

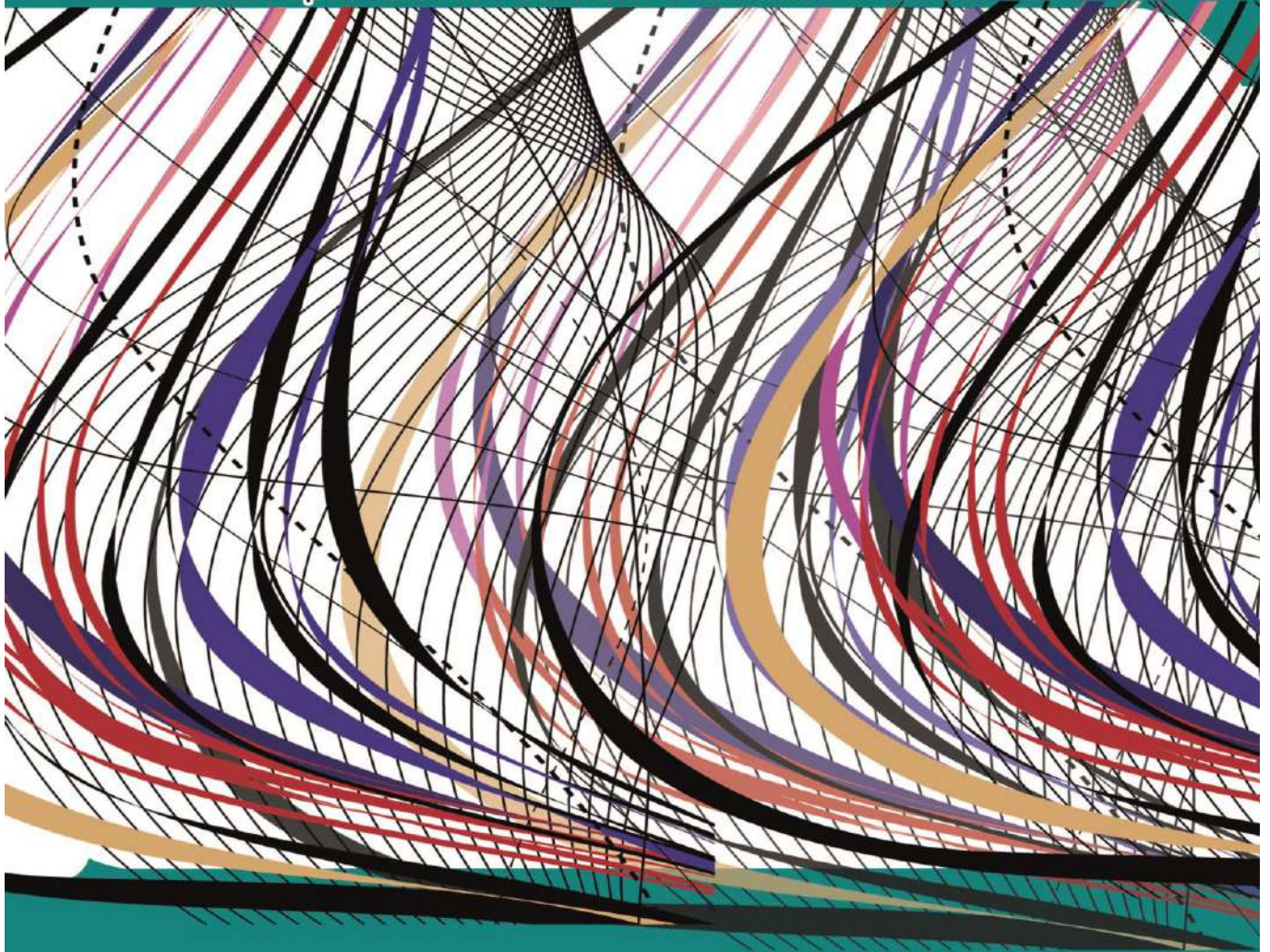
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FOREWORD

I am pleased to put into the hands of readers Volume-5; Issue-6: Jun, 2019 of “**International Journal of Advanced Engineering, Management and Science (IJAEMS)** (ISSN: 2354-1311)”, an international journal which publishes peer reviewed quality research papers on a wide variety of topics related to Science, Technology, Management and Humanities. Looking to the keen interest shown by the authors and readers, the editorial board has decided to release print issue also, but this decision the journal issue will be available in various library also in print and online version. This will motivate authors for quick publication of their research papers. Even with these changes our objective remains the same, that is, to encourage young researchers and academicians to think innovatively and share their research findings with others for the betterment of mankind. This journal has DOI (Digital Object Identifier) also, this will improve citation of research papers.

I thank all the authors of the research papers for contributing their scholarly articles. Despite many challenges, the entire editorial board has worked tirelessly and helped me to bring out this issue of the journal well in time. They all deserve my heartfelt thanks.

Finally, I hope the readers will make good use of this valuable research material and continue to contribute their research finding for publication in this journal. Constructive comments and suggestions from our readers are welcome for further improvement of the quality and usefulness of the journal.

With warm regards.

Dr. Dinh Tran Ngoc Huy

Editor-in-Chief

Date: July, 2019

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Optimal Location of Administrative Center: A Case Study of Province No. 1, Nepal

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Abstract— In developing nations, administrative facilities do not centers the majority of residing population because of poor geographical accessibility. Selection of optimal administrative center in such locations is a tedious task as the decision is contingent upon various factors. While making such decisions, major focus should be on accessibility of residing people. Thus, this study examines the role of two major factors, population distribution and transportation network distribution, in the selection of administrative centers of any location considering the case study of Province no. 1, Nepal.

Keywords— Administrative center, Location, Developing countries, Gravity model.

I. INTRODUCTION

Rural road networks that connects the population with the administrative center seems to be in deficient condition in most of the developing countries. Inadequate geographical accessibility has hindered the rural residents from getting opportunities which in turn have decreased their quality of life (Rahman and Smith, 2000). Under this context, several hypotheses have also been made that by increasing accessibility, by constructing superior roads and by choosing optimal location of facility, susceptibility can be reduced and income variability can be minimized. A sufficient rural road network and proper planning of public facilities needs to be done to enhance accessibility for rural resident so that all their requirements are met. As various evidences are exhibiting that the network and facility locations are closely interrelated, it is worthwhile to determine the network design and facility locations concurrently (Melkote and Daskin, 2001; Daskin and Owen, 2003). An analysis on roads planning and optimal public facility locations in an inclusive unified manner would help to address the problems that may arise during resource allocation. Moreover, many researches have been done in transportation network design and facility location, most of which are almost entirely independent to each other. The optimal locations of facilities, both private

and public, is restricted by the structure of the designed transportation network and will be genuine only if it serves the people in a right way. Even when facilities are located in an optimum location, residing population will not get adequate services if the networks are not designed appropriately. Therefore, to obtain the solution for above mentioned problem, it is requisite to scrutinize models where transportation networks are designed considering both present and future location of facility. In this study, transportation network configuration and new administrative center are to be optimally designed at the same time so as to allow the residents to access the facilities and thus cater their needs.

As per a 17 January 2018 cabinet meeting held in Nepal, the city of Biratnagar has been declared the interim administrative center of Province No. 1. However, the decision is made without any proper investigation of the factors. After Kathmandu, Biratnagar is the second most densely populated city. However, it does not necessarily mean that accessibility is not complicated for all the population of Province no. 1 as transportation network distribution has not been taken into account for making this arbitrary choice.

It has always been difficult to plan for the public facilities and location in the most efficient way as many factors are involved. According to the 2011 census, there are around 4.5 million people residing in the 14 districts of Province no. 1. The selection of public facility location should be favourable for the whole population. Everyone has the right to use public services and facility provided by the government in the most convenient way. If a certain portion of population is only considered while determining Public Facility Location, it might create conflict among other people. Therefore, there should be equalization of public service facility to prevent such negative aspects.

The study takes place comparing the accessibility among the 19 cities where 14 of them are district headquarters and 5 of them are commercial centers. The required data that are

collected from secondary sources are later used to conclude on a decision. The specific objectives of this study are:

- To build a general framework for location problems.
- To use this framework to determine the most appropriate administrative center of province no. 1, Nepal.

II. REVIEW OF LITERATURE

Several studies have been done to fix the factors that make the location most appropriate for public facilities. Many problems are to be encountered while selecting the optimal Public Facility Location and various researches have been done to understand these problems. In the developing nations like Nepal, local political leader or government officer makes the choice of public facility location due to which it is less likely for the selected location to be optimum (Rahman and Smith, 2000). Thus, the choice shall be done by eligible person along with proper research. Studies have shown that the use of mathematical model for locational analysis has been very effective to choose the most optimal location (Rahman and Smith, 2000).

For any public facilities, the choice of the location will have to satisfy two major purposes: to be close as far as possible to the demand of the population (so that the transportation cost will be low) and to keep the cost of constructing the facility to a minimum extent (which can be done by decreasing the number of facilities and by settling on a low-cost location) (Leonardi, 1981). There are mainly two problems that arise with the two aims mentioned above: problem of allocation concerned with the aim of minimizing transport cost and the problem of facility location concerned with the aim of selecting low-cost location (Leonardi, 1981). While picking out the administrative center, the major focus should be on minimizing the allocation-problem that is, lessening transportation costs. Aggregate approach, useful to handle allocation-problem when the list of users is so huge that it is not possible to keep data of every user and to get preference orders is despairing, gives rise to gravity-interaction models (Leonardi, 1981). Gravity models were developed empirically at the beginning however, many theoretical justifications have been proposed for them, which have made it an important topic of consideration for theoretical economists and geographers, mathematicians, and statisticians, besides regional scientists (Leonardi, 1981). Gravity model can consider both factors (road network and demographic), so helps to measure the relative distance clearly and not only the absolute distance while determining administrative center (Haynes and Fotheringham, 1984).

Before fixing administrative center for a province, areas that are eligible to become administrative center are to be investigated in a proper manner. Mostly, these areas to be researched are city centers and sub-centers. Several studies have been done in order to know the most efficient center in an area.

Many research works have been carried out to explain theoretically, the most appropriate center using finite source of data since the 1950s but it has been few years that number of approaches have been introduced to define the city centers using variety of data sources. The group of four people have done a research work on identifying city centers using human travel flows generated from location-based social networking data using different methods (Sun *et al.*, 2016).

The city centers are the crucial part of any cities and Socio-economic activities are concentrated in these centers (Anas, Arnott and Small, 1998). Since, most of the activities are clustered in these part of the city, they being administrative center, is the most sensible thing.

It is obvious that the administrative center will have abundant number of public facilities however, it does not necessarily mean that all of the public facilities are to be established at administrative center only. The place where the decision is made to locate the public facilities will have its land value increased as the demand will be higher (Fujita, 1986). Therefore, the choice may create conflict among people as everyone will want to have their land value increased. Proper research should be done before fixing the public facility location as people at different locality may have different demand. The public facilities should be constructed evenly on different sectors according to the demand of the people and only then it will help to minimize the negative aspects such as imbalance between rich and poor people, huge inconsistency between urban and rural areas and so on (Fei, Wei and Ming, 2013).

III. METHODOLOGY

The study starts with the problem formulation with respect to the relevant literatures followed by collection of data.

A. DATA COLLECTION AND EXTRACTION

This study is undertaken considering Province no. 1 of Nepal as the study location. All the district headquarters and some vital commercial centers within the province have been considered as nodes. The network and node distribution with the study area is shown in *Figure 1*.

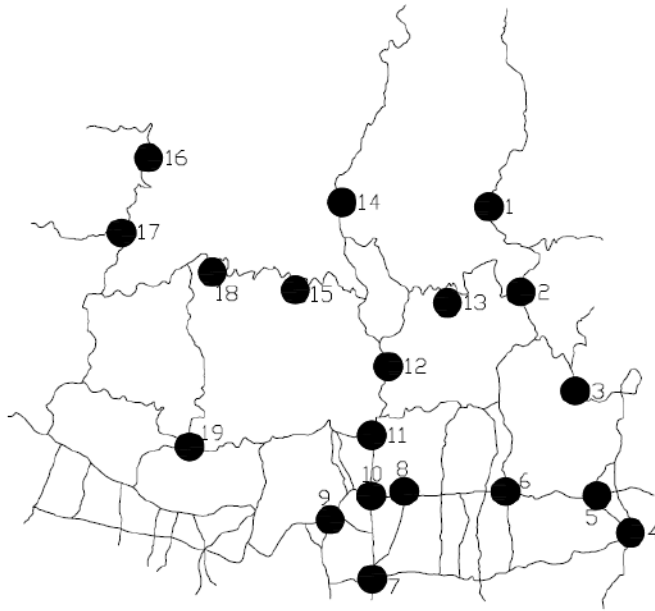


Figure 1: Network and Node Distribution

The number of nodes within the study area and their location is shown in Table 1.

Table.1: Nodes within the Study Area

SN	District	Nodes	Node Number
1	Taplejung	Taplejung	N1
2	Panchthar	Phidim	N2
3	Ilam	Ilam	N3
4	Jhapa	Bhadrapur	N4
		Birtamod	N5
		Damak	N6
5	Morang	Biratnagar	N7
		Biratchowk	N8
6	Sunsari	Inaruwa	N9
		Itahari	N10
		Dharan	N11
7	Dhankuta	Dhankuta	N12
8	Terhathum	Terhathum	N13
9	Sankhuwasabha	Khandbari	N14
10	Bhojpur	Bhojpur	N15
11	Solukhumbu	Salleri	N16
12	Okhaldhunga	Okhaldhunga	N17
13	Khotang	Diktel	N18
14	Udayapur	Gaighat	N19

Two categories of data viz. demographic and road network data were needed for the study. These data were collected from the secondary sources. The demographic data for each

district within the study zone was collected from national population census data 2011 and is presented in Table 2.

Table.2: Population Data for Each Nodes

Node	Population
N1	127,461
N2	191,817
N3	290,254
N4	270884
N5	270883
N6	270883
N7	482685
N8	482685
N9	254496
N10	254496
N11	254495
N12	163,412
N13	101,577
N14	158,742
N15	182,459
N16	105,886
N17	147,984
N18	206,312
N19	317,532

For number of nodes within the district, equal distribution to each nodes were made. The network included in Statistics of Strategic Road Network (SSRN) published by Department of Road (DOR), Nepal was only considered in the study. SSRN of Eastern Development Region was used to record the distance between each nodes.

B. MODEL FRAMEWORK

The study location consists of a number of nodes connected by a transportation (road) network. Considering the entire nodes, distance matrix can be formed in the transportation network. Commonly, shortest path algorithms such as Dijkstra (Gallo and Pallottino, 1986) can be used to calculate distance between any two destinations in the network. Moreover, a short path matrix of the network can be found utilizing Floyd-Warshall algorithm (Floyd, 1962) which gives the shortest distance to other destinations. The shortest path matrix of the network is presented in Table 3.

Table.3: Shortest Path Matrix of the Network

Origin/ Destination	Shortest Path Matrix (Distance between two nodes in km)																		
	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14	N15	N16	N17	N18	N19
N1	0	86.503	150	229.46	233.123	198.363	299.383	296.463	326.653	308.003	298.273	249.683	189.503	310.453	328.683	583.783	525.883	416.683	358.873
N2	86.503	0	77.42	156.88	146.62	111.86	212.88	209.96	240.15	221.5	211.77	163.18	103	223.95	242.18	497.28	439.38	330.18	272.37
N3	150	77.42	0	79.46	69.2	98.71	135.46	132.54	162.73	144.08	165.3	197.93	180.42	223.95	300.93	574.7	516.8	407.6	225.9
N4	229.46	156.88	79.46	0	12.53	42.04	56	75.87	74.67	87.41	108.63	157.22	217.4	242.52	260.22	468.11	410.21	301.01	145.88
N5	233.123	146.62	69.2	12.53	0	29.51	86.34	63.34	93.53	74.88	96.1	144.69	204.87	229.99	247.69	455.58	397.68	288.48	143.48
N6	198.363	111.86	98.71	42.04	29.51	0	56.83	33.83	64.02	45.37	66.59	115.18	175.36	200.48	218.18	426.07	368.17	258.97	113.97
N7	299.383	212.88	135.46	56	86.34	56.83	0	23	18.67	21.28	42.5	91.09	151.27	176.39	194.09	401.98	344.08	234.88	89.88
N8	296.463	209.96	132.54	75.87	63.34	33.83	23	0	30.19	11.54	32.76	81.35	141.53	166.65	184.35	392.24	334.34	225.14	80.14
N9	326.653	240.15	162.73	74.67	93.53	64.02	18.67	30.19	0	18.65	39.87	88.46	148.64	173.76	191.46	383.55	325.65	216.45	71.45
N10	308.003	221.5	144.08	87.41	74.88	45.37	21.28	11.54	18.65	0	21.22	69.81	129.99	155.11	172.81	380.7	322.8	213.6	68.6
N11	298.273	211.77	165.3	108.63	96.1	66.59	42.5	32.76	39.87	21.22	0	48.59	108.77	133.89	151.59	372.7	314.8	205.6	60.6
N12	249.683	163.18	197.93	157.22	144.69	115.18	91.09	81.35	88.46	69.81	48.59	0	60.18	85.3	103	358.1	300.2	191	109.19
N13	189.503	103	180.42	217.4	204.87	175.36	151.27	141.53	148.64	129.99	108.77	60.18	0	120.95	139.18	394.28	336.38	227.18	169.37
N14	310.453	223.95	223.95	242.52	229.99	200.48	176.39	166.65	173.76	155.11	133.89	85.3	120.95	0	112.3	367.4	309.5	200.3	194.49
N15	328.683	242.18	300.93	260.22	247.69	218.18	194.09	184.35	191.46	172.81	151.59	103	139.18	112.3	0	255.1	197.2	88	233
N16	583.783	497.28	574.7	468.11	455.58	426.07	401.98	392.24	383.55	380.7	372.7	358.1	394.28	367.4	255.1	0	57.9	167.1	312.1
N17	525.883	439.38	516.8	410.21	397.68	368.17	344.08	334.34	325.65	322.8	314.8	300.2	336.38	309.5	197.2	57.9	0	109.2	254.2
N18	416.683	330.18	407.6	301.01	288.48	258.97	234.88	225.14	216.45	213.6	205.6	191	227.18	200.3	88	167.1	109.2	0	145
N19	358.873	272.37	225.9	145.88	143.48	113.97	89.88	80.14	71.45	68.6	60.6	109.19	169.37	194.49	233	312.1	254.2	145	0

Case I: Considering Road Networks Only

First, only the road networks within the study zone was analysed. For each node, the sum of distance to all the nodes considered was calculated using equation [1]. The problem can be formulated as the minimization of Interaction (D_i) of the set of nodes i .

$$\text{Min } D_i = \sum d_{ij} \quad [1]$$

Where, d_{ij} is the distance between the considered i^{th} node and j other nodes.

Table.4: Interactions of each Nodes Considering Road Networks only

Node	Interaction (D_i)
N1	5389.768
N2	3947.063
N3	3843.13
N4	3125.52
N5	3017.633
N6	2623.503
N7	2636.003
N8	2515.233
N9	2668.553
N10	2467.353
N11	2479.553
N12	2614.153
N13	3198.273
N14	3627.383
N15	3619.963
N16	6848.673
N17	5864.373
N18	4226.373
N19	3048.493

One node with least D_i can be considered as the efficient administrative center location based on transportation network only. Here, Node N10 (Itahari) has least D_i , thus N10 (Itahari) is the administrative center if only the road networks are considered.

Case II: Considering Population and Road Networks

Demographic data consideration has been done to analyse the effect of population and population distribution in the determination of most appropriate administrative center. This consideration helps in identifying the location that will be nearer to higher proportion of the population. It is assumed that the total population of the district is concentrated on the district headquarter and they have to travel from the same. In the case, where there are commercial centers, the total population of the district is divided into district headquarter

and commercial centers in an equal ratio. Demographic and geographic centers should be combined in order to take the study into shape. The gravity model has been used to incorporate the demographic and geographic centers here. The fusion between these two centers for any location helps to obtain the appropriate administrative center considering residing population and road networks.

Gravity Model

Newton's gravitational law is used to calculate the relationship between the objects. This newton law has been modified to predict the movement of people and information between the cities by the social scientists which is termed as gravity model. The effect of road network and demographic condition for the selection of appropriate administrative center can be modelled using gravity model.

For each city, let the population be represented by P , and the distance between cities be represented by d . Each pair of cities is designated by the subscripts i and j . Interaction between any pair of cities is specified as T_{ij} . To generalize, this interaction can be expressed as a ratio of the multiplied populations over the distance between any pair of cities,

$$T_{ij} = P_i P_j / d_{ij} \quad [2]$$

The above equation [2] is a basic equation of gravity model which requires certain modifications depending upon different cases. The distance element d_{ij} of the basic equation is multiplied by an exponent β . To derive the correct exponent (β) for gravity model formulation many literatures have stimulated by physical science interpretations, including the Newtonian analogy where the square of distance, d_{ij}^2 , is the appropriate power (Haynes and Fotheringham, 1984). So, the equation can be written as:

$$T_{ij} = P_i P_j / d_{ij}^2 \quad [3]$$

This equation [3] has been used to integrate the network analysis and demographic analysis in this study to obtain the interaction of each nodes considering demographic and geographic center.

In this case, the problem is formulated as the maximization of Interaction (I_i) of each nodes from the set of nodes is as shown in equation [4].

$$\text{Max } I_i = \sum T_{ij} \quad [4]$$

Table.5: Interaction of each Nodes Considering Population and Road Network

Node	Interaction (I_i)
N1	11170559.1
N2	30673735.5
N3	76931990.5
N4	623954008
N5	657869471
N6	372838196
N7	1279663011
N8	1838236764
N9	781428188
N10	1615276101
N11	447590698
N12	79155801.2
N13	22724912.8
N14	24114840.5
N15	26510319.9
N16	8241028.24
N17	12736572.1
N18	23594459.1
N19	127376994

One node with maximum I_i can be considered the most efficient administrative center location based on population and transportation networks of the study area. Here, Node N8 (Biratchowk) has maximum I_i , thus N8 (Biratchowk) is the efficient administrative center when both the factors are considered (demographic and road network).

IV. RESULTS AND DISCUSSIONS

Planners often mislead in locating public facility centers in developing countries. This study explores how the administrative center location becomes inefficient when considering transportation network only. Two different results are obtained when only transportation network is taken into account and when both transportation network and population distributions within the study zone are considered, which justifies the inefficiency. The case study of Province No. 1, Nepal shows that Biratchowk is the most efficient administrative center of the study area considering both residing population and existing road networks distribution. If the network distribution is only considered in the study, the location of administrative center comes out to be Itahari. This may mislead in solving the problem of

locating administrative center. Hence, while considering these type of problems the effects of both demographic and geographic distribution should be taken into consideration.

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Status of Compliance to Dole-Department order 174 of Selected Fast food Establishments in Cabanatuan City, Philippines

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Abstract— This research paper determined the status of compliance to the Department of Labor and Employment (DOLE) Department Order (D.O.) 174 of selected fast-food establishments in Cabanatuan City, Nueva Ecija, Philippines. The researchers find this important, especially to the large fast-food corporation, as this will be able to eliminate possible penalties that the DOLE may impose on them once proven violating the said D.O. with regards to labor contractualization. The methodology used in this research is an evaluative-descriptive survey with a guided questionnaire as the main instrument. The study involved 15 purposively chosen respondents. Findings of the study indicated that some of the fast food restaurants in Cabanatuan were still non-compliant to some of the requirements under D.O. 174. This stemmed from duplication of work between regular employees and 3rd party employee arising from the agency, in terms of directing and controlling 3rd party employees as stated in the DOLE Department order which prohibits the principal on direct involvement for non-regular employees. The study recommends that the management of selected fast-food establishments should conduct a thorough review of the content of Department Order-174 and develop and empower their team leaders through capability building programs so that they will be firm in their designation and can perform their duties and responsibilities effectively.

Keywords— Business, compliance, DOLE Department 174, fast-food establishments, status.

I. INTRODUCTION

Contractualization has been a system long practice by a lot of companies in the country, especially large companies who want to keep their profits up. In the Philippine context, contractualization “is a work arrangement whereby workers are only hired for about five months without security of tenure, monetary, non-monetary and social protection benefits.” The amendment of the Phil. Labor Code, which is

more commonly known as Herrera Law [1]. Contractualization of labor in the Philippines weakens the traditional power and concept of the unions (Macaraya, 1997). With the Philippine membership to the World Trade Organization, contractualization was used to attract the investor in the form of a huge army of cheap, docile labor [2]. “Endo contractualization” refers to a short term employment practice in the Philippines, it is a form of contractualization which involves companies giving their workers temporary employment that last less than six months, while “5-5-5-” refers to contractual workers that are terminated after five months, and then rehired again for another five months or repeated hiring of contractual workers [3]. It is noted that Labor Code mandates the employers have to regularize the employee once the employee has completed a six-month continuous work. Thus, at the end of the fifth month, employees' contract is terminated, where the employee will be asked not to report for a day or two, which will then be proceeded with another five-month contract. The Department of Labor and Employment (“DOLE”) has long defined “endo” as a hiring practice deliberately resorted to prevent workers from acquiring regular status done through repeated short-term arrangements by one principal through the same or different contractors [4].

Consistent with President Rodrigo Duterte's campaign promise to end fixed-term employment, more commonly known as “endo”, the Department of Labor and Employment (“DOLE”) launched a review of Department Order (“D.O.”). In the interim, before the issuance of a new order, the DOLE released two issuances on 25 July 2016: D.O. No. 162, series of 2016.

Labor-only contracting, which is prohibited, refers to an arrangement where the contractor or subcontractor does not have substantial capital. The contractor or subcontractor does not exercise the right to control the performance of the work of the employee.” [5].

Under the Philippine Labor Code, the legitimate labor contractors are the employer of the workers. The relationship between these two is also covered by the labor code. In the thriving industry of subcontracting, the manifold rights of the workers are increasingly being violated [6].

To end 'endo.'" The marching order to end the contractualization is not an easy task to undertake. The problem of endo involves three parties in general: the enterprise that uses the labor; the labor service supplier who hires and supplies the labor; and the laborers who are hired. Under the current setup, as contractualization has developed, the company using the labor is not the direct hirer of the worker. The enterprise in need of labor services uses the labor service provider to hire workers. By using the labor service provider, the productive enterprise develops no direct employer-employee relationship with the worker [7]

In this study, the researchers attempted to describe the status of compliance of selected fast food establishment in Cabanatuan to the DO 174. Specifically, it aimed to determine the process of acquiring employees and the current employment status of selected fast-food establishments in Cabanatuan City after the implementation of DOLE Department Order 174. Likewise, it described the duties and responsibilities of different types of employees and the challenges encountered by the company during the implementation of DO 174. The first-hand knowledge and personal experience of the respondents would shed light on the problem posed herein.

