THE PHILIPPINE ELECTROPLATING INDUSTRY

A 2015 Study

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Department of Science and Technology
Metals Industry Research and Development Center

The Philippine Electroplating Industry

A 2015 Study

Foreword

The DOST-Metals Industry Research and Development Center (DOST-MIRDC) stands strong amid all the challenges it has faced together with the country's metals, engineering, and allied industries. We see to it that we find time to review the Center's vision, mission, and objectives, with the intention of making our existence relevant and our significance felt by the industries we are mandated to serve. We aim not only to provide S&T-based services and interventions that will boost the industry's productivity and competitiveness, but we intend to tailor-fit our offerings to the industry players' unique and special requirements.

Led by the aspiration to strike the most beneficial synergy with the industry, the Center maintains communication with its stakeholders. Part of our activities and targets is the determination of business trends and current status of the industry, hence, the conduct of surveys, industry profiling, and sectoral studies.

The 2015 Electroplating Study is an initiative of the MIRDC, through its Technology Information and Promotion Section (TIPS), to package the Center's services into forms that will most be helpful in bringing out the best in the businesses that make up the local electroplating industry. Contained in this Study are various information about the electroplating industry's performance, their concerns, and their business outlook, among others. Inside this publication are facts that would have otherwise been very difficult to put together, if not for the Center's efforts to carry out an up-close-and-personal kind of encounter with the electroplating businesses in various regions of the country.

What we have in this Study is information valuable to many different groups of people. For whatever purpose it may serve – organizational reform, capability-building, technology acquisition, policy-making – this Study is for all of us who will really take time to understand the landscape that surrounds the electroplating industry, appreciate how the industry is able to cope with modern-day challenges, and, in our own distinct capacities, somehow take action to contribute to its improvement.

ROBERT O. DIZON
Executive Director

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Electroplating is a sub-type of metal finishing technique utilized mostly for industrial applications to enhance the surface of a manufactured component. This industry, under the metalworking sector, is uniquely different from the other sub-sectors as the focus of its technological advancement is on exploring new applications and techniques to support functionality of the manufacturing sector while it adheres with economic and environmental sustainability.

For this industry study, a total of 117 business establishments were identified. The number of survey participants stood at 68, while the remaining firms either declined to participate in the survey or were out of the communication loop due to outdated contact information and addresses. Some establishments were also reported to have discontinued the business due to various reasons. This, however, did not impose much threat to the industry as these enterprises were replaced by more capable firms.

As indicated by the data on the electroplating industry's geographical distribution, there is a high concentration of jewelry manufacturing microenterprises that employ electroplating process in Region III, particularly in Bulacan. The export-oriented electroplating companies are concentrated in Cebu (Region VII), while other SMEs and large-scale enterprises catering to the demands of manufacturing industry specifically for automotive and electronic subsectors are typically located in Region IV and NCR.

The upturn of the industry's productivity was felt in 2013 which was evidenced by the whopping three-digit increase of USD 258.7 million in export value of electroplated products taking off from USD 6.3 million in 2012. The continuously increasing import quantity of electroplated products, however, depicts insufficient capability of the industry to attend to the needs of different sectors that rely on electroplated products.

Findings on the electroplating industry's existing manpower show a good sign of improvement as demonstrated by its current level of technical skills. However, several weaknesses of the industry, such as material-related problems and stiff competition due to foreign entrants bringing cheaper electroplated products, still need to be addressed as these may have negative impact on the sector.

The fact that most plating equipment, raw materials, chemicals and other supplies can be sourced locally creates a favorable impression for the industry as it brings assurance of continuous and prompt manufacture of electroplated products. The existing parameters to the supply and distribution of chemicals nevertheless impose some production challenges but may be positively addressed through innovation.

As the industry embraces opportunities brought about by growth in the manufacturing sector, there are imperatives for the electroplating business to continuously innovate as this is what the trend in electroplating operation suggests. Harnessing the intensive marketing strategy with technology that is well-suited with existing environmental and business policies may bring the local electroplating industry to sustainable growth and global competitiveness.

I. INTRODUCTION

The future of the electroplating industry in the Philippines depends largely on the development of its processes and on the adoption of technologies that resolve issues mitigating opportunities for its improvement. Three industry studies on the electroplating industry were conducted by the Metals Industry Research and Development Center (MIRDC) from 1990 to 2004. Relevant updates on the industry were presented in these reports, which also highlight the market profile, technical capabilities, strengths, weaknesses, and needs of the industry.

