that emphasize value creation, adaptive strategy, and market responsiveness in the digital era. The findings demonstrate that both PM and IMC significantly and simultaneously contribute to competitive advantage, reinforcing the principle that strategic differentiation and the ability to respond to environmental change are central to institutional competitiveness.

At the middle-range theory level, this research draws on modern interpretations of the marketing mix framework, where product, price, place, and promotion function as integrated strategic instruments. The results indicate that PM has a strong direct effect on competitive advantage, while its indirect effect through IMC remains limited. This suggests that although a well-structured product portfolio—reflected through dimensions such as width, length, depth, and consistency—strengthens positioning, its synergy with communication activities requires further optimization to achieve full strategic alignment.

At the applied theory level, the study incorporates practical frameworks related to product strategy, integrated communication, and customer value. The results identify IMC as the most dominant predictor of competitive advantage, highlighting the increasing importance of cohesive communication across traditional and digital channels. In the context of PTS, an integrated communication strategy plays a critical role in shaping brand perception, attracting prospective students, and strengthening stakeholder trust. IMC also serves as a differentiation mechanism by communicating academic strengths, service quality, and institutional uniqueness.

Furthermore, using contemporary competitive advantage perspectives such as VRIO and dynamic capability frameworks, the study positions IMC as a strategic resource that is valuable, difficult to imitate, and effectively organized. The combination of PM and IMC explains 71.6% of the variance in competitive advantage, indicating strong synergy between product strategy and communication capabilities. This also aligns with performance evaluation approaches such as the balanced scorecard, which emphasize the

integration of customer focus, internal process effectiveness, learning and growth, and overall institutional performance.

The practical implications of this study are substantial. PTS must enhance their dynamic capabilities by developing agility in strategic decision-making and responsiveness to market changes. They must refine product portfolios to align with evolving educational demands, while strengthening integrated communication strategies using data-driven insights, digital platforms, and AI-based tools. A marketing mix strategy that is value-oriented, customer-centric, and technology-enabled becomes essential in sustaining long-term competitive advantage in the higher education sector.

5. CONCLUSION

This study concludes that both Product Mix (PM) and Integrated Marketing Communication (IMC) have a significant and positive influence on the Competitive Advantage of Private Higher Education Institutions (PHEIs) in the LLDIKTI Region IV (West Java and Banten). The empirical evidence derived from LISREL 10.2 confirms that PM has a strong direct effect on enhancing competitive positioning. This finding highlights the strategic role of developing a diverse, consistent, and relevant portfolio, ranging from academic programs to student services and institutional facilities, to strengthen institutional market differentiation and attractiveness.

IMC also exerts a direct and significant impact on competitive advantage. This underlines the essential function of coordinated communication efforts, including digital promotion, public relations, and brand management, in shaping stakeholder perceptions and enhancing the institution's perceived value. When tested simultaneously, the combined influence of PM and IMC reaches a total effect value of 0.894, with a residual error of only 0.106, suggesting a synergistic relationship between product strategy and communication efforts. These findings advocate for the design and implementation of value-driven and integrated marketing strategies as a prerequisite for sustainable competitive advantage in the higher education sector.

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