

# **Application of Analytical Hierarchy Process for the Assessment of the Same Day Courier Services - Lalamove, Angkas, and Grab Delivery in the Philippines during Covid-19 Pandemic**

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## **Abstract**

This research aims to assess the different criteria on using the chosen same day delivery couriers namely Grab Delivery, Lalamove, and Angkas. The research itself aims to help consumers availing the service identify which one is best from the identified criteria. This research will also help to identify the areas they would need to improve by considering the criteria that were rated by the customers. By maximizing the use of Analytical Hierarchical Process (AHP), the research aims to determine the best same-day delivery courier by evaluating them and doing pairwise comparisons for each criterion. The research made use of a survey questionnaire to get customers satisfaction for delivery time, Rider's Behavior and Attitude, Aesthetics, Fees and Charges, Limitations, and Delivery Accuracy. AHP resulted in Grab being the ideal courier, Lalamove as the alternative courier, and Angkas as being the lowest voted courier.

## **Keywords**

Courier, Analytical Hierarchy Process (AHP), Grab, Lalamove, and Angkas

## **1. Introduction**

### **1.1. Objective**

The study implores two aspects for its objectives. It tackles both general and specific aims in the result of the study. While its general aspects seek towards correlating satisfaction among customers towards the delivery services brought by the selected delivery companies, it also specifies and obtains results as it compares the factors for satisfaction (Delivery time, Rider's Behaviour and Attitude, Fees and Charges, Limitations, Aesthetics, Responsiveness and Delivery Accuracy) with the performance made by delivery services Lalamove, Angkas and Grab Philippines. Furthermore, this shall serve as a future reference and criteria for future company improvements or studies.

## **2. Literature Review**

### **2.1 Same Day Delivery Courier Services**

Supported by Dones & Young (2020), demand is always followed by the supply. This has been proven towards the necessities brought by the pandemic. In their recent article featuring the urgency of the new normal's delivery courier services, various establishments have vied for their own edge in a fast-rising business sector in the Philippines.

Establishments such as J&T Express offer a cunning edge in fast yet reliable deliveries, with a 24/7 customer service, and an all-year round operation. Not only that, but they also market their service with a real-time

tracking system with prices that are inexpensive yet do not forsake the quality of the service being offered. While Fastrack Courier offers the same amenities, they are mostly known for their efficient logistics solutions that landed their title as the most trusted in Metro Manila. However, it does not offer the same wide range of vicinity compared to NinjaVan Philippines, as they cater their own edge of delivering parcels to wherever in the Philippines. NinjaVan has also gained consumers' trust with their flexible parcel pick-ups and cash-on-delivery options.

As given by Dones & Young (2020), these play a vital role in the continuous flow for goods all throughout the Philippine economy. Nonetheless, due to its recently developed popularity in the business sector, satisfaction rates are not widely compared for consumers and further studies are yet to observe their sustainability.

## ***2.2 Quality of Service***

According to Garvin (1968), a user-based approach plays a major role in customer satisfaction. This reason leads to how different needs from each consumer are being addressed in a well-mannered strategy. Companies that stay in tune towards the needs of their target audience have higher consumer satisfaction rates than establishments that classify their products in a general manner in marketing. By providing the essential needs of consumers and marketing to the public with the product's edge, marketers create a leverage in catering towards a consumer's various preferences. Another factor being considered for higher satisfaction rates would be the transaction specific satisfaction. This pertains to a customer's experience during and after the transaction, whether it served him/her the satisfaction rate of a seamless exchange.

## ***2.3 Fees and Charges***

As supported by the study of Khan (1999), a consumer is more likely to develop an interest in a certain product after reviewing it from their websites. This is usually developed because of additional information put in, the services it offers, or the price range that it delivers. As a result of his study, customer satisfaction builds as a company produces more information given for a certain product in a well-developed website. The actual rate of service as base fare and price per kilometer in Grab, the rate is ₱55 plus a ₱6 per km, then in lalamove, the rate is ₱60 plus a ₱8 per km, and lastly in Angkas, the rate is ₱50 plus a ₱10 per km.

