THE PHILIPPINE METAL STAMPING INDUSTRY at the Crossroad of Tradition and Modernization

A 2019 Study

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The Cover: Picture taken in Lucky Tableware Factory, Inc. facility.

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Preface

To carry out our information exchange, the Department of Science and Technology – Metals Industry Research and Development Center (DOST-MIRDC), through the Technology Diffusion Division – Technology Information and Promotion Section (TDD-TIPS), engages in the conduct of industry studies and circulates publications relevant to the metals, engineering, and allied industries.

The industry study in 2019 focused on the metal stamping industry. The metal stamping industry is vital in addressing the Philippine national goal towards industrialization, particularly in the automotive, food/agriculture, and semiconductor sectors. The metal stamping industry is a reflection of the extent of our country's industrial production, and it is an opportune time to know the current condition of the industry to align the government's policies and programs toward increasing productivity and better business opportunities.

The industry study presents the overall profile of the metal stamping industry in the Philippines. It includes an assessment of the internal and external factors affecting the industry as experienced by the industry players. It also features assessment and evaluation strategies that could provide valuable insights for the metal stamping companies' strategic planning and investment decisions. Other government agencies can utilize the data of the study in formulating programs, projects, and activities (PPAs) to meet the requirements of the metal stamping industry in promoting a stable national economy.

On behalf of the DOST-MIRDC, I proudly present the "The Philippine Metal Stamping Industry at the Crossroad of Tradition and Modernization: A 2019 Study."

ROBERT O. DIZON
Executive Director, DOST-MIRDC

Acknowledgement

We would like to acknowledge the Department of Science and Technology – Metals Industry Research and Development Center (DOST-MIRDC) for prioritizing this undertaking. The funding and other logistical supports extended by the Center enabled the researchers to accomplish this endeavor.

We would like to thank the DOST-MIRDC Executive Director, Engr. Robert O. Dizon; MIRDC Deputy Executive Director for Technical Services, Dr. Agustin M. Fudolig; Technology Diffusion Division Chief, Ms. Lina B. Afable; and Technology Information and Promotion Section OIC, Ms. Zalda R. Gayahan for their innovative leadership and guidance. Our deepest thanks is extended to Mr. Romanico F. Salido of the Prototyping Division, our metal stamping subject matter expert.

Appreciation is also extended to the following: DOST VII Regional Director, Engr. Edilberto L. Paradela and Engr. Elvie C. Cenita for the information and gracious accommodation; the Department of Trade and Industry (DTI) particularly the Board of Investment (BOI) for their active involvement in the Center's activities and data gathering; the Philippine Economic Zone Authority (PEZA) for allowing our survey team access to their jurisdiction; and the Philippine Statistics Authority (PSA) for the approval to conduct the survey and access to data. Their assistance expedites the conduct of this study.

We thank the rest of the members of the industry study team their untiring dedication to further the interest of the metalworking industry:

Mr. Jim Patrick S. Erispe
Ms. Josephine R. Esguerra
Ms. Vilma A. Sia
Ms. Faith P. Macatangay
Mr. Paul John V. Luna
Mr. Ronald L. Agustin

Lastly, we express our most profound appreciation to the different metal stamping companies that, despite their busy schedule and intense production demands, gladly accommodated our survey team, responded during the survey, and actively shared their experiences during the focus group discussion (FGD). Their heartfelt concern to the metals industry fuels our determination and compels us to take on the challenge of producing relevant and substantial information vital in the improvement of the metal stamping industry.

The Authors

Dr. Alexander P. Gonzales
Engr. Eldina B. Pinca

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1. INTRODUCTION

1.1. Background

The metal stamping industry has been around since 561-546 BC, with the introduction of the earliest industrially produced coins by the Lydian in what is now modern Turkey [1]. The metal stamping process was confined to coin minting until a German bicycle manufacturer used the process in 1890. Before 1890, manufacturers relied mainly on forging and die-casting for metal parts production. With the metal stamping process, manufacturers were given a faster and cheaper option for metal parts fabrication [2]. Requirements to perform the metal stamping process include stamping presses, and stamping dies to produce high volume fabricated metal parts [3]. The metal stamping process has changed over time from manual to mechanical to today's automated and digital.

The Philippine metal stamping industry has existed since the introduction of the American industrial system during the early stage of American colonization in the Philippines. Some of the press machines that exist today are remnants of this period. Metal stamping companies in the Philippines managed to adapt to the new trends of technological development. They upgraded their production by acquiring machines and equipment with considerable tonnage and improved their process by cutting down the per work piece cycling time to a minimum.

Unfortunately, some metal stamping companies seemed to be left out in the technological and process improvement competition. These issues and concerns necessitated the DOST – Metal Industry Research and Development Center (DOST-MIRDC) to conduct an industry study of the metal stamping industry in 2019.

1.2. Objectives of the Study

Generally, this study aims to determine the present status of the metalworking industry focusing on the metal stamping companies through their general, industrial, market, and technical profile that can be used as a planning and programming tool to promote the development of the industry.

Specifically, the study aims to accomplish the following:

1. To determine the present condition of the industry in terms of its general, technical, financial, market, and workforce capabilities profile;
2. To provide a Strengths, Weaknesses, Opportunities, and Threat (SWOT) analysis of the industry;

3. To determine the industry's external environment conditions through PESTEL analysis; and
4. To present an industry competitiveness analysis through Porter's five forces model.

1.3. Methodology

This industry study utilized a convergent parallel mixed-method research design (see Figure 1) [4]. A survey questionnaire was designed to produce quantitative data on the general profile, market profile, technical profile, business perceptions, expectations, and plans of the respondent metal stamping companies. Qualitative responses were incorporated in the survey questionnaire to identify the problems encountered, issues, concerns, strengths, opportunities, weaknesses, and threats of the metal stamping industry. The questionnaire was validated and approved by the Philippine Statistics Authority (PSA) with PSA Approval No. MIRDC – 1920 with validity until March 31, 2020. The PSA also granted the DOST-MIRDC clearance to survey the metals industry-metal stamping sector in a press release dated March 29, 2019, with reference number 2019-045 (see Annex A). While administering the survey, the industry study team concurrently conducted an on-site interview to gather data for Porter's Five Forces and PESTLE analysis.

Respondents were identified through the use of lists of previous shops/companies from the Philippine Metal Stamping Sector Study 2013, identified companies of the Philippine Economic Zone Authority (PEZA), and registered companies under the Department of Trade and Industry (DTI). Other sources considered were the files of the Business Permit and Licensing Office (BPLO) from the Local Government Units (LGUs) and internet searching.

The study aimed to get at least 80% of the total population of identified local metal stamping companies in the regions included in the survey to obtain reliable data on its current status. The industry study team identified 109 potential respondent companies. Due to limited time and accessibility issues, the industry study team was able to survey 94 metal stamping companies only. The list of companies who participated in this study is presented in Annex B.

The DOST-MIRDC survey team conducted data gathering with the use of the survey questionnaire parallel with an interview (see Annex C) from April 29, 2019, to October 25, 2019. Survey results were collated and encoded to produce tabular and graphical data. Interview results were processed to produce anecdotal and coded data.

The data produced were compared and related. The researchers conducted a focus group discussion (FGD) (see Annex D) on October 15, 2019, to verify the data gathered and to collect additional inputs from the participants.

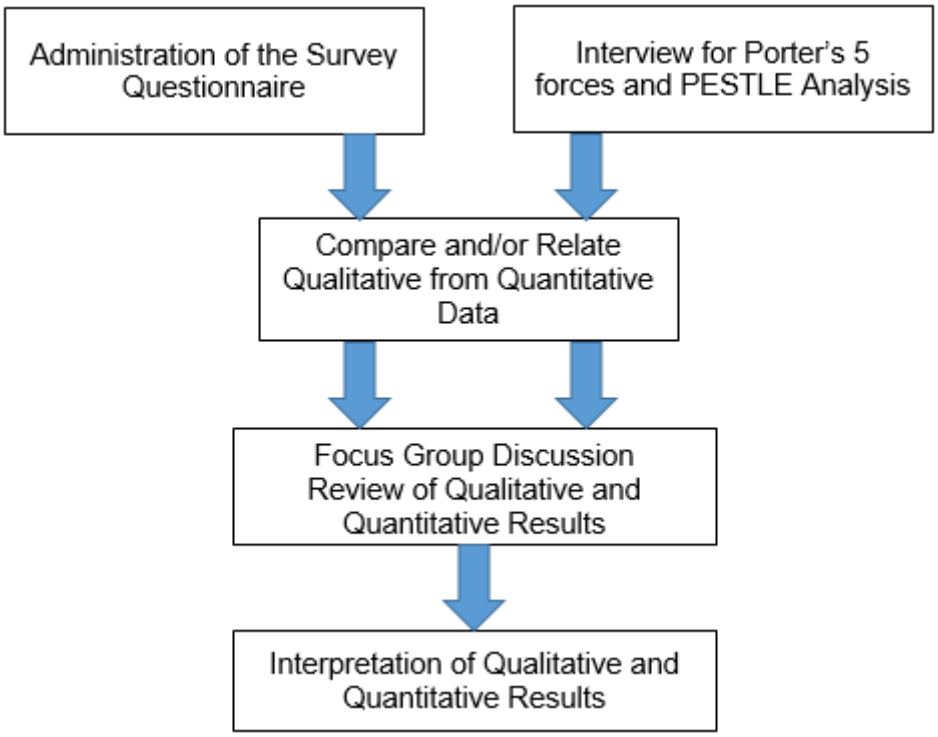


Figure 1. Convergent Parallel Mixed Method Research Design

2. INDUSTRY PROFILE

2.1. Geographical Distribution

Business location has a significant relation with the success of the business [5]. The locations of most metal stamping companies are in the metropolitan areas and economic zones of the Philippines (See Figure 2). These sites give the metal stamping companies access to ports and other means of transportation, numerous options of raw material suppliers, and closer distance to primary metal stamping clients.

There are companies located in the adjacent provinces of Metro Manila, such as Bulacan and Rizal. These locations pose longer transportation hours but offer lower operational expenses in terms of rent and labor costs.

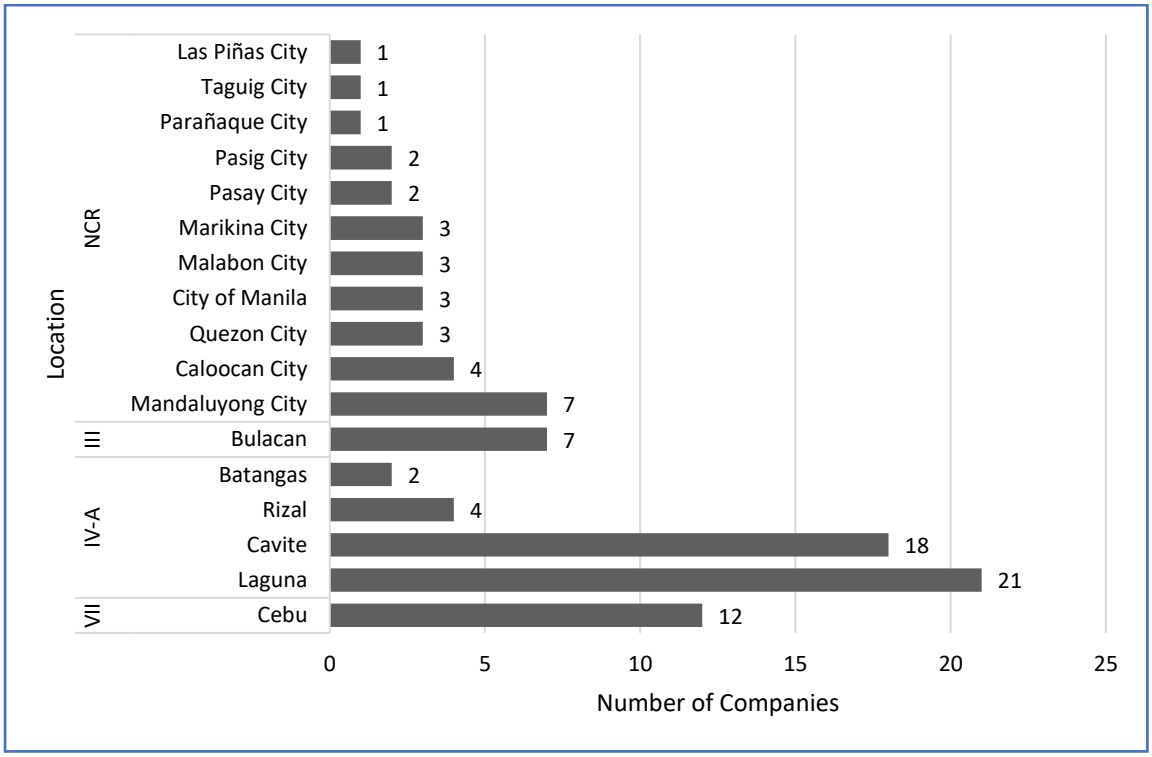


Figure 2. Business Location of Metal Stamping Companies

2.2. Status of Business Location

There are certain advantages and disadvantages to consider when deciding to either rent or own the business location. Leasing business space improves the profitability of companies but increases the corporate risk accordingly [6]. For large or established businesses, owning the business location eliminates the leasing cost to the operating expenses, which in time saves the company a considerable amount of money. Some micro- and small-sized metal stamping enterprises do not have enough capital to purchase their business space and would resort to renting to ensure the liquidity of their capital.

The majority of the metal stamping companies in the Philippines owned their business location, as reflected in Figure 3, because most are already established and have been operating for a long time.

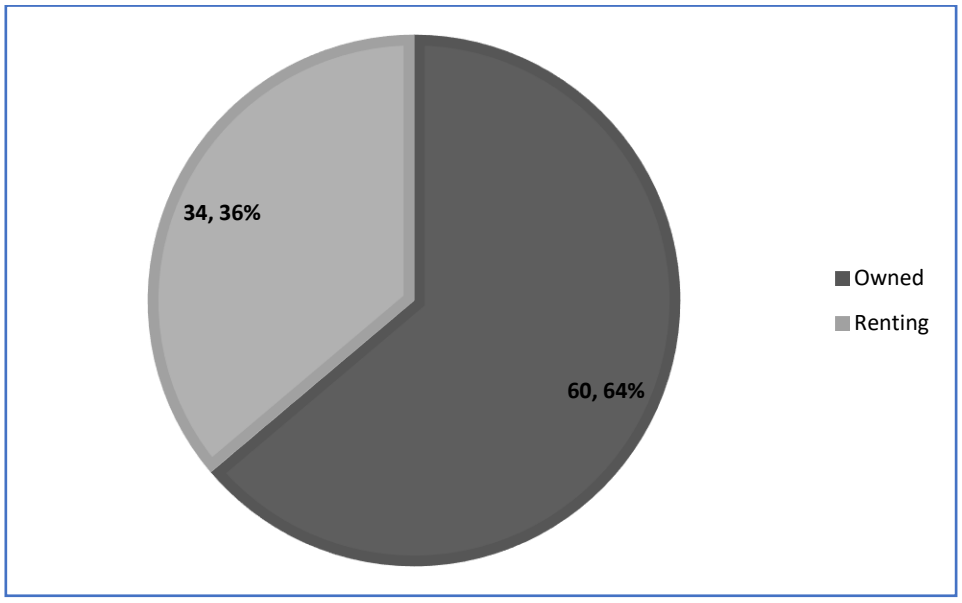


Figure 3. Status of Business Location

PEZA-located companies are usually on a long-term lease agreement for not more than 50 years and renewable once for another 25 years for companies wholly owned or controlled by aliens. For companies owned by Filipino citizens, they have the option to purchase the land [7].

Table 1. Status of Business Location per Capitalization

Category of Business in terms of Capital	Owned	Renting	Grand Total
Large	10	5	15
Medium	24	13	37
Small	19	12	31
Micro	7	4	11
Grand Total	**60**	**34**	**94**

The majority of the small and micro-enterprise also opted to operate their business in the space they owned, as reflected in Table 1. Most of the business locations are within their residential areas to save on rent expenses. Establishments who engaged on a short-term lease of business space have experienced the burden of relocating their shops. The cost of transporting their machines and equipment from one location to another is very high because it requires heavy equipment to lift and transfer them.