II. METHODOLOGY

This study used a quantitative type of research wherein current practices in terms of employment is compared with the requirement stated under Department Order 174 to determine the compliance of selected fast-food establishments. A total of 15 purposively chosen employees of selected fast-food establishments served as respondents

of this study. They were chosen purposively based on the following criteria [8]: they have prior learning or knowledge on DOLE Department Order 174, and they were directly hired, which belonged to the middle-level management.

This study used two types of techniques to be able to generate information. The first technique that was used to gather information was through Questionnaire. Questions were constructed based on Department Order 174 of 2016.

III. RESULTS AND DISCUSSION

3.1. Process of acquiring employees of selected fast-food establishments in Cabanatuan after the implementation of DOLE DO 174.

Table 1. Process of acquiring employees

	Before	After
Direct Hire	13	9
Through Agency	2	6
Total	15	15

Table 1 shows that 22 respondents answered that their workers were directly hired by the company, while 8 of them were hired through an agency. It simply means that the majority of the employers were getting their manpower through direct hiring.

About DO 174, an employee who is directly hired by the Principal is subject for regularization after its probationary period or after 6 months unless otherwise, the employee incurred any company violations that are subject for termination. On the other hand, employees hired thru a legitimate agency are an automatic regular member of that agency.

3.2. Current employment status of selected fast-food establishments in Cabanatuan City after the implementation of DOLE DO 174.

Table 2. Current status of employment

	BEFORE Implementation of Department Order				AFTER Implementation of Department Order			
	Company A	Company B	Company C	Company D	Company A	Company B	Company C	Company D
Regular	√	√	√	√	√	√	√	√
Agency	×	×	×	√	×	√	×	√
Contractual	√	√	√	√	n/a	n/a	n/a	n/a

Table 2 shows that before the implementation of DOLE Department Order the status of employment of selected fast food establishments in Cabanatuan City, 100% of them had existing regular employees, however only company D acquired manpower thru an agency and then Company - A, B, and C have existing contractual type of employees. With the stricter inspection of DOLE several companies already regularized their employees a perfect example of this is the Company A and C wherein 100% of their

employees had been already regularized by the said company on the other had Company B and D have regular employees and continue to acquire another type of employees thru legitimate manpower agency.

3.3. Duties and responsibilities of different types of employees of the selected fast-food establishments in Cabanatuan City after the implementation of DOLE Do 174.

Table 3. Duties and Responsibilities of different types of employees

	REGULAR		AGENCY	
	Count	%	Count	%
Cashiering	10	66.67	2	13.33
Inventory Mgt	10	66.67	2	13.33
Cooking	4	26.67	2	13.33
Serving	4	26.67	2	13.33
Customer Relation	10	66.67	2	13.33
Sales Call	10	66.67	2	13.33
Product Control	10	66.67	2	13.33

Table 3 shows the duties and responsibilities of different types of employees which are regular and employees from agency of selected companies which are the respondents of this research. Cooking and Serving are the task assigned to the agency as per the Service Agreement of the principal and the Manpower Agency. As stated in the DOLE DO-174 Section 5-Absolute prohibition against labor-only contracting "The contractor or sub-contractor employees recruited and placed are performing activities which are directly related to the main business operation of the principal". The result of the conducted survey shows that there are about 13.33% of employees which are under agency that performs task other than the assigned specific duties and responsibilities like Cashiering, Inventory Management, Customer Relation, sales Call and Production control.

About DOLE Department Order 174 it is clearly stated in Section 6. Other Illicit Forms of Employment Arrangements; f) requiring the contractor's/subcontractor's employees to perform functions which are currently being performed by the regular employees of the principal. In comparison to the result, it can be seen that there is duplication of work between the regular employees, part-time and agency employees certainly violating Section 6(f) of DOLE DO 174.

3.4. Challenges encountered by the company during the implementation of DO 174.

Table 4. Information Dissemination to workers (3rd Party)

Answer	Frequency	Percentage
Yes	8	53.33
No	7	46.67
Total	15	100.00

Based on the table, there are 53.33% of the respondents who answered that they face challenges in relaying the information to 3rd party crew while only 46.67% of the respondents answered that they are not facing challenges in relaying information to 3rd party crew. Still, the majority of the respondents have a hard time on relaying information to 3rd party crew. When the DO 174 was implemented, relaying of information became difficult because of the hierarchy that should be followed, and that is from Manager to Team leader then Team Leader to 3rd Party Crew.

Before the implementation of DO 174, the practice of relaying information of Management is directly given to workers regardless of the employment status. With the strict execution of DO 174, the process of relaying information should include the tripartite set up (principal to agency, agency to members/employees through the Team Leader).

Table 5. Disciplining/Correcting workers (3rd Party)

Answer	Frequency	Percentage
Yes	15	100.00
No	0	0
Total	15	100.00

As shown in Table 5, 100% of the respondents answered that their companies do not face difficulties on directly disciplining/correcting workers.

Before the implementation of DOLE DO 174, the management was directly correcting workers. When the tripartite set up was made in compliance with DOLE DO 174, selected fast food establishments experienced several problems in disciplining employees specifically the third party employees because it is inconsistently done by the Team Leader that was selected by the Agency.

Table 6. Execute performance appraisal, directing, controlling if the worker is not directly hired

Answer	Frequency	Percentage
Yes	8	53.33
No	7	46.67
Total	15	100.00

Based on Table 6, 53.33% of the respondents said that the top level management of their company was directly involved in terms of performance appraisal, directing, controlling on those workers who are not directly hired and 46.67% of them have answered that their top-level management was not directly involved in terms of performance appraisal, directing and controlling workers who are not directly hired.

It is shown in DOLE Department Order 174 under Section 5. Absolute Prohibition against Labor-only contracting; b) the contractor or subcontractor does not exercise the right to control over the performance of the work of the employee. In comparison to the result, it clearly shows that fast-food companies had challenges in executing performance appraisal, directing and controlling workers who are not directly hired, therefore violating the article on Section 5.

IV. CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of the study, the following the researchers concluded that the majority of the employees working on fast food chains were hired directly by the companies. The fast-food establishments in

Cabanatuan City contractual employees were eliminated. Likewise, the results of this research showed that there were still duplication of work that appeared to be non-compliant of Section 6; F of DO 174 which states that “requiring the contractor’s/subcontractor’s employees to perform functions which are currently being performed by the regular employees of the principal is declared prohibited for being contrary to the law or public policy”. In accordance to the implementation of the said Department Order, relaying or giving of information needed has now become complex due to the new hierarchy that was made wherein all the information must be relayed through team leaders from cooperative which serves as the middle man, and they should be the one relaying it directly to third-party employees. With this matter, it was found out that the top level management was still directly involved in terms of performance appraisal, directing, controlling on workers who are not directly hired and in correcting/disciplining third-party employees. With this, selected fast food chains have clearly did not comply on DO 174 Section 5:B of the Absolute Prohibition against Labor-only Contracting which states that “an arrangement where the contractor or subcontractor does not exercise the right to control over the performance of the work of the employee is totally prohibited”[9].

Based on the findings and conclusions of the study, the following are thus recommended:

Conduct a follow-up research which is related with this study to further validate and monitor the consistency and compliance of fast food companies with the Department Order 174 and sustain the current and right procedure of regularizing directly hired employees. Further, there should continue practice of compliance with Department Order 174 regarding the elimination of contractualization on respective companies. A thorough understanding and review of Department Order 174 shall be made by the companies to be able to make accurate decisions given available information [10] and compare it with their existing practices. Lastly, the empowerment of team leaders must be implemented. The Area coordinator from Agency should be the one responsible to study and explore the performance [11] of the perfect person qualified for the position. With the help of the top management level, credible, reliable and responsible team leaders could be developed through engaging them in training and capability buildings that will help them be competent and perfectly fit their designation.

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Evaluation of Nueva Ecija University of Science and Technology (NEUST) Extension Services Re: Mushroom Growers of Tanawan

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Abstract— This research aimed to evaluate the NEUST extension service provided by the Business Administration (BA) Society on the members of Tanawan Mushroom Grower's Association of Barangay Tanawan, Dingalan, Aurora. Evaluation research was made to assess the current situation of the cooperative in this remote barangay. Mushroom production is appropriate to the locality and its residents based on their economic profile, interests, and availability of resources. The climate of Barangay Tanawan also suits for mushroom growing. Likewise, mushroom growing requires little space and will not consume a lot of time of growers. The officers of the cooperative further requested that the BA Society could provide them free seeds and continuous assistance to make their association thrive in this business endeavor.

Keywords— Business Administration, development program, extension service, livelihood, mushroom production.

I. INTRODUCTION

Livelihood for barangay across the country is one of the basic needs of families for their everyday living. Barangays, especially those in the remote or far-flung areas need proper guidance to start up something worthy for the community, profitable for their families and learnings for the entire locality; or they may continue what they used to do bearing additional knowledge and ideas that can make their living simpler and easier.

Tanawan is NEUST's adopted barangay for its Oplan Development Program. It is a resettlement area for more than two hundred households devastated by flashfloods in 2004. Currently, Tanawan has underdeveloped road networks and backyards. It also has idle lands and structures which can be turned into something productive [1].

The BA Society of NEUST Extension Service intends for life-long barangay development by helping Barangay Tanawan's Mushroom Growers Association. Furthermore,

society wants to share timely ideas that suit the community's local workforce. A place like Tanawan is strategically located in Highland with a good source of water and fertile soil that is needed for farming.

"Issues in the community, such as this case of Tanawan, will not be solely addressed by the local government officials nor by the residents, but these need a knowledge-based sector or the epistemic community and the academe for it to come up with a scientific diagnosis with regard to the occurrences of problems in the community [2]".

This study touches the Oplan Development Program of NEUST that focuses on a mission to "Transform Barangay Tanawan into economically sufficient barangay and idyllic tourist destination in Dingalan, Aurora [1]. The said study found out that Barangay Tanawan needed assistance that will ensure the development and upgrade in the quality of life of locals, particularly in terms of water safety, backyards improvement, sanitation, waste segregation, gardening and operations of small cooperatives. Likewise, they would want training on proper leadership and management risk reduction and livelihood skills [1].

The Philippine Department of Social Welfare and Development has led in the provision of opportunities for income-generating activities and livelihood development through the implementation of the Sustainable Livelihood Program since 2011. This policy note describes the program and reflects on opportunities the plan has for improving and complementing other social protection programs [3].

On the other path, barangay may form cooperative or associations to provide goods via voluntary membership. In a news article published by The New Times in Rwanda, cooperative members were all grateful that they took a risk in forming cooperative that engaged in mushroom farming. The group made up of 25 members, 19 women, and six men, produces about 1.5 tons of fresh mushroom per month or about 400kg weekly. The project has significantly boosted members' financial muscle, as well as nutritional

levels of their families. The co-operative sells the mushrooms to a dealership and processor of mushrooms. Cooperative members say mushroom growing has considerably changed members' lives, especially by improving their household income and nutrition levels [4]. Mushroom growing requires little space and time, and farmers can make use of their rice straws following harvesting. Mushroom can be grown the whole year round provided proper storage of rice straw is prepared. Mushroom has been attracting the attention of mankind since ancient times and use of mushroom, as food is as old as human civilization. It is very rich in protein, vitamins, and minerals. Unfortunately, it is realized that mushrooms did not receive universal acceptance over the years since several naturally growing mushrooms are poisonous. Now the situation has been changed because the cultivated edible mushrooms are safe for human consumption [5].

The current study intended to determine the situation of mushroom production and problems encountered by mushroom growers of Barangay Tanawan. The findings helped the researchers to develop an intervention program that will benefit the association.

II. MATERIALS AND METHODS

This study utilized evaluation research and a survey questionnaire adopted from NEUST Graduate School as the main instrument of this study. According to [6] as cited in [7] "evaluation research focuses on assessing a particular practice or intervention at a given site." The researchers conducted a series of observation and site visitation as well as focus group discussion to get the necessary information with the used of the questionnaire regarding the concerns and profiles of Tanawan Mushroom Grower's Association.

III. RESULTS AND DISCUSSION

A. Personal Profile

Table 1.1. Demographics

Particulars	Age					Gender		Civil Status				Educational Attainment			
	20-30	31-40	41-50	51-60	Above 61	Male	Female	Single	Married	Separated	Widowed	Elem. Graduate	Highschool Graduate	College Undergrad	College Grad
Frequency	12	18	17	11	9	30	37	8	45	6	8	24	28	6	9
Percentage	18%	27%	25%	17%	13%	45%	55%	12%	67%	9%	12%	36%	42%	9%	13%
Total	67 = 100%					67 = 100%		67 = 100%				67 = 100%			

Based on the gathered data, the majority of the head of the family in Tanawan aged 31-50, mostly female and high school and elementary graduates.

Table 1.2. Income Profile

Particular	Occupation				Other Sources of Income											
	Farmer	Employee	Merchants	None	House Caretaking	Store Owner	Tricycle Driver	Farm Cleaner	Welder	Charcoal Trader	Street Vendor	Construction Worker	Gardener	Fisher	Livestock	Social Worker
Frequency	10	25	23	9	1	6	9	1	1	1	4	4	6	2	31	2
Percentage	15%	37%	35%	13%	*38 samples have other sources of income equivalent to 57% of the total population											
Total	67 = 100%															

Head of the households was mostly engaged in merchandising and entrepreneurship. This indicates that the majority of the bracket is appropriate in business venture interested and eager to do business for a living.

B. Economic Profile

Table 2. Economic Profile of Tanawan Residents

	Farmland Ownership (Covers 15% of Farming Activity on Table A2)			Land Area for Farming (Covers 15% of Farming Activity on Table A2)				Livestock			
	Own	Squatting	Renting	Below 500 sqm	500 sqm – 1 hectare	1.1 – 3 hectares	3.1 – 5 hectares	Raising Chickens	Raising Pigs	Raising Goat	Breeding Cows
Frequency	6	3	1	3	3	2	2	19	4	4	4
Percentage	60 %	30 %	10 %	30 %	30 %	20 %	20 %	61 %	13 %	13 %	13 %
Total	10 = 100%			10 = 100%				31 = 100%			

With a vast land, only 15% of the population is engaged in farming, wherein 60% of it owns the property their cultivating. Thirty-one households are into raising live stocks; mostly raising chickens covering 61% of the population.

C. Property and Availability of Resources Profile

Table 3. Property and Availability of Resources of Tanawan Residents

	Home Ownership			Classification of Major Materials Used in House			Plant Resources within the Yard								
	Owned	Renting	Living with	Concrete	Semi-Concrete	Wood	Mangoes	Papaya	Jackfruit	Coconut	Rambutan	Vegetables	Sunflower	Other Fruit Bearing	Other Plant
Frequency	31	24	12	32	32	3	34	3	6	24	8	16	2	29	3
Percentage	46 %	36 %	18 %	48 %	48 %	4 %									
Total	67 = 100%			67 = 100%											

On property assessment, fewest of the household owned house and lot in the barangay mostly concreted houses; they have various plants and fruit-bearing trees like Mango and Coconut in their yards.

D. Problems Encountered

Table 4. Problems Encountered by Tanawan Mushroom Growers Association

Rank	Problems Encountered	Frequency	Percentage
1	Lack of expertise to generate the product	67	100%
2	No market (sure market) for the product.	54	81%
3	Lack of assistance from the Local Government Unit (LGU).	34	51%
4	Lack of transportation.	32	48%
5	No internet access.	15	22%

It was found out that the highest problem of the association is expertise in generating their product. Companies that don't offer quality training to new and current employees harm not only the development of individual workers but also the evolution of the business itself [8]. Regards to this problem skills and knowledge of every member must be accelerated for the cooperative's sake.

A business owner must always be thinking in terms of supply and demand[9]. The demand and attitude of the buyer may contribute to the sales of the business. The failure to study the behavior of the target market will bring the business down. Even though they know about selling, they were not confident about their strategies on how to be an entrepreneur and to make a profit in a sustainable and

efficient way. One more factor, it is a far-flung area difficult for the LGU to reach out. Other problems in the area include logistics, promotion, and internet access.

E. DEVELOPMENT PROGRAM

The culture of mushroom growing is gaining popularity in the Philippines[5]. Mushroom Cultivation can also be a feasible livelihood activity [10]. Its present cultivation in this country is limited, perhaps due to insufficiency of planting materials and the limited local knowledge about its culture. Mushroom Cultivation can help reduce vulnerability to poverty and strengthens livelihood through the generation of the fast yielding nutritious source of food and reliable source of income [10]. Mushroom is a delicacy and is accepted as a vegetable.

Mushroom production is the solution for the problems encountered in Garden Tourism [1] after the said assessment in Barangay Tanawan. The NEUST presented activities like seminar-workshop on mushroom growing [1] (# 4), and mushroom growing and marketing [10] (#8) to solve the problems in Garden Tourism. As a response to that proposed activity, the NEUST Graduate School B.A. Society provided quality mushroom fruiting bags and a focus group discussion regarding the marketing strategy on how to market and sell the product.

IV. CONCLUSIONS AND RECOMMENDATIONS

Mushroom production is appropriate to the locality and its residents based on their economic profile, interests, and availability of resources. The climate of Barangay Tanawan also suits for mushroom growing. To add, mushroom growing requires little space and will not consume a lot of time of growers. The officers of the cooperative further requested that the BA Society could provide them free seeds and continuous assistance to make their association thrived in this business endeavor.

It is highly recommended an excessive training toward doing business in partnership with LGU and DTI for entrepreneurship awareness and to be able to make accurate decisions[11] for proper Mushroom products pricing, BFAD, DOST and TESDA for food processing and mushroom production.

Likewise, the existing cooperative and barangay officials should work hand in hand in studying and exploring the performance [12] of their mushroom in the market to enhance their on-going livelihood project further. To make the product of Tanawan to be known outside their place, participation to trade fair sponsored by the DTI every month should be encouraged.

Furthermore, the barangay needs sustainable platforms to support group that is willing to give aides for their community development, not just in livelihood; it can be on education, sanitation, barangay management, or tourism.

Table 5 B.A. Society Extension Program: Intervention Program on Mushroom Production in Tanawan Dingalan Aurora

Program	Status	Resources Needed	Hindrance	Intervention	Benefits
1.Implementation of Mushroom Production	Ongoing	1.Service Vehicle 2.Barangay Captain Assistance 3.Tanawan Residents 4.B.A. Society Officers and Advisers	-Different interests of the residents - Time Management	-The Association should participate in the implementation of the program.	A well-implemented plan will raise profit for the association. The members further developed their skills in mushroom production
2.Site Visitation	First Week June 2019	1.Service Vehicle 2.Barangay Captain Assistance 3.Mushroom Production Area	-The production area is far from the barangay hall. -Ongoing Renovation and Building	- Communication with the Barangay Officials for Assistance and Guidance going to the site. -Monitoring of	-Observation must be more efficient of the actual, and real production area must be seen. -Mushroom is food for consumption, so sanitation must be maintained and

			of Mushroom Production Area, sanitation must be observed	the cleanliness (Cleaning and maintenance should be scheduled and monitored for the site cleanliness.	always observed.
6.Mushroom Production Seminar	Second Week June 2019	1.Barangay Official Support 2.Mushroom Growers from San Ildefonso Bulacan 3.B.A. Society Officers and Advisers 4.Tanawan Mushroom Grower Members and other residents	-The mushroom growers priority in everyday life. -The resource speaker place is distant to the seminar venue	-Giving letters and announcement ahead of time to the mushroom growers regarding the planned seminar -Having an agreement with the resource speaker (free seminar in return to the marketing of his/her product.	-Being knowledgeable about the different strategy of mushroom production can drive the motivation of members to work more for the growth of the cooperative.
7.Mushroom Processing Seminar	First Week August 2019	1.Barangay Officials 2.DTI 3.BFAD 4.Cooperative Members 5.B.A. Society Officers and Members	-Lack of Mushroom Surplus -Losses on the start of the mushroom processing activity	-Conduct training regarding the culturing /making of Mushroom fruiting bag for fewer expenses. --Small losses are tolerable from the start of processing.	-Harvest Surplus can be a motivation to process mushroom into another product, for more income and more product line for the target market.
8.Mushroom Marketing Management Seminar	Second Week August 2019	1.B.A. Society Members (from the Industry), Officers and Advisers 2.Mushroom Cooperative Members	-Lack of confidence of some mushroom members regarding their product.	-Educating the members about the biggest possibility of their product, especially when develop. -Monitoring regularly must be applied.	Good Marketing Management about the Mushroom will keep the cooperative exists and grow for a long period.

9.Product Exposure (Aurora Province- Pasalubong Centers) - Different products out of the mushroom	Last week of November 2019	1. Mushroom Growers Cooperative 2. DTI Aurora 3. LGU- Aurora 4. NEUST- B.A. Society Officers and Advisers	- The pressure on the side of the members on how to introduce the product to the market or the whole province. -Different demands or interest in the market.	- Reminding the confidence learned on the marketing management seminar - Value adding on the benefits and uses of the mushroom to the target market.	- Product exposure will help mushroom growers to introduce and showcase their product to the market.
10. Sustainable/ Continues Mushroom Production Monitoring and Evaluation	First week December 2019	1. Mushroom Growers 2. NEUST -B.A. Society officers and Advisers	-Hardship in the availability of time of both parties. -LGU support in the growing mushroom production	- Setting up a time chart about the quarterly visit and checking of inventory logbooks - Formal letter request about the needed support from the government unit.	- Monitoring and evaluation were performed for the cooperative to stay and to grow as time goes by and to prevent business closure.

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Operation of Higher Education Institution-Based Cooperatives in Nueva Ecija

Rollieza Grace M. Daus-Taruc

Abstract— This study evaluated the operation of Higher Education Institution (HEI)-based cooperatives in Nueva Ecija. It described the cooperatives' historical antecedents and different aspects of operation in terms of organization and management, market and marketing, production/technical and financial aspects. The study also identified the challenges and problems encountered by the cooperatives. The study employed the descriptive type of research and the respondents of the study were the general managers and members from two public and two private HEIs in Nueva Ecija. The result of the study revealed that HEI-based cooperatives are classified as credit, multi-purpose, consumer and housing cooperatives, all operating for more than two decades. All of the cooperatives have the same set of key officers who managed the operation of the organization. They used fliers, social media and public announcement to disseminate information. The cooperatives primarily offered cash loans and selling of various commodities. As to fund resources, cooperatives sourced out their fund through the share of a capital subscription among the members. Top problems encountered by the cooperatives include limited membership expansion, decreased volume of sales, difficulties in marketing loan packages to faculty members with high take-home pay, time management and availability of officers and slow retrieval of land titles from National Housing Authority (NHA).

Recommendations offered to improve the operation of cooperatives are continuous enhancement of their operation through the integration of technology, additional personnel, new services and crafting new policies that will benefit more members of the cooperatives.

Keywords— Cooperatives, financial, management, marketing, organization, operation & technical.

I. INTRODUCTION

Different financial institutions offer a financial solution to the less fortunate segments of the society and cooperative is one of the many that gives a lower cost of financing. Putting up a cooperative in a particular agency, unit or institution of the community has become a dominant

feature of poverty alleviation program implemented by the organization. By making reserve funds, these cooperatives help to lessen members' burden in searching for immediate cash assistance for the unforeseen expenditures. Benefits gained from cooperatives create an impact on the economic conditions of members [1]. Aside from the financial assistance during the recession period, the decrease in financial suffering due to significant debts can lessen the negative impact on health conditions of the members.

According to [2], "cooperatives are autonomous associations of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled enterprise." Likewise, [3] stated that "cooperatives have been considered the key and strategy for development, specifically rural development. While [4] said, a co-op is a better co-op when it effectively meets the needs of its members. Cooperatives are good at delivering benefit to members in part because they are so flexible. A co-op does not have to have a complicated system of equity allocation and distribution to meet the needs of its membership, but the ability to tailor important elements of the ownership structure for the good of the membership is one of the things that help co-ops to serve their members well. Thus, [5] mentioned that cooperatives should provide quality supplies and services to its members at a reasonable cost.

Additionally, [6] states that the business philosophy of cooperatives is based on the concept of enlightened self-interest, which is expressed from the standpoint of the cooperating members. Furthermore, he emphasized the value of education as one of the important principles to foster the cooperative spirit. Though members do not have to handle the daily management of the cooperative, they must not completely rely on the managers because this could be a source of mismanagement, graft and corruption. Members must be knowledgeable enough about the operation of their cooperative to achieve check and balance and this knowledge can be acquired through education.

In general, there are different kinds of cooperatives, namely: (1) Credit Cooperative, which

promotes thrift and savings among its members and creates funds in order to grant loans and productivity; (2) Consumer Cooperative, the primary purpose of which is to procure and distribute commodities to members and non-members; (3) Producers Cooperative, which undertakes joint production whether agricultural or industrial; (4) Marketing Cooperative, which engages in the supply of production inputs to members and markets their products, (5) Service Cooperative, which engages in medical and dental care, hospitalization, transportation, insurance, housing, labor, electric light and power, communication and other services; and (6) Multipurpose Cooperative, which combines two or more of the business activities of these different types of cooperatives [7].

The need to establish a cooperative in schools is imperative for it is a great help in augmenting the meager income of its employees and teachers. Teachers and staff may derive their income different from one another and income serves as the basis for individual expenditures. Despite the regular or monthly salary that employees receive, most of them have additional financial resources to cover ordinary living expenses, raise and improve household welfare, academic support, and unexpected emergencies. Cognizant of the financial needs of the employees in the academe, Higher Education Institution (HEI) have engaged in the establishment of cooperatives to encourage thrift and savings mobilization among members for capital formation.

Based on the [8], it is a general observation that in Nueva Ecija, most if not all educational institutions operate an institutional cooperative, and they are operating in consonance with the Cooperative Code of the Philippines.

Studies about cooperatives are confined mostly on tackling operations and management of privately-owned cooperatives or those that were organized by laborers, and industrial and agricultural sectors. Meanwhile, there were a few types of research on assessing and evaluating educational institution-based cooperatives. With the engagement of HEIs in operating cooperatives and to fill the gap on academic-based researches focusing on HEI-based cooperatives, it is but timely and relevant to conduct this study focusing on the operation of this type of cooperative.

The researcher being a member of an academic institution aimed to assess the current status of the so-called School-based Institutional Cooperatives in Nueva Ecija which are focused on operation on the following aspects: organization and management, market and marketing aspect, production/technical aspect and financial aspect.

The researcher further delved on the impact of the cooperatives on their members and the academic institutions in general. It is hoped that this research will be beneficial to the members for it will serve as an avenue to identify the problems encountered by the members and by the management of Higher Education Institution (HEI)-based cooperatives. With the result of this study, a development plan was formulated to enhance the services of the existing cooperatives to better serve their members.

Furthermore, the conduct of this study could influence other academic institutions, be it a private or state university to take initiatives on establishing cooperatives that could extend support to their personnel in terms of financial assistance.

