

Analysis of Competitiveness of Batangas State University College of Engineering Using Porter's Five Competitive Forces Model

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BACKGROUND

There are a number of models and frameworks used in the analyses of competitiveness of engineering universities in the context of internationalization and globalization. Although much can be derived from such analyses, it is argued that universities that can be harnessed to provide competitive advantage can be best analyzed when regarded as an industry. In this study, the competitiveness of Batangas State University College of Engineering was determined based on Porter's Five Competitive Forces Model and was defined by the following: the threat of new entrants, rivalry among existing firms within an industry, the threat of substitute products or services, the bargaining power of suppliers, and the bargaining power of buyers. The intensity of threats of new entering universities, short-term substitutes, and rivalry among existing universities were determined over the strength of Batangas State University College of Engineering as supplier, and as viewed by the industries and alumni as buyers.

PURPOSE

This paper examined the competitiveness of Batangas State University College of Engineering using Porter's Five Competitive Forces Model. It assessed the competitive edge of the College as perceived by alumni and other stakeholders vis-à-vis other engineering institutions, which highlighted the applicability of this model in determining the competitiveness of the College.

DESIGN / METHOD

To be able to analyze the competitive advantage of Batangas State University College of Engineering over the other existing engineering schools in Batangas, its graduates from twelve engineering programs over the last five years were surveyed. This determined the graduates' assessment of faculty competence in different aspects, effectiveness of its curriculum, and the capability of the university in providing quality services to the students. On the other hand, the personnel from different companies in the region were included in the population of this study to determine their assessment of the competitiveness of the graduates of Batangas State University College of Engineering.

The respondents of this study were 386 alumni out of 2,197 graduates from twelve engineering programs of Batangas State University from the school year (SY) 2005-2006 to SY 2009-2010. On the other hand, a total of 52 respondents from major industries in the CALABARZON region were the second group of respondents of the study.

RESULTS

Results revealed that the perceptions of the alumni and industry partners on the College's competitiveness as regards buyer power, supplier power, threats of new entry and rivalry among existing competitors were relatively high. On the other hand, they had an average perception on the competitiveness of the College's programs considering threats of substitutes.

CONCLUSION

Porter's Five Competitive Forces Model has been found applicable in the analysis of competitiveness of Batangas State University College of Engineering similar to that in business entities to have distinct attributes and capabilities which are presented to their clientele if they are to have a strong market and competitive position.

The results underscore the competitiveness of the University in terms of faculty, curriculum and other attributes that make it a University of choice by students for an engineering education. Despite these, it is challenged by aggressive competition by other institutions and by alternative substitute modes of learning equal to an engineering degree.

KEYWORDS

Porter's Five Competitive Forces, competitive advantage, differentiation strategies

Introduction

Globalization has become inevitably beyond the control of individual Higher Education Institutions and governments. Characteristically, since global cities have a high density of participation in higher education, there is a strong positive correlation between the higher education enrolment ratio of a nation or a region, and its global competitive performance (Bloom, 2005). Future opportunities and challenges for internationalization of higher education must be explored in order to respond to globalization of societies, cultures, economies and labor markets (Kälvermark & Wende, 1997).

There has been a continuing interest in the analysis of forces that induce impact on organizations, particularly those that can be harnessed to provide competitive advantage like universities. (Thurlby, 1998). The Batangas State University stands as a university offering engineering education anchored on its mission and the mandates of the Commission on Higher Education. Having acquired recognition for its engineering education through the years, there is a felt need to verify how it stands as to the entities it has served: the alumni, and the market – the industries.

One of the bases of competitiveness is readiness for internationalization. Termed as internationalization of tertiary education (ITE), this means integrating international, intercultural or global dimension into the goals, functions, and delivery of higher education (Knight and de Wit, 1997) as cited by Eglitis and Panina (2010). Evidently, this is seen in the crafted vision of Batangas State University, which has geared its direction in the shaping of a global Filipino. Also, the Batangas State University is governed by national regulations, policies and norms which according to Duczmal (2006) may have an impact on students and their academic and personal and social behaviors as well as their choice of university. To date, the College is home to 122 top performers in national licensure examinations notably in mechanical, electrical, electronics and communications, civil, chemical, environmental and sanitary and architecture programs, and the graduates' performance in national licensure examinations is consistently higher than the national passing percentage expected among engineering graduates. As a result of the efforts to continuously improve the quality of its curricular programs, faculty, and research capabilities, it has become a university of choice by future engineering students and one of the top producers of globally competitive professionals in the region.