2.3. Year Established

Some stamping companies are time tested in terms of their production and relevance, as seen in Figure 4. The Philippine government's effort to attract more investors with the establishment of PEZA on February 21, 1995 and opening of export processing zones in different areas of the country paved the way for the establishment of more stamping companies from the 1990s to present. The majority of the metal stamping companies are not PEZA-located, but a good number of these companies are feeders of parts, dies, and tooling of PEZA-registered corporations.

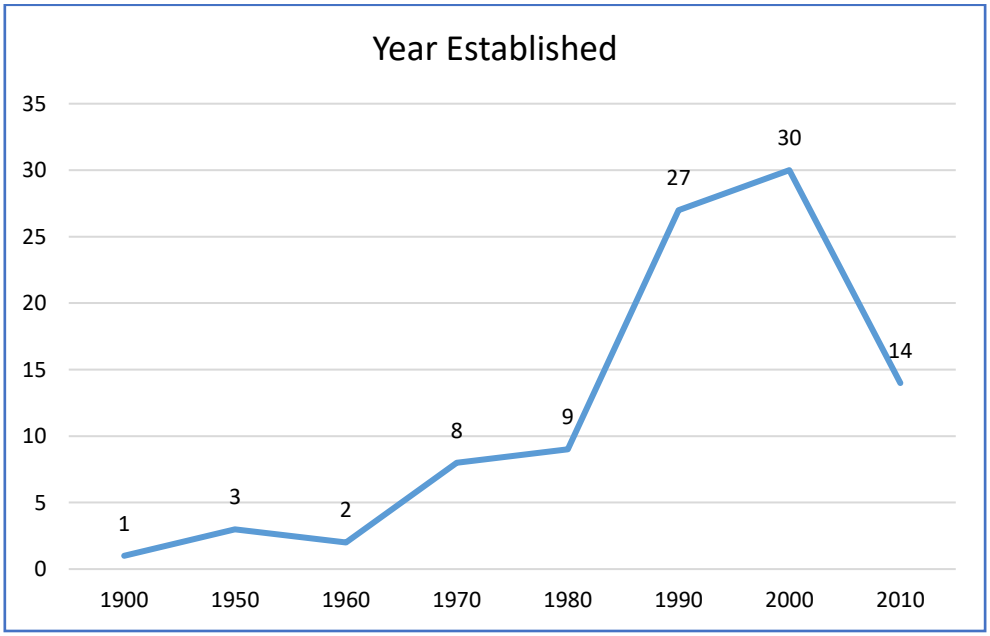


Figure 4. Year of Establishment of Respondent Metal Stamping Companies

2.4. Form of Business Organization

Most metal stamping companies in the country are corporations, as seen in Figure 5, because high capitalization is required for the acquisition of machines and equipment. Most single proprietorship metal stamping shops have limited stamping

machines which are commonly used for production of parts needed to fabricate their major products such as kitchen equipment, water tanks, toys, and souvenirs.

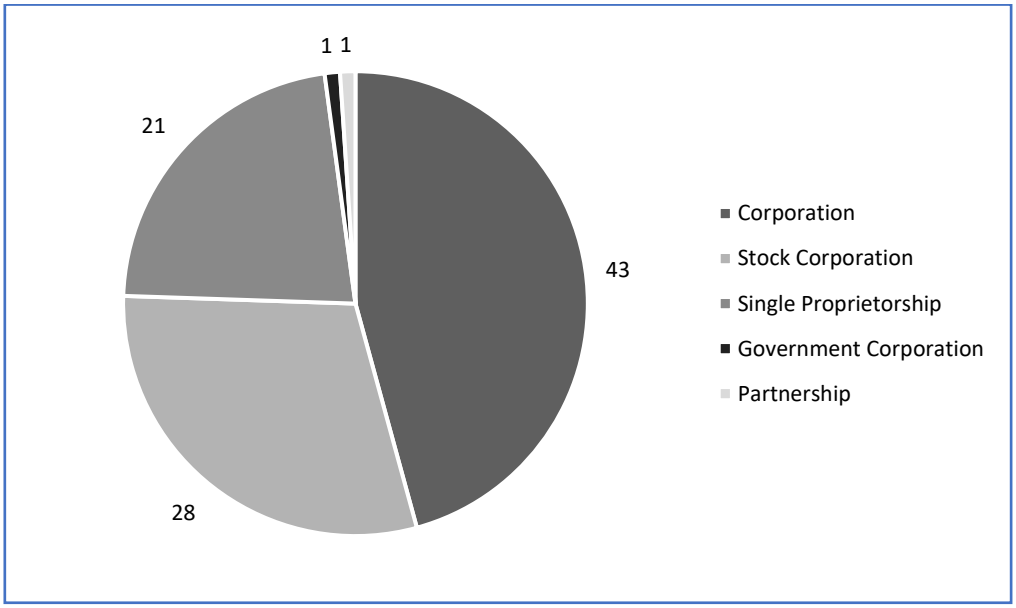


Figure 5. Form of Business Organization

2.5. Type of Economic Organization and Business Activity

The type of economic organization and type of business activity reflect the nature of the establishment visited during the survey. Majority of the establishments visited are metal stamping plant site which is also the location of their main office (refer to Figure 6). Majority or 74 of the respondent companies are independent entity, 10 are parent company, and 10 are subsidiaries of larger business organization as reflected in Figure 7.

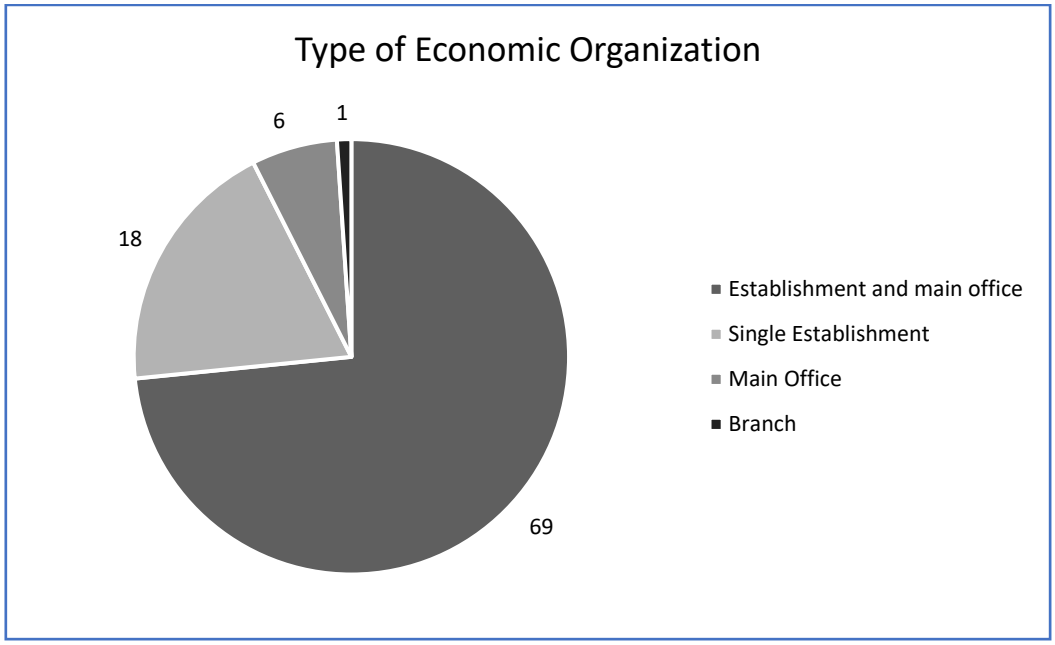


Figure 6. Type of Economic Organization

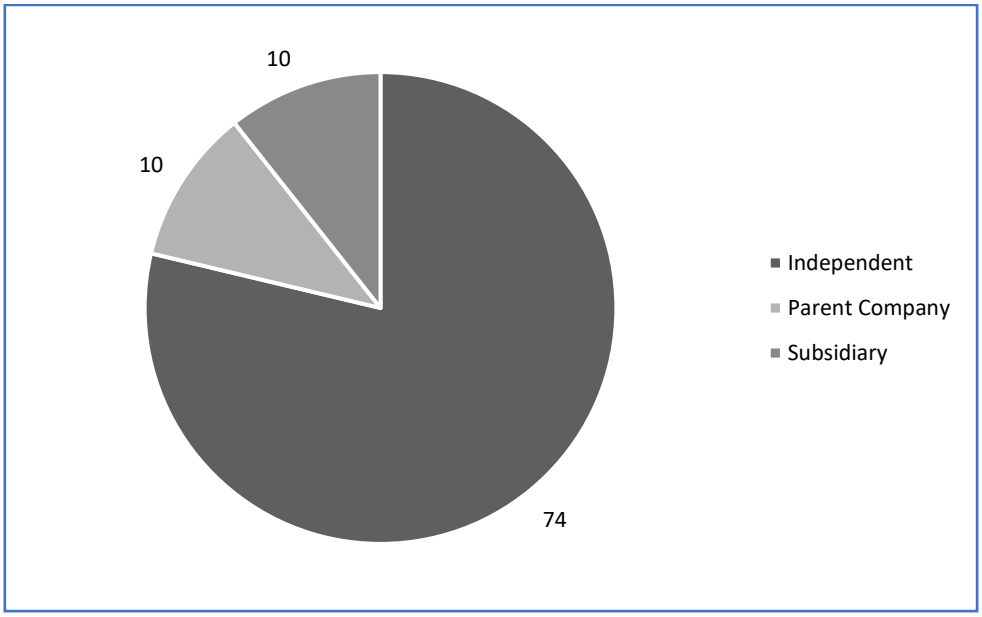


Figure 7. Type of Business Activity

2.6. Die Fabrication and Supply

Die fabrication is an integral part of the metal stamping process. Stamping is a method of cold working for sheet metal to a prescribed size and shape by means of a die and press [8]. The cost of die production affects the price of the metal stamped parts.

The higher the life cycle of tools and dies, the lower the cost of producing metal stamped parts. In Figure 8, it is apparent that the majority or 64 of the respondent metal stamping companies are capable of fabricating their dies. Metal stamping companies shared that knowledge in tool and die making is key in parts fabrication costings. Process steps can be minimized with the production of proper tool and die, thereby lowering the per piece cost of metal stamped parts in the process. They referred to this as value analysis – value engineering (VAVE) skills.

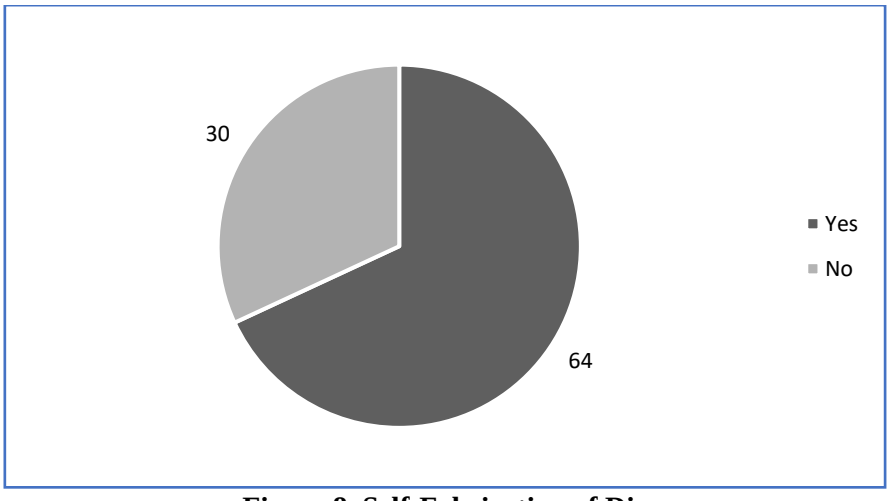


Figure 8. Self-Fabrication of Die

Among the respondent companies, 30 firms outsourced the fabrication of their dies. It is more cost-efficient for these metal stamping companies to outsource the manufacturing of tool and die instead of maintaining a tool and die fabrication unit. Quality dies usually last a long time and can endure hundreds of thousands of press cycles (see figure 9 for the life cycle of tool and die). Some companies reported that they have been using the same die since the establishment of their company decades ago.

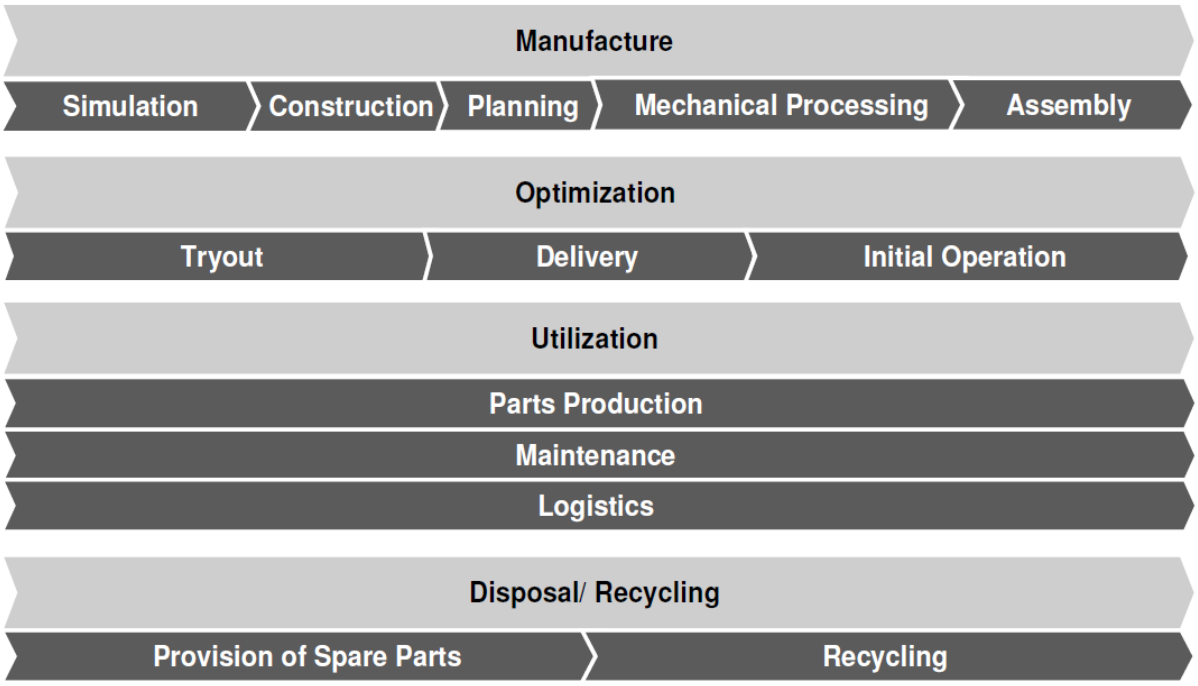


Figure 9. Detailed Life Cycle of Tool and Die [9]

2.7. Classification based on Capitalization and Number of Employees

In the early years of the metal stamping industry, large companies require a large labor force to produce volume stamped parts. It is predicted that robotics as transfer devices would replace human labor in the metal stamping industry [10]. As observed by the research team, such an advanced metal stamping process is very limited in the Philippines as of the present. Though, it can be noted in Table 2 that there are companies categorized as large based on capitalization with a minimal labor force. The decrease in the labor force is not due to robotics because most of the processes employed by the respondent metal stamping companies are short-run stamping operations [10], which still require human intervention in production. The reduction of labor can be accounted to the introduction of modern equipment such as CNC laser cutting machine and the improvement in the process most commonly referred to by respondents as 'kaizen [11].'

Table 2. Metal Stamping Companies based on Capitalization and Number of Employees

Category based on Capitalization	Category based on Number of Employees	Frequency
Large (P100,000,000 and above)	Large (200 or more)	8
	Medium (100-199)	5
	Small (10-99)	2
	Total	**15**
Medium (P15,000,001 - P100,000,000)	Large (200 or more)	5
	Medium (100-199)	6
	Small (10-99)	25
	Micro (1-9)	1
	Total	**37**
Small (P3,000,001 - P15,000,000)	Small (10-99)	30
	Micro (1-9)	1
	Total	**31**
Micro (P3,000,000 or less)	Small (10-99)	4
	Micro (1-9)	7
	Total	**11**
	Grand Total	**94**

3. TECHNICAL PROFILE

3.1. Equipment

Stamping equipment produces various quantities of shaped metals from pieces of sheets in closed dies. Table 3 shows the various stamping equipment used by the respondents of this study. There are three types of press machines: mechanical press, hydraulic press, and the hydro-pneumatic press. The most common stamping equipment is the mechanical press. Other stamping machines cited by the respondents are press machine (in general), press brake, and metal stamping machines. Tool and die facilities include CAD-CAM, CNC Lathes, die-cut machines, CNC milling, and EDM. Other stamping-related devices include riveting machines, laser machines, shearing machines, and milling machines. Quality control instruments used are caliper, micrometer, and height gauge.