## ***2.4 Limitations***

As supported by an article made by Mark Sison (2020), after the implementation of the Enhanced Community Quarantine (ECQ) in Metro Manila, delivery services were part of the first categories of industries that went in full operational capacity whether this lead to in-house or outsourced, transporting medicine, food, or any other essential goods from one place to another. Whether the purpose may be for personal or business-related, these industries made it convenient for consumers to have seamless transactions despite the pandemic.

Some of the on-demand delivery services were Lalamove (which provides on-demand or same-day pickup and delivery services straight to the recipient through app-based transactions), GrabExpress (parcels being delivered from one place to another with full transparency made possible through their business-developed application), and Angkas Padala (high-demanded roadside delivery service wherein a sender or recipient meets the biker in a respective place to deliver or receive a certain package through the use of their Angkas App). However, despite the convenience and efficiency in these fast-growing industries, no studies were further made on how sustainable or how satisfactory their services are met by consumer demands.

## ***2.5 Aesthetics***

Supported by an article from Women Network (2019), in the business sector, the design and sophistication of a product plays a major role in getting sales. The effects of its design, structure, or overall aesthetics can result in a consumer's loyalty and brand tolerance for the certain product. Additionally, a product's aesthetics if invested well by a company can lead to having a certain branding and trademark that becomes the basis for a consumer's purchase. It can deal with long-term effects such as how a product affects a consumer's thoughts or attitude once seeing the brand. It is a crucial step for a company to choose a product's aesthetics as it is the primary step on how people will assess their product.

### **2.6 Responsiveness**

In service quality, this dimension means responding immediately and instantly. The service providers not only sell good products, provide teaching demonstrations to customers, but also provide satisfied pre-service and after-service. For the target company, service providers benefit by establishing effective and prompt services like returning phone calls, emails, responding when doing business with their clients or entertaining queries of the customer. It is important that customers feel service providers are responsive to their requests.

### **2.7 Delivery Accuracy**

According to the recent headlines made by Philippine Star, delivery service companies have made massive contributions amidst the pandemic. As stated by RJ Cabaluna (2020), companies such as Grab, Lalamove, and J&T Express have earned the titles of *household names* in the economy for booming as go-to partners by numerous establishments. Due to strict health protocols caused by the pandemic, greater demands and expectations were given to these uprising fields in the industry. To combat these issues and to keep up with consumer satisfaction, delivery services invested more on technology and wider scope for their vicinity in reaching services. Moreover, as stated by Cabaluna's interview, the field of delivery services and e-commerce holds a promising role in efficiency towards a safer alternative in providing basic necessities for the economy.

## **3. Methods**

This study was achieved through an online survey using Google Forms. The study population consisted of individuals affected by the pandemic and cannot get out of their houses. All participants were given consent before participating in the study.

An online questionnaire, literature review, and online sources were used for data gathering. The questionnaire consisted of information on demographics (Age, Gender, Delivery Time, Rider's Behavior and Attitude, Fees and Charges, Limitations, Aesthetics, Responsiveness, and Delivery accuracy), usage of top courier service available in the market today, usage of courier services during or before the pandemic, preferred courier services, number of times the service has been used during pandemic, number of time service has been used before the pandemic, participants selected the usual products being delivered using a checkbox, preferred payment method, and preferred delivery option. Prices of the selected courier services were also assessed and have been gathered through their own websites.

Descriptive analytics was used to assess the difference between the demographics and the preferred services. It shows that the satisfaction of the respondents is significant among the total population of the customers in the courier services. The findings also show the high expectation of customers which need to be addressed by the courier companies.

## **4. Data Collection**

In order to construct a survey that will determine which preferred same day delivery courier customers prefer, the group constructed a survey containing criterias that were supported by literature that was researched and gotten from the internet. The criterias that were chosen were factors that tell the overall performance of those same day delivery couriers. The list of factors that the research took into considerations were namely: Delivery Time, Rider's Behaviour and Attitude, Fees and Charges, Limitations, Aesthetics, Responsiveness, and Delivery Accuracy.