Electroplating, as a subset of metal finishing operations, involves putting a tight coating of metal over a base metal through electrolytic process, not only to improve the base metal's appearance but also to protect it from atmospheric corrosion, to enhance its surface hardness and to add value. The importance of the electroplating industry cannot be denied. Its function can be useful in different levels for both large-scale manufacturing companies and small businesses, considering that the requirements of the manufacturing industry can be accommodated by the various electroplating operations.

The 2015 Philippine Electroplating Industry Study was conducted by the MIRDC with the following objectives: 1.) to determine if the electroplating sector is still affected by the shortage of skilled workers; 2.) to determine if the electroplating sector still have problems with the supply of raw materials; 3.) to determine whether the small and medium-sized companies across the electroplating sector in the metalworking industries are capable of making investments to maintain their competitive position; and 4.) to identify the most appropriate programs to be implemented by concerned organizations, public and private alike, to significantly strengthen the local electroplating sector of the metalworking industries.

In the Philippines, many industries including automotive, electronics, hardware, appliances, telecommunications, jewelry and the aerospace industry have electroplating operations in their manufacturing processes. Most electroplating businesses are categorized as micro and small enterprise and are mostly under single proprietorship. The electroplating industry comprises only 4% of the metalworking sector in the Philippines (MIRDC, 2013). Its significance, however, cannot be understated as it also brings invaluable contribution as a catalyst of the economy's development.

The automotive industry, a key player in almost all industries under the metalworking sector, is expected to exhibit further growth in its economic advantage. On the other hand, the electronics industry contributes the biggest share in terms of employment and value of output of all manufacturing establishments. The automotive and electronics industries are businesses served by the local electroplating industry. As a result of the recent positive development in the manufacturing activities in the Philippines, many have emerged as potential key players. In effect, the aerospace and jewelry industries now belong to the list of downstream industries served by the electroplating industry.

Amid the prevailing global trend in the electroplating industry, local development seems to lack an inclusive growth pattern as depicted by the previous studies. Both the issues on retention of old electroplating equipment and facilities, and dominance of semi-skilled technical workers over skilled workers imply a limited room for significant change towards improvement driven by the growth path of the country's manufacturing industry. The data derived from the electroplating study in 2004, however, indicate a noticeable change in the industry trend. From the copper- nickel-chrome (Cu-Ni-Cr) plating process, which tops the roll of plating operations performed by the industry as described by the 1990 and 1996 reports, a drastic inclination to brass plating was noted in the 2004 study.

Impacted by the performance of the Philippine metalworking sector, the electroplating industry's increasing perspective on production network has led to the rise of plating operations, particularly involving those procedures catering to the demands of the manufacturing sector.

Simultaneous assessment of the electroplating studies conducted by the MIRDC and the impact of its parameters led to this undertaking to seek for updates that will contribute to improvement of the industry. The targeted analysis for this update is deemed necessary by the fact that just like any other industries in the metalworking sector, the electroplating industry also deals with changes and upgrades in materials, technologies, and demands.

In view thereof, this study is prepared as a reference for assessing the capability of the country's electroplating industry. It provides an overview of the state of the local industry from 2012 to 2014. For the purpose of this study, survey methodology was carried out by distributing survey questionnaires to respondents and by doing personal interviews to company heads and electroplating shop owners to gather important details and inputs to the study. The respondents for this study were identified through previous studies and the metalworking sector profiling study in 2013. Additional respondents were identified through the Philippine Economic Zone Authority (PEZA) database, however, most of them declined to participate in the study.

This industry report is a pursuit intended to provide useful data to partners in the metalworking sector and for policy makers who are in need of information that will help them formulate programs intended for the electroplating industry. The contents of this study, however, may not provide a microscopic view of the industry due to the following limitations:

1. The MIRDC cannot fully explore the details of the industry's market profile as the data provided by most respondents, who are reluctant to disclose information especially for the part pertaining to cost of production and total revenue, are quite ambiguous.

2. Most respondents who declined to participate in the study are those belonging to large-scale manufacturing industry. The figures cited in this study, therefore, reflect those provided by micro, small and medium enterprises (MSMEs). Nevertheless, the MIRDC included back up information for the findings so as to avoid preconception with the data.

3. Electroplating has very limited literature and report in the Philippines. Background information on the industry were lifted mostly from the previous electroplating studies conducted by the MIRDC, existing roadmaps covering the industries catered to by the electroplating industry, and foreign reference materials.