Mechanical Press

This stamping equipment utilizes the vertical weight of the pressing die to impress into the surface of the pressed sheet (see picture on the right). The most frequently used capacity range of mechanical press is from 50 to less than 300 tons as reflected in Table 4 with 164 units.

Mechanical Press Machine Sample
(Source: https://bit.ly/2Q42uhz)

Hydraulic Press Machine Sample
(Source: https://bit.ly/339j5pJ)

Hydraulic Press

This type of stamping machine uses hydraulic cylinder to create a compressive force to shape the pressed metal sheet (see picture on the left). The same capacity range is true for 21 units of hydraulic press, the range 50 to less than 300 tons.

Hydro-pneumatic press

This type of press machine uses the combination of hydraulic and pneumatic forces of the pressing die to impress the shape at the metal mold (see picture on the right). The same capacity range also for 133 units of hydro-pneumatic press with capacity range of 50 to less than 300 tons.

Hydro-Pneumatic Press Machine Sample
(Source: https://bit.ly/2IE56ih)

Table 3. Distribution of Equipment Utilized by Stamping Respondents by Acquisition, Current Status, and Type of Acquisition

Type of Stamping Equipment	Quantity	Current Condition		Acquisition Status			
		Working	Non-working	Locally Produced		Imported	
				New	Second Hand	New	Second Hand
Mechanical Press	389	270	14	96	177	0	0
Hydraulic Press	57	48	2	6	29	2	8
Hydro-Pneumatic	66	50	3	37	13	3	0
Metal Stamping Machine	70	70	0	65	5	0	0
Press Machine	162	160	2	123	37	1	1
Riveting Machine/EDM	5	4	0	2	0	0	1
Press Brake	15	14	1	11	0	1	3
Sheet Metal Stamping Die (Die Cut Machine)	2	2	0	2	0	0	0
CAD-CAM	1	0	0	0	0	0	0
CNC Lathe	28	27	0	23	0	1	2
CNC Milling	0	1	0	0	0	0	1
Electric Discharge Machines	1	0	0	0	0	0	0
Laser Machine	2	1	0	1	0	0	0
Shearing Machine	17	12	0	4	4	4	0
Milling machines	2						
Caliper, Micrometer, Height Gauge)	50	30	0	4	0	26	0

Table 4. Distribution of Capacity Range of Major Stamping Equipment

Equipment	Mechanical Press	Hydraulic Press	Hydro-Pneumatic Press
Quantity (No. of Units)	389	57	66
Capacity Range			
600T and above	13	9	0
300T to less than 600T	35	14	0
50T to less than 300T	164	21	133
less than 50T	106	1	15
no capacity given	71	12	3

3.2. Manufacturing Processes

The processes employed by the stamping companies are as follows: Piercing and punching are the same, and usually combined with blanking. Pierce-and-blank is the process of simultaneous parts manufacturing. Piercing is the most common process. Forming is a process where metal is pushed and stretched to form a closed elongation, runs second with 55 responses while blanking followed with counts of 38.

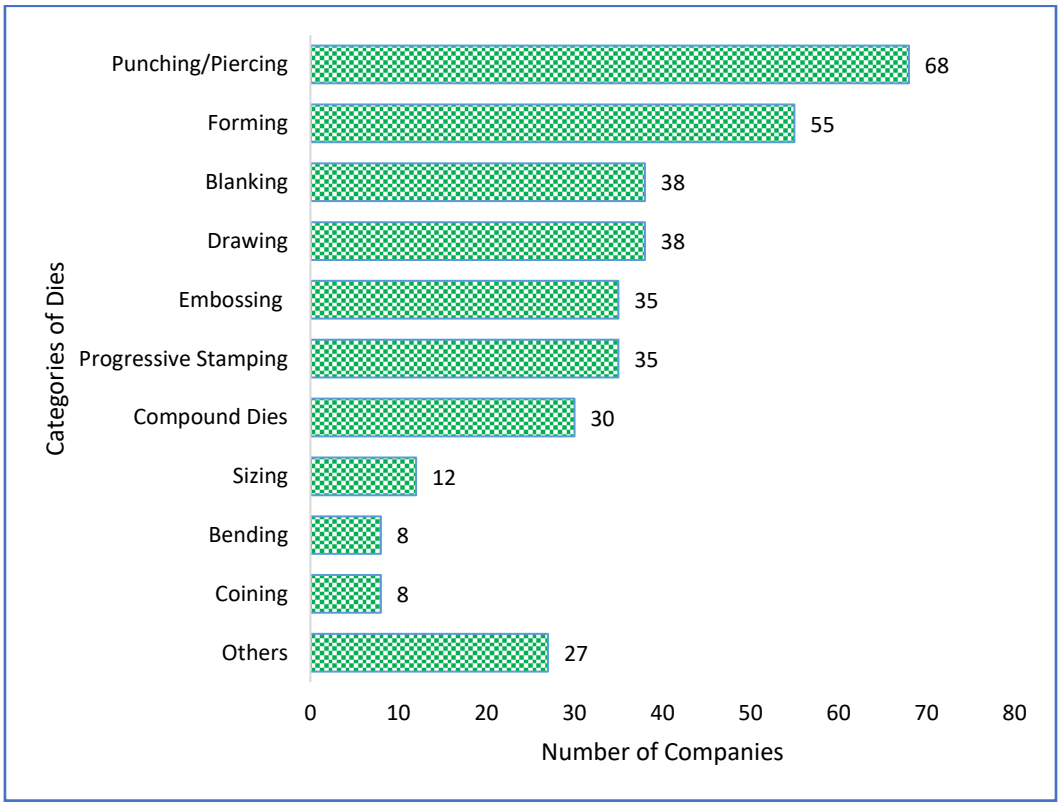


Figure 10a. Type of Dies Used

After blanking is drawing, which is a process where a blank-sheet metal is held at the edges, with the same count, 38. Then the middle section is pressed by a punch into a die to stretch the sheet into a cup-shaped drawn part. Embossing, progressive dies, compound dies, sizing, bending, and coining are also used. Other stamping processes employed include extruding, bulging, compression dies, forming, and savaging.

3.3. Other Metalworking Processes Employed by Stamping Companies

The most common partners of stamping employed by the respondents are the welding, machining, and die and mold. The welding process joins metals through the use of filler or welding rods while the machining process produces parts through turning, grinding, milling, and boring. Figure 10b shows the number of stamping companies by metalworking processes employed. As shown, the two major metalworking processes

utilized by respondent companies are welding and machining. The die and mold process is commonly employed as it produces dies used by the stamping companies to stamp massively. Other methods are surface finishing or electroplating, heat treatment, forging, and metalcasting.

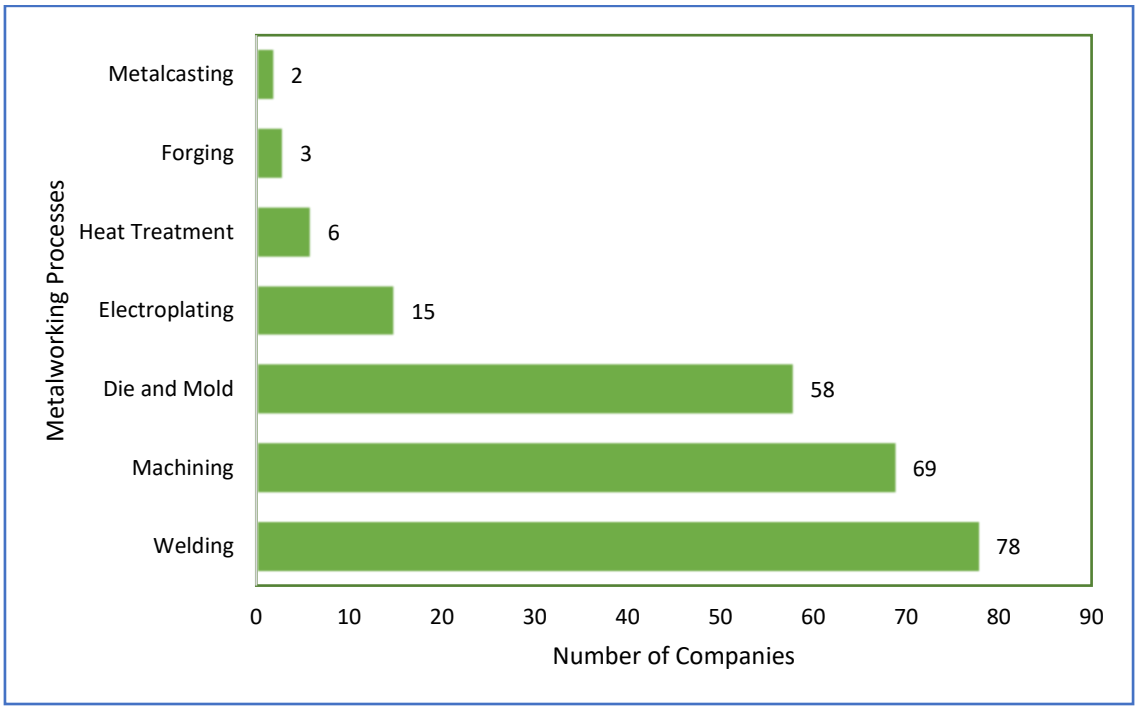


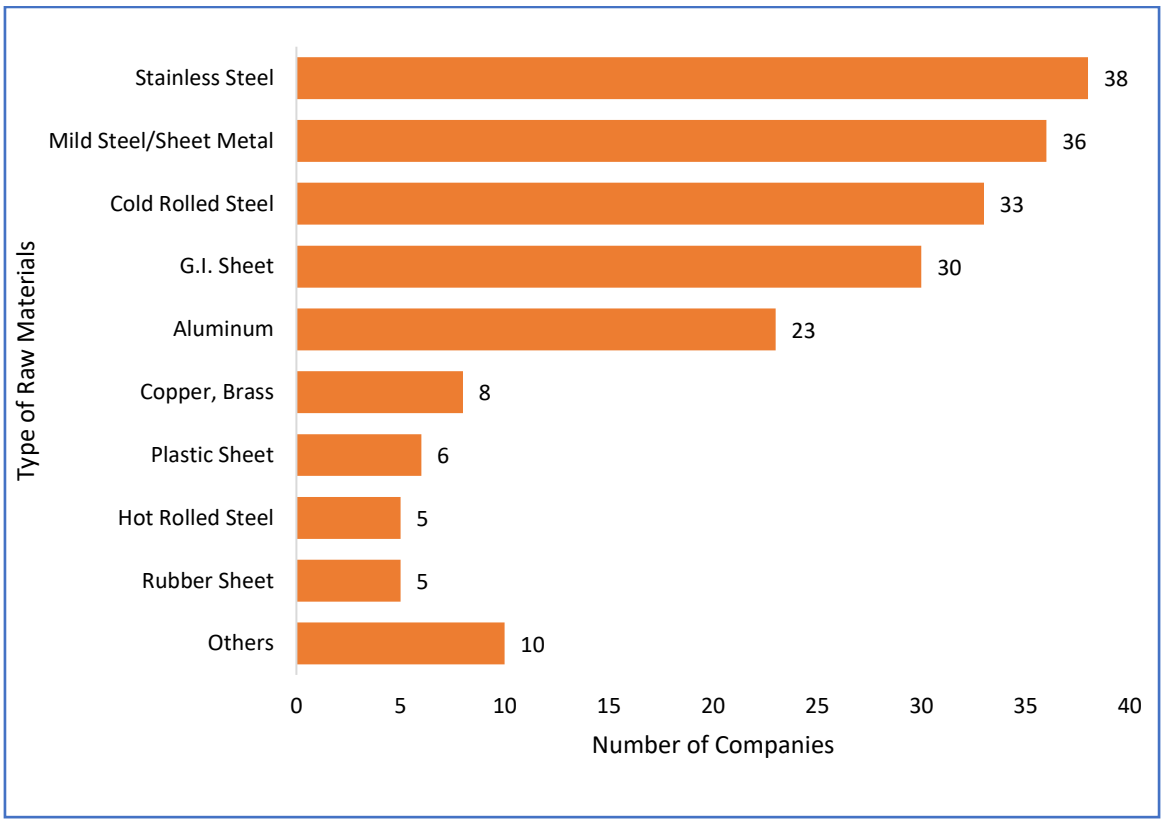
Figure 10b. Other Metalworking Processes Employed by Stamping Companies

Table 6 displays the total volume of raw materials used by stamping companies for 2018. There were 71 responses when asked where these were sourced: 11 answered imported; 35 chose local; 3 have both local and imported.

Table 5. Total Volume of Raw Materials Used by Stamping Companies

Raw Materials	No. of Kgs/Year		Total Volume
	Local	Imported	
Sheet Metal	385,308.99	1,680,300.00	2,065,608.99
Aluminum	349,927.69	48,027.46	397,955.99
Stainless Steel	44,636.09	254,016.92	298,653.01
Cold Rolled Steel (CRS)	94,300.39	128,575.55	222,875.94
Galvanized Iron (GI) Sheet	205,437.73	50.00	205,487.73
Copper	773.06	510.29	1,283.35
Plastics	1,182.00	319.13	1,501.13
Rubber	12,350	24.00	12,374.00
Hot Rolled Steel, special steel, tool steel	145,782.85	0	145,782.85
Others (brass, bronze)	4,950.00	2,002.20	6,952.20
Total	1,245,660.80	2,113,825.55	3,358,474.99

Figure 11 shows the number of metal stamping companies based on the type of raw materials they used for the year 2018. Commonly used raw materials are metal sheets, stainless steel, cold-rolled steel, galvanized iron sheets, and aluminum. Others include bronze, brass, and black iron sheets.



Note: multiple responses

Figure 11. Distribution of Stamping Companies by Type of Raw Materials Utilized

3.4. Quality Requirements of the Customers

Customers are companies or individuals that purchase goods and services from other companies or individuals. Quality requirements are defined by the customers and should be strictly met by the stamping companies. These requirements are necessary to improve the quality of the products and services. Concerning the quality requirements of metal stamped parts, all respondent metal stamping companies replied that specific dimensions or measurements are the requirements of their clients, as seen in Figure 12. Addressing this requirement calls for precision tooling and dies. Some clients also require physical, mechanical, and hardness tests, but these can be augmented by the quality of raw materials and certification from suppliers.

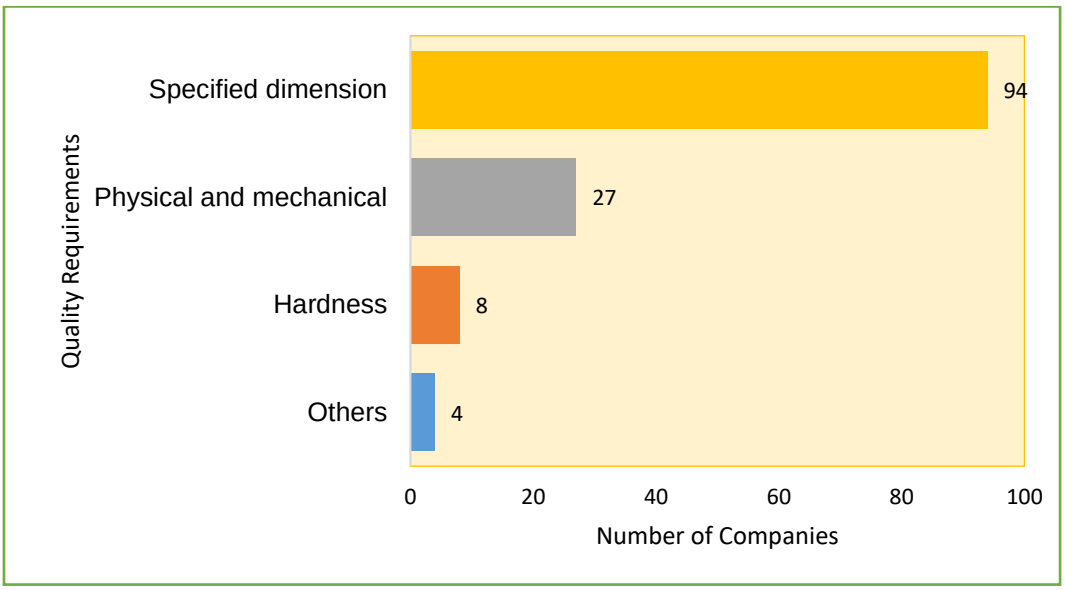


Figure 12. Quality Requirements of Clients

Table 7 shows the problem in production commonly experienced by the metal stamping companies. Among the top problems of the stamping industry are human resource, materials, and equipment. The attrition of skilled workers has been a problem of the metals industry for some time. The prospect of higher pay earned from overseas work seems to be too irresistible for Filipino skilled workers. The varying quality of raw materials is also a concern because the quality of stamped parts depends much on the quality of raw materials. The composition of raw materials affects the rate of defects or rejections. Downtime of equipment due to breakdown is also a problem to some metal stamping companies. Second-hand press machines need constant maintenance to perform well.

