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## Analyzing the Effect of Innovation, Government Support and Operational Practices on the Sustainability: The Case of Manly Plastics Incorporated

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**Abstract:** The manufacturing industry is an integral part of the economy in the 21<sup>st</sup> century through the increase in consumerism and the general needs of the human population. Despite this, the manufacturing industry faces issues regarding its sustainability and on the forefront of that is the plastic manufacturing industry who have come under fire in recent years. This paper presents an analysis of the effect of innovation, government support and operational practices on the adoption of sustainability of Manly Plastic Incorporated. The paper utilized a case study particularly Manly Plastic Incorporated which has been in the plastic manufacturing industry in the Philippines for over 55 years. A total of 91 samples were obtained using survey questionnaires distributed to top and middle managers of the firm. Interviews were conducted both from the key officers of the company and experts outside the company. Data were analyzed using Pearson correlation and linear regression. Results arising from the quantitative and qualitative data were compared to confirm if the interviewees thought the same as the findings based on the surveys. Statistical analysis result found that all independent variables had a significant relationship with the sustainability all having a p-value of <0.001 but Operational Practices had the weakest relationship with the lowest Pearson Correlation of 0.45. By cross analyzing the quantitative data and qualitative data, it was concluded that all three independent variables have a significant relationship and effect on the sustainability of Manly Plastics Incorporated.

**Key Words:** sustainability, innovation, government support, operational practices, sustainability practices

### 1. INTRODUCTION

Sustainability is a crucial issue for corporate world today. Different issues regarding environmental protection, economic growth, and social performance and contribution are being faced by businesses all over the world and developing

sustainability strategies will provide short- and long-term solutions for these businesses. Sustainability is commonly defined as a development that meets the needs of the present without compromising the ability of future generations to meet their own needs". (Brundtland, 1987). In relation the context of



business, sustainability is defined as “the management and coordination of environmental, social and financial demands and concerns to ensure ethical and ongoing success”. (Rouse, 2013) According to Atu, Amos and Uniamikogbo (2018), the triple bottom line framework of sustainability includes economic, social, and environmental aspects of a business. Pagell (2009) also states that “managers are increasingly faced with the pressure to think not just about profits, but also about their organization’s environmental and social performance.”

It is evident that sustainability indicators are not just measures of success and performance but to be deemed also as a problematic paradigm. Many researchers who have conducted studies about sustainability provided solutions, cause and effects, and explanations to help improve or change organizations’, such as plastic manufacturing firms, development strategies towards sustainability. In our world today, plastic wastes are one of the major contributors to the excessive amount of solid waste in the streets of the Philippines and key players that take part in this issue are plastic manufacturing companies. Consequently, Plastic manufacturing companies have the ability to innovate its products and enhance its operational practices in collaboration with the support provided by the government, all towards a more sustainable future in areas of plastic manufacturing, and environmental, economic, and social contributions

## 2 METHODOLOGY

### 2.1 Research Locale

Manly Plastics Incorporated (MPI) was founded in 1964 by a mold maker named Co Bun Ting and his wife, Co Po Ty. Currently, the company is the largest provider of end to end plastic product solutions in the Philippines and specializes in injection molding. It provides several design services and supplies local and international clients with high quality plastic goods in several product areas. It boasts of six

production plants located in Malabon, Cabuyao, Sucat, and Valenzuela and has a main office located in 60 West Avenue, Quezon City. It has a total workforce of 1,800 employees, five top management officers, 86 middle managers, and 1,709 rank and file employees.

### 2.2 Research Design

The study utilized a mixed method data collection, which is both quantitative and qualitative analysis. For the quantitative data, survey questionnaires were distributed to the top and middle managers of the company with a total of a total of 91 respondents. The survey questionnaires that was used for the study is adapted from various researches including Raheem and Ramsbottom (2016), Dziallas and Blind (2019), and Batista (2009), all answerable by the 5-point Likert scale. For the qualitative data, the researchers interviewed the owners of MPI combined with the experts from various sectors.

