Input Variable Correlation Framework for Effective Marketing Strategy of Student Intake in a University Program

Huma Rauf[1], Huma Sikandar[2], Hassan Anwar[3]

HITEC University[1], *Centre for Advanced Studies in Engineering[2,3], Pakistan*

Abstract

Building a successful university program is a challenge for any Institute and attracting the right intake is even a bigger challenge. Every educational Institute builds up a marketing strategy and this study is conducted to find strong likelihood of a probable pattern that link input variables to successful outcome. This research is exploratory in nature to analyze factors affecting decision making of an individual to choose a university; overall perception, public image and marketing efforts of a University. The factors having correlations that can vary in their dynamics to bring out the best quantitative and qualitative outcome for a University. Quantitative outcome relates to more student applicants in general while qualitative impact relates to higher academic rating of students at time of joining.

The input variables or predictors generate desired response by the students and the applicants. Study of intake, their historic tends give projections in future direction if the marketing strategies need revision for more effective enrollment, desirability of a program or an Institute and eventually enhanced profitability of the University. Perception is dervied by Internal referral mechanism while Image is built on external factors that reflect on the ourlook of an Institute. The intended outcome is to become the preferential choice of new students applying at time of admission.

Keywords: Marketing Strategy, Image, Perception, University intake,

Introduction

Universities are the penacle of learning and ever since history, the desire to join a place of learning has been the choice of an individual, subject to the fulfillment of certain entry conditions and requirements. With evolving global dynamics, this process of University induction has also changed. The number of available choices have increased for students and need is ascertained by universities to develop effective marketing strategies in order to attract the right candidates for possible admission in their instittes. They work on their marketing mix by offering the most desireable product for the market, set prices according to the market segment and competition level, lowering the barriers of accessibility and then to effectively promote it through a set of promotional mix to reach prospective students. Any new program is introduced after prior analysis of overall demand in the market, intended skill gaps to be filled, availability of resources like

faculty, equipment, curriculum material, laboratories, etc. Competition for program exist in outside Universities and even internally between differnt programs of the same university some programs are declared successfully while others do not perform that well. This indicate that amidst this chaos of hit and trial, success and failure there is a strong likelihood of a probable pattern or correlation that link multiple variables for a successful or an unsuccessful outcome. The research was intended to come up with a model which could the variables that are the most likely success predictors.

This is an exploratory research conducted on one Engineering University that is operational for the last nine years primarily offering Electrical, Mechanical, Computer Engineering undergraduate and post graduate programs along with Islamic Studies, Mathematics, Computer Sciences, Management Sciences, etc. The University is going through a period of evolution; it has closed down two undergraduate non engineering programs which were not popular and has opened two new programs during the brief history of the Institute. The programs that were closed are Bachelors of Business Administration & Bachelors of Islamic Studies after running for almost five years. Computer Sciences program was opened in 2012 while Computer Engineering was introduced in 2013. Some programs like Mechanical Engineering & Electrical Engineering are running successfully for the last nine years and are taken as reference in the study. Computer engineering program starting three years ago is still missing the mark in terms of popularity for the incoming students.

University accreddation criterion are changing and so are the focus on learning skills, learning objectives, increased focus on entrepreneurial skill sets and analysis of risk factors, etc ascertaining the success of multiple program and singele programs in an university. Engineering Programs throughout the world have changed and the International standard follows the Accredited Board of Engineering & Technology ABET engineering standards. Accreditation revolves around Program Education Outcomes, PEOs which are linked with Student Outcomes SO. These are carefully tailored into curriculum and called Course Learning Outcomes CLOs and altogether these outcomes correlate to the overall outcome intended to be integrated in a Civil Engineer. Here PEOs are aligned with the mission and vision of the Institute and binds all the stake holders and ingredients of outcome together like students, faculty, program, outcome, improvement, support, facilities and curriculum. Two different programs of King Saud University (Khan, 2016) & Cairo University (Ezeldin,2013) were studied to find the reasons of success in International Engineering accreditations. Irrespective of the different entities and trades, while doing quantitative analysis or quantitative analysis, the assessment of measurement units or metrics of any program is important. This finally gets reflected on quality and stability of the program. The possibility of error is more in qualitative programs as knowledge distribution, misunderstood content and quality of interview techniques can be cause of most errors. However, errors can be reduced with effective knowledge dissemination (Hebiga,2016) and effective communication (Bencsik,2015). In complex operations and large engineering programs different models (Lucaea,2014) are built to assess the overall success. In the start of any program the objectives are unclear, roles & responsibilities are ambiguous, requirements are also not clear. If the execution plan does not incorporate planning errors then the risk of failure activities can be controlled. The most unsuccessful programs fail in the beginning due to insufficient