According to Porter, it is imperative that organizations have their own strategies that reflect their needs and plans, given the institutional arrangements and external conditions. The Batangas State University took the risk of program differentiation when it started offering programs other engineering schools in the province did not offer. It adapted by making the faculty strong by sending them for advanced studies and trainings abroad to prepare them for the instructional needs and challenges of the new programs. To Porter, this move shows the competitiveness of an organization. Organizations adapting to new institutional arrangements and new demands will choose the way they respond and reorganize themselves. One way is to create added value to its products which in this context, Batangas State University did. Duczmal (2006) had cited not-for-profit organizations, such as a higher education institutions use added value strategies not just for money but works for value for society and performance of their mission, as well.

Methodology

The study was anchored on the theory of Michael Porter on competitiveness which is a tool used to analyze an industry's or company's structure and their corporate strategies. This will present the different competitiveness models and frameworks as applied to business and knowledge intensive organizations. Industry analysis in higher education institution was also presented to show the appropriateness of Porter theory in the analysis of competitiveness of universities

The respondents of this study were the 386 alumni out of 2,197 graduates over the past five years from twelve engineering programs of Batangas State University from the school year (SY) 2005-2006 to SY 2009-2010. The number of respondents used exceeds the 339 minimum required number of samples determined using Slovin's Formula with a margin of error of 0.05, distributed to different programs using stratified proportional sampling technique. On the other hand, a total of 52 respondents from major industries in CALABARZON region were the second group of respondents in the study.

Survey Questionnaire Design

Generally, the developed questionnaire consisted of seven sections (Sections A to G). The first six sections (Sections A to F) were intended for alumni respondents while the seventh section (Section G) was aimed for industry personnel who were able to handle Batangas State University College of Engineering graduates and trainees. The responses of the respondents to the questionnaire items were given scalar values of 1-5 with 1 as the lowest to 5 as the highest.

Section A. This part of the questionnaire dealt with the general criteria in choosing engineering university. This includes affordability, adequacy of facilities, laboratories and library resources, availability of scholarships, efficiency of students' services, accreditation of programs, honors and achievements earned by the university, and linkages with industries and other agencies. This reflects the competitiveness of Batangas State University College of Engineering as based on Porter's buyer power attribute as perceived by alumni.

Section B. This part pertained to faculty competence as to professional qualification, advanced education, sufficiency of teaching experience and training, affiliation to professional organizations, participation to seminars and conferences, and linkages with the industry. This reflects the competitiveness of Batangas State University College of Engineering based on Porter's supplier power attribute as to faculty competence as perceived by alumni.

Section C. This was concerned with the strength of the curriculum as to submission to Commission on Higher Education standards, updatedness and responsiveness to industry needs, and involvement of the stakeholders in its revision. This reflects the competitiveness of Batangas State University College of Engineering based on Porter's supplier power attribute as to curriculum as perceived by alumni.

Section D. This section dealt with the strength or limitations of Batangas State University as compared to other existing engineering schools in Batangas with regard performance, affordability, faculty, accreditation, research and innovation, awards and honors, linkages and international affiliation. This reflects the competitiveness of Batangas State University College of Engineering as based on Porter's attribute of rivalry as perceived by alumni.

Section E. This contained the preference to other substitutes to engineering courses which includes enrollment to short term or technical courses, affiliation to some professional organization, and enrollment to some online programs. This indicates the competitiveness of Batangas State University College of Engineering as based on Porter's threats of substitute attribute as perceived by alumni.

Section F. This part focused on the acceptability of Universities that introduce new engineering programs that are competitive in providing engineering education. This shows the competitiveness of Batangas State University College of Engineering based on Porter's threats of new entry attribute as perceived by alumni.

Section G. This concerned the attributes of the graduates of Batangas State University College of Engineering as well as the responsiveness of its curriculum relative to the needs of the industry. This reflects the competitiveness of Batangas State University College of Engineering as based on Porter's buyer power attribute as perceived by the industries.

Competitiveness Models

In the higher education literature, Pringle and Huisman (2011) observed that most models and frameworks for analysis are based on defining governance structure or coordination models such as Clark's Triangle of Coordination (1983), van Vught's Rational Planning and Control Model (1989), Olsen's Four States Model (1988) and Hood's Comparative Framework (1998).

Porter (1990) outlined his conceptual framework of competitiveness first in 'The Competitive Advantage of Nations'. At a broad level, Porter distinguished between two sets of factors that impact competitiveness: The social, political, macroeconomic, and legal context on the one hand and the microeconomic foundations on the other hand (Porter, 2004). In his research, Ketels (2006) pointed out that without microeconomic improvements macroeconomic reforms fail to achieve sustainable improvements in prosperity. Within the set of microeconomic factors, Porter distinguishes between the sophistication with which companies operate and the quality of the business environment

Haataja and Okkonen (2004) synthesized the three competitiveness models as applied to knowledge intensive organization. This includes value chain, resource-based view and knowledge-based view.