**5. Results and Discussion**  
**5.1. Numerical Results**

Respondents Profile	Category	N	%
Gender	Male	127	55.50%
	Female	102	44.50%
Age	18 years old and below	11	4.78%
	19-25 years old	143	62.17%
	26-39 years old	47	20.43%
	40 years old and above	22	9.57%
	Undefined	7	3.04%
Delivery Courier	Grab Delivery	85	37%
	Lalamove	77	33.50%
	Angkas	68	29.60%
Frequency	0 or 1 time per month	97	42.20%
	2 to 3 times per month	71	30.90%
	4 to 5 times per month	30	13%
	6 to 7 times per month	18	7.83%
	8 or more times per month	14	6.07%

Table 1. Statistical Compilation of Respondents Profile

The data above are the statistical compilation of respondents' profiles. It shows the composition of our respondents, showing that out of the 230 total respondents 127 of them are male and 102 of them are Female. Ages of these respondents were ranging from 15-58 yrs old and the result depicts that most of these people are Grab Delivery users.

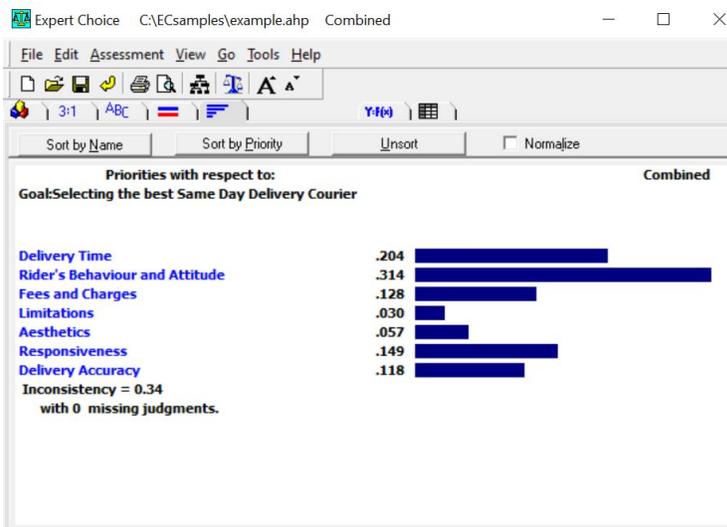


Figure 1. Weight of Criteria

The figure above is the overall result that the research group has gotten with the use of Expert Choice Software and the survey questionnaire results. Above list the 7 criterias that were based from RRL's and were considered to be factors in evaluating the overall performance of each same day delivery courier. The criteria shown in figure 1 is ranked according to which factor impacts the biggest when choosing a same day delivery courier. This is done in order to identify and differentiate the contribution of each in deciding the best courier. The distribution of weights is computed by the software in each criterion shown. It is termed as the priorities that are derived from the pairwise comparisons tab.

The one with the highest weight is “Rider’s Behaviour and Attitude” with 0.314, followed by delivery time with 0.204, Responsiveness with 0.149, Fees and Charges with 0.128, Delivery Accuracy with 0.118, Aesthetics with 0.057 and last is Limitations with 0.030. It has an inconsistency of 0.34.