The study employed descriptive and causal-effect research design through which the study was able to describe the relationships between the independent variables and the dependent variable, determine the strength of the relationship of each independent variable with the dependent variable, and to determine the effect of the four independent variables on the dependent variable, respectively.

### 2.3 Sampling

Homogenous sampling was used in selecting participants for the study, both the respondents of the survey questionnaires and interviewee. Homogeneous sampling focuses on one particular subgroup in which all the sample members are similar, such as a particular



occupation or level in an organization's hierarchy" (Saunders, M., Lewis, P. & Thornhill, A. 2012). Since the top and middle managers have the knowledge and experience in overall operations of the business, they can provide pertinent data about the effects of innovation, government support and operational practices on sustainability.

As for the qualitative data, the Vice President of Sales and Marketing of MPI, and the current president of the Philippine Plastic Industry Association will be interviewed. He was chosen because of his overall knowledge and experience in the company and in the plastic manufacturing industry for over 35 years.

## 2.4 Statistical Treatment

In analyzing the data gathered, the quantitative methods that were used for the study are basic descriptive statistics, the Pearson correlation method, linear regression and multiple regression analysis. Descriptive statistics was utilized in organizing and summarizing the data gathered from the study.

The Pearson correlation method was used in determining the strength of the relationship of the chosen variables in this study.

The linear regression analysis was used to determine the significance of each independent variable's influence on the dependent variable. Lastly, multiple regression was used to assess the combined effect the independent variables on the dependent variable stated in this study.

## 3. RESULTS AND DISCUSSION

The study utilized a 5-point Likert scale to analyze the results of the survey with the score of 5 being "completely true" and 1 being "not at all true". The poll contained questions designed to allow the researchers to evaluate the overall sustainability of MPI, as well as determine the effect, significance, and relationship of firm Innovativeness, government

support, and operational practices on the adoption of sustainability in the company.

Variable	Grand Mean	Standard Deviation
Sustainability	4.38	.40
Innovation	4.45	.46
Government Support	3.92	.64
Operational Practices	4.5	.44

Table 1: Grand mean of responses for each variable

Grand mean of 4.38 was obtained from the components of sustainability revealed that the adoption of sustainability is manifested to a great extent (Table 1). It can be concluded that sustainability is highly valued by MPI. The sustainability efforts of MPI may be driven by through the Promotion of Green and Economic Development project or ProGED of the Philippine government. ProGED is a combination of the Philippines' industry and government's initiative in promoting a greener manufacturing industry with the help of the Road Map Process in which its main goal is to "define a well-focused stimulation and promotion for an industry driven GED that is an integral part of a modernization and innovation process of the economy of the Philippines." (German Society for International Cooperation and Department of Trade & Industry, 2015). This program aims to explain various green elements for the road maps of the manufacturing sectors of the Philippines. Specifically, the plastics industry roadmap of the country is provided with suggestions on further developing the plastics industry into a greener and more economic industry.

Meanwhile, the overall standard deviation of .40 proves to have a low value and thus, proving that the sustainability section is reliable and precise.



Variable	Person R	Interpretation
Innovation	0.521097858	Moderate positive relationship
Government Support	0.509390875	Moderate positive relationship
Operational Practices	0.454224264	Moderate positive relationship

Table 2: Pearson Correlation Result

Through the Pearson Correlation method, the researchers were able to obtain R-values of 0.521, 0.509, and 0.454 for firm innovativeness, market orientation, and operational practices, respectively (Table 2). Additionally, these results showcase that the three variables manifest moderate positive relationships to sustainability.