Porter (1985) pointed out that every activity in the process creates value for the customer through the chain of activities. According to this view, the chain of activities helps to develop knowledge creation and service processes.

Porter's Five Competitive Forces Model has already been applied in a wide array of businesses including non-profit organizations where competitive advantage is a central theme. As cited by Pringle and Huisman (2011), Porter's model (1985) is anchored on microeconomics and despite criticisms from Mintzberg (1994) and others, it is still one of the most strategic frameworks used today. Since engineering universities can be harnessed to provide competitive advantage, it is in this context that Porter's Five Competitive Forces Model was chosen by the researcher in analyzing the competitiveness of Batangas State University College of Engineering.

Industry Analysis in Higher Education

According to Collis (1997), industry analysis is based on the concept that all industries create value. The questions are what amount of value the industry can create and who captures the created value. The two forces that affect the size of the industry include threat of entry of new providers and threat of substitute products. On the other hand, the three forces that determine the division of the industry include power of buyers, power of suppliers, and the degree of rivalry. Together these five forces are considered contributory to the average profitability of an industry.

Duczmal (2006) cited that some industries are inherently more profitable than others because of the distinct differences in their structure. In the analysis of higher education, the success of industry analysis lies in its focus at the various agents of change that operate directly or indirectly through the 'five forces'. The framework considers the collective changes caused by the five forces, and how the resulting changes may reconfigure the higher education industry as a whole rather than looking at the impact of the individual forces or drivers.

Each public and private higher education institution always strives to gain a competitive advantage in the market. (Porter, 1980, 1998). Having a competitive advantage over other competing organizations attracts prospective sufficient students, and further generate state funding and tuition fee income, which is necessary for sustainable development.

Porter distinguished two families of business concepts or strategies useful for industry analysis namely: product differentiation strategy and efficiency or cost leadership strategy. The first type of strategy refers to the idea that the organization is unique for it serves

a particular market and offers products and services that are different from the products offered by other suppliers. In the second family of strategies, the advantage of the organization lies in its ability to produce its product in a less costly way as compared to its competitors. As further identified by Porter, strategies can be directed towards either a broad market; or specific market segments. In some cases, targeting the broad market may lead to an increased added value and a better competitive position in the market (Duczmal, 2006).

In the case of higher education applying focus strategy, universities and colleges concentrate on a narrow student or program segment, and within that segment they manage to develop the best offer and capture the students' interests. This discourages other providers from competing directly. In this case, students have less choice and are left with fewer alternatives to choose from.

On the other hand, a broad market-wide business concept suggests a broad market strategy, where the products offered caters to a wider market segments. Organizations choosing the broad market strategy can adopt the differentiation strategy or the cost leadership strategy, emphasizing price first then availability.

However, most often they will mix both strategies, offering low-cost products to some consumer groups that emphasize the price first, and high-quality products to those consumers that are attracted by the brand and quality of the products (Porter, 1980). Universities that consider a broad market strategy offer a wide range of programs, including those leading to bachelor, master or even doctoral degrees. They may offer varied modes of delivery, including full-time, part-time and evening-time programs. Their offer is targeted at a wide array of students groups from different economic classes. They also try to attract students from rural areas by opening branches in smaller non-academic cities. Higher education institutions that decide to adopt such a broad market strategy need to have diversified sources of financial resources in the form of state subsidies or large endowments, or donations (Duczmal, 2006).

Porter's Five Competitive Forces Theory

According to Porter (1980, 1985) and Porter and Millar (1985), as cited by Shin (2001), a firm develops its business strategies in order to obtain competitive advantage over its rivals. This is done by responding to five primary forces: the threat of new entrants, rivalry among existing firms within an industry, the threat of substitute products or services, the bargaining power of suppliers, and the bargaining power of buyers (Figure 1).

The threats of new entrants become a competitive force when they are new and render the same products and services. The easier it is for new companies to enter the industry, the more cutthroat competition there will be.

Power of suppliers is the pressure suppliers can place on a business. If one supplier has a large enough impact to affect another company's offerings, definitely it becomes a competitive force to reckon and then it holds substantial power. On the other hand, power of buyers is manifested by the pressure customers can place on a business. Businesses have to adopt strategies so that they provide requirements and demands of customers as they have impact to the success sustainability and profitability of the business.