The succeeding chapter of this survey provides an overview of the electroplating industry, its general profile particularly geographical distribution, capitalization, form of business organization, types of business activity, business type, and manpower. Chapter III discusses the market profile which focuses on the industry's local production, sectors catered to by the electroplating industry, and relevant information describing the industry's competitiveness. Secondary data on the industry's import and export activities are also analyzed in this chapter. Chapter IV, on the other hand, provides information on the status of the industry's technological capability, the current equipment, facilities, and electroplating operations adopted by the respondent-companies. The last chapter presents information on the opportunities and challenges encountered by the industry. It also provides a forward looking discussion of the respondents' business outlook as they predict future business trend.

Through analysis of the data gathered from the latest electroplating industry survey, this study does not only aim to provide an update of the industry, but also to stimulate ideas on how to best improve the electroplating business in the country.

II. INDUSTRY OVERVIEW

Geographical Distribution

The distribution of the respondents who participated in this study is shown in Table 1. There were 117 identified respondents for this undertaking. The survey team, however, was only able to retrieve 68 survey forms as most respondents refused to participate in the study. Other prospective respondents have changed contact information and business address thus, making it difficult for the survey team to locate them. Most electroplating shops are heavily concentrated in Regions III, IV, VII and the National Capital Region (NCR). Region III has 18 respondent shops or 26% share.

Table 1. Geographical Distribution of Electroplating Shops

Area/Region	Frequency	Percentage
CAR	5	7%
NCR	14	21%
REGION III	18	26%
REGION IV	12	18%
REGION VI	4	6%
REGION VII	12	18%
REGION XI	3	4%
Total	68	100%

The contributing factor for the high number of electroplating businesses in Region III, particularly in Bulacan (concentrated in the town of Meycauayan), is the jewelry business. Jewelry manufacturers with electroplating operations are only a small portion of the whole jewelry industry estimated to reach 2,000 (NTRC, 2013). Generally, the jewelry industry is composed of two subsectors: the precious metal jewelry (i.e. gold and silver); and pearls, precious, and semi-precious stones. Considering that the jewelry business in Bulacan is made up mostly of home-based businesses, shop owners do not typically invest on equipment for electroplating operations. As noted during the survey, most jewelry shops in Meycauayan, Bulacan only have facilities for traditional electroless gold-plating (*tubog)* and not electroplating.

The assistance provided by the Meycauayan Jewelry Industry Association, Inc. (MJIA) has allowed Bulacan to maintain its position as the leading province specializing in jewelry manufacturing. The first training center for jewelry making, called the Meycauayan Jewelry Making Training Center (MJMTC), is one of the projects of the MJIA in cooperation with the Department of Science and Technology (DOST), the Technical Education and Skills Development Authority (TESDA), the Department of Trade and Industry (DTI), and the Local Government Unit (LGU) of Bulacan.

The concentration of businesses with electroplating operations in other areas such as the NCR, Region IV, and Region VII exemplifies a different scenario. The establishment of these companies and shops define an industry with a broader range of demands. Unlike Region III that adopts electroplating technology to cater to the demands of the jewelry manufacturing industry, other regions with electroplating business attend to the requirements of industry sectors especially in the automotive and electronic industries that are into the fabrication and manufacturing business.

Cebu is also one of the well-known locations with a relatively high number of electroplating businesses. It has a broad array of electroplating facilities that cater to the jewelry, furniture,

electronics, and home and office accessories enterprises. Acknowledging the contribution of the industry, the LGU of Cebu works hand in hand with private industries to manage hazardous waste from electroplating companies, which puts the business at ease. The electroplating shops in the NCR, Regions IV, VI, and XI, on the other hand, cater mostly to the demands of the automotive and electronics industries. They also serve the requirements of the businesses involved in the manufacture of industrial machinery and various fashion, and home and office accessories.

The analysis of firm location is significant in a way that it provides a quick view of possible employment distribution and status of technological adaptation of a certain industry. As an example, the largest concentration of electroplating businesses is in Bulacan, but a larger number of manpower and a variety of electroplating facilities can be identified from other regions.

Year of Establishment of Electroplating Shops

The number of companies and shops with electroplating operations substantially increased during the period 1991-2010. As seen in Figure 1, a total of 39 respondents established their electroplating business in the period covering 1991-2010.