probabilistic mistakes, lacking potential to understand uncertainty and risk.In order to build relationships between multiple variables mathematical models are built as regression model, polynomial function or line slop function to generate projections. Different mathematical models were reviewed and one interesting probabilistic model reviewed was a mathematical model built to determine risk in a chemical plant (Khan, 2016).

Engineering Education and Engineering practices are closely linked and curriculums need refinement as per needs of the Industry. A case study on Helsinki Metropolia University of Applied Sciences (Valmu,2009) shows that their curriculum is based on a modular approach with strong emphasis on course integration for a better learning experience. The course are integrated by combining engineering courses with non technical studies presentation skills, project management, economics, language skills and mathematics, physics etc. The pedagogy of all engineering disciplines including the electronics engineering program is based on CDIO (Conceive – Design – Implement - Operate) approach, focusing on active teaching methods, receiving practical engineering skills and other CDIO principles. Students have a good feeling with this curriculum so far. However, in the longer run, University programs are best suited to be in alignment with the needs of the Industry as need of required skills comes from industry (Uskov,1998). The rapid growth of technology, internet and overall growth of economy has raised a need for skilled IT workers for companies at a national level. The new program is developed as a response to their national need. Course constraints have to be avoided (Bencsik,2015) as these come from accreditation documentations, coordination with university wide course program, student demand, engineering system, modeling and area specific expertise, and concluded industrial practice. It is more or less the responsibility of the top management to build a sustainable program therefore good leadership role can be a contributory factor (Calderón,2016).

In University industry collaboration, Entrepreneurship is considered to be a driving force for an economic growth (Dicheva,2016). Triangle of knowledge has to be developed in integration of scientific research carried out in universities and their commercialization on the basis on knowledge and innovation (Dicheva,2016). Same aspect is highlighted in San Jose University's research that active participation and involvement of industry are critical part of new programs (Muscat,1997). In conducting of overall analysis of risk, risk assessment and modulation, the key aspect is in the finding of the right variables and connecting it to a successful outcome of interest like variable of success of a program (Hinderer,2014), enhanced overall profitability, low failures and smooth operatives.

Scope of this study is to identify the input variables of any Institute in the development of internal student perception and a positive image of the University. These variables can be the stimulus for a right marketing strategy by that Institute for a succesful intake in terms of quantity and quality. Reasearch Objectives to be hypothesized are:

   a. Investigate on all possible input variables in an Institute that can possibly formualte perception and image about the Institute.

   b. Possible correlation of Input variables on the ourcome of the Institute and the role of Independent Variables (IV) on the DependantVariables (DV). Are there

any moderator or mediator variables present and what could be the possible impact.

c. Investigate the relationship of these variables and verify from primary sources if these relationships are meaningful.

d. Overall effect of variables on the final outcome of the study.

Methodology

Marketing for educational institutes is done in the same manner as for any product or company. It has become imperative for Universities to first understand the type of market they are part of, if they are in perfect competition, monopolistic competition, oligopoly or monopoly. The University of our study is part of monopolistic competition, where they offer similar product as of other Universities and in order for them to find their position they have to establish a unique selling proposition, a unique feature so as prospective students can relate to the Institute and then apply by choice for possible induction. Marketing Strategy has to be devised accordingly and integrated in all the marketing communication of the Institute for Internal and External customers of the University. The study is done into the variables to find the strongest variable in this regards so as the University can derive a selling proposition and redirect the scattered marketing mix in a focussed and integrated manner.