II. METHODOLOGY

The study employed a descriptive type of research. Descriptive research according to [9] as cited by the authors in [10], systematically describes a situation, problem, phenomenon, service or program, attitude towards an issue or simply, it provides information on a subject. In particular, the study described the historical antecedent of the cooperatives in terms of their type, years of existence, membership, and services offered. Cooperatives, as a business enterprise, were also analyzed based on organization and management, technical/production, and financial aspects. The services offered enjoyed by the members and the problems encountered by the cooperatives are also included. The results of analyzes were the basis in the preparation of a strategic development agenda on the operation of cooperatives in HEIs.

The study was conducted in two public and two private Higher Education Institutions (HEIs) in Nueva Ecija. A total of 70 purposively chosen people served as respondents of this study. They were chosen purposively based on the following criteria [11]: they are members of the institutional cooperatives in and are more than five years as members of the cooperatives. Complete enumeration was utilized in choosing additional respondents of this research. They are all six (6) General Managers of the cooperative-respondents.

The questionnaire for the general managers of the cooperatives was used to gather data on the cooperative's historical antecedent, business operation, and challenges and problems faced in operation. The questionnaire for members gathered data on membership, services offered, and problems faced in the operation of the cooperative.

Frequency and percentage were the statistical tools utilized to present the numerical data gathered.

Sustainability, Financial Management, Risk and Credit Management and others.

III. RESULTS AND DISCUSSION

1. Describe the Historical Antecedents of HEI-Based Cooperatives in Nueva Ecija on the following aspects:

1.1 Type of cooperative

The classification of the HEI-based Cooperatives in Nueva Ecija are Credit Cooperative (.33%), Multipurpose Cooperative (.33%), Consumer Cooperative .17% and Housing Cooperative (.17%).

1.2 Years of existence

From the six cooperative-respondents, three of them were established for more than two decades. One has been operating for three decades and two for more than half of a century.

1.3 Membership

Membership of cooperatives was classified as regular members and associate members. Fifty (50%) of the HEI-based Cooperatives in Nueva Ecija are composed of regular members where the majority of them were female teaching personnel. The remaining fifty(50%) has a composition of regular and associate members, almost 10% of the total population were associate members where the majority of them belong to the non-teaching personnel of the University.

1.4 Services offered

Majority of the HEI-based Cooperatives in Nueva Ecija offer cash loan (67%), selling of commodities (.33%) which can be on a cash basis or credit and housing loan (.17%).

1.5 Mandatory pieces of training attended.

Mandatory training for cooperative officers is a training requirement that all officials of the organization must comply. All of the HEI-based Cooperatives in Nueva Ecija attended mandatory training required by the CDA. Training that they attended are Fundamentals of Cooperatives, Basic Cooperative and Good Governance Management, Basic Principles of

2. Describe the Operation of HEI-Based Cooperatives in Nueva Ecija

2.1 Organization and Management

All of the cooperatives under survey have the same set of key officers. They all composed the Board of Directors, Managers and Bookkeepers. Cooperatives 1, 3, 5 and 6 vary in some supporting staff like some have additional clerks to look into loans, office clerks, treasurer and secretary to do the operation. Cooperatives 2 and 4, which offer cooked foods, groceries and other dry goods hire cook, sales staff, merchandiser and cashier who assist the officers to supervise the organization and the operation.

All of the key officers like members of the Board of Directors and Managers receive honoraria while clerical jobs are performed by the hired personnel that receive a standard salary prevailing within the locality and they also receive other benefits.

2.2 Market and Marketing

Majority of the HEI-based Cooperatives in Nueva Ecija took advantage of the marketing opportunity during meetings and general assembly. Distribution of fliers, the use social media, public announcement through posting of banners and streamers in strategic places such as in the school premises are some of the effective tools they have been using for information dissemination.

Recruitment and retention of members and non-members are important for the sustainability of the existing cooperative. All of the cooperative-respondents have been applying the same techniques, like offering a lower rate of interest compared to any other financial institutions and faster processing time for loan application. They also increase the amount of loan if the borrower-member applied for a larger amount, provided that as per evaluation, a member's capacity to pay will be the foremost requirement for approval. The management also gives freebies and other giveaways during Christmas to the members.

2.3 Production/Technical Aspect

2.3.1. Production/Technical Aspect

Most of the services offered by the HEI-based Cooperatives in Nueva Ecija to its members were cash loan, selling of school supplies, cooked food and other grocery items and housing loan.

Interest rates are lower than other financial institution and amortization is paid through payroll deduction or over the counter of the cooperative office. Renewal of loan is granted if they have settled at least 50% to 70% of the loan term with a 3% penalty of the remaining balance if member-borrower fails to settle obligations.

2.3.2. Logistical Support

Majority of the cooperatives under survey occupy an office space where business activities take place. Most of the offices they occupy are with air conditioning unit. Office machines, equipment and devices are all available and functional. Basic facilities such as comfort room, receiving room/area and others are all available to most of the Cooperatives.

2.4 Financial Aspect

The financial aspect is described in terms of the income of the cooperatives, its capital build-up strategies and its collecting rate.

2.4.1. Cooperatives' Capitalization

Greater percentage of the HEI-based Cooperatives in Nueva Ecija have a capital ranging from P5,000,001 to P10,000,000 (33%), 17% ranges from P25,000,001 to P30,000,000. 17% have a capital ranging from P15,000,001 to P20,000,00, 17% fall under the bracket of P1,000,001 to P5,000,000 and 17% is less than a million pesos.

2.4.2. Capital Build-up and Collection rate.

Greater percentage of the Cooperatives under survey have a minimum capital subscription of P15,000.00 (33%), issuance of authorization to deduct a certain amount

from the member's monthly salary as per his prerogative relative to his/her share capital (33%); subscription of at least 200 shares for a total of P20,000.00 (17%) and a minimum of P10,000 share capital (17%).

2.4.3. Income of the Cooperative

Majority of the total income computed is increasing yearly. However, there was a sudden decrease in income for some years but eventually recovered in the later years. From the two cooperatives, income recorded for 1 Cooperative has been fluctuating for more than a decade and the other one has a deficit for two consecutive years.

3. Challenges and Problems Encountered in the Operation of the Cooperatives

3.1 Organization and Management

The HEI-based Cooperatives in Nueva Ecija has a slow rate in membership expansion.

3.2 Market and marketing

HEI-based Cooperatives in Nueva Ecija that offer tangible products need a strategic campaign to increase the volume of sales. Existence of other competitors inside and outside the school premises affects the sales.

Cooperatives that offer cash loan encounter difficulties in marketing loan packages to faculty members with high take-home pay.

The "wait and see attitude," where the member remains unrealized until loan application of other members has been approved.

3.3 Production/Technical Aspect

Time management and unavailability of officers with direct contact to the borrower-members due to the positions or designation they handle in their respective academic institutions.

Slow retrieval of land titles from the National Housing Authority (NHA).

A more spacious work place for cooperatives that offer commodities is needed to avoid shoplifting and miscommunication with the buyers/borrowers and sellers. The terms and condition and the quality of the products from the suppliers must be put into considerations.

3.4 Financial Aspect

Collection of outstanding overdue accounts; request for an additional amount of loan even the combined monthly amortization has exceeded to its limit of P5,000 net take-home pay; slow retrieval of titles from National Housing Authority (NHA); and withdrawals of membership and its equivalent capital share affects income generation.

4. Proposed Development Agenda for the Operation of Cooperatives

- a. Conduct of campaign to disseminate information about the features of the HEI-based cooperative.
- b. Hire additional personnel and work full-time to deliver effective and efficient services to every member.
- c. Revision of the loan policy to accommodate new lending activity without a major renovation.
- d. Marketing through the use of promotional techniques to help understand what the product or service of the cooperative can offer and how to plan for a successful product offering.
- e. Request for bigger office space from the University.
- f. Computerization of cooperatives' operations.
- g. Provision of additional benefits of cooperative members

IV. CONCLUSIONS

Based on the findings, the following conclusions are drawn:

1. The classification of the HEI-based Cooperatives in Nueva Ecija are Credit Cooperative, Multipurpose Cooperative, Consumer Cooperative and Housing Cooperative. They were established

for more than two decades. Majority of the Cooperatives were composed of regular members where a greater percentage of them were female teaching personnel. All of the Cooperative officers attended mandatory pieces of training required by the CDA. Training that they attended are Fundamentals of Cooperatives, Basic Cooperative and Good Governance Management, Basic Principles of Sustainability, Financial Management, Risk and Credit Management and others.

2. All of the cooperatives under survey have the same set of key officers. They all composed the Board of Directors, Managers and Bookkeepers. They vary in some supporting staff like clerks to look into loans, office clerk, treasurer, cook, sales staff and others. All of the key officers like Board of Directors and Managers receive honoraria while other supporting personnel/staff receive a salary and other benefits. They use fliers, social media, public announcement through the posting of banners and streamers in strategic places in the school premises as an effective tool for information dissemination. They offer cash loan, selling of school supplies, cooked food and other grocery items and housing loan with low interest. Majority of the cooperatives under survey occupy office space with proper ventilation. Their fund resources come from a shared capital subscription where the majority of the total income computed is increasing yearly.
3. Top problems of HEI-based cooperatives in Nueva Ecija were: slow increase in membership; decrease the volume of sales; existence of other competitors inside and outside the school premises; difficulties in marketing loan packages to faculty members with high take-home pay; time management and availability of officers; slow retrieval of land titles from National Housing Authority (NHA); more spacious work place for cooperatives that offer commodities; the terms and condition and the quality of the product from the suppliers; and withdrawals of membership and its equivalent capital share.
4. The stability and competitiveness of the HEI-based cooperatives in Nueva Ecija will be realized through the collective effort of the cooperative

management and the academic institutions where they belong.

V. RECOMMENDATIONS

Based on the above findings and conclusions, the following recommendations are made:

1. Annual general assembly meeting should be considered to increase members' awareness about products and services of the cooperative. Hence, the number of members will increase.
2. Continually provide demand-driven services to create more opportunities for the members of the cooperatives.
3. Review of credit policy should be considered to update the organization from the most effective rules and policy that can be applied.
4. Annual accomplishment reports must be presented to the members of the cooperatives for transparency.
5. Encourage members and non-members to patronize cooperatives' products and services to realize more income.
6. Provide other forms of assistance for members such as mutual aid, death aid and medical assistance which will be granted to all members for free may be considered.
7. Part of mandatory savings of cooperative for community development must be used for projects intended for the benefit of HEIs.
8. HEI Cooperatives must endeavor to organize, assist students in creating Laboratory Cooperative.

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An Assessment of Knowledge, Skills, and Attitudes of Accountancy Business and Management (ABM) Students of Senior High Schools in Cabanatuan

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Abstract— This research study aimed to assess the core competencies acquired by the ABM senior high school students of Cabanatuan City, Nueva Ecija. This assessment was done during their Work Immersion at ASKI Group of Companies, Inc. Corporate Office located at 105 Maharlika Highway, Cabanatuan City, Nueva Ecija. The study revealed that majority of the respondents agreed that students were already knowledgeable when it comes to different areas like common terminologies used in a workplace. It also shows that they are already skilled and possessed qualities needed to be competent. However, some respondents mentioned that some students still cannot analyze problem effectively and were not able to demonstrate good judgment in handling routine problems.

Keywords— Accountancy, Attitude, Business and Management Strand, Core Competencies, Knowledge, Senior High School, Skills and Work Immersion.

I. INTRODUCTION

One big move of the government towards enhancing the skills and broadening the knowledge of every Filipino especially the youth is the implementation of K-12 Program wherein the student undergoing Secondary Education need to spend six years in High School – four years in Junior High School and another two years in Senior High School (SHS). The Department of Education (DepEd) envisioned the SHS program to produce graduates prepared for higher education and capable of starting their businesses or land a job even without a college degree. Through the K-12 program, students are expected to gain core competencies that will help them to become more ready and equipped with the knowledge, skills, and good values that are essentials to nation-building [1].

When the students enter Senior High School (SHS), they need to choose the track and strand they want to pursue.

The Academic Track is one of the four tracks offered in the Senior High School program of the Philippine's K-12 Basic Education Curriculum. It is intended for students who want to pursue higher education after they graduate in senior high. There are four different strands under the Academic Track namely Accountancy Business and Management (ABM), General Academic Strand (GAS), Humanities and Social Sciences (HUMSS), and the Science Technology Engineering and Mathematics (STEM) strands. Each strand has its specializations and set of challenges [2].

One of the Academic Track Strands is the Accountancy, Business, and Management (ABM) wherein students study basic accounting, fundamentals of management, marketing, economics, entrepreneurship, and other business-related areas. The ABM Strand program offers a multitude of opportunities and direct career paths that can propel you into both personal and professional success. As previously mentioned, studying under the ABM Strand will cover the fundamentals of accounting, finance, management, and even entrepreneurship. These are the key arenas for making any business thrive. Besides the direct careers in accounting, management, and finance, there are many other common career paths that a student can pursue under the ABM Strand: Business Careers on Retails and Sales, Media, Marketing and Advertising, and Human Resources [3].

Likewise, Work Immersion, a required subject, has also been incorporated into the ABM curriculum which provides learners with opportunities: to become familiar with the workplace; for employment simulation; and to apply their competencies in areas of specialization/applied subjects in authentic work environments [3]. In this Work Immersion, the company, which serves as the Workplace Immersion Venue, will assign different trainers who will teach the students how to do certain tasks in the office. This will allow the respondents to test and observe the knowledge,

skills, and attitude of the ABM students towards a certain task or situation. This will also allow the students to put into an actual application what they have learned in the classroom. The knowledge, skills, and attitude that students need to have and to possess will be measure and test through this Work Immersion because it also aims to develop and enhance the work ethics and habits of Senior High School students. It would also serve as an assessment tool on the effectivity of the module designed for the program.

Work immersion provides them with an avenue to test themselves and apply what they have learned in a non-school scenario. In work immersion, learners are not only able to apply their previous training but are also able to experience social interactions in a work environment. Their experiences during work immersion will develop many skills and values that would help them as they transition from high school to real life [3]. Through this Work Immersion, they gave tasks to each student and assessed if those ABM students already have the needed core competencies.

The underlying questions which this study needed to address are: do the SHS students gain the core competencies needed in their work immersion? Are they already competent enough to enter college or to get employed, rather start their own business after finishing the ABM course? The researchers want to know if SHS students in the different schools in Cabanatuan are intellectually and holistically ready enough to enter college, start a business, or get employed. Through this research study also, the school administrators and teachers may be able to know if teaching techniques and tools they used are effective to meet the objectives of the program and for the companies to see whether those Senior High School students are ready and competent enough to do work-related tasks.

A study by the advocacy group Philippine Business for Education (PBED) said that the first batch of SHS graduates possesses "theoretically" 93 percent of the competencies suitable to the needs of the nation's industries, such as

critical thinking and problem-solving skills. But a separate PBED study recently said only about 20 percent of 70 of the country's leading companies across all sectors were inclined to hire senior high graduates. According to PBED executive director Love Basillote, many companies accept only job applicants with at least two years of college education, which potentially excludes SHS graduates. This hiring policy explains the discrepancy between the graduates' supposedly high competency and their low chances of getting a job, she said. "What we want is for companies to hire based on competency and not on qualification. There are many jobs where you don't need to have a college degree, such as in retail," Basillote said [1]. But still, there are some who are not convinced that Senior High School graduates are competent enough to land a job. The Philippine Chamber of Commerce and Industry's Human Resources Development Foundation Inc. (PCCI HRDF) believes the hesitance to hire fresh graduates may be due to the absence of the necessary skills and training that industries need but not yet provided by the current SHS program."At the moment, we have no confidence that they (SHS graduates) do have it," said PCCI HRDF president Alberto Fenix [1].

II. METHODOLOGY

This section presents the methods used by the researchers in gathering data and the procedures adapted to check the reliability of these data. The researchers used one of the traditional methods of research, which is a descriptive method. In this method, the researchers used questionnaires with a Likert scale from 1 to 4. This allows the researchers to see the degree of agreement or disagreement on a symmetric agree-disagree scale for a series of statements answered by the respondents. Thus, the range captures the intensity of their feeling or their opinion based on observation for a given item. The questionnaire includes a statement that measured the knowledge, skills, and attitude of the students. After the data was gathered, the researcher computed the weighted mean of the response per questions or statements in the questionnaire.

Table 1. Descriptors

Scale	Range	Verbal Descriptors	Description		
			Knowledge	Skills	Attitude
4	3.30 – 4.00	Strongly Agree	Very Knowledgeable	Highly Skilled	Very High
3	2.50 – 3.24	Agree	Knowledgeable	Skilled	High
2	1.75 – 2.49	Disagree	Least Knowledgeable	Least Skilled	Low
1	1.00 – 1.74	Strongly Disagree	Poor	Unskilled	Very Low

Table 1 shows the scale, range, verbal descriptors, and description used to measure the core competencies of ABM students of different Senior High Schools in Cabanatuan City, Nueva Ecija. Each scale in the table has a corresponding range, verbal descriptors, and description. For Scale 4 which is the highest scale, its weighted mean range is 3.30 – 4.00 and has verbal descriptor which is Strongly Agree and descriptions like Very Knowledgeable for Knowledge, Highly Skilled for Skills, and Very High for Attitude. Meanwhile, Scale 1 is the lowest scale and has a weighted mean range from 1.00 – 1.74, which means the respondent answered Strongly Disagree. It has descriptions like Poor for Knowledge, Unskilled for Skills, and Very Low for Attitude.

III. RESULTS AND DISCUSSION

A. Knowledge

Table 2. Students' Knowledge

Question	Weighted Mean	Verbal Descriptor
1. Able to understand terminologies related to tasks	2.88	Agree
2. Open to new ideas; able to learn new skills with ease	3.00	Agree
3. Can apply theories learned from school to actual work	2.58	Agree
4. Has the ability to collaborate skills learned from school and skills learned in actual work	2.58	Agree
5. Can analyze information needed to perform tasks	2.63	Agree

Table 2 reveals that students are knowledgeable and can apply ideas into actual work. With the highest weighted mean of 3, the most visible competency in the knowledge area proves that students are open to new ideas and can learn new skills at ease. The additional years in school, together with the implementation of work immersion,

enable the students to gain the needed understanding. NCTM Standards emphasized that the questions asked to students should be based on the lives of students, challenge students to develop and apply strategies, not be easily solved, and enable students to form new knowledge by making use of their previous knowledge [6].

B. Skills

Table 3. Students' Skills

Question	Weighted Mean	Verbal Descriptor
1. Is able to critically think and solve problems	2.73	Agree
2. Collaborate across networks and lead by influence	2.55	Agree
3. Has agility and adaptability	2.98	Agree
4. Has initiative and entrepreneurship	2.75	Agree
5. Has effective oral and written communication	2.65	Agree
6. Is curious and imaginative	2.95	Agree
7. Consistently produces quality results	2.7	Agree
8. Efficiently informs supervisor of any challenge or hindrance related to a given task or assignment	2.90	Agree
9. Can do multitasking	2.65	Agree
10. Can work under pressure and delivers the required tasks	2.75	Agree
11. Effective and efficient time management	2.70	Agree
12. Meets deadlines and manages time well	3.03	Agree
13. Analyses problems effectively	2.45	Disagree
14. Has the ability to make creative and effective solutions to problems	2.55	Agree
15. Demonstrates good judgment in handling routine problems	2.43	Disagree

Among the skills enumerated in Table 3, question 12, which examine if students' meet deadlines and manages time well has the highest weighted mean of 3.03. Most of the skills are present and observable except from question number 13 and 15, which survey if students analyses problems effectively and demonstrates good judgment in handling routine problems.

The authors in [6] stated that students could more easily apply the problem-solving strategies they learned when they internalize the behavior of problem-solving. They mentioned that solely mathematical calculation knowledge is not enough on its while solving a problem, a specifically dominant type of knowledge which is defined as domain-specific knowledge is also required.

C. Attitude

Data in Table 4 indicates that question 19 and 22 are very noticeable in the students' attitude. The respondents strongly agree that students' respects persons in authority and their physical appearance conforms to the workplace and placement rules. The only descriptor that falls in the "disagree" scale is question 4, which proves that students do not accept criticisms positively.

Among the questions measuring the knowledge, skills and attitude of the students, the respondents agree that students possess the competencies needed to perform their assigned task which supports the study by PBED who said that the first batch of SHS graduates possess "theoretically" 93 percent of the competencies suitable to the needs of the nation's industries, such as critical thinking and problem-solving skills.

With the given response on the three areas: knowledge, skills, and attitude, it is evident that the goal of Work Immersion which is for learners to not only be able to apply their previous training but also to be able to experience the social interactions in a work environment. Furthermore, the Work Immersion Program is also conceptualized. Basically, it aims to expose the students to the harsh realities of the environment in the workplace. This exposure also aims to develop and enhance the work ethics and habits of senior high school students. Their experiences on their Work Immersion has helped them developed many skills and values that would help them on their transition from high school to real life [5].

Table 4. Students' Attitudes

Question	Weighted Mean	Verbal Descriptor
1. Offers assistance willingly	3.05	Agree
2. Shows a positive work attitude	3.03	Agree
3. Shows sensitivity to and consideration for other's feelings	2.98	Agree
4. Accepts criticism positively	2.43	Disagree
5. Shows pride in work	2.55	Agree
6. Is punctual regularly	2.85	Agree
7. Maintain good attendance	3.10	Agree
8. Informs the supervisor in a timely manner when absenteeism and tardiness may occur	3.08	Agree
9. Has the ability to follow through and meet deadlines	2.90	Agree
10. Has commitment for his/her actions	2.75	Agree
11. Can adjust easily to changes in the workplace	2.78	Agree
12. Displays a high level of performance at all times	2.63	Agree
13. Completes assignments with minimum supervision	2.68	Agree
14. Completes tasks independently and consistently	2.58	Agree
15. Seeks support as the need arises	2.80	Agree
16. Recognizes and takes immediate action to effectively address problems and opportunities	2.63	Agree
17. Engages in continuous learning	2.88	Agree
18. Contributes new ideas and shares skills to improve the department/organization	2.68	Agree

19. Respects persons in authority	3.33	Strongly Agree
20. Uses all tools, equipment, and facilities responsibly	2.80	Agree
21. Follows all policies and procedures when issues and conflict arises	2.95	Agree
22. Physical appearance conforms to the workplace and placement rules	3.30	Strongly Agree

IV. CONCLUSION

Based on the study conducted, the researchers conclude that the students possess the needed knowledge, skills, and attitude that will enable them to perform their assigned duties. Using the weighted mean in interpreting the collected data, knowledge, and skills fall under the "agree" scale while attitude is classified under the "strongly agree" scale. According to DepEd, they are sure that Senior High School graduates are "equipped to face the world of work." [5]

On the knowledge area, it is evident that students are open to a new idea, knowledgeable about common terminologies used, and are able to analyze information needed to perform tasks.

On the other hand, the most manifested competencies on the skill area say that students meet the deadline and manage time well. Students are also curious and imaginative and have agility and adaptability. The only criterion where the respondents disagree was about the capacity of the students to make judgments and decisions.

Lastly, regarding the competencies on attitude area where the respondents gave their highest rating, the researchers found out that when it comes to their attitudes, majority of the students who underwent Work Immersion in different ASKI Group of Companies, Inc. Business Institutions and the department has good attitude, especially professionalism.

Generally, the researchers conclude that majority of the respondents agreed that the students are able to do certain tasks and act properly and professionally in an office setting. The "agree" and "strongly agree" scale proves that they are competent and has the needed knowledge, skills, and attitude that complement the requirements of industries like ASKI. DepEd stated that The K to 12 programs had equipped the students with the values, knowledge, and skills that the industries need. Their strong partnership with different industries would also enable graduates to strike a balance between theory and practice. Furthermore, the Work Immersion Program is also conceptualized. It aims to expose the students to the harsh realities of the environment in the workplace. This exposure also aims to develop and enhance the work ethics and habits of senior high school students. [7]

V. RECOMMENDATION

Through this study, the researchers can come up with possible suggestions that the faculty of the different Senior High Schools in Cabanatuan City can do with the help of ASKI Group of Companies, Inc. to maximize the potentials of their students and strengthen their competencies.

The researchers recommend that before deploying their students for Work Immersion, it is better to both parties (ASKI and SHS faculty) to talk about the immersion to be able to make accurate and better decisions [8] regarding the working conditions of the students.

Additionally, the faculty should discuss to ASKI the students' background, strengths, and weaknesses, which aimed to reduce the students' difficulties [9] in immersion.

On the other hand, ASKI must also let the faculty or Work Immersion Focal Person knows where department or Business Institutions they will possibly deploy the students and what tasks to be done in that department. Likewise, ASKI and Senior High Schools should work hand in hand in studying and exploring the performance [10] of the students by allowing the Work Immersion Focal Person to visit the students at ASKI and discuss the performance and work attitude of the students. After the Work Immersion program, trainers must also explain to the students their evaluation regarding the students' core competencies and stress out their strengths and weaknesses so that in return the students may become aware of these. ASKI must also discuss to Senior High Schools after the Work Immersion their evaluation and observation about the students and not only let the evaluation form speaks for them. In this way, they can come up with strategies or ways to educate and develop the students who were subjected to the Work Immersion.

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The Strategic Leadership and the effect in the Development of an Iraq Oil Industry

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Abstract— This research paper is to the identify an extent and practice of the Strategic leadership and its relationship with the Iraq oil industry, The researcher used a descriptive analytical approach, Designed specifically for data collection, 130 questionnaire was distributed to employees Iraq oil companies and retrieved 114 valid questionnaires for statistical analysis, The outcome showing that there are the positive relations between (supporting senior management the strategic leadership and a trends illustrating a strategy in the oil sector). A number of conclusions were reached, the most important being a relationship between practice and the role of the strategic leadership on the oil Iraq industry.

Keywords— Iraq oil industry, Strategic leadership, Development.