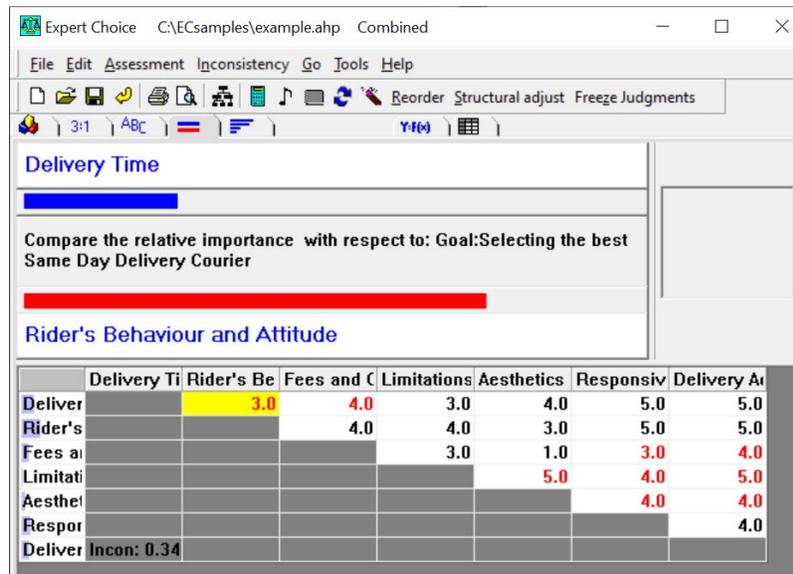


Figure 2. Pairwise Numerical Comparison of Criteria

The pairwise numerical comparison of all the criteria with each other is executed in figure 2. The numerical values in black represent all the Rider’s Behaviour and Attitude criteria, meaning that all numerical values in black are considered to be in favor of the Fees and Charges. This also means that the specific criteria has the highest weight. On the other hand those values in red are favoring the criterions in the column. Producing inconsistency of 0.34

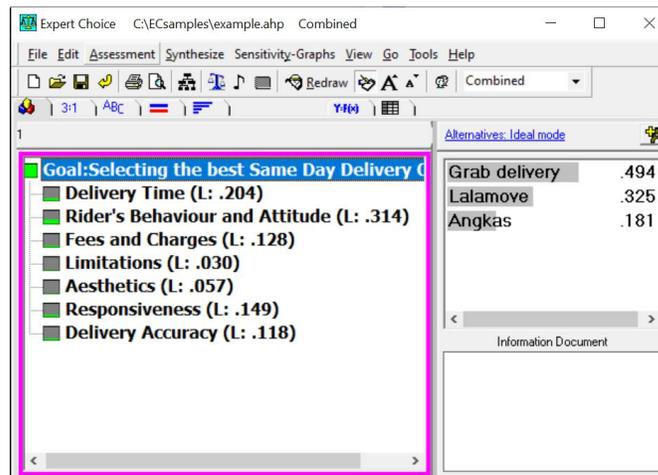
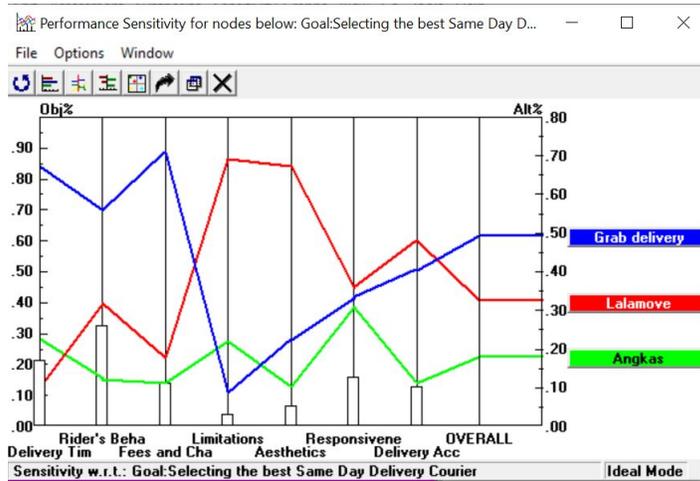


Figure 3. Weights of Same day Delivery Couriers Alternatives

After doing all the pairwise comparisons for each criterion, the weights of the three alternatives are computed by the software as seen in the figure above. There are assigned weights and a graphic representation for each alternative. The Delivery Courier that got the highest weighted score base from the software was the Grab Delivery having .494. The Lalamove Courier comes second with a value of 0.325, and then Angkas comes last with a computed value of 0.181. Base from the pairwise, both Lalamove and Grab were battling it out in terms of which courier is better when it comes to the given criteria

## 5.2. Graphical Results



The sensitivity analysis of all the pairwise comparisons for each criterion are displayed in the figure above. The weights obtained for all the alternatives in terms of all the criteria are shown. The Blue line represents Grab Delivery, the Red line represents the Lalamove and the green line represents the Angkas. It can be observed that Grab has the highest scores for the majority of the criteria. The end part of the graph labeled overall depicts the total or the end result of which Same day Delivery courier is most preferred based on the criterions given.