Availability of substitutes is a pressure as buyers will have the tendency to switch to another supplier with a competitive product or service. These forces help analyze the intensity of competition to the profitability and attractiveness of an industry. Figure 1 shows the interaction among the different competitive forces.

In the context of Porter's Five Competitive Forces, the study presupposed that these could also be adopted as assessment factors in determining the competitiveness of educational institutions. Along this end, the forces were aligned so that they may appropriately be useful on the educational field. Supplier in the educational sector referred to faculty and curriculum;

buyers referred to industries and students; existing competition referred to existing neighboring universities and colleges; Substitutes referred to alternative engineering education aside from the degree programs and new entrants referring to new schools offering engineering education.

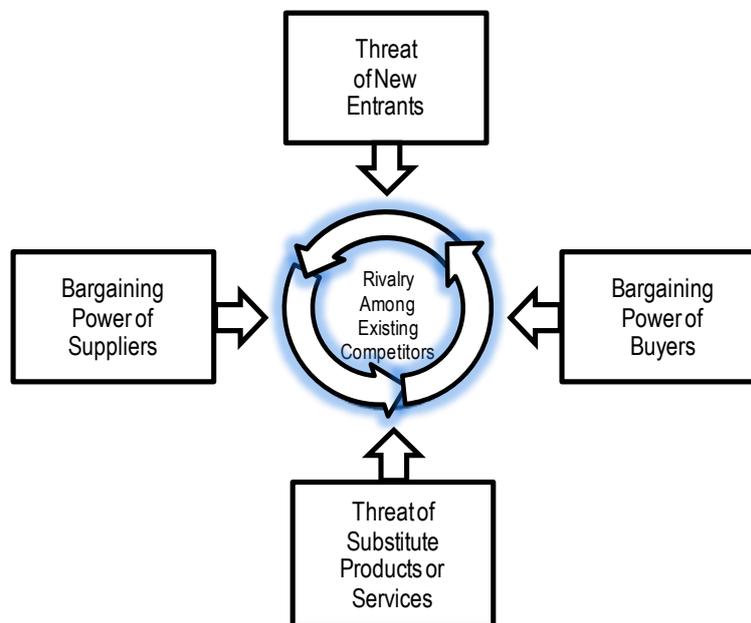


Figure 1. The Five Forces that Shape Industry Competition

Source: Harvard Business Review, 2008, Based on Michael Porter's Five Forces of Competitive Position Model

Results

Table 1 and Table 2 summarize the results of the survey conducted. The responses of 386 alumni and 52 industry personnel in the scale of 1 to 5 were averaged and the results were tabulated as weighted mean.

Supplier Power. Faculty competitiveness as to competence was perceived by the alumni as generally high. They found the faculty are qualified professionally, have sufficient teaching experience, equipped with related training, established linkages with the industry, have professional organization affiliations, take an active role in organizing seminars and conferences, and pursue advance studies in their respective specialization. When competitiveness of the College was surveyed as to its curriculum, the perceptions were that the College had high level of competitiveness.

Buyer Power. Porter has stipulated that there are factors that influence the way business entities give value to their products. One important factor is the buyer who decides on the quality of the product. In the context of the study, universities, just like business entities, have to use strategies which should satisfy the buyers, who in this study are the students and industries. The alumni's perceptions were that the College had high competitiveness as to its high performance in licensure and certification examinations, which made it a school of choice to take engineering education. Based on industries' perceptions, the College had high competitiveness as to preparations, work attitudes, and curriculum.

Table 1: Competitiveness of Batangas State University College of Engineering as Based on Porter's Five Forces Attributes as Perceived by Alumni