Our outcome of concern is primarily the success of an academic program or an Institute in terms of more people giving a high weightage to University in their decision making process of choosing a University. For this we have to first understand the process that happens before a prospective student enters a University, what elements draw him/her to the program? The initial variables identified are both known and unknown as follows;

a. Known Variables, as identified initially:

X1. Professional Accreditation

X2. Faculty to Student Ratio

X3. Fee Structure

X4. Total Number of Students

X5. Competition (both inter university and intra university programs)

X6. Financial Assistance Scholarships

X7. Hostel Facility

X8. Admission & Retention Rate

X9. University Image in the market

X10. Quality of Faculty

X11. Course Content Quality/Engagement Content

X12. Graduate Prospects

X13. Evaluation & Examination Criteria

X14. Transportation Facility

X15. Internship & Research Opportunity

X16. Laboratory Facility

X17. Extracurricular Activities

X18. Strong Alumni Network

X19. Leadership Opportunities

X20. Study Abroad Opportunity

X21. Academic Support Service

X22. Overall Campus Facilities

b.   Unknown Variables

W1. Number of applicant (historic data) applied

W2. Merit

Variables show different level of dependability on each classifying them as dependant or independent variable. This research intends to establish correlations and assign probabilities on variables of interest. Historical data can also help in establishing goal seek function. As software doing simulations on @Risk we see the multiple effect of different input data variables, their effect with changed probabilities, correlations and possible outcomes. Research intend to use sensitivity analysis in determining the most critical variables, build a model and apply multiple simulations to see how output varies with change in inputs.

These variables are the building block of the two components:

a.   Perception of University Students to formulate Internal Referral

b.   Image of the University in market for evaluation of incoming applicants

By Internal referral, it refers to the word of mouth marketing conducted by the University students if they are satisfied they tell their friends and family to apply for an institute and program. Normally this is the strongest element in marketing if a satisfied user is spreading positive perception. By Image of an Institute it refers to the name that has been earned by the students relating to any laurels, winnings outside the University, global or national recognition earned by the faculty or student of the University. This plays an important role in generating a desire for students to join an institute. Here, effective marketing can play the role of moderator between the Independent Varaible and Dependant Variable making the relationship enhave its positive correlation.
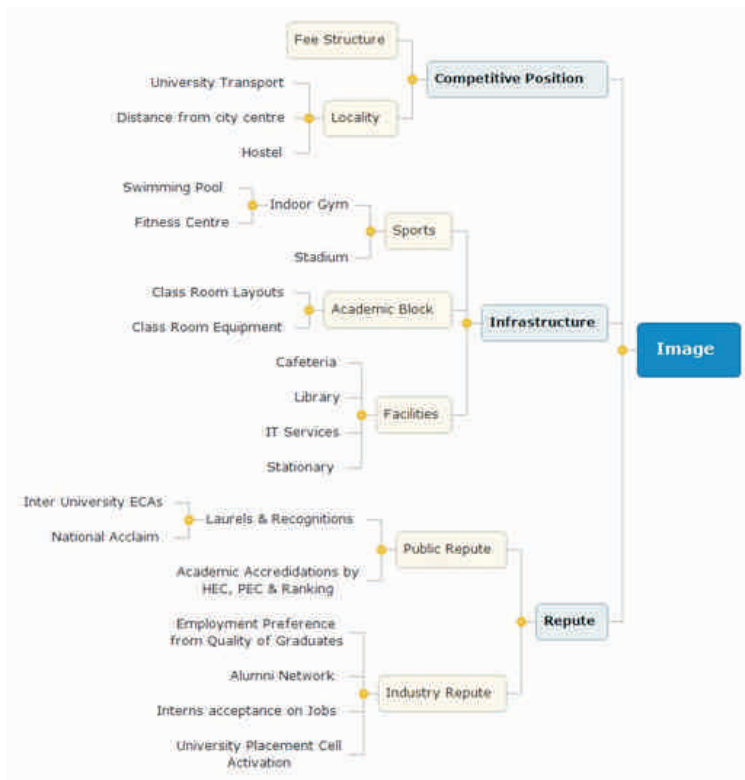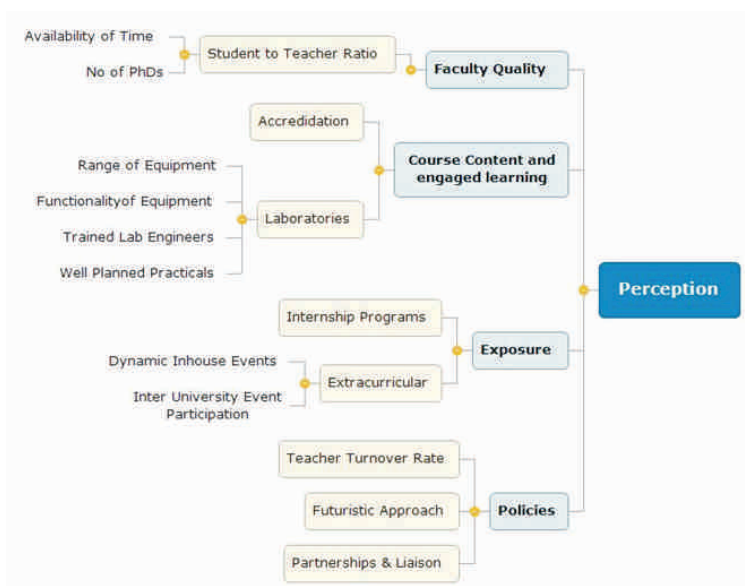
Figure 1: Image