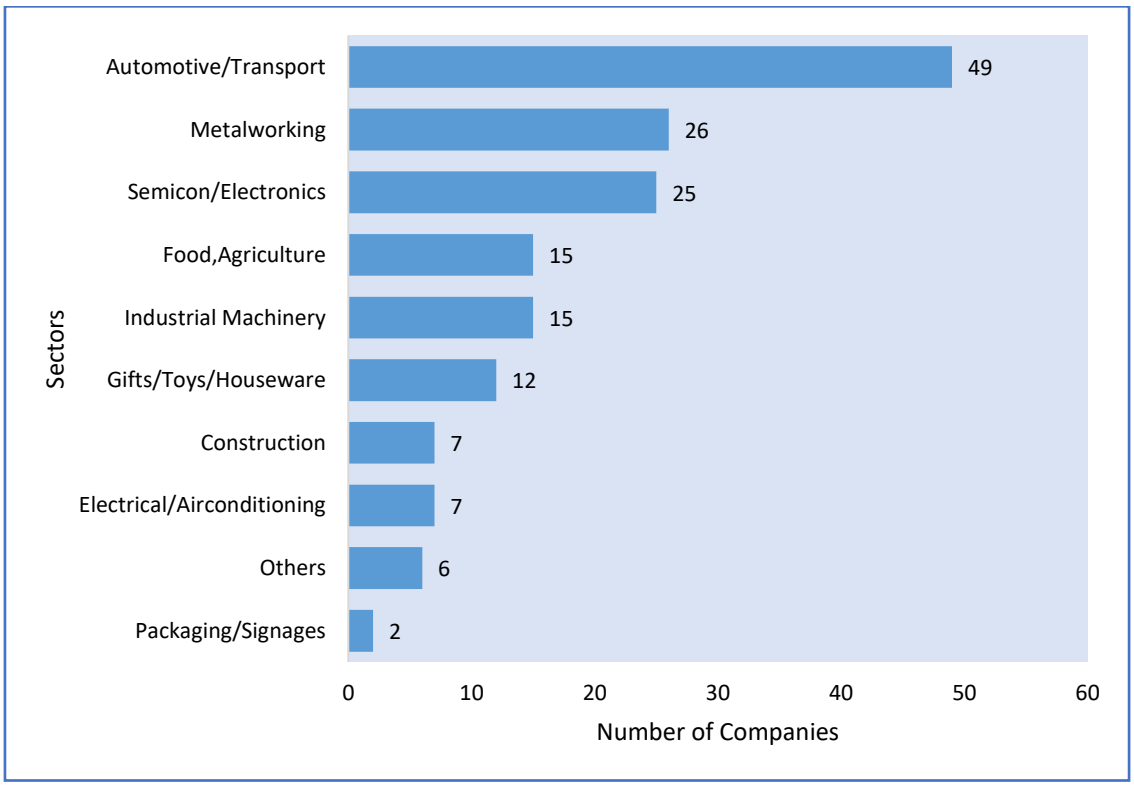
Table 6. Problems in Production

Region	Human Resource	Materials	Equipment	Safety	Utilization Rate of Equipment	Shop Lay-Out	Quality Control / Quality Assurance	Utilities
III	2	4				1		
IV-A	12	16	7	3	3	1	2	2
NCR	9	7	6	4	2	2	1	1
VII	11		1	1		1		
Grand Total	**34**	**27**	**14**	**8**	**5**	**5**	**3**	**3**

4. MARKET PROFILE

4.1. Sector Served by the Stamping Industry

The primary sectors being served by the Philippine metal-stamping-industry are the automotive or transport sector, the metalworking sector, and the semiconductor or electronic sector, as shown in Figure 13. The sales of vehicles in the Philippine is continuously increasing as featured in Figure 14. Even with the signing of RA10963 or the TRAIN law, which dramatically increased the taxes imposed on motorized vehicles, the sale of cars and other means of transport, though slow, is still improving [12]. These sectors fuel the demand for metal stamped parts in the Philippines.



Note: multiple responses

Figure 13. Sector Served by the Stamping Industry

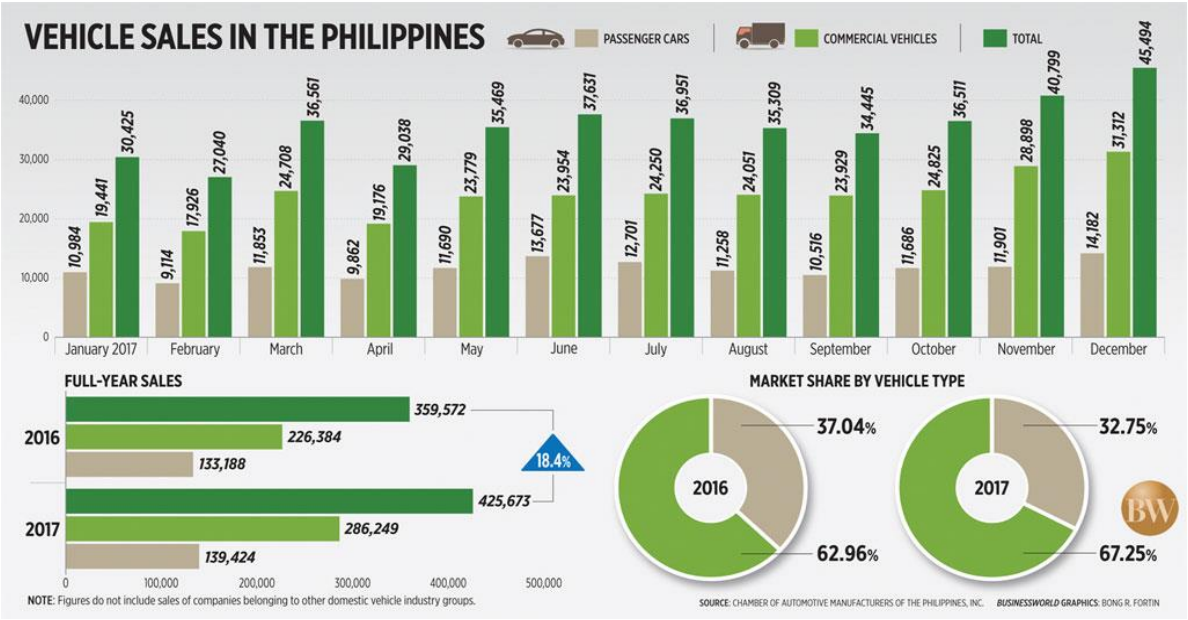


Figure 14. Vehicle Sales in the Philippines [12]

4.2. Employees and Production

The respondent metal stamping companies categorized as medium in terms of capitalization are 37, and small is 31 for a total of 68 out of 94 metal stamping companies in this study (see Table 8). By the number of existing shops, the medium and small capitalization metal stamping companies dominate the Philippine market, and the data on the total cost of production in Table 9 shows that medium and small capitalization companies are controlling about 47% of the total production from 2016 to 2018. The data in Table 8 on the total number of employees provide another perspective, the number of employees by large companies in terms of capitalization outnumbers that of the medium and small capitalization companies combined. The average number of employees per company shows that large-capitalization enterprises have an average of 406 employees, while medium-capitalization enterprises have an average of 98. The 2018 average per plant production of large-capitalization enterprises is P375M. The medium and small capitalization enterprises 2018 average per plant production is P102M and P17M, respectively (see Table 10). This data suggested that the large capitalization metal stamping companies in the Philippines are operating on a different level. It was shared by the respondents that when clients require consistent high-volume production they usually turn to large capitalization metal stamping companies because they have the capabilities in terms of machines and equipment.

Table 7. Average Number of Employees per Capitalization

Category based on Capitalization and Number of Employees	Number of Companies	Total Number of Employees	Average Number of Employees
Large (P100000000 and above)	**15**	**6083**	**406**
Large (200 or more)	8	5451	681
Medium (100-199)	5	570	114
Small (10-99)	2	62	31
Medium (P15000001 - P100000000)	**37**	**3639**	**98**
Large (200 or more)	5	1511	302
Medium (100-199)	6	711	119
Micro (1-9)	1	8	8
Small (10-99)	25	1409	56
Small (P3000001 - P1500000)	**31**	**823**	**27**
Micro (1-9)	1	8	8
Small (10-99)	30	815	27
Micro (P3000000 or less)	**11**	**202**	**18**
Micro (1-9)	7	25	4
Small (10-99)	4	177	44
Grand Total	**94**	**10747**	**114**

Table 8. Total Production per Capitalization

Row Labels	Actual Number of Responses	Sum of 2016 Total Production	Sum of 2017 Total Production	Sum of 2018 Total Production
Large (P100000000 and above)	6	2,046,983,537	2,204,673,458	2,253,999,545
Medium (P15000001 - P100000000)	30	2,811,848,721	3,020,369,667	3,069,452,839
Small (P3000001 - P1500000)	26	448,027,833	451,479,070	454,206,433
Micro (P3000000 or less)	8	34,600,000	36,880,000	33,500,000
Grand Total	**70**	**5341460091**	**5713402195**	**5811158817**

Table 9. Average of Total Production per Capitalization

Row Labels	Actual Number of Responses	Average of 2016 Total Production	Average of 2017 Total Production	Average of 2018 Total Production
Large (P100000000 and above)	6	341,163,923	367,445,576	375,666,591
Medium (P15000001 - P100000000)	30	93,728,291	100,678,989	102,315,095
Small (P3000001 - P1500000)	26	17,231,840	17,364,580	17,469,478
Micro (P3000000 or less)	8	4,325,000	4,610,000	4,187,500
Grand Total	**70**	**76306573**	**81620031**	**83016555**

4.3. Level of Competition

Competition in the target market is considered very high to moderate for most of the respondent metal stamping companies, as seen in Figure 15. For micro, small, and medium enterprise (MSMEs) metal stamping companies, maintaining their clients is not a problem, especially if those clients have been with them for a very long time. The MSMEs metal stamping companies can deliver high-quality precision parts though they have limitations in terms of volume production. The problem of the MSMEs is capturing new markets and clients. They perceived that the current playing field is already saturated, as seen in Table 11. For large metal stamping companies, other smaller industry players are not a threat in their current productions and clients because, at the moment, they are the only ones capable of delivering both the quality and volume requirements of their clients.

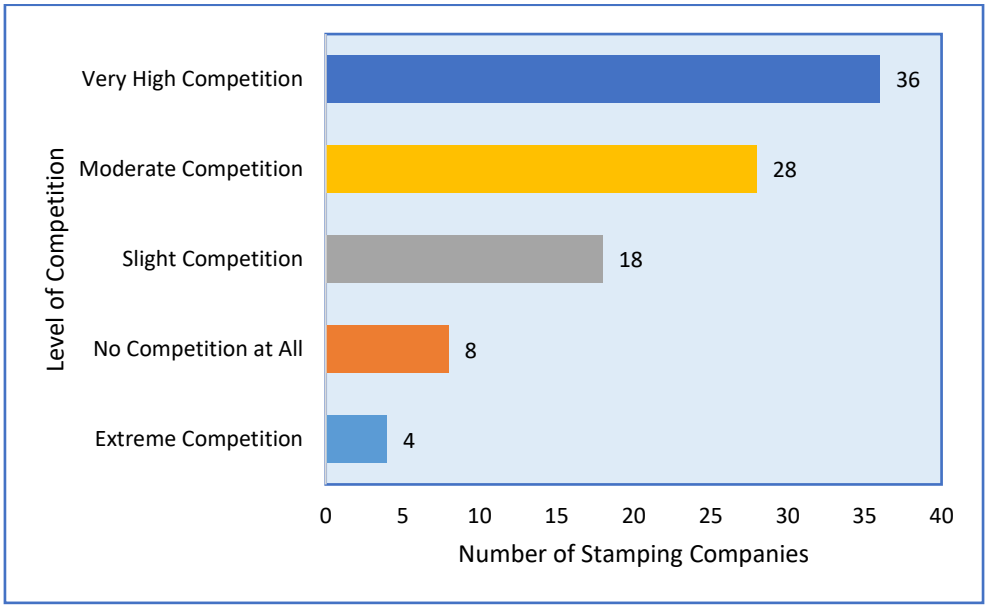


Figure 15. Level of Competition in the Target Market

Table 10. Level of Competition in the Target Market per Capitalization

Category in terms of Capitalization	LEVEL OF COMPETITION					
	No Competition at All	Slight Competition	Moderate Competition	Very High Competition	Extreme Competition	Grand Total
Large (P100000000 and above)	3	5	4	4	0	16
Medium (P15000001 - P100000000)	4	6	8	16	2	36
Small (P3000001 - P1500000)	1	6	12	12	0	31
Micro (P3000000 or less)	0	1	4	4	2	11
Grand Total	**8**	**18**	**28**	**36**	**4**	**94**

4.4. Production from 2016 to 2018

The cost of total production for the metal stamping industry is increasing from 2016 to 2018, as shown in Figure 16. When the result on total production is plotted per region, it shows that the region with the highest production output is Region 3, followed closely by Region 4A, as seen in Figure 17. MSMEs in the NCR and Region 7 are usually located within the city and cannot have a maximum production of stamped parts due to the noise created by the press machines. They often have a specific time of production so as not to disturb residential areas around the vicinity of their shops. In comparison, shops in Regions 3 and 4A are usually located within economic zones, or they have an operation plant with large land areas. With this ideal condition, the noise received by the adjacent communities is minimized, allowing them to conduct 24 hours of production when they are rushing for volume job orders.