I. INTRODUCTION

Higher echelons theory suggested a specified knowledge, experiment, value and cucumber from top managers affect those respect an environment and strategy decisions those made. In the past 30 years, this theory was expanding to what they know now represented the strategic leadership theories.(Hambrick. D. C., and Mason, P. A., 1984).As strategic leaders which in general include a leader executive officer and them higher management staff, and a board of HR. the opinion of the strategic leaders is differentiated of oversight theory of the strategic leadership on a former is worried about the leadership of companies, however a focus in leadership in companies (Finkelstein, S., Hambrick, D. C., and Cannella, A. A ., 2009).The critical frailty on our flow knowledge from the strategic leadership is the shortage of the integration between micro, and the macro-perspective of the leadership, and a lack of discussion, through leadership scientists on organizational behavior, and the strategic administration domain. That lack of integration and the discussion leaders to multiple terminologies and disconnect constructs, intervention research questions,

research not building in the right result, broken, of the different theories. Of the try towards integration exemplify on a critical review(Boal, K. B., and Hooijberg, R., 2001).It was Publishing in the leadership quarterly: the suggested the complementary sample connection modern leadership theory (ex. view, the gravitational and transfer leaders) and emerging leadership theory (ex. leaders person differences, through personality, and cognitive factor, as long as behavioral complication) with the strategic leaders' effect.(Crossan, M., Vera, D., and Nanjad, L., 2008).Presented the integrative scope of responsibility of the strategic leaders through the leadership of a self (ex.person-consciousness and the developed of characters power) the leadership of the others (ex. technicality of inter-personal impact), and the leadership of the organizations (ex. alignment of the environment, strategy, and organization). That initial complementarity effort was compatible with the flow discussion in a micro-companies view from the strategic (Felin, T., and Foss, N ., 2005).Actually, understanding the strategic leadership include highlighting what efficient top leaders, in fact, do in this system to produce the strategy leadership-focus organizations (Rumsey, M. G., 2013).Moreover, the strategic leaders request to could a focus on a serious resource whose is more like to made the difference on a confirmation from the sustained the future of the success(Hitt, I., Ireland, R., and Hoskisson, R. E., 1995).However, who was recommending that the strategic leadership is almost winning arrival in the key resource this as coalitions with accomplice companies' social capital" and capabilities to building big team human capital, as the most essential companies' resource. A strategy review of literature emphasizes the active the strategic leaders' capacity are indeed on new competitors a landscape expecting, for the 21st century(Ireland, R. D., and Hitt, M. A., 2005).Maybe the most mission for the strategic leaders this active on management the companies' of the resource.

Strategic leader succeeds the company's portfolio from the resource by regulating their till capacity, building companies to using the ability, and development and investigation the strategic leadership to influence these resource (Sirmon, D., Hitt, M., and Ireland, R. D., 2007). Strategic leadership is the integral ingredients from a strategic administration operation, and this a consideration as an operation the transforms a formulated strategic to the chain of action, and the outcome into including the vision, mission, strategy the goals from companies is success achieved planning (Thompson, A.A. and Strickland, A.J., 2003). Strategy leader has the roles into play in all of a mentioned strategy leadership action. Conversely, all of that strategic leadership reactions actively contributes to an efficient strategic achievement (Hitt, M.A., Ireland, R.D. and Hoskisson, R.E., 2007). Strategy leaders are the chain from decision and effectiveness, both process oriented, and fixed on nature, during whom, over time past, present and the future from the companies integrate. The Strategy leadership model the bridge between past a present, and a future, by reaffirmed essence importance, to include continuity, and safety as a companies' contention with well-known, and unknown fact and probable. The Strategy leadership development focus and become an organization constitutional human and public capital, and capacity to meeting true-times opportunities and threat. Lastly, the strategy leadership made feels of award means into environment disorder and ambiguous, and provide the vision, and on the way map allows the companies to develop and innovate (Boal, K. B., 2004, August 17–20).

Iraq Petroleum Industry

Iraq has a world's third- large oil reserve. Moreover, a developing of Iraq petroleum sector was cruelty disabilities by the contract of the war, sanctions, weak investment, an exodus outcome of the technocrat and the vandalism. Correctional Iraq's oil infrastructures and expansion developing and the product is of fundamental importance to a country in the future. Accordance with the dated the publicly an available scanning, there are 28 large fields on Iraq, who contract a predestined 12% of complete certain global reserves. The finder as the early adage an Ottoman, large gigantic fields on Qurna (same called West Qurna or Qurna 1 & 2) is as well located on a Basra Governorate. Majnoon field in a north Basrah this the 3 large gigantic fields in Iraqi. All of that field are predestined into being between a 3rd and a 9th large fields on the world. An exceptional scale from the field and then much-sustained production is due to the almost ideal combinations from an importance subterranean geologic framework and the highly

enforceable reservoir. Those private sedimentary properties made the extremely recovery (capacity to exception the height proportion from the giant fields) and prosper contribute (and knows a number from success well completed as split into by a number of good excavation) between a high on the world. Therefore, a closeness from those gigantic fields to applicable ports for unloading by pipelining in the Umm Qasr. The closeness to the port, height success and the recovery rate, the along-with amazing geologic properties from petroleum some, contribute into the height profitable award to any IOC interested to attractions on a sizable risk linked with the Iraqi investment (Thomas W., 2010).

II. RESEARCH OBJECTIVES

Essential objectives from the research are to discussing the perceived roles from the strategic leadership on the strategy achievable in oil Iraq companies. That well of done on the efforts to allowed rules and guidance for the efficient was the use of the strategic leadership on general, and specified the strategy leadership reactions in special, as the drivers from the strategic achievable on oil Iraq companies.

Realize an essential objective, the objective of the study is to discuss:

- A understand the efficiency of the strategic achievable in oil Iraq companies.
- A understand barriers into the strategic achievable on oil Iraq companies.
- A understand drivers of change of the strategic leadership achievable in oil Iraq companies.
- A understand roles of the strategic leaders achievable in oil Iraq companies in general, and specifically in the terms of an achievable strategy.

Determining the Strategic leadership Direction

The upper management teams should develop an explicit vision for companies. Expressing and the communications from the fomenting vision crucial task of strategic leadership from the companies. Those need to paint the pictures, where the companies It will be in 4-12 years and bring employees into until and do into the futures. A vision shall request into the push and beyond staff stretch those stream expectancy. A vision interests as the destination into companies and Thus as information into strategic leadership formula and achievement. Additionally, a vision launched by the upper management teams must outline essential value and an ideological the companies intend into "life by. If it is too has any effect, a vision should communicate and cultivated throughout companies and over-times. Besides,

discussing the need to interpret the generality of a vision until measurable — or specific goal — with adhered from each the management levels and regions of business.

Nature of strategy leadership style

Furthermore to the effectiveness or the responsibility of upper administration teams, as summarized on an antecedent section, into understanding interaction of leadership, and strategic, it's advantageous into look in a style from strategic leadership senior management may be used. Therefore, emphasizes a needs in the top from the companies of what label "Strategy Leadership". Describe Strategy Leadership as a capacity to impact others into a voluntarily made day into day resolution the improves long-range survive from companies however maintain it is the long-range financial stabilization. The keys elements from the definitions are an equilibrium between an imports of a long-range orientation from companies, together with equal importance long-range financial stability. It's important to recognize the context the strategy leadership is the organizational status, style that upper management may employees (Rowe, W. G., 2001).

Strategic Leaders

Strategic Leaders is comparatively rare. Those are the synergistic collection of what is best on both the Leaders and the administrative. This can equilibrium a more long-range financial, and operation need for companies together with a long-range strategy opportunity the may be inventory. Those merged a vision, innovative and indispensable for long-range successful with an operation concentrate, and understand retain organizational stability. Strategy Leaders is capable of link with the people around him and have powerful performance expectation.

As an outcome the capability into equilibrium shorts and long terms strategy requisites from companies. Therefore, Strategy Leaders make them fortune in companies. Noted previous would be a much-cited example of a Strategy Leaders, Both of those managers using the vision, creativity and power to inventions them respective the companies and

made their leaders in the private sector. Was balancing while for the strong administrative and the operation understood from the businesses.

The doesn't mean an imaginative or administrative style of leaders is no longer wanted. Together of that style contributing to companies and into large administration the performance, but those must be equiponderant into earning a benefit together bring into companies. A predominant a visionary might lead to overly the risky strategy resolution-make, timely the reservation administration styles will probably outcome on the advised resolution the leads into organizational concurrence decline over-time.

III. METHODOLOGY OF RESEARCH

This study will be carried out into achieve the above objectives, including exploration and morphology by nature and conducting interviews based on the form of the questionnaire. The research methodology defines the purpose of the research, how it works, how to measure progress, and what constitutes success with regard to the specific objectives of the research study. Research design is to identify methods and procedures for obtaining the information needed to structure or solve the problem. It is the overall operational pattern or framework for a project that stimulates information to be collected from any source and action. Based on the main purpose of our investigation, exploratory research was found to be the most appropriate. This type of research has the primary purpose of developing insights on the problem. Examines the main area where the problem lies and also tries to evaluate some appropriate courses of action. The tool used to collect data was in the form of a questionnaire. The questionnaire was used because it facilitates the scheduling and analysis of the data to be collected. The collected data were subjected to simple frequency distribution and percentage analysis.

Data analysis and interpretation

A factor analysis using to evaluate the validity (Cronbach's alpha) to assess the reliability of questionnaires.

Table 1 Reliability Statistics

Section	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
x9	9.37	3.682	.596	.628
x10	9.52	3.599	.459	.708
x11	9.44	3.907	.488	.686
x12	9.51	3.457	.549	.650

Table 1 shows, the Cronbach's Alpha, a measure of samples efficiency was conduct to identify if enough related subsistence between the features of the individual components in all a section from questionnaires. Cronbach's Alpha statistic, the Correlation statistic is specific when using this experience. (Cronbach's Alpha) statistic of larger from 0.708, the associated of fewer from or egalitarian into 0.650, and the anti-image interrelationship statistic of large from 0.628 suggest enough interrelationship available to the factors analysis.

Once an appropriate correlation from finding between component evaluations within a specific dimension, a factors analysis for a distance should be performed. Principal, the factor analysis (true-employees analysis) was used together with the perverse turning (Cronbach's Alpha). A factor load of the large in or equal into 0.686 this is the designer of the relationship between components. A restructuring competencies' outcome to all of a dimension.

Table 2 shows, Cronbach's alpha was used to identifying a reliably from questionnaires used on the studying.

Section	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
x13	9.06	3.302	.528	.624
x14	8.85	3.900	.524	.629
x15	9.01	3.815	.512	.633
x16	8.97	3.957	.421	.686

Values range between .624 and .686; while 3.957 indicates exemplary reliability, the values .421 is considered to be an abatement level of acceptability. A reliable statistic for all of a specific factor is presented. Therefore, it's clear for Table 2, the Cronbach's alpha to all of a specified factor is well over abatement frontier of acceptable from 3.957. The outcome indicates questionnaires used in studying has the

height level of reliable. Table with an item-total value for an individual component of all of a specified factor has been comprised in this study, this table indicates that all of the components relate to the specified factors and a coefficient (Cronbach's alpha) values of specified factors will not be increased if some from the components left out.

Table 3 Perceived effectively of the strategic leadership implementation

statements	No range (%)	Small range (%)	Moderate range (%)	Large range (%)	Very largerange (%)	criterion deviation
Has your company get a strategical and a clear vision in the future	5.80	2.826	.512	.739	.751	.499
Does the message of your company give a real sense to associate all contents of the strategical trend	5.792	2.324	.686	.540	.839	.369
Does your company explain the dangers and the obstructions which they have to be avoided	5.89	2.421	.350	.663	.568	.534

The response indicates that though a supermajority's of respondents are of concepts the companies are effective at implementation strategic leadership, this still perceives the gaps between an effectual formulation and execution of strategic leadership on the oil companies. Recalling the

levels of relation into the efficiency of strategic leadership achievable and whether established strategies is implementing to the full potential.

IV. CONCLUSION

Strategic leadership is reintegration to an administration and into the success of all companies. Those are explicit relations between the ability, and performance of a president and senior administration teams of the companies and the success of the companies. Senior administration teams impact each stage on a strategic leadership process. A resolution and action from a President and the senior administration, whether it is adjusting a strategic leadership of orientation of companies, or use the company's core competencies for competitors advantage, the effect on the developing and achievable of a strategy of companies.

Parallel, those number from the related style of strategic leaders the senior administration may publication, was depended on those individual distinctive and experiment. Companies and senior administration need to use the appropriate equilibrium of strategic leaders' style to improve the potential of the long-range strategy effectiveness. should contend this ideally the President and maybe others senior administration must using the "strategy leadership style", however at the ridiculously least conclude the senior administration teams must seek an equilibrium between over visionary strategy leadership styles and more strategic leadership styles. Finally, appropriate senior administration leadership actions and leadership style is integration to companies the strategic efficiency and long-term success.

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The Diversity of Seed Size and Nutrient Content of Lablab Bean from Three Locations in Indonesia

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Abstract— *Lablab bean (Dolichos lablab L.) is one of the legume species that have the potential as an alternative food source for Indonesian people. The purpose of this study was to examine the diversity of seed size and nutritional content of six lablab bean accessions found in the Madura, Probolinggo, and West Nusa Tenggara (WNT), Indonesia. Morphological observations of seeds which included parameters of length, width, thickness, and seed weight, while the nutrient content of seeds was obtained from proximate analysis which included assay of fat, protein, and amylose. Data analysis used in this study was a one-way analysis of variance and Pearson Product Moment test. The results of the analysis showed that the variety of accessions had a significant effect on all morphological parameters and nutrient levels studied. Besides, the results of data analysis also inform that some morphological parameters and nutrient content have a significant correlation. The findings of this study also show that lablab seeds contain high protein and amylose, so the use of this plant as alternative food in Indonesia is highly recommended.*

Keywords— *Lablab bean, nutrient content, morphological diversity.*

I. INTRODUCTION

The availability of alternative food sources is an essential condition in various developing countries [1]–[3], including in Indonesia. These food sources should have to meet several criteria, such as cheap, easy to cultivate, rich in energy, and high in protein [4]. The declining national food availability and the increasing population growth position this issue as one of the central issues that must be considered by various parties [5]. Therefore, potential local food exploration needs to be carried out intensively [6], one of which is through research activities.

One group of plants that has great potential as a nutrient-rich food source is Legumes [7], [8]. Legumes or beans are plants belonging to the family Leguminosae (Fabaceae) that are capable of producing seeds in the pod [9]. The ability of various Legumes capable of

forming symbiotic with an organism that could fix Nitrogen [10] causes the plant cloud to contain high amounts of protein [11]. The content of starch in the cotyledons of Legumes seeds is also able to provide carbohydrates for humans [12]. In this regard, Indonesia is one country that has many local beans that need to be explored more optimally [13].

One of the local beans found in Indonesia is Lablab bean [14]. Apart from Indonesia, these beans can also be found in India [15], [16], Bangladesh [17], Kenya [18]. This bean, also known as the Dolichos bean, has the Latin name *Dolichos lablab* L., after previously known as *Lablab purpureus* L. In some countries, the plants that are believed to come from Africa is also known as Hyacinth bean, Pavta, Chicharas, or Auri [19]. In Indonesia, this plant has a specific name such as in Java known as *koroueceng*, *koropedang* or *korowedhus*; in Madura called *kacangkomak*; and in Sunda, it is called *kacangjeriji* [14].

Similar to other countries [20], [21], the lablab bean is still not optimally utilized and cultivated as the primary food source of nutrition for the people of Indonesia [22]. The popularity of the bean is also far behind other legumes, such as peanuts, soybeans, and mung beans. The three legumes are beans which are recommended to cultivate by the Indonesian government policy [23]. Lablab beans are less attractive to the public. If examined further, in addition to the potential as a source of nutrition, lablab bean also contains various bioactive compounds [24]. The existence of these bioactive compounds can potentially act as a natural medicine for various diseases [25]. Some of these diseases include diabetes [26], liver disease [27], to obesity [28].

Based on the background that has been conveyed, it can be seen that lablab bean is an alternative food source that is still marginalized in Indonesia. Efforts aimed at popularizing this plant as a food source for the community need to be carried out sustainably. Studies that examine the benefits of this plant, such as the nutrients contained in the seeds of this plant, also need to

be done. Unfortunately, such information is still rarely found. Various studies of legumes in Indonesia are still often only focused on soybeans [29], [30] and peanut [31], [32]. On the other hand, the research that studies lablab bean is still very little with a limited focus of study. Some of these studies also only involve lablab bean, which is only found on Lombok Island [33], [34]. Therefore, the purpose of this study was to determine the morphology and nutritional content of lablab seeds found in several regions in Indonesia.

II. RESEARCH METHODS

Source of materials

The lab bean seeds used in this study were obtained from plants that grew in several regions in Indonesia. Some of these regions, i.e. in the West Nusa Tenggara region, Probolinggo, and Madura. Two accessions from each region were used as research material in this study. The list of accessions and the codes for each accession are presented in Table 1.

Table 1. List of lablab bean accessions used in this study

Accessions	Code
Madura 1	Mdr1
Madura 2	Mdr2
Probolinggo 1	PL1
Probolinggo 2	PL2
West Nusa Tenggara 1	WNT1
West Nusa Tenggara 2	WNT2

Morphological measurements

The seeds that have been collected at various sampling locations were taken by the Biology Laboratory of the University of Muhammadiyah Malang. In the laboratory, observing seeds from various accessions that have been collected is done. The data examined in this study are quantitative parameter data on seed morphology. These parameters, including length, width, thickness, and seed weight. Data on length, width and thickness have units of centimetres (cm), while data on seed weights have units of a gram (g). Determination of seed weight using analytical scales. The scales used are "Ohaus Pioneer". On the other hand, seed thickness is measured using a calliper.

Proximate Analysis

Proximate parameters were analyzed in this study, namely the content of fat, protein, and amylose. The ash to amylose content studied was based on not only the sample's wet weight, but also the dry weight of the sample. The fat content analysis procedure uses the procedures based on the Indonesian National Standard [35], protein content was based on AOAC [36], whereas amylose used the IRRI method [37]. These proximate analyzes were carried out at the Balai Penelitian Tanaman Aneka Kacang dan Umbi, Malang.

Data Analysis

Data obtained in this study were analyzed using one-way analysis of variance (ANOVA). Accession was positioned as an independent variable, while seed length, width, thickness, as well as seed weight and fat, protein, as amylose content were positioned as dependent variables. If the results of the hypothesis test conclude there are significant differences; then the data analysis is continued with the Duncan test with a significance level of 5%. Also, a correlation analysis using Pearson Product Moment was conducted to determine whether there was a relationship between the morphological and nutritional parameters measured in this study.

III. RESULTS AND DISCUSSIONS

In this study, six lablab bean accessions spread across several regions in Indonesia have been collected. The picture of the six lablab bean accessions observed in this study is presented in Figure 1. Furthermore, to determine whether there are differences in seed size and nutrient content of the six accessions, the measurement data are analyzed using one-way ANOVA. The results of the one-way ANOVA tests that have been carried out are presented in Table 2. Based on Table 2, it can be seen that morphological parameters that indicate a significant difference between lablab bean accessions. is the parameter of seed length [$F(5,6) = 18.291$, $p = 0.001$], seed seed width [$F(5,6) = 6.486$, $p = 0.021$], seed thickness [$F(5,6) = 5.798$, $p = 0.027$], and seed weight [$F(5,6) = 16.736$, $p = 0.002$]. Furthermore, significant differences also occurred in the nutrient content of the seeds, namely the fat content [$F(5,6) = 18.485$, $p = 0.001$], protein [$F(5,6) = 19.157$, $p = 0.001$], and amylose [$F(5,6) = 298.841$, $p < 0.001$]. Thus, the ANOVA results showed that the differentiation of seeds from various accessions of lablab bean found in several regions in Indonesia.

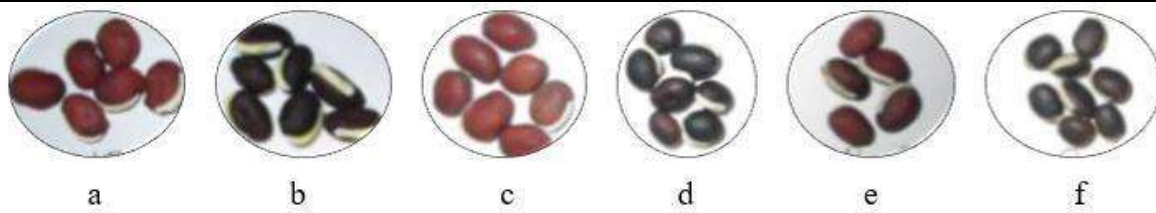


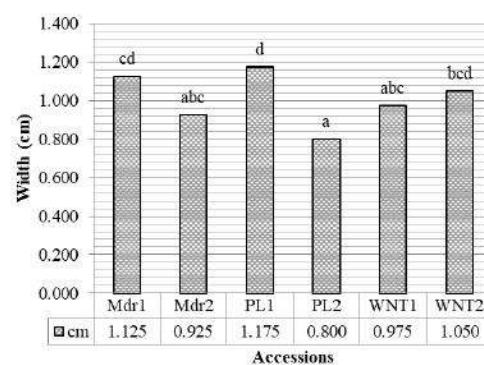
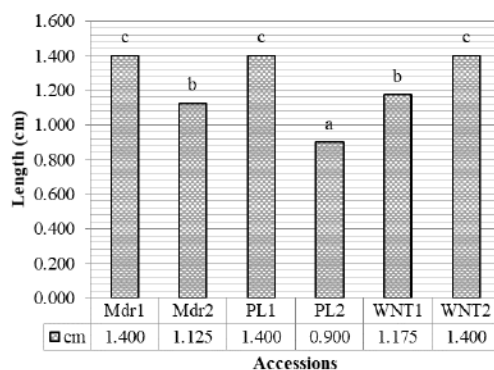
Fig.1: Lablab bean accessions used in this study: a) WNT1, b) WNT2, c) Mdr1; d) Mdr2, e) PL1, and f) PL2

Table.2. ANOVA test results of the effect of accession on the morphological character and nutritional content of lablab seeds

Dependent Variables	Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Length	Accession	0.419	5	0.084	18.291	0.001	0.938
	Error	0.028	6	0.005			
Width	Accession	0.189	5	0.038	6.486	0.021	0.844
	Error	0.035	6	0.006			
Thickness	Accession	0.186	5	0.037	5.798	0.027	0.829
	Error	0.039	6	0.006			
Weight	Accession	2.344	5	0.469	16.736	0.002	0.933
	Error	0.168	6	0.028			
Fat	Accession	0.239	5	0.048	18.485	0.001	0.939
	Error	0.016	6	0.003			
Protein	Accession	23.543	5	4.709	19.157	0.001	0.941
	Error	1.475	6	0.246			
Amylose	Accession	10.049	5	2.010	298.841	<0.001	0.996
	Error	0.040	6	0.007			

Furthermore, the data were analyzed using the Duncan test. The summary of posthoc test results for morphological parameters is presented in Figure 2. In the Duncan test results graph, accessions with the same alphabet label show no significant difference at the significance level of 5%. Based on Figure 2, it can be seen that the accession of WNT 2 produces the longest seeds. However, the seed length of the accession was not significantly different from the accession of Madura 1 and Probolinggo 1. On the other hand, Probolinggo 2

accession had a significantly shorter size compared to all accessions collected in this study. Also, it can be seen that Probolinggo 1's accession has widest seeds. However, the width of these seeds is not significantly different from the accession of Madura 1 and WNT 2. On the other hand, accession of Probolinggo 2 has seeds with the smallest size although the width of the accession is not significantly different from the accession of Madura 2 and WNT 1.



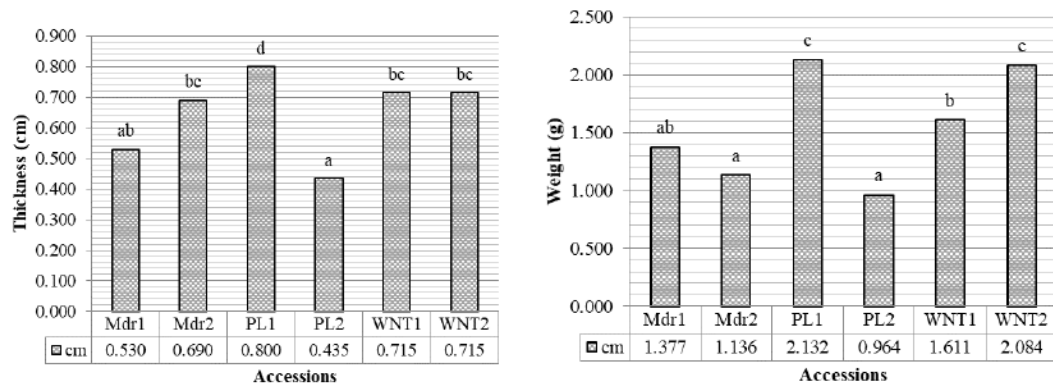


Fig.2: Duncan test results of the effect of accession on the lablab seeds size

In the parameters of seed thickness, accession of Probolinggo 1 has seeds that are significantly thicker when compared to other accessions, whereas accession of Probolinggo 2 has the thinnest seeds. The accession has seeds whose thickness does not differ significantly from Madura 1's accession. Furthermore, in seed weight

parameters, Probolinggo 1 and WNT 2 accessions have the heaviest seeds, while Probolinggo 2 accessions produce the lightest seeds. The accession has a weight that is not significantly different from the two accessions from Madura.

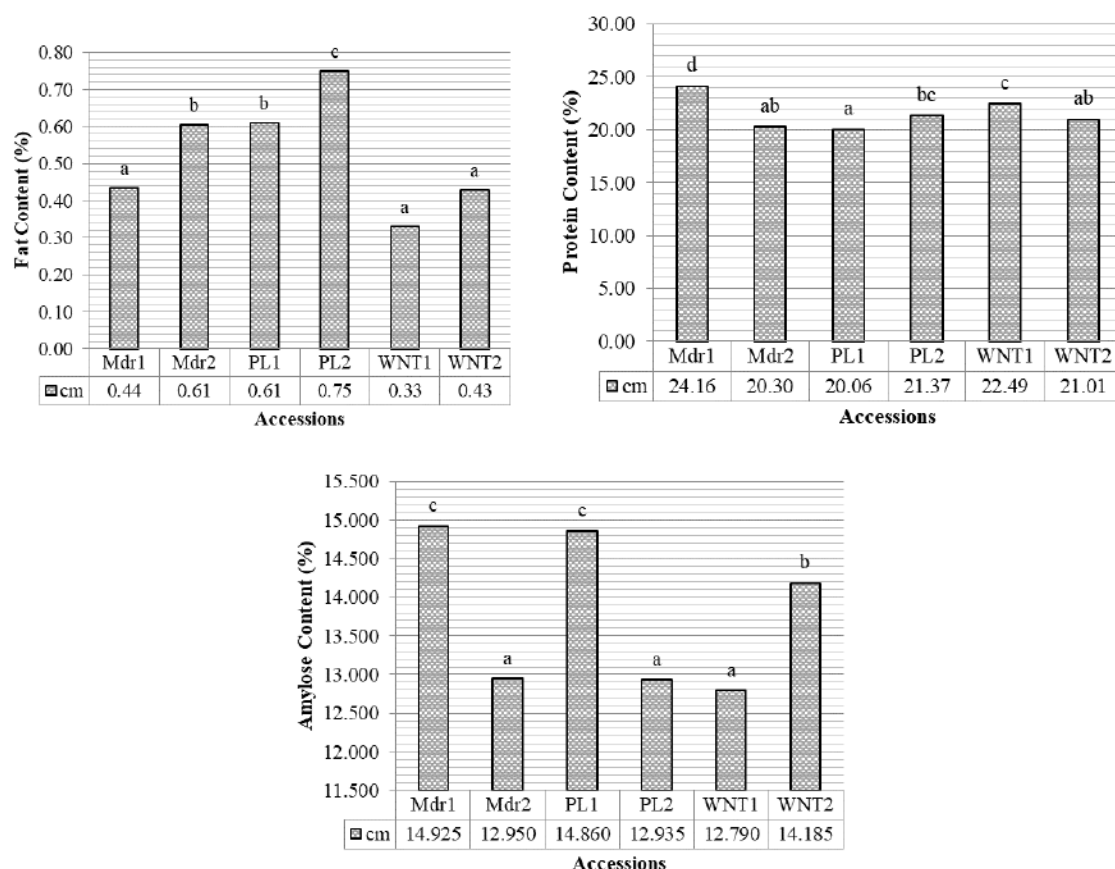


Fig.3: Duncan test results of the effect of accession on the nutrition content in lablab seed

Furthermore, the Duncan test results on the parameters of nutrient levels are presented in Figure 3. Based on Figure 3, seeds that have the highest fat content and protein content are accessions of Probolinggo 2 and Madura 1, respectively. The accession of Madura 1 also

has the highest amylose content even though Amylose levels were not significantly different from Probolinggo 1 accession. On the other hand, two accessions from WNT and Madura 1 accession had the lowest fat content. In protein parameters, Probolinggo 1 accession has the

lowest levels even though these levels do not differ significantly from Madura 2 and WNT 2 accessions. Finally, Madura 2, Probolinggo 2, and WNT 1 accessions

have significantly lower amylose levels than the other three accessions.