Figure 2: Perception

The Historic Data of the University shows a gradual increase in the proportion of people applying and getting admission. Like earlier on they had 1 out of 6 probability of getting admission in the University and now the proportion is intake is 1 out of 4.

Table 1: Historic Intake

Session	Applicants	Percentage reduction	Intake	Proportion of Intake
2012	2500	100%	411	16.44%
2013	2192	87%	455	20.7%
2014	2158	86.3%	452	20.9%
2015	1987	79.4%	472	23.7%
2016	2207	88%	510	23.10%

Table 2: Intake distribution with respect to Intake from multiple parts of Pakistan
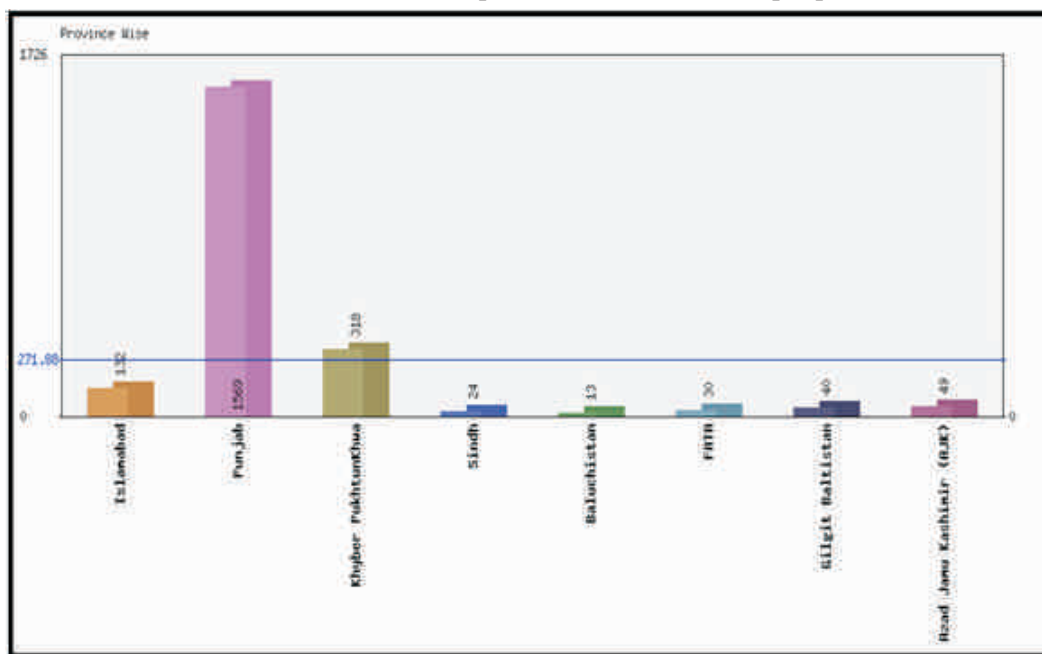
Table 3: Historic Merit of Incoming Studentss