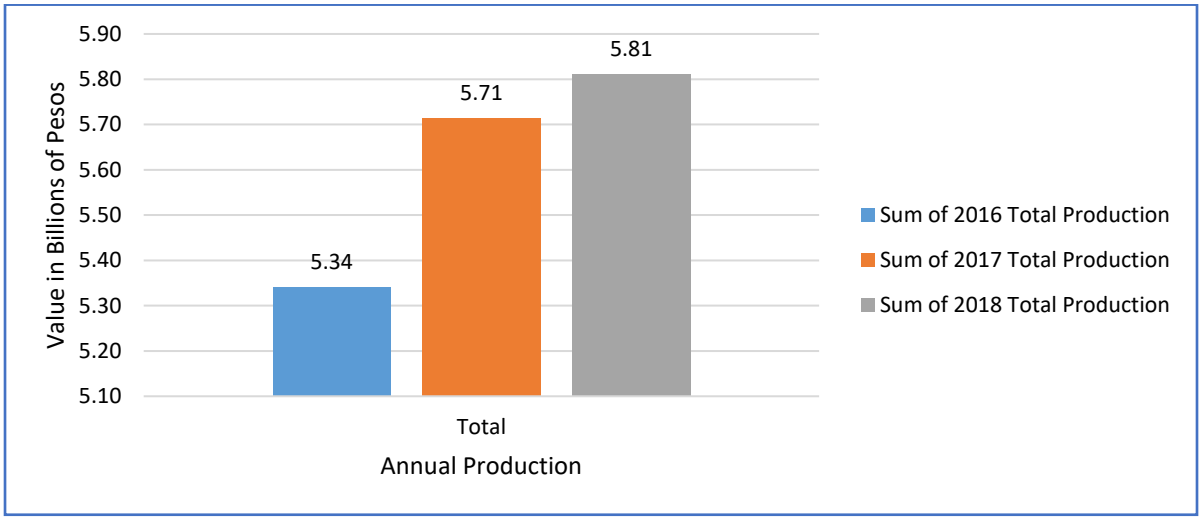


Figure 16. Total Production from 2016 to 2018

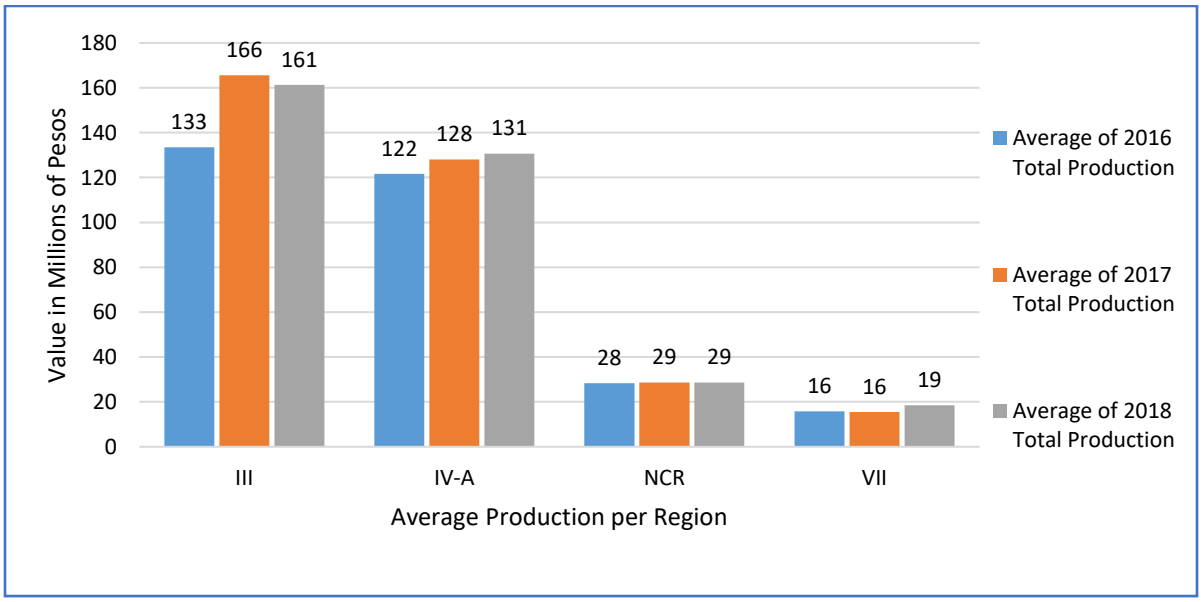


Figure 17. Total Production from 2016 to 2018 per Region

4.5. Future Business Outlook

The majority of the respondent metal stamping companies are optimistic in the condition of the current stamped parts market and the economic status of the country as a whole (see Table 12) because they have uninterrupted production at the moment and job orders are stable.

Table 11. Perception on the Condition of the Current Stamped Parts Market

Region	Depends on	Don't know	Optimistic	Pessimistic	(blank)	Grand Total
III	0	0	7	0	0	7
IV-A	3	0	36	2	4	45
NCR	3	2	19	2	4	30
VII	0	2	9	1	0	12
Grand Total	**6**	**4**	**71**	**5**	**8**	**94**

The majority of them are even planning to increase their current production, business condition, average selling price, and the number of people in 2019 and for the next five years (see Table 13 and Table 14). Respondent companies shared that they are expecting more productions in the future. They said that some discontinued job orders are now being negotiated for fabrication once again. This condition is evident for metal stamping companies involved in the relaunching of some AUV models.

Table 12. Expectations for the Current Year (January 1 – December 31, 2019)

Expectations	Expectations for the Current Year (January 1 – December 31, 2019)					
	Production	Export Order	Import Order	Business Condition	Average Selling Price	Number of People
Increase	64	9	22	58	60	53
Decrease	10	2	6	12	10	13
No Change	20	83	66	24	24	28
Grand Total	94	94	94	94	94	94

Table 13. Future Action for the Next 5 Years (2020 -2024)

Expectations	Future Action for the Next 5 Years (2020 -2024)					
	Production	Export Order	Import Order	Business Condition	Average Selling Price	Number of People
Increase	77	73	73	67	68	66
Decrease	4	21	21	4	6	7
No Change	13	0	0	23	20	21
Grand Total	94	94	94	94	94	94

Though only a handful of the metal stamping companies have plans to establish additional plant sites, most of them are convinced that they are capable of developing another production line within the next five years (see Table 15).

Table 14. Plans for Future Expansion

Plans	for the Current Year (January 1 – December 31, 2019)		Future Action for the Next 5 Years	
	Plan to Branch Out	Expansion of Production Line	Plan to Branch Out	Expansion of Production Line
With	6	72	13	86
Without	88	22	81	8
Grand Total	94	94	94	94

4.6. Engagement in Exportation

Most of the metal stamped parts are not being exported, as reflected in Figure 18. The metal stamping companies support the automotive, metalworking, and other industries in the Philippines. These industries assemble their products in the country for local and foreign markets. Metal stamping companies in the Philippines can be considered indirect exporters. Indirect exporters or value-added exporters are manufacturers who export through international wholesalers, whereby a substantial portion of global trade is facilitated by intermediaries [13]. Those that are engaged in direct exportation are highly specialized metal stamped parts manufacturers such as vintage automotive parts and patented parts in the case of firearms and ammunition.

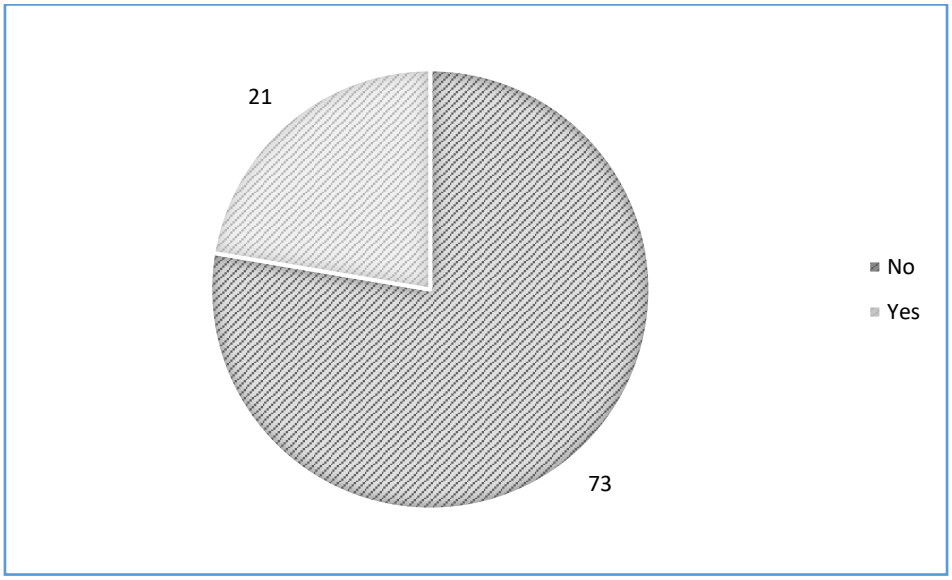


Figure 18. Engagement in Exportation

4.7. Imports and Exports Status

Table 16 shows the value and volume of imports relative to stamping from the top 10 performing countries. By volume, China dominates the market with 3.9M kg. of stamped products followed by Japan with 1.4M kg. By value, Japan stamped

products hold the top rank with US$9.76M, followed by China with US$1.04M. This data illustrates that Japanese stamped products though lesser in weight, hold more value in terms of cost contrary to China's higher volume but lesser in cost. This data also revealed that in the cost to weight ratio, China has the lowest cost among the top-performing countries with US$0.27 per kilogram of stamped products. These figures confirm the observations shared by the respondent metal stamping companies that low cost stamped products from China flood the Philippine market.

Table 15. Value and Volume of Philippine Imports for 2018

Rank	Top 10 Performing Countries	Gross Kilo (in Kg)	CIF Value (in USD)	Cost/Kg (in USD)
1	JAPAN	1,414,989.67	**9,765,074.00**	6.90
2	PEOPLE'S REPUBLIC OF CHINA	**3,906,533.53**	1,042,665.00	**0.27**
3	UNITED STATES OF AMERICA	95,840.87	794,080.00	8.29
4	SINGAPORE	410,545.84	631,963.00	1.54
5	HONG KONG, CHINA	150,979.96	279,272.00	1.85
6	GERMANY	114,485.82	257,423.00	2.25
7	MALAYSIA	146,127.31	225,242.00	1.54
8	REPUBLIC OF KOREA	320,317.11	218,735.00	0.68
9	TAIWAN (REP. OF CHINA)	463,649.58	173,482.00	**0.37**
10	THAILAND	123,465.21	144,300.00	1.17

Source: Foreign Trade Statistics of the Philippines, PSA

Among the top import products relative to stamping are dies for drawing or extruding metal, interchangeable tools, and tools for drilling, among others (see tables 17). This data reflected the need to improve the technological and production capabilities of the Philippine tool and die makers.

Table 16. Philippine Imports of Stamping, by Product Type 2018

Rank	Top 10 Commodities	Gross Kilo (in Kg)	CIF Value (in USD)
1	- Dies for drawing or extruding metal	375,210.91	**5,678,169.00**
2	- Other interchangeable tools	**2,109,012.35**	3,752,183.00
3	- Tools for drilling, other than for rock drilling	1,787,749.58	1,669,661.00
4	Rock drilling or earth boring tools	648,116.30	867,810.00
5	- - Electrically operated	1,300,024.14	576,806.00
6	- Tools for pressing, stamping or punching	326,536.14	416,265.00
7	- Tools for tapping or threading	278,089.82	381,769.00
8	- - - Electrically operated	586,944.91	333,476.00
9	- Tools for milling	68,033.46	251,822.00
10	- - With working part of cermets	95,394.84	137,006.00

Source: Foreign Trade Statistics of the Philippines, PSA

The top export destination of Philippine stamped parts, and other stamping related products are the United States of America, with US$3.4M worth of products and Japan with US$2.1M (see Table 18). It can also be observed that Thailand has the highest cost per kilogram of export. The top commodities for export are interchangeable tools, tools for press, stamping or punching, and electrically operated tools and equipment (see Table 19).

Table 17. Value and Volume of Philippine Exports for 2018

Rank	Top 10 Performing Countries	Gross Kilo (in Kg)	FOB Value (in USD)	Cost/Kg (in USD)
1	UNITED STATES OF AMERICA	**255,964.71**	**3,372,505.00**	13.18
2	JAPAN	221,011.91	2,095,153.00	9.48
3	SINGAPORE	9710.95	554,604.00	57.11
4	AUSTRALIA	7909.44	342,197.00	43.26
5	CANADA	30,436.00	340,794.00	11.20
6	BELGIUM	30,430.00	333,841.00	10.97
7	TAIWAN (REP. OF CHINA)	19,153.72	129,859.00	6.78
8	REPUBLIC OF KOREA	17,286.04	129,114.00	7.47
9	UK OF GREAT BRITAIN AND N. IRELAND	5,248.00	71,720.00	13.67
10	THAILAND	378.57	38,254.00	**101.05**

Source: Foreign Trade Statistics of the Philippines, PSA

Table 18. Philippine Exports of Stamping, by Product Type 2018

Rank	Top 10 Commodities	Gross Kilo (in Kg)	FOB Value (in USD)
1	- Other interchangeable tools	**436,071.46**	**5,504,401.00**
2	- Tools for pressing, stamping or punching	280,594.73	2,611,176.00
3	- - Electrically operated	73,620.00	566,562.00
4	- Tools for boring or broaching	339.66	279,654.00
5	Rock drilling or earth boring tools	5,914.00	229,640.00
6	- Dies for drawing or extruding metal	3,048.90	190,459.00
7	- Tools for drilling, other than for rock drilling	18,100.62	168,966.00
8	Diamond drill bits	18.00	9,604.00
9	- - With working part of cermets	227.43	9,421.00
10	- Tools for milling	9.97	6,972.00
	Total	**817,944.77**	**9,576,855.00**

Source: Foreign Trade Statistics of the Philippines, PSA

Import and export data illustrated in Figure 19 showed that operations and outputs of the stamping industry in the Philippines are steadily rising from 2015 to 2017 but took a nosedive in 2018. The only significant change in the business environment factors is the implementation of the TRAIN law. It is observable from the data that the Philippine stamping industry is still import-dependent, but somehow, it is exerting an effort to balance the trading system.

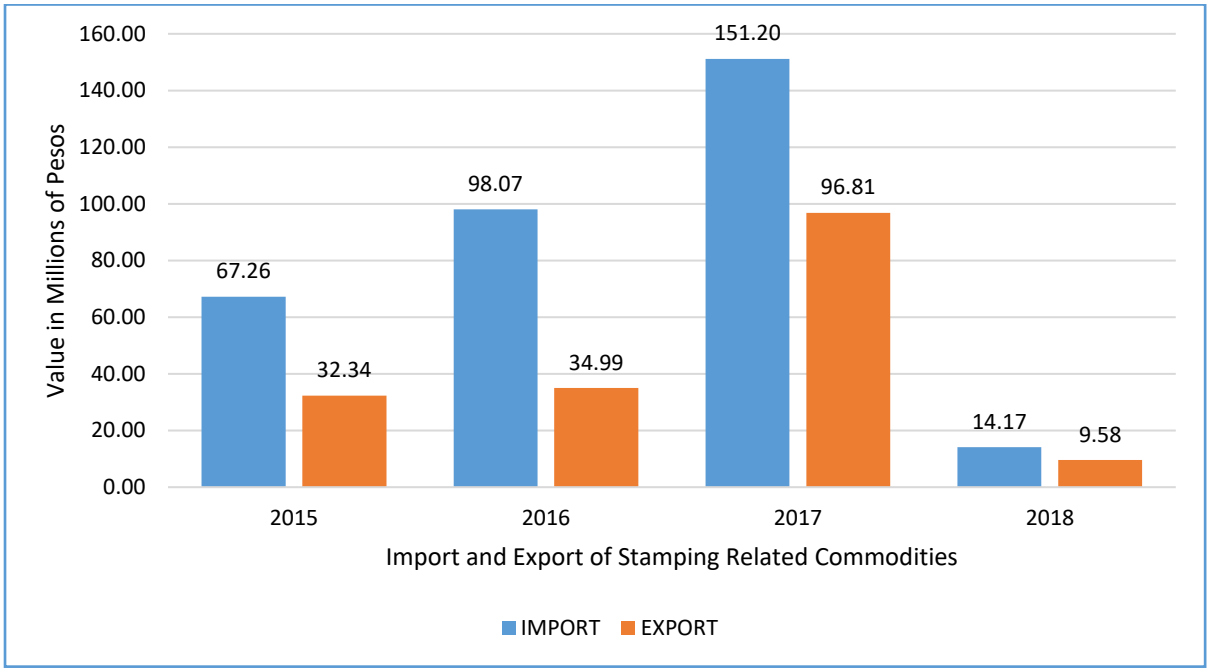


Figure 19. Philippine Import and Export of Stamping Related Commodities for 2015 to 2018

5. SWOT Analysis

Strengths and weaknesses of companies are internal factors that companies have control of, while opportunities and threats are external factors that companies have no control of, but both affect their operations.

5.1. Strengths and Weaknesses

Responses for strengths and weaknesses are chosen from six categories - very strong, strong, neutral, weak, very weak, and none/not applicable, depending on the respondents' perception of the status of their companies on the different factors provided.

It can be observed from Table 20 that the strengths of the metal stamping industry in the Philippines lie on their company reputation, quality of product and/or service, and company location. Internal R&D can be a potential weakness for the metal stamping industry though it had a 3.27 mean score or a verbal interpretation of neutral. Other potential weaknesses are the pool of skilled workforce and internal quality control.