Table.3. The correlation test results between the size of the seed and the nutritional content of lablab seeds

	Fat	Protein	Amylose	Length	Width	Thickness	Weight
Fat	1	-0.541	-0.144	-0.500	-0.424	-0.333	-0.441
Protein	-0.541	1	0.179	0.114	0.093	-0.440	-0.212
Amylose	-0.144	0.179	1	0.823**	.815**	0.157	0.563
Length	-0.500	0.114	0.823**	1	0.835**	0.470	0.750**
Width	-0.424	0.093	0.815**	.835**	1	0.411	0.642*
Thickness	-0.333	-0.440	0.157	0.470	0.411	1	0.737**

** . Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The results of the correlation analysis are presented in Table 3. Based on Table 3, it can be seen that some parameters have a significant correlation, while some other factors do not have a significant correlation. The parameters that have a significant correlation, namely between the length of the seeds with amylose content ($r = 0.823$; $p < 0.01$), the width of the seeds with amylose content ($r = 0.815$; $p < 0.01$), seed width with seed length ($r = 0.835$; $p < 0.01$), seed length with seed weight ($r = 0.750$; $p < 0.01$), width with seed weight ($r = 0.642$; $p < 0.01$), and seed thickness with seed weight ($r = 0.737$; $p < 0.05$).

Overall, the results of this study indicate that differences in accession produce a variety of characters from seeds. The diversity of characters does not only occur in morphological character but also the nutritional content. The emergence of character diversity in the lablab bean species can be caused by genetic factors [38]. As is well known, even in the same species, one member of the species with other members have different genetic variations [39]. The genetic variation refers to variations in allele pairs, thus determining the genotype of each accession [40]. The constitution of the genotype will determine what character will be expressed by the individual [39], [41].

In addition to genetic factors, the environment also plays a role as a factor in the emergence of interspecific diversity [38]. Environmental factors can cause interspecies diversity in at least two ways. The first way is that environmental factors do not cause constitutional genetic changes but will affect the genetic regulation of living things [42]. Certain environmental conditions can suppress the expression of several genes and activate the expression of several other genes [39]. As a result, even though they have the same allele, the characters that appear can be different. The second way,

environmental factors will influence the physiological and metabolic processes of living things. As is well known, the environment plays a role in providing nutrients for plants through not only nutrients contained [43], [44] but also microbial activity in the soil [45]. These substances often act as precursors in various metabolisms that occur in cells. Certain environmental conditions were indicated can inhibit the process of nitrogen fixation in the symbiotic activity that occurs in the roots of Legumes [46].

Related to nitrogen fixation, one of the critical nutrients needed by plants is Nitrogen [47]. Nitrogen acts as a primary component of amino acids [48], the monomer of protein. If the Nitrogen level in each location has a significant difference, it is possible that the levels of a protein produced by each plant in these locations are different. Also, environmental factors, such as Nitrogen and carbon dioxide level in the environment affect the photosynthesis rate of plants [49], [50]. Photosynthesis is an anabolic process aimed at producing starch as a food reserve from plants [47]. When the photosynthesis rate is low, the growth and nutrient contained in plants are also low. Given this study involves three regions from three different islands, different environmental factors have been described in this discussion might happen. However, further research needs to be done to ascertain which factors have the most role in the diversity of the phenotype recorded in the results of this study.

Moreover, the proximate test results show that protein is a nutrient with the most content contained in seeds when compared to fat and amylose. These protein levels range from 20.06 to 24.16% from the wet mass of the seed. This range is in line with the previous report that uses lablab bean from local markets in Bangladesh [17]. Therefore, this finding confirms that lablab bean has excellent potential as a protein-rich alternative food

source. Besides have a high protein level, proximate results showed high levels of amylose contained in lablab seeds. The range of amylose levels is from 12.79 to 14.93% of seed's wet mass. Amylose is the part of the starch, polysaccharides found in seeds that act as an energy source [51]. Amylose forms about 20-30% of the starch structure. Therefore, amylose levels describe how much energy can be obtained from these seeds if consumed by someone. The high amylose levels reported in this study are in line with the high levels of carbohydrates contained by lablab seeds studied in India [16] and Bangladesh [15]. Both studies reported that the carbohydrate content in lablab seeds could reach 48 to 61% of the seed mass. This information proves that the lablab seeds also have the potential to overcome the problem of malnutrition that occurs in some regions of Indonesia.

IV. CONCLUSION

In this study, the diversity of morphology and nutrient levels of six lablab bean accessions was assessed. The results of data analysis concluded that differences in accession caused differences in length, width, weight, and thickness of seeds. Differences in accession also cause differences in levels of fat, protein, and amylose contained in lablab seeds. The results of this study indicate that lablab bean can be used as a functional food because of the high levels of protein and amylose contained in these legume seeds.

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A Study on the Performance of Mutual Fund Scheme in India

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Abstract— A mutual fund is a trust that encompasses the savings of a number of investors who share a common financial goal. The money thus collected is then invested in capital market instruments such as shares, debentures and other securities. The income earned through these investments and the capital appreciation realized is shared by its unit holders in proportion to the number of units owned by them.

Thus, Mutual Fund is one of the most effective instruments for the small & medium investors for investment and offers opportunity to them to participate in capital market with low level of risk. It also provides the facility of diversification i.e. investors can invest across different types of schemes. Indian Mutual Fund has achieved a lot of popularity since last two decades. For a long time UTI enjoyed the monopoly in mutual fund industry. But with the passage of time many new players came in the market and thus the mutual fund industry faces a lot of competition. Now a day this industry has become the major player of the financial system. Therefore it becomes important to investigate the mutual fund performance at continuous basis.

The wide variety of schemes floated by these mutual fund companies gave wide investment choice for the investors. Among wide variety of funds equity, diversified fund is considered as substitute for direct stock market investment.

In present paper an attempt has been made to investigate the performance of the open ended, growth oriented, equity diversified schemes on the basis of return and risk evaluation. The analysis was achieved by assessing various financial tests like Average Return, Standard Deviation, Beta, Coefficient of Determination (R^2), Alpha, Sharpe Ratio and Treynor Ratio whose results will be useful for investors for taking better investment decisions. The data has been taken from various websites of mutual fund schemes and from amfiindia.com. The analysis depicts that majority of funds selected for study have outperformed under Sharpe Ratio as well as Treynor Ratio.

Keywords— Mutual Fund, Average Return, Standard Deviation, Beta, Alpha, Coefficient of Determination.

I. INTRODUCTION

Investment is to allocate money in the aim of some benefit in the future. It involves the decisions like, where to invest, when to invest and how much to invest. General public is attracted by capital market but numbers of problems are connected with it. It is very difficult to understand the complexities involved in the stock market operation and it is not so easy to judge the fluctuations in stock price. Mutual fund is a medium which helps to mobilize money from investors to invest in different financial instruments with the investment objectives being agreed upon by the mutual fund and the investor. When investors access to market, through mutual fund, they avail the professional fund management services offered by an assets management company. The primary role of a mutual fund is to help the investors in earning return or building their wealth with low risk. Mutual fund seeks to mobilize money from all possible investors. Though mutual funds are good investment avenues for small savers who have low risk bearing capacity, the selection of appropriate mutual fund and scheme is a tedious task especially for person having non-financial background. Hence, the practitioners and academicians relating to mutual fund are supposed to fill and serve that requirement for healthy progress of the mutual fund industry.

II. REVIEW OF LITERATURE

The present context deals with the review of literature on 'Evaluating the Performance of Indian Mutual Fund Schemes'. Review of some of the studies is presented here.

Adhav, Mr S.M. & Chauhan, P.M. (2015) appraised and juxtaposed the performance of mutual fund schemes of selected Indian companies by standard deviation & Sharpe's Ratio. They observed that all selected equity mutual funds accomplished better than their benchmark indices. It was disclosed from the study that risk for debt fund was lower than that of the equity funds. The authors came to a conclusion that equity oriented hybrid funds did better than the other type of hybrid funds. The arbitrage fund & conservative debt hybrid funds performed worst.

Ayaluru, M.P. (2016) worked to assess the performance of ten open ended equity schemes of Reliance Mutual Fund. The study was in alliance to the period from Aug 2009 to July 2014. The study spotlights that all the selected funds performed above the selected benchmark return. Further, Jensen measure projected that all the selected schemes showed positive alpha. According to beta values out of ten schemes, only four schemes showed high risk. In this study Reliance Pharma Fund had highest value and Reliance Diversified Power sector had lowest value of Sharpe & Treynor ratio.

Ratnarajun, P. & Madhav, V.V. (2016) surveyed the risk return relationship and market volatility of the opted mutual funds and studied the performance of selected schemes from march 2012 to march 2016 by using Sharpe and Treynor models. The architect scrutinized the performance of thirty open ended diversified equity schemes. Performance of Reliance Regular Saving Fund Equity, SBI Contra Fund, and HDFC Equity Fund was not found nice. It was also seen that the Sharpe's ratio was positive for all the selected schemes. These reviews are few in numbers and nowadays also mutual fund industry is one of burning research topics for researchers in finance. Here, the researcher has focused only on top schemes so that outcome of these can be produced before existing & the potential investors of mutual funds can focus on top schemes.

III. OBJECTIVES OF THE STUDY

- i) To analyse the trends in returns of growth oriented selected equity diversified mutual fund schemes
- ii) To evaluate the performance of growth oriented selected equity diversified mutual fund schemes by using the various financial tests
- iii) To compare the performance of growth oriented selected equity diversified mutual fund schemes

IV. METHODOLOGY

The study uses a sample of ten mutual fund schemes comprising of all equity diversified large cap funds on random basis. The data have been used and collected from the factsheets, newspapers, Journals, books and periodicals. The data were also collected from various web sites like moneycontrol.com, mutualfundindia.com, investopedia, investorzone, morningstar.com and amfiindia.com etc. Further the monthly yields on 91-day treasury bills of GOI have been used as a surrogate for risk free rate.

V. ANALYSIS OF DATA

Beta: Beta is an estimation of mutual fund schemes volatility compared to its criterion. This ratio would help to determine how much a fund's performance can diverge compared to its standard. $\text{Beta} = (\text{Standard deviation of mutual fund scheme} / \text{Standard Deviation of Benchmark}) * R\text{-Square}$. A fund with beta value more than 1 would move more volatile than the market. If beta value is less than 1 it means fund will be less volatile than the market. **Standard deviation:** Standard deviation (SD) estimates the volatility the fund's returns in relation to its average returns. It tells how much the fund's return can diverge from the historical mean return of the scheme. The more the standard deviation, the more volatile is the fund's returns. Prefer funds with lower volatility.

R Squared: It's a estimation of co-relation between mutual fund schemes performance and its criterion. It ranges between 1 and 100. $R - \text{Squared} = (\text{covariance between benchmark and mutual fund scheme} / (\text{Standard deviation of mutual fund scheme} * \text{standard deviation of benchmark}))^2$. A high R-squared, between 85% and 100%, specifies the fund's performance patterns have been in line with the index. A fund with a low R-squared, at 70% or less, shows the security does not act much like the index.

Alpha: This ratio helps to estimate the fund manager performance. $\text{Alpha} = \text{Mutual fund scheme return} - (\text{Risk free rate of return} + (\text{beta} * (\text{Benchmark return} - \text{Risk free rate of return})))$. *Risk free return is the return that would be gained if it's invested in a govt bond for the same period as mutual fund. Greater the value of alpha, it's good for investor. Positive alpha numbers indicate positive returns compared to criterion and negative alpha value indicates negative returns to criterion.

Sharpe Ratio: Sharpe ratio helps the investor know how much a mutual fund delivers return with respect to the risk taken by it on comparing a fund with risk free rate of return. $\text{Sharpe ratio} = (\text{Mutual fund returns} - \text{Risk free rate of return}) / \text{Standard deviation of mutual fund}$. **Significance:** More it's the better, if this value is negative it should be understood that the mutual fund is not performing well when compared to risk free rate of return (Govt. bonds or even a simple FD).

Treynor Ratio or reward to volatility ratio

This ratio is formulated by Jack Treynor to measure a fund's performance against the risk taken. Formula of Treynor ratio = $(\text{Mutual fund return} - \text{risk free rate of return}) / \text{Beta of mutual fund}$. **Significance:** more the ratio, greater the returns against volatility.

VI. RESULTS & FINDINGS

The performance of selected funds is evaluated using average return, standard deviation, Beta and R in the following ways:

Table-1: Performance in terms of Average Returns

Sl. No.	Name	AUM	1/2y (Cat Avg 11.95)	1y (Cat Avg 5.36)	3y (Cat Avg 13.15)	5y (Cat Avg 13.85)
1	Edelweiss Large Cap Fund-DP-G	156.36	11.77	5.59	13.81	14.72
2	Reliance Large Cap Fund-DP-G	12767.61	14.82	10.26	16.89	17.37
3	Axis Blue Chip Fund-DP-G	4802.16	14.87	10.39	15.86	15.27
4	Mirae Assets India Equity Fund-DP-G	11892.50	13.22	9.93	17.57	18.63
5	Franklin India Bluechip Fund-DP-G	8009.27	11.28	5.90	11.9	13.29
6	SBI Bluechip Fund –DP-G	22100.45	12.71	1.30	11.95	16.07
7	Canara Robeco Bluechip Equity Fund-DP-G	178.80	12.80	8.04	14.64	13.82
8	Tata Large Cap Fund-DP-G	790.24	12.62	5.36	12.48	13.47
9	LIC MF Large Cap Fund-DP-G	273.89	13.14	4.60	11.61	12.50
10	IDFC Large Cap-DP-G	414.96	9.96	4.57	13.71	11.42
	Total		127.19	65.94	140.42	146.56
	Average return		12.719	6.594	14.042	14.656

Source: www.moneycontrol.com, www.sebi.gov.in and www.amfindia.com. Total and average return calculated by author.

An analysis of Table-1 reveals that in case of all Equity option schemes of Diversified funds, four out of ten funds have earned higher returns in comparison to their average return and average annual return. The top performers in terms of return, in the half-year and one year time duration, in decreasing order are Axis Blue Chip Fund-DP-G, Reliance Large Cap Fund-DP-G, Mirae Assets India Equity Fund-DP-G and Canara Robeco Bluechip Equity Fund-DP-G. The remaining six funds have shown inferior return than the market return and thus have been

unsuccessful in beating the market. Now we see that in 3y time duration, Mirae Assets India Equity Fund-DP-G has occupied the top position among four top performers in terms of return. In 5y terms, five out of ten funds have earned higher return in comparison to their average annual return. The top performers are Mirae Assets India Equity Fund-DP-G, Reliance Large Cap Fund-DP-G, SBI Bluechip Fund –DP-G, Axis Blue Chip Fund-DP-G and Edelweiss Large Cap Fund-DP-G. The remaining five funds have shown inferior return than the market return.

Table.2: performance in terms of SD, Beta and R²

Sl. No.	Name	SD (Cat Avg 11.25)	Beta (Cat Avg 0.85)	R ²
1	Edelweiss Large Cap Fund-DP-G	13.27	1.04	0.90
2	Reliance Large Cap Fund-DP-G	13.05	0.97	0.92
3	Axis Blue Chip Fund-DP-G	12.23	0.89	0.81
4	Mirae Assets India Equity Fund-DP-G	12.46	0.96	0.97
5	Franklin India Bluechip Fund-DP-G	11.72	0.92	0.95
6	SBI Bluechip Fund –DP-G	12.31	0.94	0.93
7	Canara Robeco Bluechip Equity Fund-DP-G	12.80	0.95	0.93
8	Tata Large Cap Fund-DP-G	12.78	0.96	0.91
9	LIC MF Large Cap Fund-DP-G	12.69	0.93	0.91
10	IDFC Large Cap-DP-G	12.04	0.94	0.95

Source: www.moneycontrol.com, www.sebi.gov.in and www.amfindia.com.

Analysis of Table-2 Return should not be considered as the sole basis of measurement of the performance of a mutual fund scheme, it should also include the risk taken by the fund manager because different funds will have

different levels of risk attached to them. Risk associated with a fund, in general, can be defined as variability or fluctuations in the returns generated by it. The higher the fluctuations in the returns of a fund during a given period,

higher will be the risk associated with it. Table-2 states that standard deviation of all the selected funds are higher than category average 11.25. Standard deviation (SD) measures the volatility of the fund's returns in relation to its average return. The higher the standard deviation, the more volatile is the fund's return and funds with lower volatility are to be preferred more than the others. In respect of standard deviation, the preferred fund is Franklin India Bluechip Fund-DP-G.

A fund with beta value more than 1 would move more volatile than the market. i.e. if market moves up 100% a fund with beta value of 1.5 would move up by 150% and if market comes down by 20% the fund will come down

by 30%. If beta value is less than 1 it means that fund will be less volatile than the market. i.e. if market moves up 100% a fund with beta value of 0.75 would move up by 75% and if market comes down by 20% the fund will come down by 15%. So, Edelweiss Large Cap Fund-DP-G is the top performer.

A high R-squared, between 85% and 100%, indicates that the fund's performance pattern has been in line with the index. A fund with a low R-squared, at 70% or less, indicates the security does not concur much with the index. Except Axis Blue Chip Fund-DP-G, remaining all the selected funds have been in line with index.

Table.3: Performance in terms of ALPHA

Sl. No.	Name	ALPHA (Cat Avg -0.74)	Remarks
1	Edelweiss Large Cap Fund-DP-G	-0.67	Better risk adjusted return
2	Reliance Large Cap Fund-DP-G	2.38	Better risk adjusted return
3	Axis Blue Chip Fund-DP-G	1.94	Better risk adjusted return
4	Mirae Assets India Equity Fund-DP-G	3.28	Better risk adjusted return
5	Franklin India Bluechip Fund-DP-G	-2.50	Poor risk adjusted return
6	SBI Bluechip Fund –DP-G	-1.94	Poor risk adjusted return.
7	Canara Robeco Bluechip Equity Fund-DP-G	0.14	Better risk adjusted return
8	Tata Large Cap Fund-DP-G	-2.46	Poor risk adjusted return
9	LIC MF Large Cap Fund-DP-G	-2.62	Poor risk adjusted return
10	IDFC Large Cap-DP-G	-0.61	Better risk adjusted return

Source: www.moneycontrol.com, www.sebi.gov.in and www.amfindia.com.

Analysis of Table-3 Alpha is a measure of mutual funds' performance after adjusting the risk. This ratio helps to measure the fund manager's performance. Higher the alpha, it's better for investor. Positive alpha numbers indicate positive returns compared to category average and negative alpha value indicates negative returns compared to category average. For example if alpha is 8 it means scheme would outperform category average by 8% and if alpha -8 the scheme will underperform by 8% compared to category average. Table-4 reveals that top

performers of six out of ten selected funds. The top performers are Mirae Assets India Equity Fund-DP-G, Reliance Large Cap Fund-DP-G, Axis Blue Chip Fund-DP-G, Canara Robeco Bluechip Equity Fund-DP-G, Edelweiss Large Cap Fund-DP-G and IDFC Large Cap-DP-G. The remaining four selected fund have been performed badly.

The results of the Sharpe Ratios of the selected mutual fund schemes of all the growth option with the category average portfolio have been presented below:

Table.4: Performance in terms of Sharpe Ratio

Sl. No.	Name	SHARPE RATIO (Cat Avg 0.48)	Remarks
1	Edelweiss Large Cap Fund-DP-G	0.58	Better risk adjusted return
2	Reliance Large Cap Fund-DP-G	0.79	Better risk adjusted return
3	Axis Blue Chip Fund-DP-G	0.75	Better risk adjusted return
4	Mirae Assets India Equity Fund-DP-G	0.90	Better risk adjusted return
5	Franklin India Bluechip Fund-DP-G	0.42	Poor risk adjusted return
6	SBI Bluechip Fund –DP-G	0.47	Poor risk adjusted return.

7	Canara Robeco Bluechip Equity Fund-DP-G	0.65	Better risk adjusted return
8	Tata Large Cap Fund-DP-G	0.46	Poor risk adjusted return
9	LIC MF Large Cap Fund-DP-G	0.43	Poor risk adjusted return
10	IDFC Large Cap-DP-G	0.58	Better risk adjusted return

Source: www.moneycontrol.com, www.sebi.gov.in and www.amfindia.com.

Analysis of Table-4 The Sharpe Ratio measures the fund's excess return per unit of its risk (i.e. total risk). This ratio indicates the relationship between the portfolio's additional return over risk-free return, and total risk of the portfolio which is in terms of standard deviation. A high and positive Sharpe Ratio shows a superior risk-adjusted performance of a fund while low and negative Shape Ratio is an indication of unfavourable performance. Generally, if Sharpe Ratio is greater than the benchmark, the fund's performance is superior over the market and vice-versa. The results of the Sharpe Ratios of the selected mutual fund schemes of all the growth/equity options with the benchmark portfolios have been presented in the table-x. Six selected funds have the

greater value than the Sharpe ratio category average which shows their superior performance. Top performing fund schemes as per Sharpe ratio analysis were Mirae Assets India Equity Fund-DP-G, Reliance Large Cap Fund-DP-G, Axis Blue Chip Fund-DP-G, Canara Robeco Bluechip Equity Fund-DP-G, Edelweiss Large Cap Fund-DP-G and IDFC Large Cap-DP-G. Thus, it can be concluded that the performance, in terms of Sharpe Ratio of most of the above mentioned selected mutual funds, has been satisfactory and have outperformed the market index during the study period.

The results of the treynor ratios of the selected mutual fund schemes of all the growth option with the category average portfolio have been presented below:

Table-5: Performance in terms of Treynor Ratio

Sl. No.	Name	TREYNOR'S RATIO (Cat Avg 0.06)	Remarks
1	Edelweiss Large Cap Fund-DP-G	0.07	Better risk adjusted return
2	Reliance Large Cap Fund-DP-G	0.11	Better risk adjusted return
3	Axis Blue Chip Fund-DP-G	0.10	Better risk adjusted return
4	Mirae Assets India Equity Fund-DP-G	0.12	Better risk adjusted return
5	Franklin India Bluechip Fund-DP-G	0.05	Poor risk adjusted return
6	SBI Bluechip Fund –DP-G	0.06	Poor risk adjusted return.
7	Canara Robeco Bluechip Equity Fund-DP-G	0.08	Better risk adjusted return
8	Tata Large Cap Fund-DP-G	0.06	Poor risk adjusted return
9	LIC MF Large Cap Fund-DP-G	0.06	Poor risk adjusted return
10	IDFC Large Cap-DP-G	0.07	Better risk adjusted return

Source: www.moneycontrol.com, www.sebi.gov.in and www.amfindia.com.

Analysis of Table-5 Treynor ratio measures the relationship between fund's additional return over risk-free return and market risk is measured by beta. The larger the value of Treynor ratio, the better is the performance of portfolio. Generally, if the Treynor ratio is greater than the category average, then the portfolio is supposed to have outperformed the market and indicates superior risk-adjusted performance. Table Y presents the results of Treynor Ratio from the selected mutual fund schemes with their respective category average portfolios. The analysis reveals that six out of ten diversified fund schemes are greater than the category average which means that the portfolio has been able to outperform in the market and indicates the superior risk-adjusted performance. Top performing fund schemes as per treynor

ratio analysis were Mirae Assets India Equity Fund-DP-G, Reliance Large Cap Fund-DP-G, Axis Blue Chip Fund-DP-G, Canara Robeco Bluechip Equity Fund-DP-G, Edelweiss Large Cap Fund-DP-G and IDFC Large Cap-DP-G.

VII. CONCLUSION

In India, numberless mutual fund schemes are available to general investors which generally confuse them to pick the best out. This study provides some insights on mutual fund performance so as to assist the common investors in taking the rational investment decisions for allocating their resources in correct mutual fund scheme. The performance of Ten sample mutual fund schemes, has been evaluated in terms of return and risk analysis, and

risk adjusted performance measures such as Sharpe ratio and Treynor ratio. In a nut shell, the performance of mutual fund in terms of Average returns, forty-fifty percent of the diversified fund schemes have shown higher and superior returns and remaining of them have shown inferior returns. In terms of standard deviation, hundred percent of the selected schemes have high volatility than the market. Except one, all the funds have beta less than one yet positive which imply that they were less risky than the market portfolio and in terms of coefficient of determination (R^2), nine funds were near to one which indicates higher diversification of portfolio and have been in line with index. In terms of Alpha, six out of ten selected, the fund's manager's performance have been remarkable. Six out of ten funds have shown superior performance under the Sharpe ratio as well as Treynor Ratio.

From the above analysis of ten selected mutual fund schemes we are in a dilemma to choose the best amongst them because some schemes have outperformed the others in certain determinants. We have assessed ten determinants in total and three companies have made their mark to the top of the determining parameters. So we cannot determine a scheme that the most befitting and perfect of all but what we can do is that we can divide the principal amount of money amongst the schemes giving maximum benefits proportionately such that we can make out the most of it.