S.#	Program	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016
1	BS Mechanical Engg	60%	59.62%	71.3%	66%	66%
2	BS Electrical Engg	56.78%	55.27%	64.22%	59.8%	58%
3	BS Computer Engg	-	-	56.1%	46.22%	45%
4	BS Computer Science	42%	50.4%	48.2%	45.40%	37%

Marketing Analysis of the University is done by applying the following techniques:

a.   Through Input Output variable Relationship & Framework.

b.   Through Qualitative Analysis Technique of conducting survey from students.

c.   Analysis of Marketing Mix of the University for Integrated Marketing efforts.

A framework of these Input Variables lead to the Image and perception about an Institute, these along with a good marketing strategy makes a strong impact on the prospective students. Marketing strategy also acts as a moderator for Perception and Image Building.

Model – Regression Model

Z = Outcome of concern = Healthy intake in terms of quantity and quality

$Z = Y1 + Y2 + Y3 + \ldots + Yn$

- ➠ $Y1$ = Internal Referrals account to uncalculated Decision Making Process = $W1$ (word of mouth effecting applicant's choice and perception) + $X10$ (Faculty Quality as word of mouth)

- ➠ $Y2$ = Calculated Decision Making ($X12$ (Job Possibilities in Market + $X1$ Accreditation/Ranking and Competitive Positioning Analysis)

- ➠ $Y3$ = Communication Strategy

Map 1: Distribution of Students from multiple backgrounds and No of Engineering Universities in the respective areass
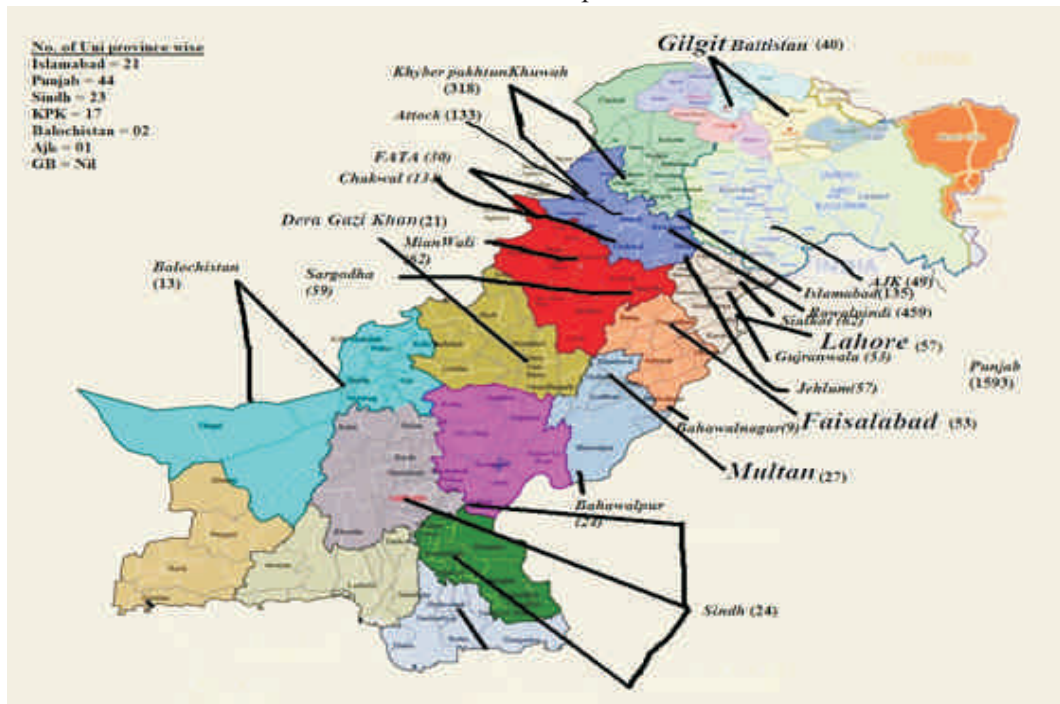
Results