Table 19. Strengths and/or Weaknesses per Region

Strengths and/or Weaknesses	Region				Grand Total
	III	IV-A	NCR	VII	
Shop / Company Reputation	4.00	4.18	4.36	4.42	**4.25**
Quality of Products and/or Services	4.00	4.13	4.21	4.00	**4.13**
Shop / Company Location	3.57	4.18	3.89	4.33	**4.06**
Market Reach	3.43	3.90	3.96	3.92	**3.89**
Output Capacity	3.57	3.95	3.75	4.00	**3.86**
Production Efficiency	3.29	3.95	3.86	3.67	**3.83**
Marketing Strategy	3.86	3.84	3.70	3.83	**3.80**
Facilities and Equipment	3.43	3.92	3.71	3.83	**3.80**
Financial Resources	3.29	3.87	3.70	3.92	**3.78**
Internal Quality Control System	4.00	3.85	3.57	3.42	**3.70**
Pool of Skilled Workforce	3.43	3.54	3.61	3.50	**3.55**
Internal Research and Development	3.00	3.25	3.25	3.67	**3.27**

Ratings: 5 – Very Strong; 4 – Strong; 3 – Neutral; 2 – Weak; 1 – Very Weak; 0 – None/Not Applicable

In comparing data from Table 20 and Table 21, it can be observed that Region 3 production efficiency and financial resources are an issue, especially for the small and micro-enterprise. Financial resources and facilities and equipment are perceived strengths for large metal stamping companies. Though the score is not that low for large metal stamping companies, they can still improve in terms of internal research and development, market reach, production efficiency, and marketing strategy. Small and micro metal stamping companies surprisingly have an outstanding market reach because of their specialized nature.

Table 20. Strengths and/or Weaknesses per Capitalization

Strengths and/or Weaknesses	Category based on Capital				Grand Total
	Large	Medium	Small	Micro	
Shop / Company Reputation	4.54	4.39	4.03	4.09	4.25
Quality of Products and/or Services	4.46	4.06	4.10	4.00	4.13
Shop / Company Location	4.08	4.27	3.90	3.80	4.06
Market Reach	4.00	3.91	3.90	3.64	3.89
Output Capacity	4.31	3.88	3.77	3.50	3.86
Production Efficiency	4.00	3.79	3.90	3.55	3.83
Facilities and Equipment	4.31	4.12	3.43	3.20	3.80
Marketing Strategy	4.00	3.88	3.75	3.45	3.80
Financial Resources	4.33	3.94	3.60	3.10	3.78
Internal Quality Control System	4.15	3.85	3.47	3.14	3.70
Pool of Skilled Workforce	4.15	3.48	3.50	3.10	3.55
Internal Research and Development	3.25	3.52	3.00	3.00	3.27

Ratings: 5 – Very Strong; 4 – Strong; 3 – Neutral; 2 – Weak; 1 – Very Weak; 0 – None/Not Applicable

5.2. Opportunities and Threats

Responses for opportunities and threats are also chosen from six categories – fast improving, improving, unchanging, declining, fast declining, and none/not applicable depending on the respondents' perception of the experiences of their companies concerning outside forces relevant to their operations.

Perception of the improving condition of customer satisfaction, market for product and/or services, and demand for products and/or services are seen as opportunities for the metal stamping industry. At the same time, the declining state of government assistance and subsidies, partnerships/linkages, and tax policies are potential threats (see Table 22). It can be observed in Table 23 that tax policy is not much of a threat to MSMEs metal stamping companies in comparison to large metal stamping companies. Large metal stamping companies are also on the watch for substitute products in the form of plastic parts, particularly in the automotive sector.

Table 21. Opportunities and/or Threats per Region

Opportunities and/or Threats	Region				Grand Total
	III	IV-A	NCR	VII	
Customer Satisfaction	4.14	4.10	4.04	4.17	4.09
Market for Products and/or Services	3.86	3.80	3.70	3.83	3.78
Demand for Products and/or Services	3.86	3.73	3.74	3.83	3.76
Complementing Products and/or Services	3.00	3.88	3.73	3.83	3.75
Supplier Chain/Raw Materials	3.14	3.71	3.50	3.50	3.57
Local Competitors	3.14	3.67	3.42	3.33	3.50
Substitute Products and/or Services	3.29	3.37	3.27	3.75	3.38
Foreign Competitors	2.29	3.43	3.32	3.42	3.29
External Research and Development	3.50	3.21	3.25	3.00	3.22
Tax Policy	2.86	3.18	3.07	3.25	3.13
Partnership/Linkages	3.33	3.08	3.29	2.45	3.07
Government Assistance & Subsidies	1.00	3.11	2.91	2.64	2.89

Ratings: 5 – Fast Improving; 4 – Improving; 3 – Unchanging; 2 – Declining; 1 – Fast Declining; 0 – None/Not Applicable

Table 22. Opportunities and/or Threats per Capitalization

Opportunities and/or Threats	Category based on Capital				Grand Total
	Large	Medium	Small	Micro	
Customer Satisfaction	4.15	4.15	4.00	4.09	4.09
Market for Products and/or Services	3.92	3.76	3.83	3.55	3.78
Demand for Products and/or Services	3.92	3.74	3.80	3.50	3.76
Complementing Products and/or Services	3.92	3.76	3.76	3.50	3.75
Supplier Chain/Raw Materials	3.64	3.62	3.53	3.45	3.57
Local Competitors	3.50	3.64	3.31	3.60	3.50
Substitute Products and/or Services	3.17	3.47	3.28	3.64	3.38
Foreign Competitors	3.42	3.38	3.36	2.70	3.29
External Research and Development	3.25	3.55	2.64	3.00	3.22
Tax Policy	2.92	3.09	3.14	3.45	3.13
Partnership/Linkages	3.56	3.32	2.57	3.25	3.07
Government Assistance & Subsidies	3.58	3.16	2.44	2.00	2.89

Ratings: 5 – Fast Improving; 4 – Improving; 3 – Unchanging; 2 – Declining; 1 – Fast Declining; 0 – None/Not Applicable

6. PESTLE Analysis

PESTLE Analysis is a strategic planning tool used to assess and evaluate the impact of political, economic, social, technological, legal, and environmental factors might have on a particular industry.
PESTLE analysis is essential in risk assessment and management [15].

Political - These factors determine the extent to which a government may influence the economy or a particular industry.

Economic - These factors are determinants of an economy's performance that directly impact a company and have resonating long term effects.

Social - The sociological factor takes into consideration all events that affect the market and community socially.

Technological - These factors pertain to innovations in technology that may affect the operations of the industry and the market favorably or unfavorably.

Legal - This factor takes into consideration all legal aspects like employment, quotas, taxation, resources, imports, and exports, etc.

Environmental - These factors include all those that influence or are determined by the surrounding environment.

6.1. Political Factors

During the interview conducted by the survey team with the respondent metal stamping companies, the political factors which they considered relevant and pressing are the Corporate Income Tax and Incentives Rationalization Act (CITIRA), the Ease of Doing Business, and the Public Utility Vehicle Modernization Program (PUVMP).

CITIRA

The Tax Reform for Acceleration and Inclusion (TRAIN) 2 was renamed "Tax Reform for Attracting Better and High-Quality Opportunities" (TRABAHO) and was later renamed again to CITIRA. CITIRA includes provisions that might affect the exemption enjoyed by the Philippine Economic Zone Authority (PEZA) registered companies.

In 2017, 4,147 PEZA-registered companies were employing about 1,417,832 Filipino workers [16]. Currently, the Philippines has the highest corporate tax rate in the ASEAN region. TRAIN 2 or CITIRA will level the playing fields by reducing the

current 30% corporate tax of firms. The CITIRA will also eliminate exemptions, incentives, and benefits enjoyed by some companies with the guiding principles of fairness in mind. This system is called horizontal equality [17].

Unfortunately, CITIRA does not have provisions that exempt companies under PEZA. The policymakers considered that the more than four thousand PEZA-registered companies seemed to be a small sacrifice compared to the bulk of those who will be benefited by the provisions of CITIRA in lowering corporate taxes while eliminating corporate incentives, especially in the export processing zone areas. Based on the respondents' interviews, numerous metal stamping companies outside of PEZA will be affected because a significant percentage of their production goes to companies within PEZA.

Based on the statements of PEZA Director General Charito Plaza, "industries feel we have unstable investment policies and laws. They are scared to expand if we keep on changing the rules in the middle of the game [16]." The respondent metal stamping companies also shared that some PEZA companies have already decreased their job orders, and some are already planning on relocating a large portion of their plant operations to countries like Vietnam and Thailand.

The effect of uncertainties caused by the implementation of CITIRA is taking its toll on the local metal stamping companies and other metal fabricators whose major clients belong to PEZA. The respondents also shared that the demands of local industries could not sustain their current operations. If such condition persists, their workers will be displaced, and local metal industries will either close or downsize.

PUVMP

On June 19, 2017, the PUVMP was introduced by the Department of Transportation (DoTr) through Department Order No. 2017-011, otherwise known as the 'Omnibus Guidelines on the Planning and Identification of Public Road Transportation Services and Franchise Issuance [18].' One of the facets of this program is to improve the condition of public transportation by replacing the iconic symbol of Filipino industriousness, the jeepneys.

There is a need to replace the old jeepneys because they are viewed as unsafe and environmentally unfriendly to the commuting public, see Figure 21 for illustration [19]. Some groups saw this program as 'anti-poor' [20] because it would cost the jeepney drivers or operators P1Million to acquire the authorized and euro 4 compliant (DENR Administrative Order No. 2015-04) modern unit. Despite the resistance from the different transport sectors, the PUVMP also poses opportunities for local transportation body and chassis manufacturers and assemblers to aid in realizing the objectives of the program [19].

The DoTr aims to modernize more than 170,000 public utility vehicles before the end of June 2020. As of September 2019, only 18,000 PUVMP-compliant vehicles are in operation based on LTFRB data [21]. The following are requirements of modern PUVs [22]:

- Euro-4 compliant motor or electric engine
- CCTV camera
- Automated payment system
- GPS monitor
- Speed limiter
- Easy accessibility for PWDs, seniors, pregnant women, and those with limited mobility
- Higher passenger capacity (sitting and standing)
- Meet international and local emission standards

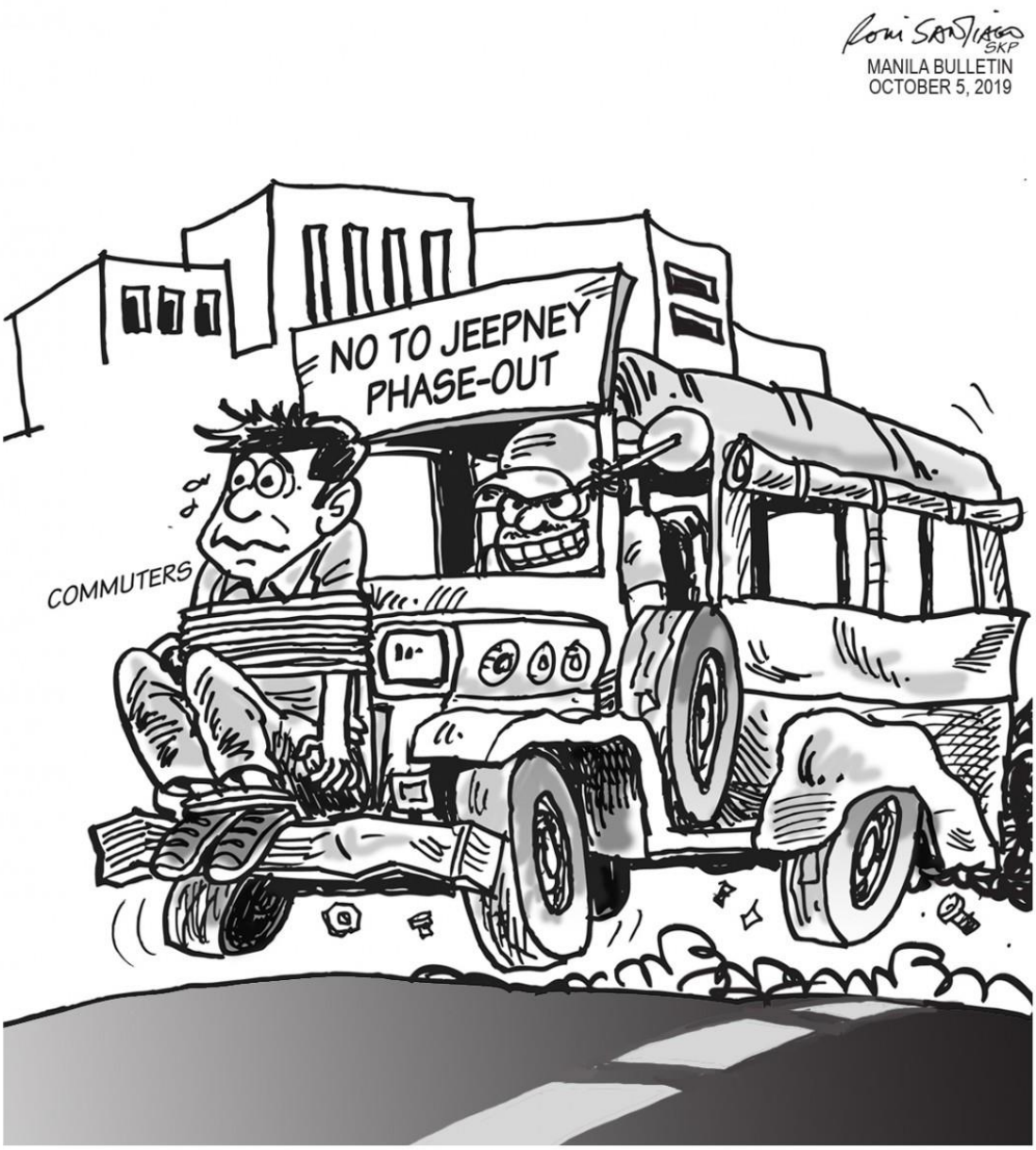


Figure 20. Need for Jeepney Modernization [23]

6.2. Economic Factors

The economic factors identified by respondents are the Comprehensive Automotive Resurgence Strategy (CARS) program of the DTI, port congestion in Manila, heavy traffic in the Metropolitan areas of the Philippines, and source of local raw materials.

CARS Program

The DTI implemented the CARS Program through Executive Order No. 182 signed on May 29, 2015. The CARS program seeks to intensify the automotive industry of the Philippines by providing incentives amounting to P27Billion to accredited automotive manufacturers, which in turn are expected to contribute P300Billion to the domestic economy. The program intends to produce 600,000 automobile units in six years by identifying 3 model units which will be manufactured in the Philippine for 200,000 unit each model. Two models were already identified and already in production, the Toyota Vios and Mitsubishi Mirage and Mirage G4 [24]. The third players in the CARS program are determined to be manufacturers participating in the Public Utility Vehicle Modernization Program (PUVMP).

Traffic Congestion

Data from Waze, a traffic navigation online application, said that if you are a motorist, it will take you an average of around 4.9 minutes to cover 1 kilometer in Metro Manila. Waze said that this traffic condition is the worst in the world. The data was based on the Waze monitoring of the September 2019 traffic flow situation. The Japan International Cooperation Agency (JICA) said that traffic congestion is costing the Philippines about P3.5 billion per day based on their 2017 data [25]. Traffic congestion is also one of the main concerns of metal stamping companies. During the interview and FGD conducted by the Center, metal stamped parts need to be transported, and generally, the destination would pass within the metropolitan areas. Some companies have already relocated to areas closer to their clients. Those who do not have enough capital, unfortunately, would have to wait for the Philippine government to solve the traffic congestion problems through the ongoing Build Build Build program.

Port Congestion and Supply of Raw Materials

The way in and out of the country for raw materials and most manufactured goods are through ports. The current condition of Philippine ports, especially in Metro Manila, is heavily congested. One of the leading causes identified was the filling-up of empty containers. For every five (5) cargo containers that enter the country, only one comes out laden with goods or merchandise [26]. Raw materials used for metal stamping are imported from other countries. Slow port mobility affects the entry of raw materials of metal stamping companies, compounded with the presence of a lot of fees and penalties resulting from congestion problems further increased its cost.

Though this is not directly a problem for most metal stamping companies who are not involved in the importation of raw materials, the add-up cost due to port congestion decreases their competitiveness in the global market.

6.3. Social Factors

Noise Pollution

Noise pollution is viewed more as a social issue than an environmental one mainly because prohibitions usually originate from complaints of the members of the community. On April 29, 2019, the Land Transportation Office released a memorandum prohibiting bora-bora or motorcycles with modified mufflers causing unwanted sounds [27]. Metal stamping shops engaged in the modified muffler business are affected by such directives because, as they reported, authorities would apprehend motorcycles with modified mufflers regardless of the decibel range it emits. The metal stamping shops are then forced to get certifications on the sound emission of their products.