So in this field where we have a multitude of mutual fund companies available with fanciful and attractive schemes it becomes bewildering and baffling for common masses to choose the best of out of these without scepticism. So it's important that the common masses are made aware of these schemes without forgery and manipulations by the agents and institutions involved in mutual funds such that the illiterate and financially backward citizens, which forms the majority in India, can get a good access to these schemes and make the most out of it

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Journey of SDSSU towards Internationalization

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Abstract— This paper examined the profile of SDSSU as it takes its journey towards internationalization. It used case study in which documentary analysis of a unit was applied. The profile of the university has potential conformities of high performance, from instruction to extension functions that are essentials for global marketing and competitiveness. Hence, it needs a number of employees, specifically in terms of faculty, as it is seen that the population of students is expecting to be increased due to the free tuition, and availability of grants and scholarship programs. It shows also high performance in terms of program accredited, board programs, and extension services. As to faculty, few meet the educational qualifications but it is evident that majority of them are aiming a highest educational qualifications. Lastly, majority of their level of trainings, conferences, and seminars they attended are in local level.

Keywords— Journey, Internationalization, Profile.

I. INTRODUCTION

Internationalization of higher institutions deliberates sustainability for improving quality, relevance, and competitiveness (Egron-Polak and Hudson, 2014). The significance of internationalization focuses to the developments of globalization. This study was undertaken to investigate on profile ensuring that Surigaodel Sur States University (SDSSU) meets international standards in carrying out its four-fold functions.

The significance of internationalization has been cited by different studies; Green (2012), Green (2013), Gacel-Ávila (2012), Altbach and Knight (2011), Xuan (2015), and Hénard, et.al. (2012). The success of internationalization in measuring both institutional performance and student learning outcomes (Green, 2012) plays a vital role in the institutional context that institutional performance and student learning perspective are related to prepare them as global citizens in achieving global learning (Green, 2013). It develop innovative approaches that improve relevance and function which a key strategy (Gacel-Ávila, 2012). Hence, it is the motives for growth in international higher education and the

landscape of programs and institutions (Altbach & Knight, 2011) that effectiveness of leaders influence from the organizational culture of internationalization (Xuan, 2015) can do to promote, to support, and to manage internationalization more effectively (Hénard, et.al., 2012). These facts claim that SDSSU needs to examine its readiness for internationalization.

The quest for internationalization of education has been a primordial concern among higher education institutions (Rosaroso et.al, 2015). The aforementioned studies contributed a common understanding that HEIs must embrace internationalization. Recently, the Surigaodel Sur State University (SDSSU) submitted International Standardization of Organization (ISO) 9001:2015 certification and it was awarded last February 22, 2019. Hence, the conversion of Surigao del Sur State University (SDSSU) through RA 9998 from Surigao del Sur Polytechnic State College (SSPSC), which was approved on February 22, 2010, made it known as one of the prestigious institutions of the Philippines. According to UniRank (2019), formerly 4icu.org, among more than 200 colleges and universities of the Philippines, it is among the top 200 most popular Schools in the Philippines this 2019. In addition, the passing of its Multidisciplinary Research Journal in the criteria for journal Asian Citation Indexing on 2018 gives a wider avenue in disseminating research outputs published in journal. These facts imply that it is necessary to examine the profile of SDSSU to assess its readiness towards internationalization.

The readiness of SDSSU for internationalization is an inevitable challenge as part of globalizing institution. Thus, the results of this study could be the basis for future researchers to create and to improve a proposed intervention that could help SDSSU ready for internationalization as a foundation towards quality clienteles' services satisfaction and continual improvement (ISO 9001:2015).

II. RESULTS AND DISCUSSIONS

The succeeding figures and tables present the profile of the University.

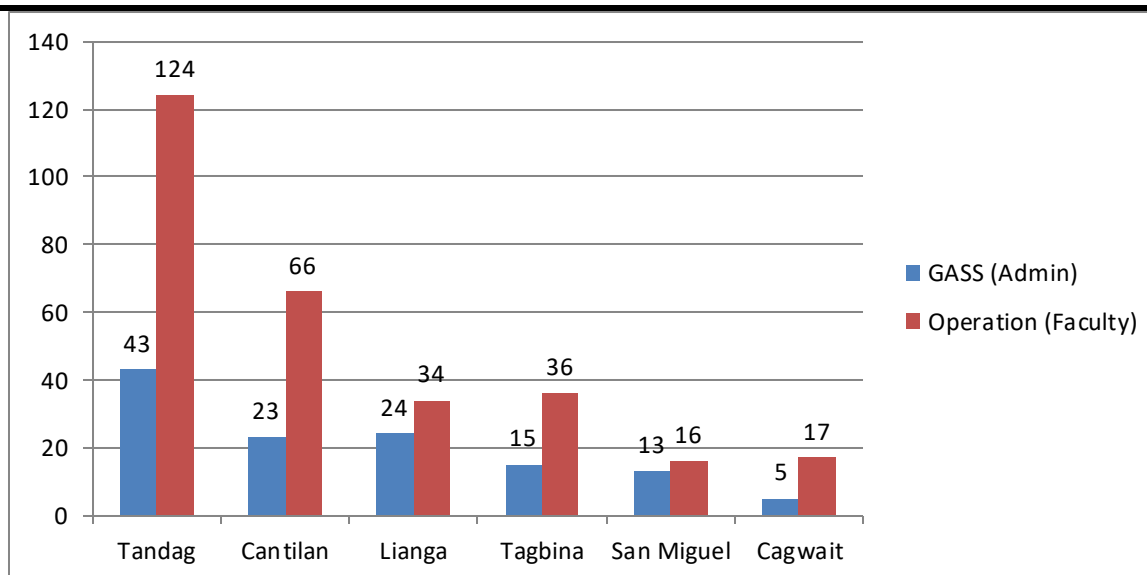


Fig.1: Summary of Employees as of November 2018

Figure 1 presents the bar graph of the summary of employees of SDSSU as of November 2018. Based on the figure 3, the most number of personnel is concentrated in Tandag Campus showing an overall percentage of 124 or 42.43% of faculty and 43 or 34.96% administration employees, while Cagwait Campus having 17 or 5.80% of faculty and 5 or 4.07% administration employees. This is also a normal turnout because of the seat of governance of the SDSSU system is in Tandag City. Applicants also flock in the main campus because the student population which is around 4,000-5,000 per semester also needs a bigger number of faculty to handle them. SDSSU as an academic institution has a system of recruiting its personnel through its Personnel Selection Board (PSB) who does the interview before they will be recommended

to the Board of Regents (BOR) for appropriate action. They peruse the applicant based on academic preparations and the overall preparations including character and attitude towards work. The selection committee comprised of the University's Vice Presidents, Campus Directors, BOR Secretary, HRMOS, and the Deans. According to Engetou (2017), the flexibility and productivity of the institution will determine its organizational performance. The equipment of an organization include capital, man, machine, and any other human resources. Further, he said that an organization which recruits enough personnel and has good management members can improve the overall work performance of the institution.

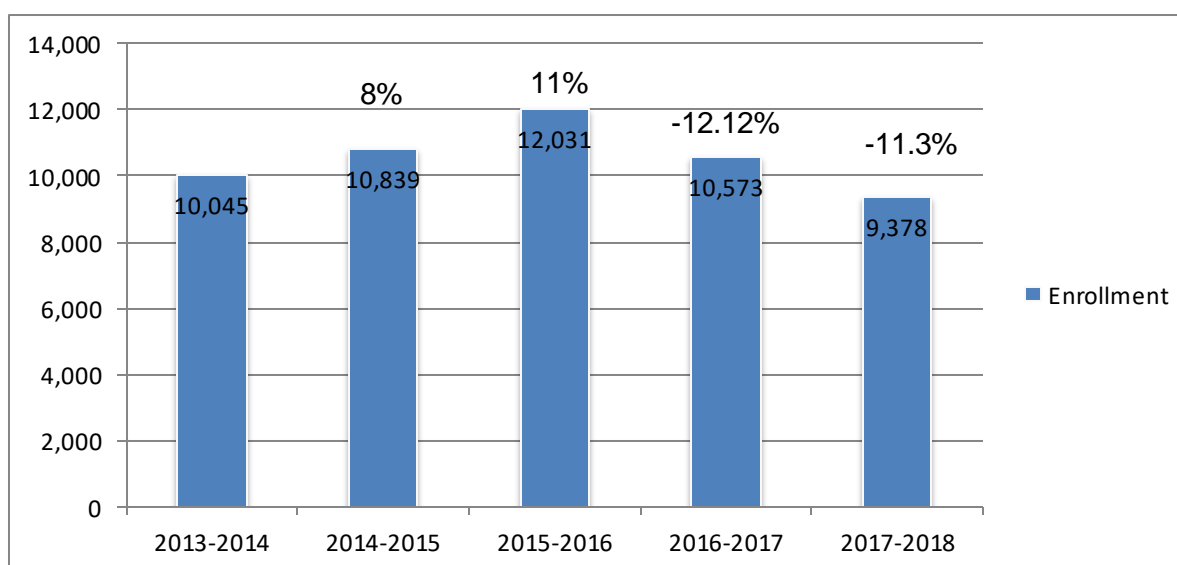


Fig.2: Enrollment Rate in the last 5 years

SDSSU has a vibrant student population every semester. It caters students coming from the various municipalities of the Region. Figure 2 shows a bar graph of the enrollment rate of SDSSU in the last 5 years. It reveals that the highest enrollment rate is on 2015-2016 with an enrollment of 12,031 or 11%. In the succeeding years, there is a fluctuation, but it rises back on AY 2017-2018. The fluctuation can be attributed to the fact that these enrollees contribute to their parent's livelihood to sustain the needs of the family. Many of the students belong to disadvantaged families and even with the free tuition fees, they still need to cater the needs on their food and lodging and their expenses for their school requirements. These among others become a reason why some of the students tend to stop pursuing their education.

Another reason could be the grueling demands of tertiary education that challenges them academically and psychologically causing them to drop from school. However, the free tuition fee scheme of the present

Government has also helped these students access higher education. According to Fisher and Scott (2011), tertiary education will benefit from its students once they become its alumni because they can transform the economy of the country using the skills they have acquired from their learning institution.

With the enactment of R.A.No. 10931 in promoting universal access to quality tertiary education by providing free tuition and school fees in SUCs, and the availability of scholarships and grants, opening of new curricular offerings, and the inclusion Bislig Campus in the SDSSU system, enrollment is expected to escalate in the coming years. In preparation for the burgeoning enrollment in the forthcoming years, the University through its current administration has prepared the infrastructure and its human resource to cater to the possible increase in enrollment. SDSSU makes good use of the Government's financial support to bring quality education to the people of the province and the Region.

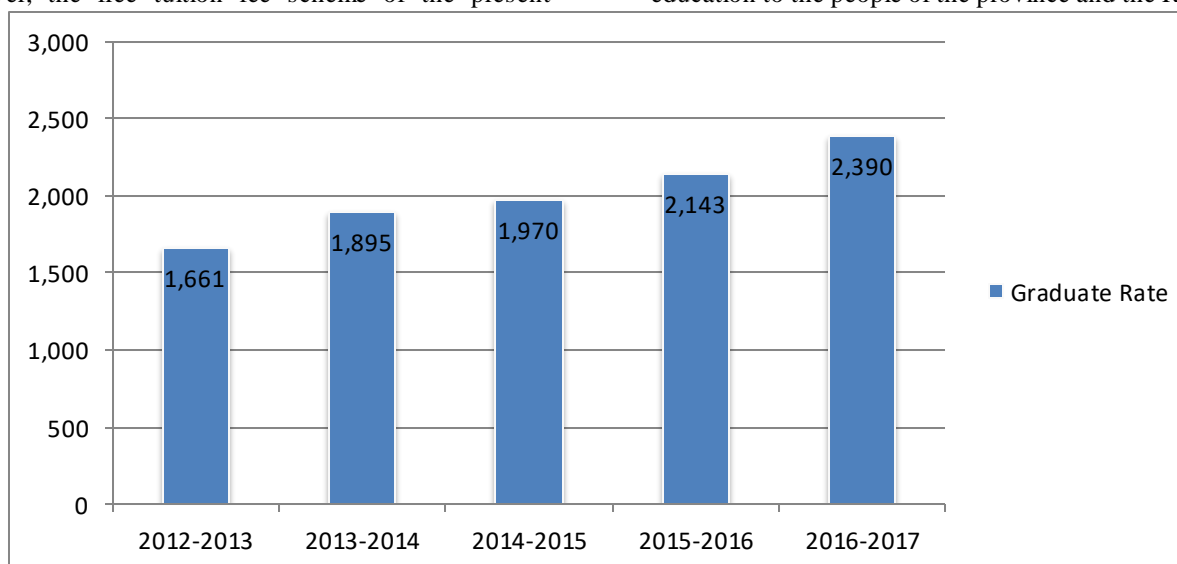


Fig.3: Graduate Rate in the last 5 years

Figure 3 presents a bar graph of graduate rate of SDSSU in the last five years. As it shows the academic year 2016-2017 has the highest rate of 2,390 graduate rate, while academic year 2012-2013 has the lowest rate of 1,661 graduate rate. This implies that there is constant increase of graduate rate of SDSSU. Hence, when there is a constant increase of graduate rate, there is a sustainable development of human resource. This finding conforms to the post of un.org (no date) that obtaining a quality

education is the foundation to creating sustainable development. In addition, higher education represents a critical factor in innovation and human capital development and plays a central role in the success and sustainability of the knowledge economy (Dill and Van Vught, 2010). Thus, skills and human capital will become the backbone of economic prosperity and social well-being in the 21st century (OECD, 2012).

Table.1: Summary of the Program Accreditation

SDSSU Campuses	Total No. Of Programs	No. of Accredited Program by Level			TOTAL	% of Accredited Program	No. of Non Accredited Program	% of Non Accredited Program
		I	II	III				
Tandag	31	5	10	11	26	83.90%	5	16.1%

Cantilan	13	1	3	8	12	92.30%	1	7.7%
Liang	9	2	7	0	9	100%	0	0%
Tagbina	7	0	6	0	6	86.71%	1	14.28%
San Miguel	4	3	0	0	3	75%	1	25%
Cagwait	2	1	1	0	2	100%	0	0%
Total	66	11	27	19	58		8	

Table 1 presents the summary of the program accreditation of SDSSU. As it shows, there are 58 accredited programs out of 66 programs offered by the SDSSU system, 27 programs are in Level II accredited while 11 are still in Level I. Across the table 3, both Lianga campus and Cagwait campus have the highest percent of accredited programs for it shows 100% of accredited program. This implies that the top management operates an ideal academe institutions consonance to the quality education standards that conforms to clienteles' satisfaction. This finding is conform to the statement of (Xuan, 2015) that internationalization motives for growth in higher education and the landscape of programs and institutions that effectiveness of leaders influence from the organizational culture of internationalization can do to promote, to support, and to manage internationalization more effectively.

Program accreditation is an important mechanism for quality assurance. Hence, SDSSU has also submitted its programs to this quality assurance activity involving its human resource and all other resources to ensure that the University has put in place all the aspects of its operations for quality service. From the table, it can be deduced that Tandag Campus has the most number of accredited programs ranging from Level I – III status. Understandably, the campuses with least number of program accreditation are those with small population in terms of students and manpower. Tandag also being the main campus strives to access quality assurance evaluations because it comprises four colleges to include: College of Business and Management, College of Teacher Education, College of Engineering Computer Studies and Technology, College of Arts and Sciences.

Table.2: Performance of Board Programs in Licensure Examination in 2017

Board Program	First Timers					Rate of Accomplishment	Repeaters					Rate of Accomplishment	Overall Performance					Rate of Accomplishment	REMARKS
	Passed	Failed	Total	SDSSU %	National %		Passed	Failed	Total	SDSSU %	National %		Passed	Failed	Total	SDSSU %	National %		
LET Elementary	61	85	146	41.8%	45.0%	93%	16	178	194	8.3%	6.18%	133.5%	77	263	340	22.65%	19.94%	114%	Overall performance is above the NPP
LET Secondary	210	159	369	56.9%	72.3%	79%	76	394	470	16.2%	21.80%	74.2%	286	553	839	34.09%	39.88%	85%	Overall performance is below the NPP
Civil Engineering	15	7	22	68.2%	63.8%	107%	2	0	2	100%	32.08%	311.7%	17	7	24	70.83%	38.57%	184%	Overall performance is above the NPP
Agriculture	5	5	10	50.0%	39.8%	126%	3	6	9	33.3%	26.91%	123.9%	8	11	19	42.11%	36.38%	116%	Overall performance is above the NPP
Fisheries	5	19	24	20.8%	39.9%	52%	3	20	23	13.0%	21.26%	61.4%	8	39	47	17.02%	31.75%	54%	Overall performance is below the NPP
Forestry	1	2	3	33.3%	71.0%	47%	2	3	5	40%	25.72%	155.5%	3	5	8	37.50%	42.22%	89%	Overall performance is below the NPP
Midwifery	17	13	30	56.7%	67.4%	84%	9	11	20	45%	25.78%	174.7%	26	24	50	52%	45.43%	114%	Overall performance is above the NPP
TOTAL	314	290	604	51.99%	53.57%	97.0%	111	612	723	15.4%	12.61	121.8%	425	902	1327	32.03%	31.51%	101.6%	Overall performance is above the NPP

Table 2 shows the performance of board programs licensure examination in 2017 of SDSSU. It indicates the

overall performance which is indicated from the performance of first takers and repeaters examinees. To

sum up, it indicates that 32.03% is the overall performance of SDSSU which is above from the national passing percentage of 31.51%. Hence, the rate of accomplishment of SDSSU is 101.6% that has a description of above the National Passing Percentage (NPP).

Furthermore, among the 7 board programs offered by SDSSU, Civil Engineering board program is the highest overall performance. As it shows, 70.83% is the overall performance percentage which is above from 38.57% of the NPP. Hence, civil engineering program takes pride in its PRC Licensure examination last November 2013 Board Exam, as it makes SDSSU ranked 7th among school in the Philippines. This implies that SDSSU aspires to be an effective service provider, it adheres to quality standards and delivery of quality services to its clientele and stakeholders. It contends with

present day imperatives and realities as heightening global competitiveness (ISO 9001:2015).

According to Dotong & Laguador (2015) that Quality Assurance mechanisms either locally or internationally recognized that utilized and adopted by the HEIs must reflect on the quality of their graduates which is one way of measuring the performance of an institution. They added that strengthening the degree program through QS World University Ranking by Subject must be the focus of the marketing strategy of the HEIs rather than promoting the institution as a whole. They concluded that international recognition of the program by subject could somehow uplift the credibility of the institution in the world market.

Table 3 presents the headcount of faculty with regular plantilla items by educational qualifications of SDSSU.

Table.3: Headcount of Faculty with Regular Plantilla Items by Educational Qualifications

Educational Qualifications	SDSSU-Tandag	SDSSU-Cantilan	SDSSU-Lianga	SDSSU-Tagbina	SDSSU-San Miguel	SDSSU-Cagwait	TOTAL
1.PhD/EdD degree holder	31	16	3	4	1	2	57
2.Pursuing or w/ units in doctorate program	25	15	8	6	8	3	65
3.Masters degree holder	39	27	14	15	4	4	103
4.Pursuing or w/ units in masters program	31	10	10	12	3	8	74
TOTAL	126	68	35	36	16	17	299

As the campus with biggest student population, SDSSU Tandag serves as the highest workforce with 126-faculty, while SDSSU San Miguel with 16 faculties is the lowest numbered faculty which is close to SDSSU Cagwait which is 17 out of 299 regular faculty. As shows in table 5, a total of 299 faculties who delivers the major services of SDSSU in terms instruction, research, and extension. Among of these faculties, Masters' degree holders are the most numbered educational qualification as it gives a total 103 faculties while 74 of them are still pursuing or with units in masters program. This implies that all programs or academe services delivered are manned by qualified educators. Hence, students are given quality higher services in education.

One of the requirements of QMS is the people which emphasize that *the organization shall determine and provide the persons necessary for effective implementation of its quality management system and for the operation and control of its process*. This statement is supported also in the study of Flores, et.al. (2012), as cited by Compe (2018), that academic preparation is very vital in any field of work. It is the source of all the knowledge that an individual need as he performs his/her daily tasks.

Figure 4 presents the summary of distribution of trainings, conferences, and seminars attended by the faculty.

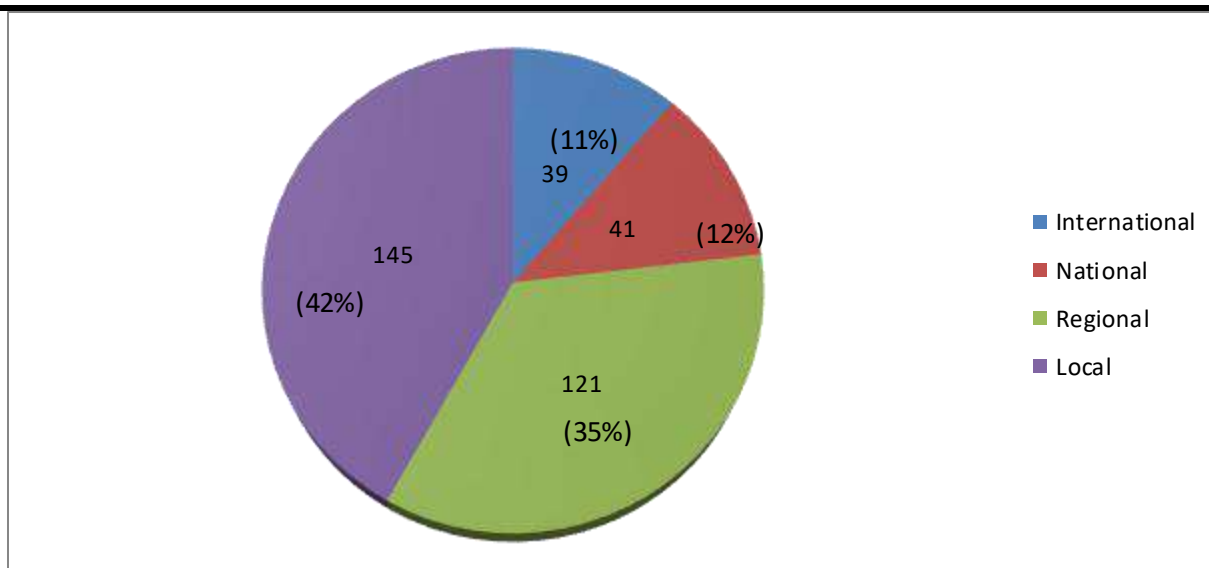


Fig.4: Summary of Distribution of Trainings, Conferences, and Seminars

As shows in figure 4, 145 or 42% are trainings, conferences, and seminars most attended by faculty in local level, followed by 121 or 35% in the regional level, while 39 or 11% are in international level is the lowest distribution. This implies that there is continuous improvement in the professional development of the faculty. Faculty is self-motivated to learn more in his/her side of professional awareness.

The clause 7.2 (competence) of QMS requirements highlights that *the organization shall determine the necessary competence of person (s) doing work under its control that affects the performance and effectiveness of the quality management system; and ensure that these persons are competent on the basis of appropriate education, training, or experience.* This

statement is conforms to the statement of Llopsis (2014) that *"No matter how much potential an employee has, it can remain dormant if not managed rightly and properly nourished with the right ingredients. A great leader will never allow an employee's potential to go unnoticed or to lose its momentum. Realizing potential to its fullest often requires breaking through barriers and creating new paradigms"*. It emphasizes that it is always encourage that as a good leader, he/she should not just see how his/her people jobs well but motivate him/her in discovering new standards that could increase productivity, sustainability and opportunities to the organization.

Table 4 presents the summary of performance of extension services indicators and targets 2017

Table.4: Summary of Performance of Extension Services Indicators and Targets 2017

MFOs and Performance Indicators	Institutional Target	Institutional Accomplishment	Accomplishment Rate
1.Number of persons trained weighted length of training	12,000	12,990.25	108%
2.Percentage of clients who rate the advisory services as good or better	95%	98.33%	103.5%
3.Percentage of persons who received training or advisory services who rated timeliness of service delivery as good or better	95%	99.3%	104.5%

As glean in Table 4, it indicates the MFOs and performance indicators that SDSSU needs to accomplish. As shows, SDSSU marks an institutional target but it accomplished more than to its target. Thus, the accomplishment rate of SDSSU in terms of performance in extension is more than 100%. It implies that extension

services of SDSSU conforms more than to the expectation and satisfaction of clientele.

This finding conforms to the statement of Mane and Patil (2015), Neyestani (2016), and Lushi, et.al. (2016) that firms can achieve internal improvements or that standard can assist the firms to maintain or increase their market share by satisfying the customers. Hence,

customer satisfaction and client satisfaction are the most important aspect of maintaining QMS for construction projects.

Extension services is one of the major functions of SDSSU which is mandated also CHED throughout HEIs of the Philippines. Hence, partnership with stakeholders plays a significant role in bringing the name of SDSSU in international level. This fact conforms to the statement of Lupdag-Padama, et al., (2010) and Rosaroso, et al. (2015) that stakeholders share common conceptions of internationalization in higher education institutions. Hence, it is impossible without partners or linkages that bring us to the third mechanism. Compatible Partnerships bridge local HEIs to the globalized world that may be determined by the global need or gap that the institution intends to fill globally

III. CONCLUSION

The profile of the university has potential conformities of high performance, from instruction to extension functions that are essentials for global marketing and competitiveness. Hence, it needs a number of employees, specifically in terms of faculty, as it is seen that the population of students is expecting to be increased due to the free tuition, and availability of grants and scholarship programs. It shows also high performance in terms of program accredited, board programs, and extension services. As to faculty, few meet the educational qualifications but it is evident that majority of them are aiming a highest educational qualifications. Lastly, majority of their level of trainings, conferences, and seminars they attended are in local level.

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Leadership Styles of Industrial Engineers in Pottery Industries in Pampanga

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Abstract— The researchers conducted this study which evaluated the leadership styles of industrial engineers in pottery industries in Pampanga in the Philippines. The twenty-six (26) respondents were profiled and the correlation between each characteristic and the three leadership styles: autocratic, democratic, and free-reign (*laissez-faire*), was computed. After analyzing the results, it was observed that most of the respondents favored a democratic leadership style. Moreover, the researchers draw out that as the young IE supervisors tend to support free-reign leadership less as compared to older IE supervisors.

Keywords— Autocratic, democratic, industrial engineering, leadership styles, pottery industries.

I. INTRODUCTION

A lot of individuals think that to become a leader in business; one should have some kind of business-focused educational background. But the truth is leaders of several companies share one thing in common: they were all educated in or began their careers in some form of engineering discipline [1].

Many engineers in this day and age are leaders of different industries. Civil, Mechanical, Electrical and Industrial engineers were most likely to be involved in leading their people and in doing crucial decision making.

In this study, the researchers focused on the leadership styles of industrial engineers in selected pottery industries in Pampanga. Pottery has been an important element in the history of the human race, allowing for the storage and transport of a range of materials as well as acting as an artistic medium for thousands of years [2].

In Manila, pottery has been elevated to an art form. Different pottery styles have also been introduced to the urban public through the establishment of pottery schools and regular pottery exhibitions/shows in art galleries. It has captured the upscale market that regularly supports the works by these potters [3].