Formation of a framework and linking of Relationship of input Variables with the Outcome of the study are shown below:

Mental Map of Probabilistic Successful University Program
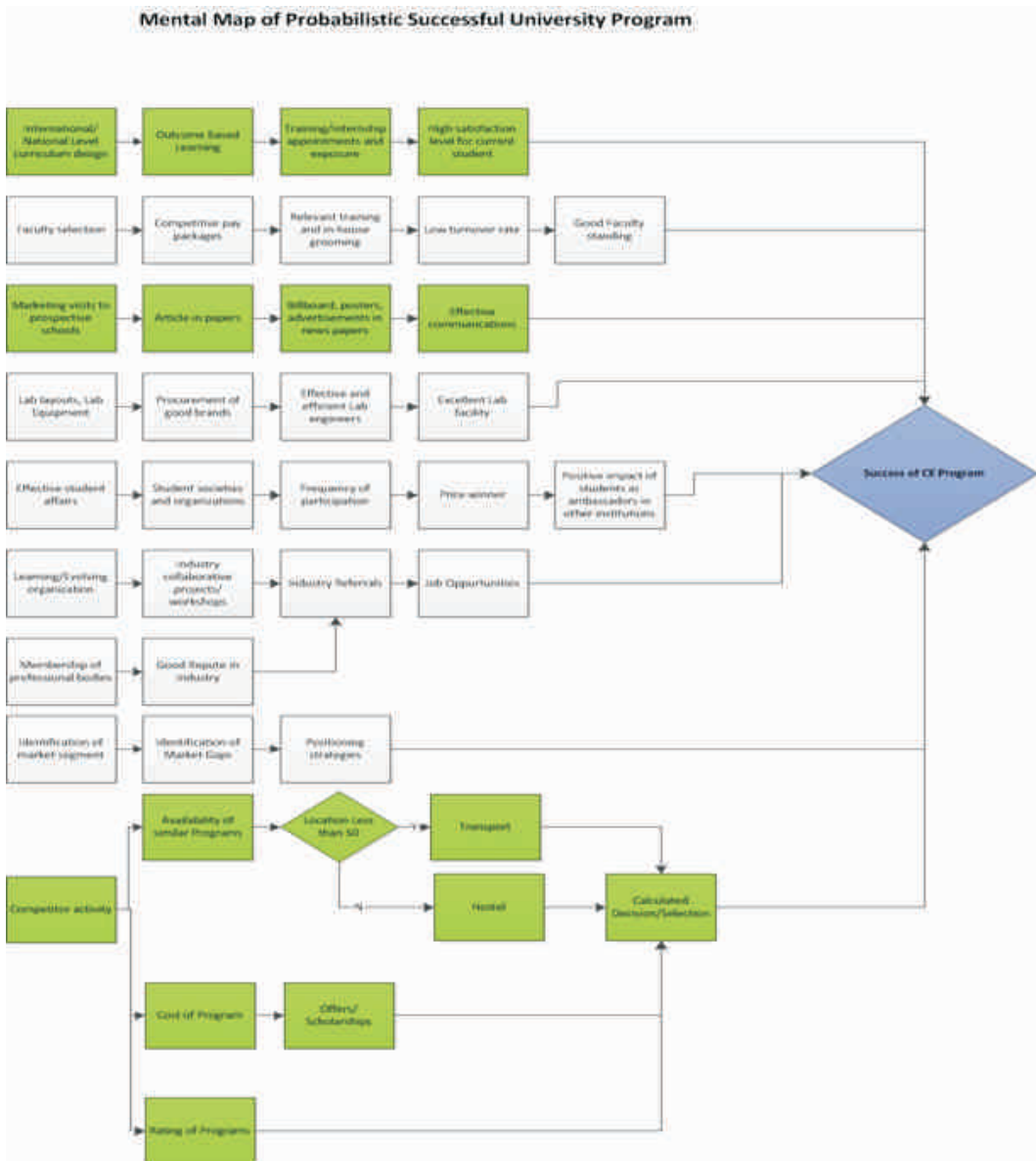
Y1: Level of Satisfaction of current students