Metal industries such as metal stamping, foundries, forging, machine shops, and the likes are producing noise that can be considered occupational hazards based on World Health Organization reports [28]. Households and other establishments surrounding or are close to factories or production plants of the metal stamping companies are often affected by such noise. Some respondent metal stamping companies shared this insight, and on their defense, they said that they were in the location long before the residential units were constructed. This kind of incident reflects poor land use or land-classification planning on the part of the local government unit. Some of the respondent metal stamping companies made an arrangement with the community as to the time of operation of the stamping machines, which eventually affected their production output or capacity.

Technical Workers

TESDA is currently offering a 294-hour training for Metal Stamping NCII recognized through TESDA Board Resolution No. 2009-06. The Metal Stamping NC II Qualification consists of competencies that a person must achieve to set up, conduct trial run, and operate mechanical press; perform mechanical shearing operation which applies to a range of press operations including blanking, cutting-off, piercing/punching, trimming and bending; and perform mechanical press forming operation which refers to a variety of press forming operations including piercing/punching, trimming, and forming/drawing [29]. Like any other courses offered by any technical and vocational training institutions, the theory sometimes does not align with the actual production settings. As shared by respondent metal stamping companies, many technical and vocational training institutions do not have the appropriate machinery and equipment to prepare trainees on what they will handle in the actual production settings. To remedy the gap, some metal stamping companies apply for accreditation from TESDA so that they can train individuals and eventually

absorb them as employees. Some respondent metal stamping companies said that it is easy to train press machine operators, but for other more technical work like die-setting, it will take more time and hands-on practice.

6.4. Technological Factors

CNC Laser Cutter vs. Conventional Mechanical Press Machines

Laser technology is now replacing the selected metal stamping process. Laser cutting machines have their advantages and disadvantages over conventional press machines [30]. Advantages include the capacity to handle bigger metal sheets and perform the work that usually requires multiple processes using mechanical press machines. It has minimal contact with the workpiece, thereby minimizing machine maintenance work, which will result in longer production time. The disadvantage is the composition of the material to be cut. Some alloys are heat sensitive, which means their composition may change once exposed to extreme heat, making it brittle. Laser machines also have process limitations. They cannot perform bending and other forming processes. Some respondent metal stamping companies have already invested in CNC laser cutting machines, which enable them to cut down on labor and increase their production capabilities.

Conventional mechanical press machines are still the most reliable metal stamping equipment, as viewed by the respondent metal stamping companies. Repair is low costing and simple. Mechanical press machines can perform almost all stamping works depending on their tonnage capacity, tooling, and die. The disadvantage of the mechanical press machine is higher labor requirements and wear out of tooling and die due to constant contacts and stress.

Tool and Die Technology

The condition of the stamping tool and die technology is one of the concerns of the metal stamping industry of the Philippines. Press machines have limited purpose without tooling and dies. Tool and die technology in the Philippine has its limitations on the size and complexity of designs based on the 2018 Die and Mold Industry Study of the MIRDC [14]. This instance is due primarily to the capacity of machines and equipment available in the country today. The metal stamping industry requires large to massive dies that could weigh several tons. In this case, metal stamping companies import dies from die and mold companies in China, Taiwan, or Japan, among others, who can satisfy their design or size requirements.

DOST SETUP

The Department of Science and Technology (DOST) Started the Small Enterprise Technology Upgrading Program (SETUP) in 2002 [14]. Since then, the program has helped various enterprises, which include the metals industry. Only 36

out of the 94 respondent metal stamping companies responded 'YES' when asked if they have heard about the DOST SETUP program, and among those who have heard only eight answered that they have availed of the program (see Figure 20).

Based on the interviews and FGD conducted by the MIRDC industry study team, the respondent metal stamping companies do not require much of the research and development (R&D) in terms of the stamping process. Most of their R&D activity was conducted in relation to the design and production of efficient tools and dies.

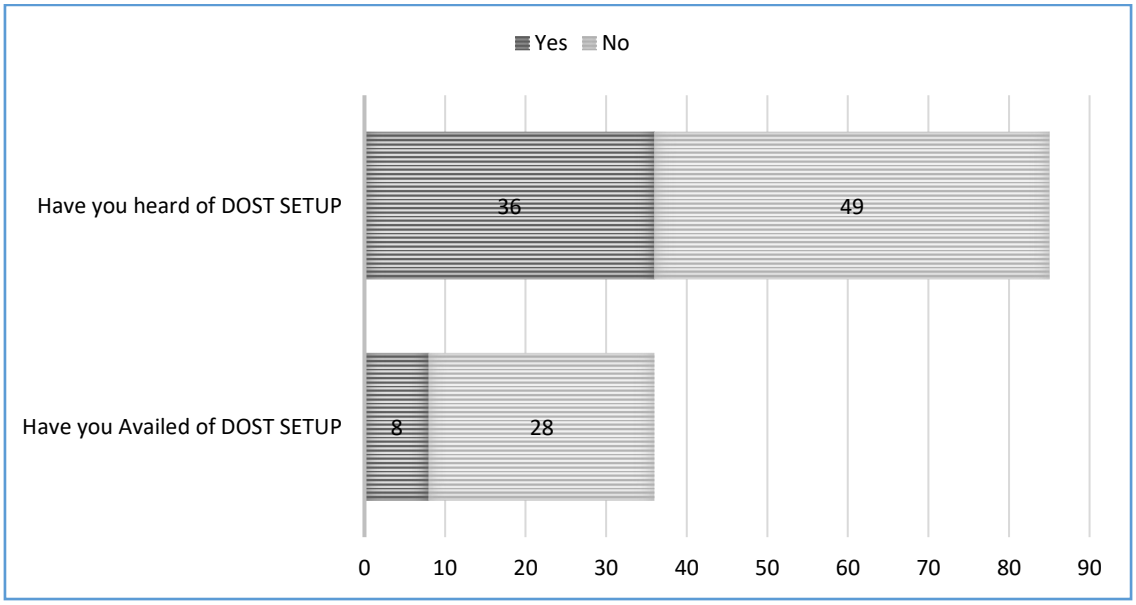


Figure 21. DOST-SETUP Program Engagement

6.5. Legal Factors

Ease of Doing Business

On 28 May 2018, President Rodrigo Roa Duterte signed in to law R.A No. 11032 or "An Act Promoting Ease of Doing Business and Efficient Government Service Delivery (EODB-EGSD Act), Amending for the Purpose Republic Act No. 9485 Otherwise Known as The Anti-Red Tape Act (ARTA) of 2007, and for Other Purposes [31]."

In the 2019 ease of doing business index data of the World Bank, the Philippines ranked 95 in the world while New Zealand, Singapore, and Hong Kong held the first, second, and third positions respectively [32]. The ease of doing business is one of the indicators that attract investors in the country. Unfortunately, being rank 95 among 190 countries is not that attractive to both local and foreign investors.

Hopefully, with the full implementation of RA 11032, the ranking of our country would improve significantly.

Electric Power Industry Reform Act (EPIRA)

The Republic Act No. 9136 or the Electric Power Industry Reform Act (EPIRA) was signed into law on June 8, 2001. One of the aims of the EPIRA is to ensure a reasonable price of electricity by letting the free market forces dictate the price. In other words, the objective is to privatize the assets of the National Power Corporation and encourage private electric corporations to generate, transmit, distribute, and supply the electricity demand of the country [33]. Unfortunately, the price of electricity in the Philippines is still one of the highest in Asia almost 20 years after the signing of the law. That is why most critics ask for the immediate repeal of the EPIRA [34]. The EPIRA law also prohibits the government from intervening in the power generation industry because it might result in unfair competition with the private electric power industry. There are still areas in the Philippines with an unstable supply of electricity, while some off-the-grid areas have no electrical supply up to date. Critics of the EPIRA law suggested the creation of a government-run Mindanao Power Corporation (MinPoCor) to provide reliable and low-cost electricity in Mindanao. They said that if the EPIRA law would block its inception, then it is the law that should be reviewed. They also added that the EPIRA law is encouraging cartel or monopolistic behavior of the energy companies [35].

The metal stamping industry, like any other metal industries, is energy-intensive. Press machines and other equipment will not run without electricity, and some metal stamping companies have reported that the fluctuating supply of electricity is affecting their operations and output capacity.

6.6. Environmental Factors

Chemical Control

Electroplating is one of the processes in metal surface finishing. Some metal stamped parts require electroplating for rust proofing and other aesthetic purposes. On October 26, 1990, the Republic Act No. 6969 (An Act to Control Toxic Substances and Hazardous and Nuclear Wastes, Providing Penalties for Violations Thereof, and for Other Purposes) was signed into law. This law imposed stricter rules in the importation and processing of certain substances that are deemed hazardous. In 2005, the DENR issued DAO 05, Series of 2005 (Toxic Chemical Substances for Issuance of Chemical Control Orders). One of the substances specified in the order was chromium. In 2019, the DENR drafted the Chemical Control Order (CCO) of Chromium (VI) and Chromium (VI) Compounds. At the moment, clearance for chrome plating becomes more and more strict.

Metal stamping companies are now implementing alternative metal surface finishing processes in place of chrome-plating such as electrodeposition painting, powder coating, and even the traditional ceramic coating method.

Heavily Silted Ports in Manila Bay

Heavy siltation of Manila bay is an obstacle for international trading and the entry of raw materials for the metal stamping industry. Rivers connected to the Manila bay rapidly deposit clay and other sediments, causing the bay to become too shallow for some cargo ships to reach the port [36]. As shared by the raw material importers during the FGD, they were forced to hire smaller vessels to bring the cargo from the international cargo ships to the port area, which added extra cost to the imported raw materials. In 2018, the Philippine Navy (PN) and the Philippine Reclamation Authority (PRA) started dredging areas of Manila bay near Sangley Point in Cavite to accommodate bigger warships [37]. International traders are hoping that the same could be done in the areas near the port of Manila.

Occupational Health and Safety Standard

Republic Act No. 11058, also known as Occupational Safety and Health Standards (OSHS) law, was signed into law on August 17, 2018, and its Implementing Rules and Regulations (IRR) - Department of Labor and Employment - Department Order No. 198-18 was signed on December 6, 2018. The aim is to 'ensure a safe and healthful workplace by affording them full protection against all hazards in their work environment.' The IRR also assured that small and micro-enterprise with a workforce of fewer than 50 employees should have a compliance standard [38]. Safety is one of the major concerns of a metal stamping company. During the interview, the respondent metal stamping companies shared that they enforced all necessary preventive measures and installed safety sensors to ensure that workplace accidents or injuries do not happen.

6.7. Conclusions and Recommendations

Assessment of the business environment of the metal stamping companies in the Philippines provides potential risk but also holds possible opportunities.

The PUVMP supported by the CARS program of the DTI provides business opportunities for metal stamping companies in terms of required stamped parts for body, chassis, and other components to modernize the public utility vehicles. Interested metal stamping companies need to coordinate with the DTI of their accredited manufacturers for possible inclusion in the program.

There is a high rate of attrition of technical workers in the metals industry, but TESDA has programs of training new metal stamping technicians with NCII. Metal stamping companies need to coordinate with the nearest TESDA centers for

partnership in terms of on-the-job training (OJT) or have their companies accredited as a training center.

Laser cutting technology and training for tool and die making is already available in the country. Metal stamping companies can coordinate with the MIRDC for available training and other business advisories.

All government agencies are currently implementing the EODB-EGSD Act under the supervision of the newly created Anti-Red Tape Authority (ARTA). It is expected that transactions with government offices in terms of business registrations, permits, taxes, and other business operations will be much faster and more efficient.

Observance of occupational health and safety standard will assure employees' safety and minimize metal stamping companies' unwanted expenses on accident hospitalizations.

Some risks that need the attention of metal stamping companies are the possible implementation of CITIRA, which might affect the status of companies under PEZA. Metal stamping companies whose clients are under PEZA need to coordinate their strategic plans with the contingency plans of their PEZA clients just in case CITIRA would push through.

Expected delays in the delivery of raw materials due to traffic and port congestions require planning and proper stock management to ensure the appropriate delivery time of stamped part to clients.

Noise pollution is also manageable by implementing proper shop lay-out and soundproofing. Metal stamping companies also need to coordinate with their local government unit to inform them of the nature of their operations, so that they could consider it in their commercial mapping and land-use planning.

Automation and computerization are the new trends in industrial operation as shared by the respondents during the interview. Old mechanical press machines still serve their purpose for the metal stamping industry. To become locally and globally competitive, metal stamping companies need to invest in new technology to address the demands of their clients.

The EPIRA enables the Philippine government to free itself from the burden of subsidizing the power sector. The high cost of electricity is one of its externalities. At the moment, the national government has not shown immediate intention of addressing the issue. The DOE only advises consumers to perform energy-saving practices. Corporations are encouraged to coordinate with the DOE for information regarding energy-saving practices.

Chromium and other chromium compounds are chemicals under the chemical control watch of the DENR. The use of such chemicals is highly regulated because it is deemed hazardous to the environment. Metal stamping companies in need of chrome plating can still avail of such process through DENR cleared electroplating companies. For the rustproofing process, other metal stamping companies are using

powder coating and electrophoretic deposition (EPD) painting. Some are just advising their clients to convert their raw materials to stainless for rust proofing.

The rehabilitation of the Manila Bay area is now a priority project of the DENR with a budget of $906M [39]. The goal of the project is to make Manila Bay fit for recreation once again by 2020. This project will address the siltation of Manila Bay soon.

Table 23. Summary of PESTLE Factors

PESTLE Analysis	Opportunities	Threat
Political Factors	PUVMP	CITIRA
Economic Factors	CARS Program	Traffic Port Congestion Supply of Local Raw Materials
Social Factors	Technical Workers	Noise Pollution
Technological Factors	CNC Laser Cutter Tool and Die Technology	Old Stamping Machines
Legal Factors	Ease of Doing Business	EPIRA
Environmental Factors	Occupational Health and Safety Standard	Chemicals Control Heavily Silted Ports in Manila Bay

7. Porter's Five Forces Model

Porter's Five Forces Model is a powerful management tool in determining the competitive advantage and profitability of a particular industry [40]. The idea is that each company operates under the influence of interconnected forces: suppliers, substitutes, buyers, new entrants, and competitors. Michael Porter's microeconomic concept became a centerpiece in the practice of strategic management though it failed to attract practitioners of practical management [41]. Porter's Five Forces Model, can be enhanced with other analytical tools presented in this study, such as the SWOT and PESTLE.

7.1. Bargaining Power of Suppliers

The following are observations shared by the respondent metal stamping companies regarding the **bargaining power of suppliers**:

Supplier Relations

- Suppliers that are long term partners to stamping companies provide 30 to 90 days payment terms depending on the volume of orders.
- Cost is still the primary determinant of supplier choice. Stamping companies perform canvassing from three (3) to five (5) suppliers.
- Major raw material suppliers in the Philippines are few and capable of controlling prices if they communicate with one another.
- Prices are generally standard or the same in major suppliers, but discounts are given depending on the volume of orders.
- International prices of metal supplies are available as a reference to local prices.
- Importation through foreign suppliers is an option only to those who can wait for raw material and for those who have a large volume of orders.
- Some clients enforce a centralized purchasing system (CPS), which means that stamping companies have no control over the choice of supplier.

Raw Material Requirements

- The price of the dollar greatly affects the price of local raw materials.
- Other raw materials, such as titanium, are not readily available in the local market.
- Stamping companies need fresh or new materials. Scrap materials (retaso) are rarely used except if it is fixed in the internal process arrangement.
- Small and micro stamping companies cannot purchase in volume. They only buy what they needed for a particular project.
- Some materials cannot be stored for an extended period because of rusting issues, so they don't purchase more than what they needed in their current project or job orders.
- The quality of raw materials is often an issue. Some clients ask for material testing certification from the supplier.

- For some stamping companies, switching from one supplier to another is not an issue because their raw materials are not that specialized like black iron, GI sheets, Cold Rolled Steel, and Mild Steel.
- Raw material with warp is an issue because it can affect the final output.
- Some stamping companies prefer raw materials from Japan, especially if clients have issues with the standard or quality of raw materials.