Making pottery was an early art adeptly practiced in old Pampanga. Earthenware vessels were known in pre-colonial history, and shards have been found in Porac, Lubao, Guagua and Candaba that dates back to the 13th to 16th centuries, a period of active trade with our Asian neighbors. Some have been dated to the Metal Age of Philippine pre-history [4].

Many places in Pampanga were engaged in the pottery industry. This industry helped the province to be economically viable. Industrial engineers who were working as leaders of the pottery industry in Pampanga were the focus of this study. It described their leadership styles. Are they autocratic, democratic or free-reign (*laissez-faire*) leaders? An autocratic leader is one who takes all decisions himself without consulting the subordinates while the democratic leader encourages his subordinates to participate in the decision-making process and *laissez-faire* or free rein leader goes a step further and turns an entire problem or project over to subordinates [5].

Specifically, this study aimed to describe the profile of the Industrial Engineers, their leadership styles and the relationship between their profile and their leadership styles. Results of this study may help the owners of the company determine the suited leadership styles in the pottery industry to be able to make accurate and better decisions [6] regarding their business concerns.

II. METHODOLOGY

The study used a descriptive correlational research design. According to [7], as cited by [8], "Correlational research is employed to test the degree of relationship between two variables."

The data collection was done in selected pottery industries in Pampanga wherein several Industrial Engineers were employed as leaders in their respective departments. These companies manufactured different products but shared a common goal, which is to achieve productivity through effective leadership.

The respondents of the study were 26 selected engineers in Pampanga. They were chosen purposively based on the following criteria [9]: industrial engineer (IE); and currently were leaders of different departments in pottery industries.

The instrument used in this study was the Leadership Style Survey Questionnaire (LSSQ) by [10]. The LSSQ was utilized to collect data about the perceived leadership styles of Industrial Engineers. Data were collected through the distribution of survey questionnaires to the respondents.

Survey questionnaires are personally handed to the respondents by the researchers.

To organize and summarize the demographic profiles of the respondents and the scores in the LSSQ, descriptive statistics were used. On the other hand, Pearson Product Moment Correlation Coefficients was used to compute the relationship established among the demographic profiles and leadership styles of IEs. SPSS software was employed to process all the numerical gathered data.

III. RESULTS AND DISCUSSION

Table 1. Description of the Respondents' Demographic Profiles

Category	Frequency	Percent
Age (in years)		
21 - 30	18	69.2
31 - 40	4	15.4
41 & above	4	15.4
No. of Months in the Company		
12 - 24	17	65.4
25 - 48	7	26.9
49 & above	2	7.7

Table 1 exhibits the demographic profiles of the 26 IE supervisors in terms of their age in years and the number of months in the company. Majority of the respondents were still young since they were in the age range of 21-30

(69.2%). As to their stay in the company, more than 60% were in the range of one to two years in their work (12 to 24 months).

Table 2. Determination of Dominant Leadership Styles among Respondents

Leadership Styles		
Autocratic	1	3.8
Democratic	19	73.1
Free-Reign	6	23.1

Table 2 reflected the individual leadership style preferences of the respondents. It can be observed from the table that majority of the IEs were employing democratic leadership styles and only one is applying an autocratic form of managing their people.

The data suggest that only one engineer takes all decisions himself without consulting the subordinates while the majority of them encourages their subordinates to participate in the decision-making process [5].

Table 3. Relationship between Demographic Profiles of IE Supervisors and their Leadership Styles

Indicators	Leadership Style	Pearson Correlation	Asymp. Significance (2-tailed)	Verbal Interpretation (Pearson-r test)
Age	Autocratic	0.036	0.86	Not Significant
	Democratic	-0.063	0.759	Not Significant
	Free-Reign	-0.500*	0.017	Significant
No. of Months in the Company	Autocratic	-0.089	0.667	Not Significant
	Democratic	0.068	0.74	Not Significant
	Free-Reign	0.089	0.665	Not Significant

Table 3 revealed the significant relationship that exists between the demographic profile and the leadership styles of the respondents. Pearson Product Moment Correlation Coefficients was used in providing Pearson correlation values, each with its corresponding interpretations (significant or not significant).

Pearson's r correlation is used for the demographic data such as age and number of months in the company because the data gathered were in terms of number or quantitative. In the case of the age of the IE supervisors, it can be inferred from the list of values and their corresponding interpretations, that age was not significantly related to autocratic and democratic leadership styles while it was negatively related to free-reign leadership style. This means that young engineers were more of free-reign leaders, implying that they turn an entire problem or project over to their subordinates [5].

IV. CONCLUSIONS

The researchers concluded that most of the respondents were 21-30-year-old and were working in the Production Department for 12-24 months. It can also be concluded that the majority of them opt for a democratic leadership style. Moreover, the researchers draw out that as the young IE supervisors tend to support free-reign leadership less as compared to older IE supervisors.

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A Cloud-based Online Access on Smart Energy Metering in the Philippines

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Abstract— This qualitative study was conducted to identify how smart energy metering could utilize the energy consumption remotely through cloud-computing and the utilization of the data management, and data visualization of a cloud-computing. Participants are working directly in smart energy metering and cloud-computing. Results revealed that most participants believed that smart energy metering can be controlled by cloud-computing and smart energy metering offers a robust and reliable modem enabling efficient communication. Moreover, some participants believed that existing application can deliver accurate data analysis, management, operations, and customer engagement. Few participants were direct users of cloud-computing but in some utilizations particularly in high-rise buildings, malls, and manufacturing plants, they were using cloud-computing to monitor their power usages and the harmonics power supplies in their facilities. Participants believed that application can edit, collect, deliver data through the utility-grade of meter data management system and most of cloud-based has utility on data visualization from web-based energy portal and reporting tools for consumers and utilities. Some participants said that the system is usually compatible in the SAP system. More so, most participants believed, that the scalability, central data storage, cost-efficiency, real-time response, and securities are advantages of the system and the location of data, inefficient cloud security policy, mixing of data, term of agreement, compatibility, application programming interfaces, redundant data management and disaster recoveries are the challenges of the system.

Keywords— Cloud-computing, commercial and industrial utilization, power electric subsystem, smart energy metering.

I. INTRODUCTION

Smart energy metering are those technology devices that record consumptions of power electric subsystems such as generation, transmission, distribution and utilizations of commercial and industrial sectors. Nowadays, smart energy

meters can work over IOT (internet of things) through the various techniques of cloud-computing [1]. In smart energy metering, the energy usage is done in real time with the ability of smart meters' network communication and more reliable and fast communication is guaranteed with the smart grid distributed energy data management which practices digital and other innovative technologies to manage the transport of energy from power plants to see the changing energy demands of the consumers and these energy demands can measurable through advanced metering infrastructure (AMI) that multiconnected into smart grid today. The AMI solution is combined energy metering, network-communications, and IT platform. It is intended to carry smart energy metering functionality equipped for back-office integration even though hiding the difficulty of energy metering communication technology [2]. AMI allows two-way communications between consumers & utilities through communication networks, smart meters, data management, and data visualization systems. The main function is to offer utility companies real-time data related to power consumption and allow the consumer to make energy usage based on the price at the time of use. These systems can able to help utility companies to manage energy demand by identifying peak time of load. Moreover, these systems also help consumers manage their energy consumption as well as TOU or Time-of-Use rate. This has contested to increase the demand by the implementation of AMI. An AMI system was comprised of a number of technologies and applications that have been integrated to perform as one: the smart energy meters, the smart communications, the operational gateways, and the meter data management systems [3]. These AMI systems and its data management can able manipulate by storing energy data and viewing the data on energy consumptions by cloud-based online access.

According to Mell P and Grance T (2011), The NIST (National Institute of Standards and Technology) definition of cloud computing [4] a cloud-computing is "a model for enabling convenient, on-demand network access to a shared

pool of configurable computing resources(e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction." In command to reach an accessible, demand-based IT Infrastructure, cloud-computing solutions, and smart energy meter must be incorporated. The five characteristics of cloud-computing include [5-7]: *On-Demand Service* - A customer can separately and individually deliver computing competencies as required automatically without needful human contact with each service's provider; *Ubiquitous Network Access* - Capabilities are available over the network. It can be accessed through standard mechanisms, to be used by heterogeneous thin or thick client platforms; *Location Independent Resource Pooling* - A multi-tenant model is used to serve multiple consumers from a pool of computing resources. The customer has no control over the exact location of the provided resources; *Rapid Elasticity* - Cloud-computing supports elastic the nature of storage and memory devices. It can expand and reduce itself according to the demand from the users, as needed; and *Measured Service* - Cloud-computing offers metering infrastructure to customers. Cost optimization mechanisms are offered to users, enabling them to provision and pay for their consumed resources only. Virtualization technology can be used in cloud-computing that categorize into three types of computing resources: *Software as a Service (SaaS)* - One to many application deliveries to a customer is provided by the SaaS model and means that only the smart grid customer can access the service that is installed on the utility's hardware via an Internet connection [8]; *Platform as a Service (PaaS)* - Service provider provides the development on environment and some of the smart grid utilities can use this model if they do not want to invest in the environment or when they want to focus on the functionality of services and concentrate on the applications without considering development on environment [9]; and *Infrastructure as a Service (IaaS)* - Infrastructure can be offered as a service by cloud-computing to smart grid utilities and cloud-computing platforms can share or devote infrastructure to smart grid utilities who pay for their hardware usage. IaaS performance can also be increased significantly if smart grid utilities outsource cloud-computing, resources and the infrastructure from other parties [10]. In the deployment model, a cloud can be classified into four groups: *Public Cloud* - In this model, users pay per use of smart grid services. There was not any limitation about which user can or cannot use cloud service because it is a public cloud.

Service providers can make different offers, therefore smart grid services can be charged or not charged based on the offered conditions. Cloud Provider manages the cloud in the smart grid and users access the smart grid through the Internet [11]. All the services in this cloud are standardized to meet the comparability requirements of smart grid applications [12]; *Private Cloud* - it was internal deployment model that works like a private network. However, it can differ depending on the smart grid application's requirements. If a basic private cloud is used in a smart grid, each smart grid utility has its own data center and provides services by itself. Thus, high security, reliability, and confidentiality are ensured. But this model disallowed other utilities from accessing services and if an interrelationship is required between smart grid services that are located in different utilities, it is difficult to give access permission to utilities. This problem can be solved in two ways; one of them is by letting an external service provider realize the operation of the private cloud according to a *Service Level Agreement (SLA)* without taking data and infrastructure; the second way is to outsource the private cloud by giving all infrastructure and its management to another service provider [11]; *Community Cloud* - This cloud structure was facilitated for private use by a specific consumers from institutions that have common concerns (e.g., task, safety necessities, rule, and compliance considerations). It may be kept, accomplished, and worked by one or more institutions, a third party, or some combinations of them, and it may exist on or off premises; and *Hybrid Cloud* - Smart grid utilities that took advantage of cloud computing with a cost-efficient way can use the hybrid cloud deployment model. This model combined private and public cloud deployment models for smart grids by making a smart grid utility a cloud provider that holds its own data center and uses a private cloud model. Smart grid utility processes, analyze and combines data in the private cloud and builds services. Then, all of these services are published to all other utilities by using public clouds [11].

Cloud-based Smart Energy Metering Development and Applications

Smart energy metering deployed into power electric subsystems that can be incorporated with cloud-computing today and this development has been recognized as an innovative technology for the smart grid that strengthens all these subsystems and hence, it becomes a dominant component for smart grid applications. Within this framework, many cloud-computing based successfully

works with smart energy meters development including devicehub.net [13], OpenHAB [14], OpenIoT[15], Particle [16], and NASA's High-End Computing Capability (HECC) Project [17] has been implemented. Two-way or bidirectional communications is one of the significant structures of the smart grid. This carries to control and processes with smart energy meters that accumulate data from smart grid stakeholders' devices and perceive their status. However, if a new system requires to be added on this smart grid application, the entire system must rehabilitate [18]. These are one of the many reasons why National Grid Corporation of the Philippines (NGCP), power plants and other power utilities connected into the grid have no such cloud computing-based access on their grid and they'd also avoided it by using the cloud smart energy meter background [19]. NGCP, generation plants, and power utilities must carefully understand that the smart grid services that perform an advanced metering infrastructure application are placed into the smart energy meter application cloud. These amenities are established, sustained and updated by the utilities inside this cloud. A smart energy meter accesses these services through a public border and controls the policies with respect to approaching response from cloud-computing. For example, cloud-computing includes heater control services that acquires the heat stability to align billing and warming of the system. A smart energy meter requests this amenity and controls the heat according to approaching data information. If the cloud provider updates this service such as changing the heat balance, the smart energy meter does not a necessity to know these variations, it ensures the equal thing with respect to a service response. This framework delivers competent solutions with these features for the Advanced Metering Infrastructure (AMI) of the power electric subsystems in the Philippines, to facilitate the fast, scalability, dependency and reliability of smart grid because all smart energy metering must be met into one connection and shared cloud-computing platform.

II. METHODOLOGY

This qualitative study was based on interviews of participants working in power electric subsystems such as power generation, transmission, distribution utilities, and commercial and industrial utilities. Researchers used qualitative research design to uncover dimensions such as beliefs, thoughts, and motivations and provide insight into complex relations. The study consisted of 4 groups from power electric subsystems. Participants were chosen purposively based on the following criteria [20]: they were directly and actively working in smart energy metering and cloud-computing and were willing to give informed consent. The researchers recruited twenty participants through a combination of electrical and IT personnel from power generation, transmission, distribution, and commercial and industrial utilization. The participants of the study were 5 working in power generation, 5 working in power transmission, 5 working in power distribution, and 5 workings in commercial and industrial utilization. Data were collected using face-to-face interview, online survey questionnaire, and focus group. All interviews were voice-recorded, transcribed and collected. The researchers used the second interview in method of focus group whereas the direct users of smart energy meter and cloud-computing from face to face interview and online survey questionnaire have been interviewed again separately in the group interview. The interviews were conducted from March 2019 to April 2019 in power electric subsystem and commercial & industrial utilities in the Philippines. The interviews conducted in coal plant in Pampanga, transmission and distribution utilities in Nueva Ecija, system integrator in Makati City, car manufacturer in Sta Rosa, Laguna, properties developer in Pasay City and Pasig City. Qualitative data analysis was used to analyze the data in this study. This is utilized to construct based on the interpretation, explanation or understanding of the participants about the questionnaires in the research study. Table 1 shows the profile of the participants as to their department, age, sex and position level.

Table 1. Profile of the Participants

First Interview:	Industry Type	Sources of Interview		Department		Age				Sex		Position Level			
		Face to Face	Online Survey Questionnaire	EE	IT	25 below	26-35	36-45	45 above	M	F	Entry Level	Senior Level	Supervisor	Managerial
	Generation	5	0	4	1	1	1	2	1	4	1	1	2	1	1
	Transmission	5	0	4	1	1	3	1		5	0	1	3		1
	Distribution	1	4	4	1		3	1	1	5	0	3		1	1
	Commercial & Industrial	0	5	3	2	1	1	2	1	3	2	1	1	2	1
	Second Interview in Focus Group:	Knows Very Well & Directly Users		Department		Age				Sex		Position Level			
Smart Energy Meter		Cloud-computing	EE	IT	25 below	26-35	36-45	45 above	M	F	Entry Level	Senior Level	Supervisor	Managerial	
20		3	15	5	3	8	6	3	17	3	6	6	4	4	

III. RESULTS AND DISCUSSIONS

All 20 participants from power generation are using smart energy metering same with power transmission except in power distribution and commercial and industrial utilizations in the Philippines. They believe that head-end or application can edit, collect, deliver data through the utility-grade of meter data management system (MDMS) and most of cloud-based have utility on data visualization from web-based energy portal and reporting tool for consumers and utilities (stakeholders).

Additionally, they have faith that most of the smart energy metering can be controlled by cloud-computing as long it is configurable and it has communication that compatible to connect in cloud-based. They said that “smart energy metering and systems can able to manage meter resources efficiently because most of the smart energy meters can import and export data, can use time of use (TOU) with multiple tariff or net-metering, load profile for energy, instantaneous reading, maximum demand, time maximum demand, alarm event logs, retrieval of power quality event data including sag/swell, total harmonic distortion, unbalance, over current exceedance, and retrieval of maximum, minimum and average voltage, current and other electrical quantities”.

Moreover, the participants said it has a head-end system with communication server capability, cross-platform AMR system (Microsoft and Linux), cloud-based system, online instantaneous data reading through web and online load profile analysis. Most of them said that “smart energy metering can manage both locally and remotely and it is

configurable since they have configuration tools dedicated to their system provider and that data from head-end or application can export to others system as long they are compatible with CSV files or encrypted data. Some participants said it was compatible usually in the SAP system in which is the most acquainted data management system.

Most participants particularly the direct users of cloud-computing believed, that the importance of cloud computing in the smart energy metering are the following: The system could import and export the data in less time required with high-frequency data gathering; the system has a real-time data streaming in less than few second intervals for customer engagement, power usage management, demand response, and other core applications; the system must resilient and scalable to a million's smart energy meter and reduced infrastructure cost, reduced IT operations costs, and built-in disaster recovery and high accessibility; the system has instinctive meter commissioning and fully compliant with advanced distributor load control requirement; the system could support real-time diagnostics and meter configuration; System could support dynamic service enablement (enable/disable and upgrade business services); the system has a real-time meter data, automated meter configuration and firmware upgrade; the system must control by consumers and stakeholders using user authentication (through Microsoft Active Directory and ADFS); the system could entry easy back-office systems integration through web-centric APIs and data formats; and the system must have integration with the cloud to cloud

APIs and smart-phone applications. The direct users of cloud-computing believed, that these are the advantages of cloud-computing in smart grid in the following below: *Scalability* - system must receive rigorous data demand and can easily add new data storage devices as the demand grows in the smart grid; *Central Data Storage* - cloud-computing has wide grid access in the system and obtains availability. It must have mutual communication platform to evade various middleware software and border access by the system. Data reliability applied data formats on one dominant platform; *Cost Efficiency* - system can effortlessly switch from energy resources to other resources because it is associated in the network and all devices are associated to each other and send status data to utilities to be measured by them. This data exchange is provided at a low cost over cloud-computing and dedicated resources are used for the smart grid; *Real-time Response* - systems could process an enormous amount of information such as energy usage, control, meter data management, and market energy data in real-time response. Distributed data processing center could provide a scalable load balancing technology, control systems, and AMI in smart grid need a real-time response feature to process fast response against power outage and no delay on transferring and displaying control signals and pricing information for the demand management in the grid; and *Security* - system must deliver data security and privacy. In this case, a private cloud can be used in a smart grid to provide confidentiality, access right, data encryption, etc. This can be accomplished if SLA or service level agreement is done with the cloud provider. In cloud-computing, multiple head-ends or applications are deployed, managed, and run in one data center. Users of the same cloud cannot see each other's information and disturbances in this shared cloud.

Also, most participants particularly the direct users of cloud-computing believed, that these are the disadvantages or challenges of cloud-computing in smart grid in the following below: *Location of data* - System server is to be found anywhere, so the location of this server that store, retrieve, and process smart grid application are not known by stakeholders or consumers. This is a very serious issue on the data management and data visualization in the smart grid. So, defining data location by the service provider is important for the stakeholders or consumers; *Inefficient cloud security policy* - some cloud service providers (CSPs) apply weaker security policies than others. These changes may be specific to utilities, so they may cause discrepancies from utilities and this can solve by requiring the level of

service level agreement for the smart grid; *Mixing of data* - in this system, the location of independent resource pool can access the applications, there are many multi-user applications in CSPs but yet, security and scalability of them is an open issue. So, security technique is being applied such as data encryption to maintain the reliability and confidentiality of smart grid applications; *Term of agreement* - some point smart grid utilities requested to CSPs to not include commercial papers in the contracts that hold data in cloud were utilities can pay a huge amount of charge after SLA end date; *Compatibility* - cloud-computing does not observe with audit necessity which most serious matter that must be overcome by CSPs. However, cloud-computing has various challenges due to the location of data, mixing of data, inefficient security policy, etc. So, it is hard for CSPs to become compatible with smart grid auditing necessities including privacy laws; *Application Programming Interfaces (APIs)* - various application in cloud computing are applied by CSPs and it's compatible with specific utility's APIs. Therefore, passing another CSP to CSP it takes difficult and longer time; and *Redundant Data Management and Disaster Recovery* - emergency data recovery is the biggest concern of utilities because the system distributes data in multiple servers in diverse location. So, reliability cannot be provided to utilities when data at a certain time is not clear. In addition, utilities know the server data and access it when disaster recovery happens. So, a system most of the time do subcontract services and also recovery processes from other parties that may grounds of the problem when data is not held by the main CSPs. They are in favor of having cloud-computing because the system could provide fast, reliable and efficient information to them but some participants said it must consider the restoration of the national grid when it comes with cloud-computing, a system need rehabilitation of grid to followed the cloud-based online access on smart energy metering. They believe that smart energy metering offers robust and reliable modem enabling efficient communication that can run with 3G/4G technology, RS232 and RS485 port, GSM, GPRS, transceiver module ready, RF transceiver module ready, WIFI, ZIGBEE, LORA, PLC, and operational gateway module. Some participants believed that existing head-end system or application can deliver accurate data analysis, management, operations, and customer engagement.

However, some participants from power distribution still use traditional or manual energy meter same with commercial and residential buildings but most participants

from commercial and industrial utilizations especially in high-rise buildings, malls, and manufacturing plants where they are using smart energy metering which hinders the application and benefit such as “smart energy metering can run in SCADA and BMS ready protocol (MV90, DNP3, and MODBUS)”.

IV. CONCLUSION AND RECOMMENDATION

Most participants believed that smart energy metering can be controlled by cloud-computing and smart energy metering offers a robust and reliable modem enabling efficient communication. Moreover, some participants believed that existing application can deliver accurate data analysis, management, operations, and customer engagement. Few participants were direct users of cloud-computing but in some utilizations particularly in high-rise buildings, malls, and manufacturing plants, they were using cloud-computing to monitor their power usages and the harmonics power supplies in their facilities. Participants believed that application can edit, collect, deliver data through the utility-grade of meter data management system and most of cloud-based has utility on data visualization from web-based energy portal and reporting tools for consumers and utilities. Some participants said that the system is usually compatible in the SAP system. More so, most participants believed, that the scalability, central data storage, cost-efficiency, real-time response, and securities are advantages of the system and the location of data, inefficient cloud security policy, mixing of data, term of agreement, compatibility, application programming interfaces, redundant data management and disaster recoveries are the challenges of the system.

The researchers recommended to increase the consciousness of the stakeholders from power electric subsystems in the Philippines regarding the smart energy metering. The companies should be the one responsible to study and explore the performance [21] of latest engineering technology such as this oneto be able to make accurate decisions given available information [22] for the benefit of the consumers and the company, as well. The researchers also suggested that there should be a follow-up quantitative research with large number of participants to further strengthen the finding of this study.

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Using the MODO in Capital Expenditure

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Abstract—The study presents a methodology for the analysis of new investments in property, plant and equipment from the use of operational performance objectives as a premise for decision-making. Qualitatively, we used the product of this study — operations performance matrix. The matrix was then applied through a survey of a sample of footwear companies in the region of Jaú, state of São Paulo, Brazil. The correlations between the scores obtained for each operational performance objective were tested. The analysis of the regression coefficients associated to each independent variable (quality, reliability, speed and flexibility) allowed to conclude that all the questions had a positive impact on the dependent variable (costs), indicating a positive correlation. This survey demonstrated the utility of the proposed methodology when using as a premise for decision the performance objectives of operations that demonstrated that the dependent variable is the consequence and not the cause as treated in the conventional investment analysis that uses the cash flow logic and value present as a decision factor. However, the methodology presented as a complementary form is the analysis of investments of this nature in relation to techniques widely used by the market that adopt the financial results projected as critical success factors.

Keywords—Capital Expenditures, Operations Strategy, MODE, Competitive Positioning, Decision Making.

I. INTRODUCTION

The definitions of competitive positioning go through the operations strategy in order to identify the performance objectives of operations capable of generating competitive advantages. Therefore, decision-making at the time of the acquisition of fixed assets (IA) requires special attention, since machinery and equipment can become obsolete quickly due to the reduction of the lifetime of the products, as a result of globalization and an increasingly larger economy competitive.

Due to the capital they have, large companies have invested millions in the acquisition of IA, capable of generating differentiated products due to the application of disruptive and / or sustained technology, which

guarantees product differentiation and even a considerable competitive advantage. These companies use advanced techniques of financial, economic, operations management and project engineering to succeed in the acquisition of new IA [1] [2] [3] [4].

However, for smaller companies, acquiring new IA may become a problem due to lack of structure and knowledge in management techniques.

Of course, these investments arise from the need for growth, from the obsolescence and natural wear and tear of machines and equipment, vehicles, among others. In most cases, the technique used for decision-making is the comparison of the expenditure necessary for the acquisition in the present moment in function of future financial returns [5]. To say that the value of a firm is equal to the value of its projected cash flows, discounted at an appropriate rate, leaves many practical questions open [6].

Therefore, IA acquisitions should not only take into account financial returns, but also the competitive benefits that this new IA can provide [7] [8]. Gains with flexibility, speed, quality, reliability and low cost have been advocated as a way to generate competitive benefits. When the decision-making in the acquisition of IA does not pass through these analyze, the relationship of the company with its continuity will be aggravated. On the contrary, when the decision goes beyond the financial return, it allows the company to observe and review its operational power [9].

From the study of the operations strategy, the analysis of the operations performance objectives are fundamental elements for the maintenance of the business activities and consequently the definition of its competitive position [10] [11] [12]. This analysis has been used and recommended from a variety of perspectives, including IA acquisitions, when seeking means of guiding the decision is very important once the capital is used, repentance can be costlier. To know the processes of evaluation of investments in IA, to seek maturity by the managers, potentiates returns, reducing costs and increasing profitability [13].

Several forms and formulas have been proposed for this orientation and analysis to occur, causing managers to

make decisions that favor the pursuit of achievable operations performance objectives through the acquisition of new IA. Examples are the demand flow chart, earnings and risk analysis, the cross-matrix of performance targets, the investment certification index and the operational performance index. In all of them the performance objectives of operations are placed as a critical success factor in acquiring an IA. However, we observed in these discussions a gap arising from a combinatorial sequence of applications that would culminate with a methodology proper to the expected purpose [14] [15] [16] [17] [18].

In this work, the main objective of this work is to use the principles of the operations strategy to expand the analysis of the IA acquisitions. In order to do so, we advocate the creation of an instrument to survey the necessary items for the evaluation of qualitative variables or critical success factors, which, afterwards, should be submitted to quantitative analysis, generating a logical argumentative sequence as a means of reflection and complement to the techniques of financial analysis already existing and consolidated by the market.