Level of satisfaction of enrolled students is going to translate into word of mouth referral. If all variables are X, level of satisfaction is going to be generated from X2, X6, X10,

X13, X15, X16, X17, X21, W1 & X22. A survey questionnaire is built to evaluate the most preferred variables by the current students. Survey showed the most important factors in generation of word of mouth or referral by the students are the good faculty quality X10 and the overall preference given to the mechanical program given by the incoming students. This is unplanned decision influence by the students of the University in convincing people in the surrounding about their choice of technology and the Institute. Common variables or variables with dependency on other input variable were automatically ruled out during the process.

Y2: Competitors

It is a form of calculated Decision making that evaluates competitor's product and offer. The survey revealed two top indicators as X1 & X12 as a perception of any program by a prospective student. From job perspective, data is obtained from the survey questionnaire regarding the perception in the mind of the students about how quickly graduates from these disciplines get employment opportunity from the Industry. Alumni data of ME program can be used as historic data but this does not exist for CE, therefore, survey data is used instead.

Y3: Marketing success is claimed when the internal customer the current student understands the positioning strategy of the University and uphold those values as a brand identity in the market. Once graduates join the Industry, Alumni channel can also stregthen the image and branding of the University and if the experience is good people would start recognizing the institute as a recognized quality provider University.

Comparing two programs of the same University with one declared as a successful program and the other struggling to survive, the histogram are as below:
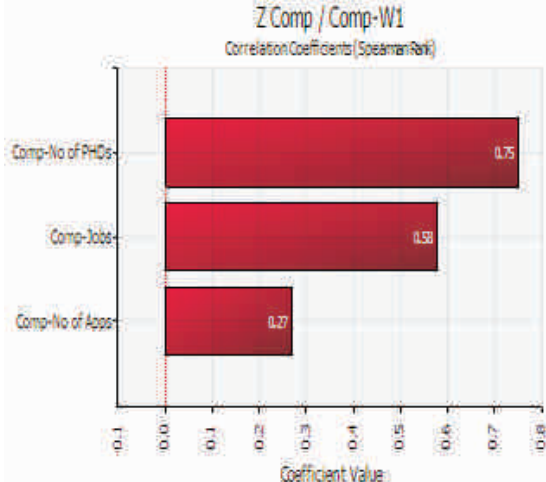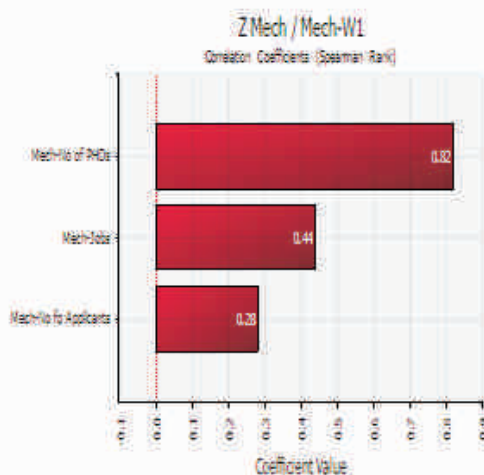
The graph above shows the Mech students showing greater value to the Faculty Quality in the generation of a good perception of the students. The cumulative curve for a given output or input are also seen in the graph below, where two Y-axes, one on the left for the histogram and a secondary Y-axis on the right for the cumulative curve.
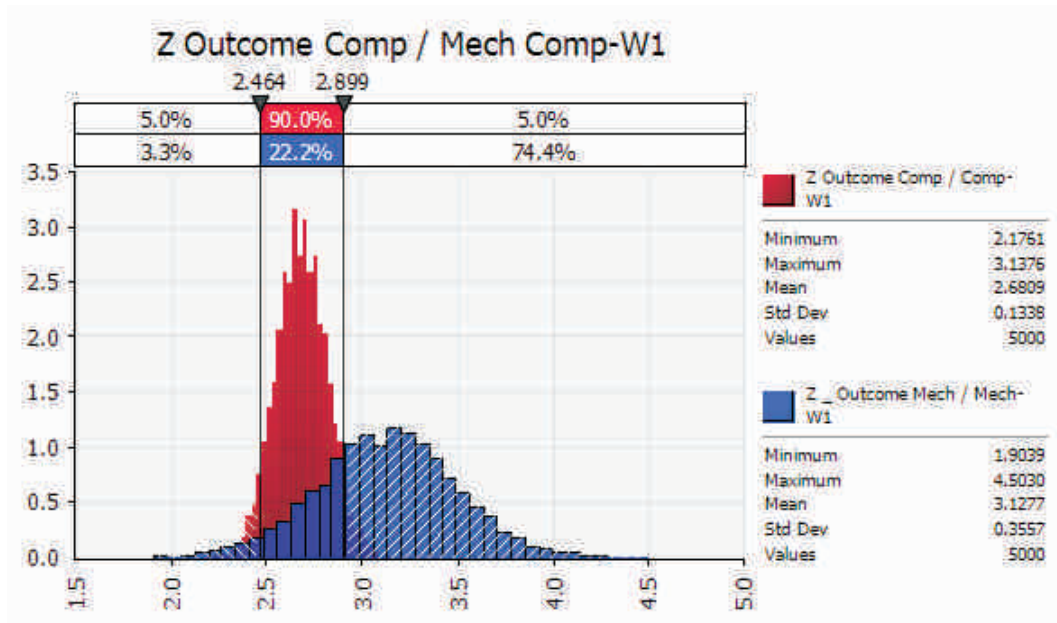
The cumulative distribution curve show greater variability for Mechanical program showing dependence on multiple variables. When the input variables are initially plotted the factors looked discrete and independent, however, when closely monitored they are directly or indirectly linked with each other. Like a good image of the program is going to come from high quality of faculty, academic support, campus facility, number of labs and facilities, etc and the same factors are the building block of accreditation of the program. Similarly, admission and retention rate would be dependent on fee structure, hostel facility, transport facility, leadership opportunities, extracurricular activities and campus facility. Correlation and dependency is present in many input variables. The outcome Y1 is taken from the students through a questionnaire as to ascertain what factors contribute to the generation of multiple perceptions by the students and their families to let them refer the program to others. The outcome of level 1 ie Y1 revealed that this depends a lot on the quality of faculty and their qualification while the significant contributor for Y2 is the availability of employment