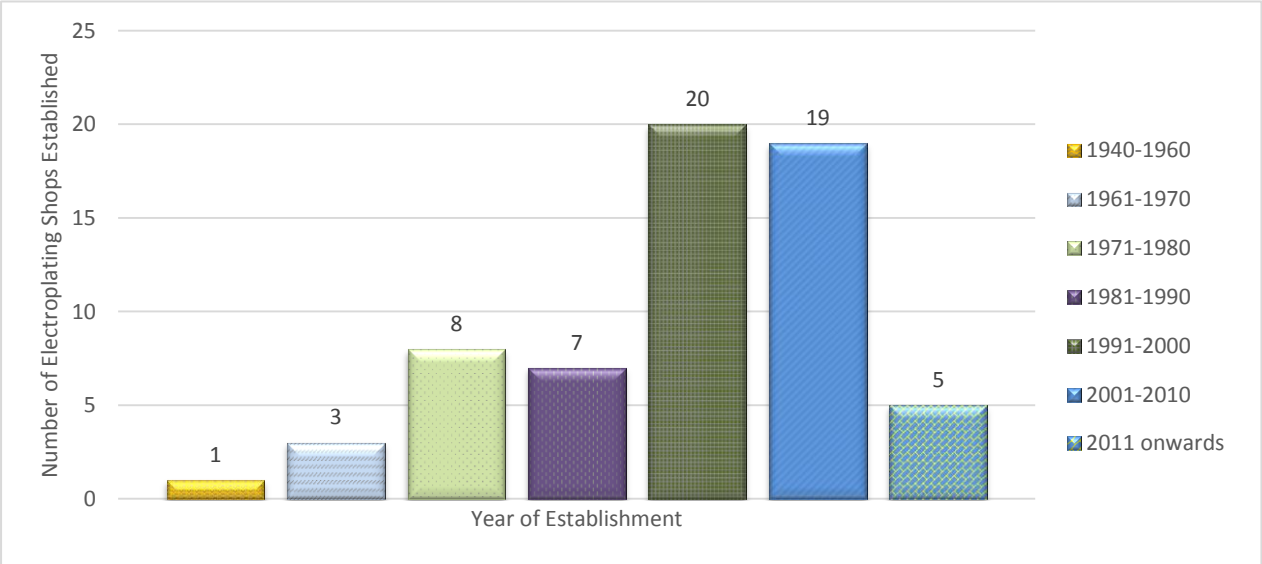


Figure 1. Year of Establishment of Electroplating Shops

Surprisingly, the reported number is not concentrated on a specific sub-sector of the electroplating industry but rather on its various natures. According to Aldaba (2014), the Philippines made strategies for the manufacturing sector since the 1980s. Generally, the development of the manufacturing sector was slow from 1980s to 1990s but was observed to increase from 2001-2010.

The Philippine electronics industry, as described by Agarwalla (n.d.), is the driver of the Philippine economy as increasing investments for the electronics industry were noted from 1992 to 2001. Moreover, the portal for the manufacturing of automotive parts and components also opened doors to accommodate new players in the 1990s (Aldaba, 2007), while the jewelry industry was driven to develop through the Jewelry Industry Act that was approved in 1998.

The development of the sectors catered to by the electroplating industry is one of the possible reasons why the electroplating industry was able to gain momentum in the 1990s and maintain it following the rise of the manufacturing industry from 2001 onwards.

Form of Business Organization

The type of business entity is one of the primary considerations when deciding to join a certain industry. The major forms of business organization are single proprietorship, partnership, and corporation. Table 2 presents the Form of Business Organization of the Electroplating Shops.

Table 2. Form of Business Organization of Electroplating Shops

Form of Business Organization	Frequency	Percentage
Single Proprietorship	40	59%
Partnership	1	1.5%
Corporation	26	38%
Others*	1	1.5%
Total	68	100%

*Specified by the respondent as government institution

The number of respondents in the 2015 electroplating study that are classified as single proprietorship increased by 8% compared to the recorded data in 2004. As presented, 40 out of 68 or 59% of the respondents indicated their business organization as single proprietorship, while 26 respondents or 37% reported that their businesses were established as corporation. On the other hand, only one respondent reported a partnership form of business, while the other one belongs to 'others' category and was specifically a government institution.

In putting up an electroplating business, environmental restrictions may impose drawbacks especially for single proprietorship because the liabilities are to be shouldered solely by the owner. Going through the complicated process of getting permits and licenses may be worth the effort considering the opportunities being presented by an electroplating business.

As a general requirement for investors in the Philippines, registration of business name as single proprietorship is processed through the Department of Trade and Industry (DTI), while registration of corporations and partnerships are done through the Securities and Exchange Commission (SEC).

Types of Business Activity

Table 3. Types of Business Activity of Electroplating Shops

Type of Business Activity	Frequency	Percentage
Independent	60	88%
In-house or Captive	4	6%
No data	4	6%
Total	68	100%

The Types of Business Activity of Electroplating Shops can be seen in Table 3. As shown, 60 out of 68 or 88% of respondents classified their business activity as independent, while only four out of 68 or 6% are captive shops. In-house or captive shops are subsidiary of a larger company. The remaining 6% of the respondents did not provide information as to the classification of their business.