## 5.3. Proposed Improvements

The results from the survey suggest that participants are most likely Grab Delivery services. The country has been riding high since the onset of the pandemic, expanding their services and operations to meet the growing demand of customers and businesses. Companies like Grab, Lalamove, and Angkas have seen their brands turn into household names as they became the go-to partners of businesses and customers alike during this ongoing health crisis. To keep up with the boom, these companies have stepped on the gas to beef up their operations. However, the issues when it comes to failed access information to customers, Timeliness of delivery (delayed delivery), Loss ratio (the number of damaged shipments and complaints) the company should focus on considerate the quality processes in transport, forwarding and logistics companies, it should be remembered that qualitative elements are implemented for the client. The Company should use a regression policy of any damages to its subcontractors and it results in a significant decrease in the number of complaints.

## 5.4. Validation

The data gathered and computed by its scores on its criteria are shown. The table has the data needed to calculate and perform an ANOVA data analysis to provide a validation that can show if there is a significant difference between the selected courier services which are Grab, Lalamove, and Angkas.

Table 5.4.1 ANOVA Results of Delivery Time

Anova: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
Angkas	70	305	4.357143	0.493789		
Grab	89	389	4.370787	0.485955		
Lalamove	71	328	4.619718	0.296177		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	3.19735	2	1.598675	3.719454	0.025737	3.035617
Within Groups	97.56787	227	0.429814			
Total	100.7652	229				

Since the p-value in the Table 5.4.1 is less than 0.05 and the F-statistic value is greater than the F-crit thus, we can conclude that there is a significant difference among the three selected couriers within the given criterion.

Table 5.4.2 ANOVA Results of Rider's Behavior and Attitude

Anova: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
Angkas	70	307	4.385714	0.3853		
Grab	89	400	4.494382	0.4119		
Lalamove	71	334	4.704225	0.26841		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	3.721841	2	1.86092	5.175452	0.00634	3.035617
Within Groups	81.62164	227	0.359567			
Total	85.34348	229				

Since the p-value in the Table 5.4.2 is less than 0.05 and the F-statistic value is greater than the F-crit thus, we can conclude that there is a significant difference among the three selected couriers within the given criterion.

Table 5.4.3 ANOVA Results of Fees and Charges

Anova: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
Angkas	70	246	3.514286	2.949068		
Grab	89	355	3.988764	1.283963		
Lalamove	71	291	4.098592	1.175855		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	13.80697	2	6.903483	3.92967	0.021001	3.035617
Within Groups	398.7843	227	1.756759			
Total	412.5913	229				

Since the p-value in the Table 5.4.3 is less than 0.05 and the F-statistic value is greater than the F-crit thus, we can conclude that there is a significant difference among the three selected couriers within the given criterion.

Table 5.4.4 ANOVA Results of Limitations

Anova: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
Angkas	70	281	4.014286	0.883851		
Grab	89	366	4.11236	0.91905		
Lalamove	71	322	4.535211	0.9666		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	11.03678	2	5.518389	5.978665	0.002948	3.035617
Within Groups	209.5241	227	0.923014			
Total	220.5609	229				

Since the p-value in the Table 5.4.4 is less than 0.05 and the F-statistic value is greater than the F-crit thus, we can conclude that there is a significant difference among the three selected couriers within the given criterion.

Table 5.4.5 ANOVA Results of Aesthetics

Anova: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
Angkas	70	311	4.442857	0.540166		
Grab	89	388	4.359551	0.5738		
Lalamove	71	316	4.450704	0.422535		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.417594	2	0.208797	0.403917	0.668178	3.035617
Within Groups	117.3433	227	0.516931			
Total	117.7609	229				

Since the p-value in the Table 5.4.5 is greater than 0.05 and the F-statistic value is less than the F-crit thus, we can conclude that there is no significant difference among the three selected couriers within the given criterion.