University has to devise measures to further strengthen the process of generation of a more positive environment for the current student so as these can be individual marketing stimulus and if worked upon effectively does not require an external enforcement. A satisfied customer is all one need for the generation of internal referral and same also held true in 2016 survey of student intake where 65% of the applicant referred to being directed to the Institute through Internal referral.

Conclusion

The goal of the study is to generate a variable analysis of input predictors and if these can be used for the building of a marketing strategy of the University. The results show perception and image connected to faculty quality, academic facilities and future

prospects of the student with respect to their job viability. Institute. In order to generate the internal referral, focus has to be the current students where achievements and successes need to be advertised for confidence building. More ownership of the successes by the University can boost morale level of students. The internal audience through a promotional mix of multiple mediums within the University channel can help genrate the perception. Here positioning of individual University programs also need to be established in order to generate a theme that can be used by the University during promotional drives. Narrowing down of variables through student survey and historic data revealed that the key features influencing student choices are word of mouth referrals by current students, image of the University and the mechanism in which the image gets conveyed through marketing strategies. The key variables of influencing word of mouth are faculty quality, student trends, job opportunities in the market and accreditation status of the University. Faculty Quality is ascertained by the number of PhD professors and overall quality perception is generated by lab, research, internship programs and academic support. Hiring of good faculty is within the control of the University and a careful selection with retaining of quality employee is desired. Job prospects in market are external factors but good industry academia linkage is an internal effort that is going to help the external factor. Accreditation is again an internal strength while student trend and preferences are external factors. Study revealed that in order to provide strengthening of a risky program, faculty quality should be strengthened the most, good job prospects can be sought for the graduates besides self employment can be promoted and the icing on the top comes from a good marketing communication strategy. Promotion of any program has to first start from positioning strategy and then the use of effective communication mechanism.

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