Tool and Die Requirement

- Supply of tool and die is not an issue, there are available tool and die fabricators in the country.
- The clients shoulder the cost of the die. Either they pay in full from the initial transaction, or the price is spread throughout the project.
- Some dies are imported, especially large dies in which local fabricators have no capability of making due to limitations in terms of machines and equipment.
- Most stamping companies are capable of fabricating the simple dies required by clients. For complicated dies, the stamping companies outsource its fabrication.

7.2. Threat of Substitute Products or Services

The following are observations shared by the respondent metal stamping companies regarding the **threat of substitute products or services:**

- The industry finds the threat of substitutes for metals stamp parts as weak. There are items or parts that clients prefer as metal.
- Before, the trend is metal to plastic parts. Today the trend is going back to metal because the business sector finds after-sale issues from converted metals parts problematic, especially parts that are exposed to varying temperatures.
- Processes that require stamping before are now replaced by other means such as laser/plasma cutting.
- The metal stamping process has metal sheet thickness limitations that can be augmented by laser cutting machines.

7.3. Bargaining Power of Clients

The following are observations shared by the respondent metal stamping companies regarding the **bargaining power of clients**:

- The stamping industry finds clients' bargaining power strong.
- Some clients, especially in the automotive sector, require that stamping companies offer a periodic price reduction.
- Some clients require continuous process improvement (kaizen) and ask that process improvement be reported. This system is sometimes the basis of the price reduction request.
- Some international/foreign clients tend to favor their nationals in distributing projects or job orders. The preference is due to corporate attitude and commitment to quality. Local stamping companies need to build a good reputation or rapport to penetrate their market.

- Clients have a firm idea of the price of their required items. Depending on the volumes of work, they usually ask for a 3-5% discount.
- Having products or processes that are unique can decrease the power of clients to dictate the price.
- Some clients tend to stay with one partner stamping companies to increase the consistency and reliability of parts or components. It also aided in determining system problems in case of product recalls or pull-outs.
- Some clients require a Kanban system to establish consistency in delivery time and ensure uninterrupted production.

7.4. Threats of New Entrants

The following are observations shared by the respondent metal stamping companies regarding the **threats of new entrants**:

- Newly established micro or small stamping shops do not pose a threat to established stamping companies because they serve different clients' requirements. Clients prefer established stamping companies for volume works.
- If new entrants invest in new technology, they can easily compete with existing stamping companies.
- New entrants are usually subsidiaries or breakaway group from the mother company who want to establish a separate clientele. Others have capitalized on an identified industry need.
- New entrants have to learn the stamping process, then buy press machines, and establish their shops.

7.5. Rivalry among Existing Competitors

The following are observations shared by the respondent metal stamping companies regarding the **rivalry among existing competitors**:

- The large stamping companies perceived that competition is generally low while medium, small, and micro feels that competition is very high.
- Large and medium stamping companies considered other companies as complementors or clients rather than competitors.
- Industry players have active interaction with one another and would usually meet in conferences, exhibits, and meetings of organizations such as the Philippine Die and Mold Association (PDMA) and Philippine Parts Manufacturer Association (PPMA).
- Chinese stamp parts are a threat to the local industry, but clients have the perception of inconsistency in the quality of Chinese products.
- If clients have contacts with metal stamping companies in China, they might prefer importation because of the price.

7.6. Complementors (plus one)

The following are observations shared by the respondent metal stamping companies regarding the **complementors**:

- Stamping companies usually outsource plating, powder coating, electrodeposition painting, and laser cutting services.
- Some large stamping companies already invested in powder coating and electrophoretic deposition (EPD) painting facilities.
- Stamping companies viewed that the rudiments of the legal requirements in establishing electroplating facilities are too tasking.
- The plating process is not customized or exclusive. Stamping companies can change service providers easily but chooses to maintain long-term partners for reliability and consistency of outputs.
- Some companies with ISO systems are required to check sub-contractors if they are environment and safety compliant by performing year-round visits.
- To avoid plating, some companies encourage their clients to convert their raw materials to stainless. The additional cost of the plating process is sometimes equal, if not more expensive, to stainless.

7.7. Conclusions and Recommendations

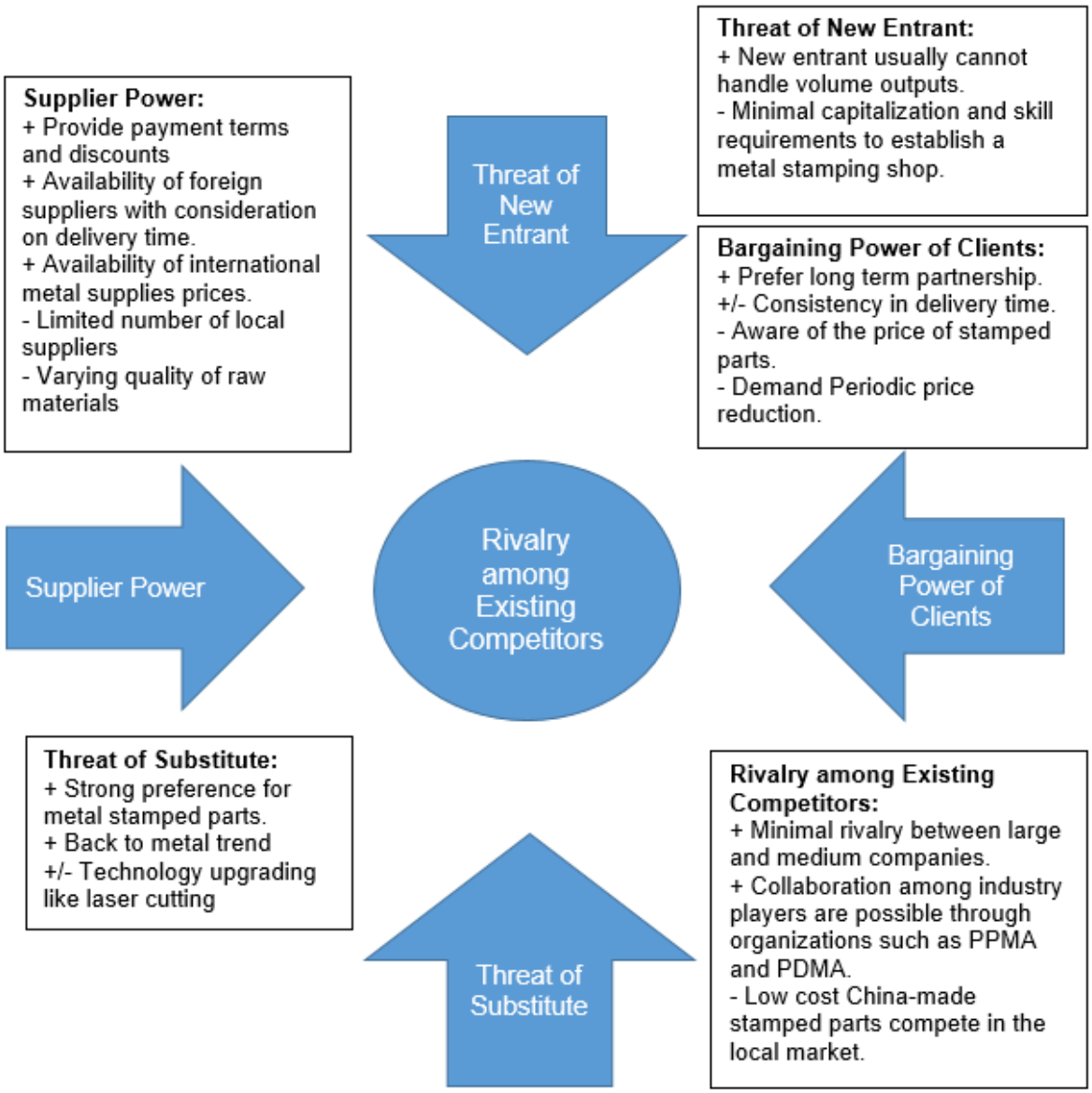
The competitive business environment for the stamping industry is still conducive for investments. There are limited major local suppliers of metal sheets, tubes, and bars. Still, importation is always an option for companies who can wait for their raw materials, which can be augmented by proper stock management and Kanban system implementation. International metal supplies prices are available for comparison with local rates, which minimize the chance for price manipulation. Quality of raw materials may vary from one supplier to another, but experienced metal stamping companies can quickly identify defects and inconsistency in the raw material.

Demands for metal stamped products are increasing because those who converted in plastic parts are now considering going back to metals for durability, especially those parts exposed continuously to varying temperatures. Metal Laser-cut parts are replacing some metal stamped parts, but established metal stamping companies can easily purchase laser cutting machines to cope up with the demands of the market.

The only foreseeable downside of the metal stamping business is the knowledge that the clients already have a firm idea on the prices of their required metal stamped parts, and they keep on asking periodic price reduction based on process improvements. Though clients have a firm asking price, metal stamping companies can still enjoy a reasonable margin of profit by implementing the VAVE strategy.

It is relatively easy to establish a new metal stamping shop because a conventional mechanical press machine is cheap, and it takes only a short time to learn to operate it. For new entrants to carve a significant market share, they need to invest heavily in modern machines and equipment.

There are minimal rivalries among existing metal stamping companies because each one of them has already established their specialization and areas of expertise. Some have already created a rapport with their clients who consider them as long-term partners.



Legend: + = Positive Observation; +/- = Neutral Observation; - = Negative Observation

Figure 22. Porter's Five Forces Diagram for Metal Stamping Industry

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Annex A. PSA Press Release

REPUBLIC OF THE PHILIPPINES
PHILIPPINE STATISTICS AUTHORITY

PRESS RELEASE

PSA Grants Clearance to the Conduct of the Survey of Metalworking Industry: Stamping Sector

Date of Release: 29 March 2019
Reference No. 2019- 045

On 18 March 2019, the Philippine Statistics Authority (PSA) granted clearance to the conduct of the Survey of Metalworking Industry: Stamping Sector of the Metals Industry Research Development Center (MIRDC) under the Department of Science and Technology (DOST).

The survey aims to determine the present status of the stamping sector by collecting information on the general, industrial, market and technical profile that can be used to inform plans and programs that aim to develop the industry and to enhance the global competitiveness of the Philippine metal stamping sector. Specifically, the survey aims to assess the need for facilities upgrading, workforce skills development and investment incentives that will help improve the stamping sector through the implementation of the most appropriate programs by the government and various relevant organizations.

The data items to be collected in the survey include the following:

- general information of establishments
- employment of establishments
- export market
- indicator such as production and sales
- equipment, instruments utilized and raw materials used
- problems, issues and concerns in die and mold sector
- business outlook and plans

The survey will collect data from stamping establishments located in the National Capital Region (NCR), Region III (Central Luzon), Region IVA (CALABARZON), Region VII (Central Visayas), and Region XI (Davao Region) and will start in April 2019. A total budget of Php 365,000.00 will be utilized for personal services, maintenance and other operating expenses (MOOE) such as travelling expenses, supplies and printing of materials and capital outlay.

Results of the survey are expected to be released in December 2019.

The survey was reviewed and cleared for conduct under the Statistical Survey Review and Clearance System (SSRCS), a mechanism being implemented by the PSA by virtue of Rule 28 of Implementing Rules and Regulations (IRR) of Republic Act (RA) No. 10625 to:

PSA Complex, East Avenue, Diliman, Quezon City, Philippines 1101
Telephone: (632) 938-5267

- ensure sound design for data collection;
- minimize the burden placed upon respondents;
- effect economy in statistical data collection;
- eliminate unnecessary duplication of statistical data collection efforts; and
- achieve better coordination of government statistical activities.

In line with this, the PSA enjoins establishments in the regions covered to support the said survey.

For further information on SSRCS, please contact the Statistical Standards Division (SSD) of the Standards Service (SS) with telephone numbers (02) 376-1928 and (02) 376-1931, and email address: ssd.staff@psa.gov.ph or ssdss.staff@gmail.com.

Lisa Grace S. Bersales

LISA GRACE S. BERSALED, Ph.D.
Undersecretary
National Statistician and Civil Registrar General

JBP/LJP/PARSB/JSB

Annex B. List of Metal Stamping Companies

1. 5-Top Builders & Industrial Sales Corp.
2. A-5 Alliance Industrial Machines Inc.
3. Abcor Industrial Corp.
4. Accuform, Inc.
5. Amantech Corp.
6. Ambrose Industries, Inc.
7. Andy Salvador Handicraft
8. Ant Steel Corporation
9. Armscor Global Defense, Inc.
10. Atlas Metal Industries
11. Atlas Metal Industries, Mandaue
12. Autubus Industries, Inc.
13. BDC Industrial & Allied Corp.
14. BDM Machine Shop
15. Cebu Atlas Merchantile Corp.
16. Centro Manufacturing Corp.
17. Cherimel Phils. Inc.
18. Chorakawa Technologies Inc.
19. Choryo Tooling's System Inc.
20. CMG Metalcraft
21. Dienamik Tool Services
22. ERML Trading and Engineering Services
23. Fabricator Phils. Inc.
24. FAG Engineering Group
25. Flouseal Engineering Services
26. Fravinz Enterprises, Inc.
27. GC Gentech Corp.
28. Gica Engineering Technology Center
29. Golden Dragon Metal Products, Inc.
30. Grasco Allied Metalworks Specialists, Inc.
31. Hap Metal Fabricators
32. Harmo Technology Corp.
33. HDM Technologies, Inc.
34. Ito Seisakusho Philippines Corp.
35. Janus Manufacturing Inc.
36. Javapro Machinery Works
37. JFB Tech Phils., Inc.
38. Juntec Corp.
39. KEA Industrial Corp.
40. KJ Springs & Plastics Tech. Inc.
41. Land Transportation Office
42. LM Precision Products Inc.
43. LMM Water Tank & Gen. Merchandise
44. Lucky Tableware Factory, Inc.
45. M2 Fabrication, Inc.
46. Malasaga Trading Corp.
47. Mandaue Atlas Steel Fabrication
48. Maximetal Industries, Inc.
49. MD Juan Enterprises, Inc.
50. MD RTG Sheet Metal Fabrication, Inc.
51. Michael Tin Shop
52. Mitsuba Phils. Corp.
53. Nippon Scaffoldings & Formworks Corp.
54. Nissin Precision Phils. Corp.
55. Nogalo's Enterprises
56. Nuvali Steel Processing Center Inc.
57. OEM Parts Mfg./OEM Thuyo
58. Okabe Nikoh Corp.
59. Optitech Corp.
60. Oscar Tank
61. P.IMES Corp.
62. P.R. Ditangco Metal Products
63. Polysar Industrial Sales Corp.
64. Precision Forming Corp.
65. Precision Stamping
66. Prestige Metal Corp.
67. Proline Industries Metal Works & Engineering
68. Puma Spring & Rubber Industries
69. RAS Tooling Specialist
70. Rich Metal Products Corp.
71. RJ Spring Rubber & Metal Parts Mfg. Corp.
72. Roberts Automotive & Industrial Parts Mfg. Corp.
73. Rolexal Metal Fabricator
74. Rollmaster Machinery & Industrial Services Corp.
75. Sampo Molding and Assembly Industry Corp.
76. Santos Power Press
77. SD Industries, Inc.
78. Shin Heung Electro-Digital, Inc.
79. Shinkozan Corp.
80. Sobida Motors Corp.
81. Sohbi Kohgei (Phils.), Inc.
82. Solid Engine Rebuilders Corp.
83. Southbay Tooling Corp.
84. Stamp Form Metalworks, Inc.
85. Supersystems Toolings & Metalfab, Inc.
86. Technol Eight Phils.
87. TMK Trading Corp.
88. Tri-R Allied Industries, Inc.
89. Utsuta Metal Stamping Phils, Inc.
90. Valerie Products Manufacturing, Inc
91. WB Technologies Inc.
92. Well Tank Enterprises
93. Wellmade Motors & Development Corp.
94. YRS Motorcycle Modification

Annex C. Photos during the Interview


SEIRI
SEITON
SEISO
SEIKETSU
SHITSUKE


SHINKOZAN


Vivo V9
Dual Rear Camera


Vivo V9
Dual Rear Camera


INXS
SOMETIMES YOU KICK
Vivo V9
Dual Rear Camera


Vivo V9
Dual Rear Camera


Vivo V9
Dual Rear Camera


Vivo V9
Dual Rear Camera


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Annex D. Photos during the FGD








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