SECTION A. CRITERIA IN CHOOSING ENGINEERING UNIVERSITY	Weighted Mean	Verbal Interpretation
The Batangas State University ...		
• provides affordable education.	4.17	High
• has adequate facilities.	3.48	Average
• has varied library resources.	3.52	High
• provides effective and efficient student services.	3.55	High
• offers scholarships to support poor but deserving students.	4.18	High
• offers accredited and relevant programs.	3.95	High
• reaps outstanding achievements in local and national competitions.	4.12	High
• has high performance level in licensure and certification examinations.	4.23	High
• has strong linkages with industries, government and other agencies.	3.92	High
SECTION B. FACULTY COMPETENCE		
The Batangas State University College of Engineering faculty members ...		
• are qualified professionally.	4.00	High
• have sufficient teaching experience.	3.82	High
• are equipped with related trainings.	3.71	High
• established linkages with the industry.	3.67	High
• have professional organization affiliations.	3.88	High
• pursue advance studies in their respective specialization.	3.78	High
SECTION C. CURRICULUM		
The Batangas State University College of Engineering curriculum...		
• meets Commission on Higher Education standards.	4.21	High
• is updated and responsive to the needs of the industry.	3.90	High
• is revised with student involvement.	3.72	High
• is revised with alumni involvement.	3.57	High
SECTION D. STRENGTHS / LIMITATIONS OF NEIGHBORING UNIVERSITIES		
Batangas State University ...		
• exceeds in performance compared with other universities.	4.16	High
• has advantages over other universities in Batangas with regards to:		
o Cost / Affordability	4.23	High
o Faculty	3.85	High
o Accreditation	3.93	High
o Research and Innovation	3.79	High
o Awards and Honors	4.12	High
o Industry Linkages	3.85	High
o International Affiliation / Recognition	3.68	High
SECTION E. CHOICE OF SUBSTITUTES		
I consider / prefer / believe ...		
• enrolling in short term courses in lieu of an engineering degree.	3.01	Average
• affiliation with professional organization rather than acquiring an engineering degree.	2.98	Average
• enrolling in online programs to acquire an engineering degree.	2.97	Average
• that online degrees can give me training responsive to industry needs.	3.08	Average
SECTION F. ACCEPTABILITY OF NEW UNIVERSITIES		
The new schools in Batangas...		
• are competitive in providing engineering education.	3.65	High
• introduce new engineering programs.	3.52	High
• have competitive engineering curriculum.	3.56	High
• have qualified faculty.	3.55	High
• have strong partnership with industries.	3.48	Average
• have global recognition.	3.37	Average

Table 2: Competitiveness of Batangas State University College of Engineering as Based on Porter's Buyer Power Attributes As Perceived by Industry Personnel

SECTION G. INDUSTRIES	Weighted Mean	Verbal Interpretation
The Engineering graduates of Batangas State University ...		
• are well trained according to the industry needs such as		
○ Engineering Skills	4.29	High
○ Safety Practices	4.04	High
○ Research and Innovation	4.00	High
○ Continuous Professional Development	4.06	High
• are equipped with good work attitudes such as		
○ Leadership	4.21	High
○ Inter personal relationship	4.21	High
○ Responsibility	4.27	High
○ Commitment	4.23	High
The Engineering curriculum of Batangas State University is...		
○ responsive to industry needs.	4.13	High
○ updated according the trends in the industry.	4.02	High

Threats of Substitutes. Competition becomes strong when business entities which offer similar services and products create strategies and offer novel products which may be used as alternative to the same product but at possibly the same quality at a lesser cost. This study posits that institutions also use the same strategy, which increases their market and value and therefore become a threat to the other institutions. The alumni had average perceptions on substitutes to an engineering degree. They had expressed average preference in enrolling in short terms courses in lieu of engineering degree, affiliation with professional organization rather than acquiring engineering degree, and enrolling in online programs to acquire engineering degree.

Threats of New Entry. It was posited by Porter that entry of competitors may influence the sustainability and profitability of a particular industry. In the same context, educational institutions' existence may be challenged with the threats of new rivals in the field. According to the alumni, the new schools in Batangas had high competitiveness specifically in providing engineering education. They perceived that the new schools in Batangas are competitive in providing engineering education, and in introducing new engineering programs. The alumni also perceived that the new engineering schools have competitive engineering curriculum and qualified faculty.

Rivalry among Existing Competitors. Porter places rivalry as the strongest among the forces as it gauges the strength of a business entity. The alumni perceived that the College had high competitiveness over other engineering institutions with regard to its cost affordability, performance in licensure examinations, industry linkages, accreditation, awards and honors.

Conclusions

The foregoing discussion showed the applicability and significance of Porter's Five Forces Theory in the analysis of competitiveness of Batangas State University College of Engineering similar to that in business entities to have distinct attributes and capabilities which are presented to their buyers if they are to have a strong market and competitive position.

The results of this study forwards that the Batangas State University College of Engineering, as perceived by its graduates and the industries which are either linkages / employers of the graduates, has high competitiveness when it comes to faculty, curriculum and other attributes which make it a University of choice by students for an engineering education in

the region. Moreover, industries have affirmed high competitiveness of the graduates when it comes to preparedness in engineering work and work ethics.

Despite these, the College has to face challenges as regards competition from new institutions which are aggressively competing with the College in terms of its responsive curriculum. Also, there is the imposing challenge of trying out alternative substitute modes of learning to equal an engineering degree, which carries managerial implications with a focus on directing measures to sustain the competitive stature of the College of Engineering.

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