Hypothesis	P-value
H4: Innovation has a significant effect on the Sustainability of MPI.	<0.001
H5: Government Support has a significant effect on the Sustainability of MPI	<0.001
H6: Operational Practices have a significant effect on the Sustainability of MPI	<0.001

Table 3: Simple Linear Regression Result

Hypothesis	P-value
H7: Innovation, Government Support and Operational Practices have a significant effect on the Sustainability of MPI.	<0.001

Table 4: Multiple Regression Result

As could be seen Table 3 shows that each independent variable - innovation, government support and operational practices - has a significant effect on the adoption of sustainability by manifesting a p-value less than 0.001. Meantime, Table 4 displays that the combined effect of all three independent variables are highly significant, with the overall p-value being less than 0.001. However, operational practices obtained a p-value of 0.940 which means there is weak evidence against the null hypothesis and therefore, the effect of operational practices can be neglected.

Through pattern matching, the researchers were able to confirm trends observed from the various analyses of quantitative data. The qualitative data presented that MPI value sustainability in its operations and incorporates all three dimensions and all three variables to the best of its ability, in accordance to its needs in certain projects.

#### 4. CONCLUSIONS & RECOMMENDATIONS

Statistical analysis result manifest that the three independent variables have a highly significant effect on sustainability of MPI. This conclusion was obtained through the p-value of the independent variables in correspondence to following the  $p < 0.001$  rule. Moreover, based on analysis through linear regression, the it was determined that each independent variable has a highly significant effect on sustainability. Nonetheless, the results from performing multiple regression revealed that only innovation and government support have a highly significant effect on sustainability since its p-values are less than 0.001. Operational practices, on the other hand, have a p-value of 0.940 and therefore, have a weak effect on sustainability of Manly Plastics, Inc. Meantime, the findings from the qualitative analysis revealed that operational practices have a significant effect and contribution on sustainability.

Manly Plastics Incorporated is a plastic manufacturing company that has specialised in injection moulded plastic since 1964. However, the market for plastic is changing rapidly and consumers are becoming increasingly concerned with sustainability initiatives. With the changing trends,



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demands and expectations, companies like Manly Plastics need to quickly adapt and increase sustainability in order to remain competitive in the market.

Based on the findings, there is a moderate positive relationship with Innovation, Government Support and Operational Practices on Sustainability. Although, Innovation has the highest impact on sustainability as compared to the other independent variables. Thus, the researchers recommend the company to increase sustainability through innovation.

First, the company should invest in new machinery and equipment to increase sustainability. Investing in the latest innovations in machinery can help the company in various ways. It can help the company produce goods that are more economical and in a cheaper manner since new technology allows companies to lessen waste, energy usage and help increase the efficiency of production. The company can invest in energy efficient equipment, high efficiency motors, high efficiency transformers, closed-loop water cooling systems and high-power capacitors for this purpose. By lessening waste, energy consumption and increasing efficiency, the company can lessen production and operational costs which can help the company's economic sustainability and greatly improve operational practices and competitiveness. Another option is to invest in equipment that can help the company increase environmental sustainability.

Second, Manly Plastics can increase research and development efforts in order to create new processes, products and innovations in order to stay competitive in the market. For example, the company can innovate to create products that use post-consumer goods as material. This can be done by collecting and reusing used material and integrating them into new products. This helps promote a circular economy for plastic material, helps increase the sustainability of using plastic goods and helps increase the environmental sustainability of the company. Increasing research and development will also help encourage continuous improvement within Manly Plastics Incorporated.

Lastly, the Philippine government should implement more laws and regulations focused on sustainability and these should be strictly enforced. These laws and regulations should make sure

that manufacturing firms comply with what is expected of them when it comes to sustainability although these laws and regulations should not only focus on the firms but on the people as well. The lax enforcement of littering and pollution laws in the Philippines plus the uneducated has created a buildup of litter, pollution and waste around the country and it is not getting much better. This buildup of litter has a strong impact on the plastic manufacturing industry where plastics have become a point of scrutiny for the pollution problems in the Philippines. In the case of MPI, they are strong believers in sustainable practices but they still are affected by the attack on plastics created by the trash of the consumer.

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