The gain with this methodology is the analysis on the current and future stage of the operations performance objectives from the acquisition of new IA. In this sense, whenever this methodology is applied, a quantitative-qualitative analysis will be carried out in order to evaluate the alignment of this new acquisition with the objectives by which the company positions itself in the market and competes. Therefore, this analysis may demonstrate opportunities and alternatives for your user.

In the analysis of the recent market scenarios it is evident that the competitiveness between companies has required constant investments in IA. Many companies apply resources to improve operational efficiency, better shareholder return, customer loyalty, as well as the definition of a better competitive position, investing in the best technologies and equipment available, and incorporating modern business management techniques, maximizing the use of tangible and intangible resources [3].

Another reason for new investments in fixed assets is due to the great need for new products, which causes the current product life cycle to become smaller and smaller. In the past, the need for new products was lower and, consequently, the life cycle was higher, requiring less investment in substitutes [14]. Organizational markets change constantly, demanding from their suppliers more quality, fair prices, speed and, above all, added value [19].

The need to invest in AI has led some researchers to conclude that the valuation of these investments should not only take into account financial decisions [7] [8].

1.1 Operations Strategy

The strategy of operations is less related to individual processes and more to the business as a whole, more concerned with changing scenarios and business, and how operations need to give rise to these changes, providing the basis for a sustainable advantage. One way of quantifying this contribution is to identify the level of operations and the capacity required. The result of positive decisions in this context turns into a performance that generates certain competitive benefits [2].

Studies have proven the significance of the operational performance objectives in a survey applied in Iranian industries, creating an operational model that established the necessary relationship between the corporate strategy and the operations strategy [20]. It has been proven that this alignment is significant and distinguishes successful companies from unsuccessful ones, highlighting seven types of alignments, resulting in a model that associates alignment with organizational performance.

Many companies fail to realize that the lack of alignment between tangible and intangible resources reduces their capabilities. Some researchers point the cause to this gap as the market-based view where many companies are guided by marketing. In this sense, the subsystems would be weakened and the operational capacity of the company would tend to generate lower performance and, consequently, to generate less competitive benefits [9] [21] [22].

Competitive benefits are classified in three stages, the first being the order qualifier, where you have the basic attributes that a product or service must possess for the purpose of participating in a market, however, you will only be assured a positive performance if these characteristics make up the so-called order-winning factors, in which customers see the key conditions for their acquisition. Attaining a maximum performance, we have the so-called surprise, given its condition of assigning to the client advantages previously not conceived [2].

Therefore, in order to achieve these competitive benefits, the organization as a whole must be imbued with the same objective, and in this sense, the acquisitions of IA must add up to the operational result, not only in terms of reducing labor costs or maintenance, but also with respect to other operations performance objectives such as efficiency, flexibility, quality, speed, reliability, determined by their interaction with the other subsystems of the company. These objectives of operations performance will allow the company to achieve the desired competitive benefits contrary to the thesis that the results to be generated by an IA is its net present value discounted from acquisition and maintenance costs.

Therefore, going beyond the financial return as a way of measuring the contributions coming from acquiring an IA is a preponderant factor for the authors mentioned above. In this sense, it is fundamental to understand how the operational performance objectives can be used at the time of acquisition to evaluate what competitive benefits or what contributions may generate the IA that will be integrated with the company.

1.2 Operations performance objectives

There are many costs that could be avoided if the operational performance objectives had been analyzed before acquiring an IA. For example, the setup of a machine that interferes with speed and production flexibility [24]. Thus, operations performance objectives directly interfere in the goal termed costs, deducing that these are not the cause, but rather the consequence [25]. In this way, operations strategies should be focused as competitive differentials, analyzing the operational performance objectives, where costs (initial, operation and maintenance), quality (durability, customer perception), flexibility (capacity to change bulk, products and processes) will be the differentials capable of generating the competitive benefits necessary to achieve the desired performance [26]. This set that integrates the importance of the operations strategy was proven by survey studies from 2008 to 2013, demonstrating that these are the attributes studied by researchers in four decades [22].

Figure 1 demonstrates the necessary relationship between the performance objectives of operations related to internal and external aspects as a way of increasing the capabilities of the companies.



Fig.1: Alignment between internal and external aspects of performance objectives.

Fonte: Adapted from Slack and Lewis (2008).

Quality is something desired by every consumer of products and services and must be generated from the

production process. This basic principle refers to the fact that the productive process must create efforts to generate quality. In this sense, machines and equipment must allow this goal through three stages: elimination of losses, elimination of causes of losses and optimization of processes [27].

Quality must be achieved by operations generating skills to deliver products and services reliably and consistently. This study has proven through information about corporate reputation in hundreds of companies analyzed in Fortune magazine, that quality is intrinsically linked with innovation and profitability, but quality alone is not capable of generating innovation and profitability.

If a company manages to combine quality with speed it will have a good competitive advantage. In this sense an IA must have the ability to foster the delivery of products and services with quality and speed. To calculate the process lead time it is only to measure the product-process-hour relationship, dividing the number of products in the process by the number of finished products per hour. However, to associate speed and quality, lead-time must be measured by dividing by the number of value-added steps [28]. This vision corroborates the strategy of operations that has as a definition for speed the time of customer service, respecting their need from the request to the delivery of products and services [2].

The speed gained with the new IA will allow two macro performance goals, which are: inventory formation and timely delivery. As inventory formation, although there are techniques to minimize this item, because it is understood that they consume resources due to idleness, even so, even fewer, will be necessary for many business activities [27]. In this sense, speed will allow higher stock indices, higher production rates, faster delivery methods, more realistic promises, better order production control, and better information systems.

Quality and speed without the addition of the performance goal of operations called reliability is meaningless, and this should not be confused because speed is used meaning keeping promises of delivery - honor the delivery time given to the customer in quantity, price, between other attributes agreed in the negotiation [2]. Overall reliability is intrinsically associated with IA reliability, which tends to be lower throughout its operational life, even with all the maintenance excellence that can be applied [14].

Another virtue that an IA should have is flexibility while ODO. Flexibility describes the ability of a manufacturing plant to be useful for different production tasks, and the smaller the re-ordering efforts required between orders, the greater the flexibility [29], since it has to be able to

respond quickly the needs of customers [17]. For this, it is fundamental that equipment and machines allow two conditions: the flexibility of the product and the flexibility of the volume. The flexibility of the product is to identify the ability of the production system to rapidly change production from one product to another. Volume flexibility, on the other hand, indicates the capacity to increase or reduce the volume of production without thereby increasing fixed costs in the same proportion.

It is not only low cost that promotes a company or product, but, rather, the union of product mix, positioning and production, which are conditions that will be achieved with a good strategic dimension and with an adequate level of investments. The criticism is related to the incessant pursuit of low cost, deteriorating the other objectives of operations performance. In many repositions or acquisitions of IA what determines decision-making is the volume of production and the low cost of production, without considering other competitive benefits that the IA can generate. Thus, it is important to note that an IA can contribute not only to reducing operating costs, but also to promoting the quality, speed, reliability and flexibility necessary for production and the company as a whole. This alignment should be traced by the operations strategy and should be a long-term corporate view [22].

In this way, maintaining the conditions to adapt to the laws of the market is fundamental and, in that sense, the observance of these precepts through the objectives of operations performance before the investment in IA is fundamental. Therefore, this step has to be consistent and systematized.

1.3 Evaluation of acquisitions in IA

Investment projects are often complex. In order to understand the various aspects involved in decision-making, it is customary to construct models. Models are simplifications of reality, which sin for simplifications, but bring huge gains in operational aspects. A model of monetary flows, occurring punctually at the end of periods, is a simplification of one of the financial dimensions of an acquisition project in IA [6].

It is through Capex that most IAs are requisitioned in organizations, that is, it is the formal mechanism that conveys the needs of acquisitions of assets demanded by the business activity as a whole, mainly by the industrial production. Capex or investment in capital goods is the amount of resources spent on the acquisition of goods and reinvestments in a company [31].

The criticism regarding the capital budget and consequently Capex is that they take into account, as critical factors of success and investment decision-making, the net result of the project and its rate of return,

without considering a measure of alternative sensitivity or else transform the value of money which is a ne-order polynomial that does not have a single root in a new equation with n roots [32] [33].

For each of these approaches, there are additional alternatives that help to determine the final value or value creation, and that there is no better model, but a model appropriate to the scenario or characteristics of the company or asset being evaluated [5]. No traditional method of investment analysis meets, in isolation, all the criteria for a decisive selection of projects of different natures. This restricts the use of mono-objective functions as a form of optimization for the capital budget process [34].

The capital budget rules that use the concept of net present value as a decision factor, deconstructing the model and indicating that complementary analyzes should be performed, since finance theory should not be used as a flow chart in the investment decision, but only as a vector for the decision to invest in IA, were severely criticized [35].

The capital budget should contemplate the investment proposals in IA, aligning them with the strategic planning. Criticism is on the condition that larger, non-daily projects tend to be more information than smaller projects, however, the cause of organizational mismatches may be due to lack of intersection. The author advocates auditing for both types of projects, focusing on the information subsidy for both [12].

Therefore, creating a trail for analyzing acquisitions in IA is fundamental in any proportion, be it at the replacement or strategic level, since, in fact, what most companies have used is a budget that generates autonomy for a particular business unit, and this is not necessarily aligning goals with the operations performance objectives that guide the organization. Repeated acquisitions without this compliance could lead a company to have performance problems in a short time [36].

II. PROPOSAL

This work is limited to developing a methodology to analyze investments in IA from the use of theory on operations strategy. An additional contribution is sought that assists in decisions oriented towards the achievement of objectives that allow a better competitive performance, generating the continuity of the business activities.

Documentary and bibliographical research was used for the construction of knowledge through a systematic reading of part of the existing literature, including theses, articles and books. The survey was also used as a means to gather opinions and information from a population -

which will be identified in the next section - through a questionnaire [37].

Once the documentary and bibliographical research was done, the objectives of the operations performance that the IA was to achieve were established, being instrumented by the Matrix of Operational Performance Objectives (MODO) presented in Table 1. The MODO is the fruit of this research work and was the instrument used in the applied survey, whose results will be presented and discussed later.

The survey was used to identify the tangible and intangible benefits of acquiring specific equipment. The survey questions were elaborated according to the alignment that the equipment should present in relation to the current and future competitive positioning adopted by the companies. It seeks to understand the understanding that this acquisition will bring from the point of view of quality, speed, reliability, flexibility and costs, among other performance objectives of operations to be listed by the company.

The survey carried out with MODO was only the first step, since, afterwards, quantitative tests with greater power of response should be applied to the pertinence of each questioning. The number of performance objectives of operations to be used in the survey should be coherent with those desired competitive benefits, therefore, keeping in relation to the number of lines represented by the measures to measure the internal and external benefits.

To measure the reliability of the items created for the MODO, the test called Cronbach's Alpha was applied. This test is often used in empirical research involving multi-item tests, covering latent random variables, for example, quality assessment of a questionnaire with a latent profile metric. The alpha should be interpreted as a squared correlation coefficient, where, for example, a result of 0.75 should correspond to a 75% real impact of the variables. In a first phase the MODO was applied experimentally in the sample aiming at its validation. At this stage, with the data collected, the reliability and unidimensionality of each of the operations performance objectives were verified [38].

In the next step, the correlation between the scores obtained for each operational performance objective was analyzed using Pearson's Correlation Coefficient and regression models. The Pearson correlation coefficient, which varies between -1 and 1, is a measure of linear association between continuous variables. Values close to 1 (in absolute value) indicate a strong association between variables and, close to zero, indicate absence of association. Positive values indicate that the variables

vary in the same direction and negative ones that vary in the opposite direction [39].

Table 1: Operations Performance Objectives Matrix (MODO)

Evaluation Potential Competitive Benefits of IA			
Operations Performance Objective: Quality			
Potential Internal Benefits	Score	Potential External Benefits	Score
Performance Objective: Speed			
Potential Internal Benefits	Score	Potential External Benefits	Score
Operations Performance Objective: Reliability			
Potential Internal Benefits	Score	Potential External Benefits	Score
Operations Performance Objective: Flexibility			
Potential Internal Benefits	Score	Potential External Benefits	Score
Operations Performance Objective: Costs			
Potential Internal Benefits	Score	Potential External Benefits	Score

Source: Adapted from Slack and Lewis (2008).

This coefficient, although it allows to evaluate the degree of association between continuous variables, does not allow to define a cause-effect relation. This type of relationship - the form with a variable is influenced by one or more variables - is possible with regression models. These models allow us to study relations of functional dependence between one or more independent variables and a dependent variable [40]. This method was applied to evaluate how the four items (speed, quality, flexibility, quality - independent variables) influenced the cost (dependent variable) question.

In addition, we used exploratory factor analysis, regression analysis and score analysis. However, if the objective is to compare two devices, the Student's T-Test for paired samples or the non-parametric Wilcoxon test for paired samples should be used if the conditions for the first application are not met [41]. If the objective is to compare three or more devices, the repeated measures ANOVA or the non-parametric Friedman test should be used if the conditions for ANOVA application are not met [38].

The scoring analysis for each operational performance objective was performed using descriptive statistics. Although statistically primary, it provided an overview of each objective, combining all results for a general

analysis that was compiled at the time of the decision and sent to the simulation of economic and financial results.

III. RESULTS AND DISCUSSION

To validate the methodology presented in the previous section, a survey was carried out with a large sample of footwear manufacturers in the region of Jaú, State of São Paulo, Brazil, with 45 items listed and 31 respondents, according to Figure 2. The evaluation occurred in acquisition of an IA for automated cutting of leather, which is the upper part of the footwear. This equipment is of fundamental importance for an industry of this sector and contemplates among other all the objectives of operations performance presented in the theoretical foundation.

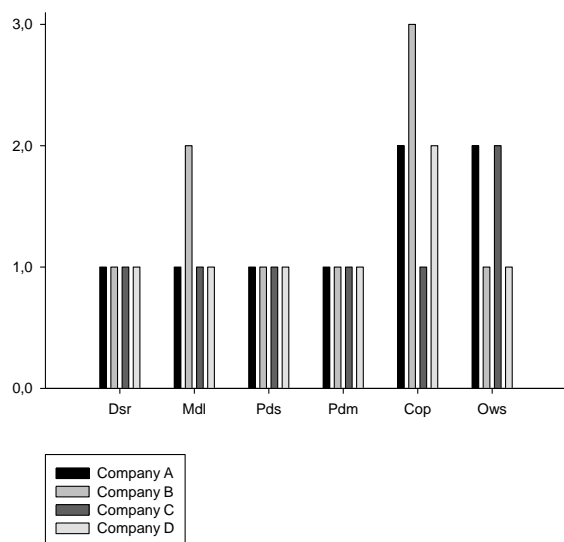


Fig.2: Operational function respondents.

Subtitle: Dsr: Designer; Mdl: Modeler; Pds: Production Scheduler; Pdm: Production Manager; Cop: In Charge of Production; Ows: Owners.

The MODE produced for this survey took into account all literature covering the operations strategy, considering only the generic performance objectives [2]. Because there were several companies, there were no specific issues or concerns about the strategic alignment adopted by them. The initial concern was to validate the method generically.

Nine questions were elaborated for each generic goal of operations performance, seeking to identify potential internal and external benefits. As demonstrated each objective influences the result of another and consequently in the result of operations of the company. Therefore, in the construction of the MODO care was taken to create questions that were related only to the performance objective itself.

Once the Cronbach's Alpha was applied for the reliability and the origin of each question [38], the obtained answers were compiled and taken to the SPSS software for statistical analysis according to the sequence shown in the section dealing with the proposal. This was the time to chart a general analysis to identify whether the IA has adherence to the generic objectives of operations performance.

As a synthesis of the analysis of these answers, a global score was obtained as presented in Table 1. This was the first step of the results that the SPSS software produced and which was the result of a primordial analysis, since if the median and the standard deviation did not reach considered satisfactory, all underlying analyzes would be compromised.

Questions	Minimum	Maximum	Mediana	Medi a	α
Quality	5.00	7.00	6.00	6.00	0.77
Velocity	4.00	7.00	6.00	5.84	0.86
Reliability	5.00	8.00	6.00	6.00	0.89
Flexibility	5.00	7.00	6.00	6.00	0.77
Costs	5.00	7.00	6.00	5.94	0.81
Global Score*	5.00	7.00	6.00	5.84	0.52

Table 1: Overall score and each item of the MODE (N = 31).

Analyzing the descriptive statistics that gave rise to Table 1, we reached a consolidated scenario where the mean (5.84) and median (6.00) were slightly above the center point of the scale (5), indicating that the acquisition of the equipment would have a positive impact in all operations performance objectives. All scores had median scores of 6 and near average scores ranging from 5.84 (Speed) to 6.00 (Quality, Reliability and Flexibility), indicating that the respondents also valued the impact of each item on the equipment acquisition. It can be deduced that the analysis by score resulted in the principle composed by Equation 1.

$$MODO = \sum_{t=1}^n \frac{AI}{\mu ODO} \leq Md ODO \quad (1)$$

Equation (1): MODO Setting

For the interpretation of Equation 1 it is considered as numerator the IA that will be evaluated. As the denominator, the average of the operational performance objectives obtained by the overall score. The result of this equation should be less than or equal to the overall score

of the median of the operations performance targets. The higher the results, the better the evaluation. Therefore, and in agreement with the idea that intangible benefits will only be useful if they can be converted into tangible benefits, since the operational benefits have already been treated, it is important to extend the analyzes to the economic dimension, and a regression analysis is performed.

In the regression analysis it was intended to study the influence of the performance objectives of operations denominated Quality, Speed, Reliability and Flexibility (independent variables) on Costs (dependent variable). Using the same software and the same database, the results are presented in Table 2.

Table 2: Results of the regression model ($N = 31$).

Independent Variables	Non-standard Coefficients		Standard Coefficients	Test T	
	B	Default Error	B	t	P
Constant	0.643	0.870		0.739	0.466
Quality	0.234	0.089	0.346	2.635	0.014
Velocity	0.143	0.075	0.236	1.904	0.068
Reliability	0.300	0.082	0.513	3.672	0.001
Flexibility	0.193	0.094	0.286	2.059	0.050
Model	Dependent Variable: Costs R = 0.785; R ² = 0.616 F(4; 26) = 10.447; p < 0.001				

The techniques used are corroborated by studies [39] [40] in showing that the model is significant ($F(4; 26) = 10.447$; $p < 0.001$), with the independent variables explaining 61.6% of the Costs question ($R^2 = 0.616$). The analysis of the regression coefficients associated to each independent variable allowed to conclude that all the questions have a positive impact on the Cost variable, indicating that an increase in the scores of the questions causes an increase in the score Costs. The reliability performance ($B = 0.300$, $\beta = 0.513$, $p = 0.001$) had a stronger impact on the dependent variable Costs, followed by Quality ($B = 0.234$, $\beta = 0.346$, $p = 0.014$), Flexibility ($B = 0.193$, $\beta = 0.286$, $p = 0.050$) and velocity ($B = 0.143$, $\beta = 0.236$, $p = 0.068$). Therefore, the results show that these variables consist of a set and should be treated as such to achieve competitive differentials, corroborated by other studies [26].

For each operational performance objective, nine questions were listed. The reliability was the objective that had the highest consideration in the analysis by score and in the coefficients of regression. Thus, the quality and

expected speed in the equipment are justified by this ranking in the analysis [2]. Respondents understood the questionings made that there will be elimination of losses, elimination of causes of losses and optimization of processes, as well as the speed of delivery at the right time for the customer [11] [27].

As for the flexibility to have a median score in the overall analysis and especially in relation to the standard deviation, being also the penultimate one in the regression analysis, it is justified because of the flexibility to describe the ability of a plant and not only of an equipment [29]. As the equipment tested is for cutting the leather, other production sectors such as assembly and finishing were not analyzed. Thus, it is understandable the results achieved, since respondents understood by MODO that this equipment alone would not have the capacity to generate flexibility and speed to the point of being considered in isolation as generating a potential internal or external benefit.

In view of the issues listed for this research, it was demonstrated by the results that, initially, the set of operations performance objectives had favorable aspects and generated potential internal and external benefits. It was observed that the cost variable was explained to a great extent by the other variables. Thus, according to results from other studies [25], in which costs are not the cause, but rather the consequence, it became evident which of the objectives could burden or cancel this acquisition. In this sense, MODO and its treatment helped managers to understand the relationship between the expenditures required for the new acquisition and the economic result arising from the generation of potential internal and external benefits for each operational performance objective, against the increase of profitability, as an expected result in the acquisition of a new IA [13] [7] [8].

In this way, it is fundamental that a good theoretical basis be used to defend the questions applied in MODO, that these questions are proved pertinent through the statistical tests demonstrated in this section, that the survey application has a consistent target population and that, mainly, the analyzes of the results are by statistical tests and subsequently submitted to the financial evaluation, as shown in Figure 3, which illustrates a sequence for this analysis, proposing the application of techniques of evaluation of investments already widely used by the market [5] [32] [33] [34].

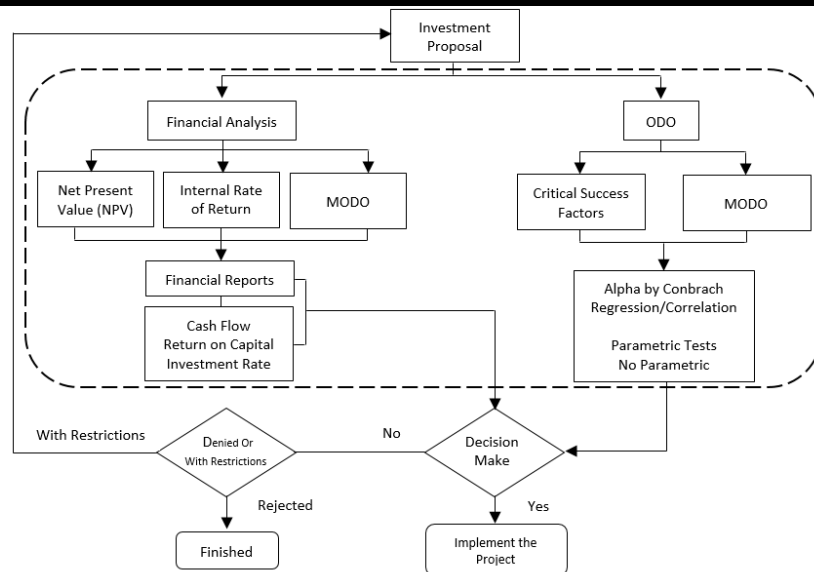


Fig.3: Sequence for analysis of IA acquisitions

The proposed methodology goes against the criticism given in other studies [6], since the value of a company is not equal to the value of its projected cash flows discounted at an appropriate rate, but rather its capacity to gather resources and transform them in capacities [9]. In this regard, when reviewing concepts about operations strategy, operations performance objectives and potential internal and external benefits when acquiring a new IIA, the company is placing first its need to remain active in the market, seeking the necessary performance to be considered as the winner of the request and even surprise [2], thus defining its competitive position [10] [11] [12].

The proposal of this work, summarized in Figure 3, addresses a gap arising from a combinatorial sequence of applications that culminates with a methodology for acquiring an IA according to notes made in previous studies [14] [15] [16] [17] [18] [20]. These techniques will allow you to prove which IA will integrate more monetary results for the company. They are fundamental to prove the competitive benefits achieved by the ODO due to the acquisition of a new IA and how they will impact monetarily on the company's cash flow. Therefore, these vectors that traditionally are the main ones in the decision of investment, end up being consolidated also by a previous analysis from the perspective of operational gains. Thus, through the questioning applied in the MODO, the primary condition has to be positive, only then to be submitted to financial evaluation.

IV. CONCLUSION

With the objective of demonstrating the relevance of the operations strategy in the evaluation in the acquisition of IA, this work resulted in a methodology with applicability of the MODO, which contemplates

qualitative and quantitative methods in the definition of the performance objectives of operations and potential internal and external benefits.

The proposed methodology presents a different analysis of what is practiced by the market, because counter to the cash flow to present value as a decision factor, compels the company to reflect how that new IA will be integrated to the plant and its productive layout.

This search has occurred due to many criticisms presented in the literature through the way companies acquire or replace their IA, mainly due to the great changes that have occurred in the world market, where, increasingly, products have a shorter life cycle.

The proposal and the sequence of analysis presented in this paper are not rigid and therefore may be adapted to the needs of the company as well as to the conditions of acquisition. However, it is recommended to adopt a methodological rigor in the preparation of the MODO, as well as in its analysis through the statistical tests presented.

The use of MODO assumes that it will drive the user's efforts to a definition of their competitive positioning by analyzing the performance objectives of operations that their physical subsystem can generate. This analysis opens a new window for managers to identify and quantify what competitive performance they want to achieve.

Even without access to the financial data of the companies participating in the survey, however, through the operational data obtained through MODO, it was possible to correlate the alternatives to the independent variables (quality, speed, reliability and flexibility), with the dependent variable (cost), which will greatly facilitate the identification of results in the financial analysis

already established, because its executors will know the source of the costs.

Another important aspect in relation to MODO is that it uses the opinion of several actors regarding the IA that will be acquired. Thus, in large companies where divisional accounting exists, one can have aggregate values from the view of these actors who do not necessarily need to belong to that unit alone. This practice overthrows the thesis that the capital budget is plastered and passive of manipulation. Thus, for the assembly of a unit score and also a global score, it is fundamental to represent the will and the knowledge of those involved in the operational, tactical and strategic processes of a company.

As future contributions, it is expected that further work will re-discuss the importance of evaluating operations strategy, operational performance objectives, and potential internal and external benefits in acquiring IA. These, in turn, are part of a universe called the physical subsystem that interacts with other subsystems in order to achieve corporate objectives and goals.

It is also suggested combining this discussion with the Balanced Scorecard (BSC). Although it has not been addressed in this paper, the theory about the BSC is widely known in the market. In this way, the operational performance objectives could be used as perspectives for the construction of a strategic map. Thus, the company over time would have a control panel on the performance achieved from the existing IA, choosing the priorities in acquiring new IA. Incorporating the divisional BSC into the corporate BSC would contribute to a broader understanding of how the physical subsystem should be composed to continue competing.

Another technique widely used by the market and that can be expanded by MODO is the measurement of the Economic Value Added (EVA). By adapting to the BSC, a strategic financial map could also be constructed to demonstrate which IA is creating value, that is, a ranking would be created to demonstrate quantitatively the overrun of the cost of capital spent on the acquisition plus depreciation and maintenance as a function of the lifetime. The more productive the equipment is beyond the cost mentioned, the greater the aggregate economic value it would generate. This practice would take a new score into the analyzes promoted for MODO, adding value to its analytical capacity.

It should be emphasized that this work did not aim to minimize the techniques already used by the market, nor the dynamics applied to investment projects. However, a cut within this horizon is presented, demonstrating the importance of ODO analysis in the acquisition of new IA. It is defended that all good technique is applied. In this

sense, MODO is added to existing techniques.

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