Table 5.4.6 ANOVA Results of Responsiveness

Anova: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
Angkas	70	292	4.171429	0.607867		
Grab	89	399	4.483146	0.411645		
Lalamove	71	315	4.43662	0.50664		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	4.211113	2	2.105557	4.206208	0.016081	3.035617
Within Groups	113.6324	227	0.500583			
Total	117.8435	229				

Since the p-value in the Table 5.4.6 is less than 0.05 and the F-statistic value is greater than the F-crit thus, we can conclude that there is a significant difference among the three selected couriers within the given criterion.

Table 5.4.7 ANOVA Results of Delivery Accuracy

Anova: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
Angkas	70	307	4.385714	0.3853		
Grab	89	398	4.47191	0.502043		
Lalamove	71	325	4.577465	0.361771		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1.301871	2	0.650936	1.537759	0.217092	3.035617
Within Groups	96.08943	227	0.423301			
Total	97.3913	229				

Since the p-value in the Table 5.4.7 is greater than 0.05 and the F-statistic value is less than the F-crit thus, we can conclude that there is no significant difference among the three selected couriers within the given criterion.

## 6. Conclusion

The purpose of this research was to assess courier services between Lalamove, Angkas Padala, and Grab Delivery and its implications to customer satisfaction by using the Analytic Hierarchy Process (AHP) within an event of Covid-19 Pandemic. Based on the analysis conveyed, it can be concluded that the objectives of this research is successfully met as one of the objectives is that the research correlates satisfaction among customers towards the delivery services brought by the selected delivery companies and the other objective is to specify and to obtain results as it compares the factors (Delivery time, Rider’s Behaviour and Attitude, Fees and Charges, Limitations, Aesthetics, Responsiveness and Delivery Accuracy) for satisfaction with the performance made by the selected courier service. The researchers used an application called Expert Choice where it is a decision-making software that is based on multi-criteria decision making and the software uses the Analytical Hierarchy Process (AHP) which is the primary method to be used in the research. It is shown in the validation that the analysis is verified and comes with an analysis of variance that shows the significant difference between the selected courier service. Analysis of variance is commonly used to analyze the difference between selected variables of its mean. It also shows that the data gathered within this research can be analyzed with the analysis of variance as the calculated data comes with a mean that can justify the difference between the selected courier services. There are numerous researches about the comparison of the selected courier service and the difference of this research from the rest is the method used in this research is Analytic Hierarchy Process (AHP) which compared to descriptive and statistical analysis that are commonly used with this type of research.

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## Biographies

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**Cedric F. Reprado** is a student from Mapua University, Philippines and currently taking up Bachelor of Science in Service Engineering and Management. A member of a school organization called Engineering Through Imagination and Research - Academic Society, and served as an Executive Committee. A businessman that owns a small food chain restaurant and a small grocery store. He took up several seminars that were mainly concerned in service management, methods of different analysis, marketing strategies, and technology.

**Christian Jay Sesnorio** is a college student currently in MAPUA University. His major is Industrial Engineering and Management. He is also a member of an organization under MAPUA University, namely, Philippine Institute of Industrial Engineers(PIIE) - Mapua University Student Chapter in 2018.

**Henrie Louis Subido** is a student from Mapua University, Philippines and currently taking up Bachelor of Industrial Engineering. A member of a school Seniors Basketball Team. He took up his early year of school in Lourdes School of Mandaluyong, and finished his Senior High School in De La Salle Santiago Zobel and was also part of the Zobel Jrs Basketball team.

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Engineering (IE) and Masters of Engineering Program major in IE from Mapua University, Intramuros, Manila, Philippines. She is a Professional Industrial Engineer (PIE) with over 15 years of experience. She has taught courses in Probability and Statistics, Methods and Time Study, Systems Engineering, Operations Research and Computer Integrated Manufacturing. She is a part-time consultant that specializes in improving different systems/processes which includes re-layout, computation of manpower requirement, establish Job Description, etc. She has done research projects in operations research, production and human factors and ergonomics. She is a member of Philippine Institute of Industrial Engineers (PIIE).