Most electroplating firms are taking advantage of opportunities confined in adhering to independent type of business. Haveman (1996) made an interesting analysis on the relationship of metal finishing to the rest of manufacturing process. As he explained, metal finishing, which includes electroplating, is technically the last operation done before sales or assembly. Having a metal finishing facility is considered to be capital intensive and only gives minor financial

impact on the overall value added of the product, counting to the fact that using chemicals in metal finishing process is ultimately subject to environmental regulations. In this sense, most manufacturers pick a more practical option to outsource the metal finishing operations to independent electroplating firms, hence, its dominance in the industry.

Types of Electroplating Business

Table 4. Type of Electroplating Business

Types of Business Activity	Frequency	Percentage
Manufacturing	26	38%
Jobbing	31	46%
Both	8	12%
No data	3	4%
Total	68	100%

Table 4 shows the Types of Electroplating Business. Electroplaters mostly stick to jobbing activities, as represented by 46% percent of response from survey participants. As revealed in the table above, 31 out of 68 respondents are in jobbing operations, while 26 out of 68 or 38% are into manufacturing activity. Jobbing operations offer a variety of technical processes to accommodate specific requirements by customers, while manufacturing operations are more inclined in attending to continuous demand focusing on mass or batch production. In general, electroplating operations require very specific technical demands in terms of equipment and manpower hence, the prevalence of jobbing operations.

It was noted that eight out of 68 or 12% of electroplating shops are engaged in both manufacturing and jobbing. In this case, when product development through effective application of technology becomes attainable for a certain electroplating business that is into manufacturing, the business builds capabilities for customization of products which is a value-adding opportunity. This further leads to industrial advantage that becomes a catalyst for a much wider range of operations.

Most companies with electroplating operations in the Philippines also employ other metalworking processes other than electroplating. Machining, metalcasting, welding, stamping, tool and die, and heat treatment are the other processes that are employed in the companies that were surveyed. Most establishments that are able to acquire different equipment to service the various demands of their customers are mostly capable of manufacturing products and at the same time, accepting job orders for modified products.

Distribution of Electroplating Shops According to Capital

Respondent-companies were categorized based on their capital. Those with a capital of P3,000,000 or less belong to the micro enterprise; those with P3,000,001-P15,000,000 capitalization are categorized as small enterprises. Medium enterprises have a capital of P15,000,001-P100 million, while those with a capital exceeding P100 million belong to the large enterprise category. Figure 2 shows the Distribution of Electroplating Shops According to Capital.

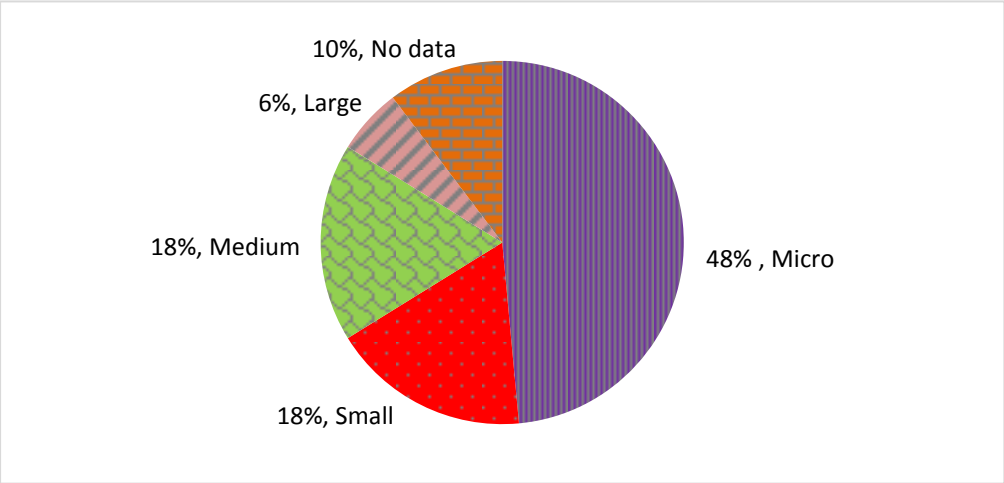


Figure 2. Distribution of Electroplating Shops According to Capital

As shown, nearly half of the respondents are micro enterprises, that is, 33 out of 68 or 48% of the respondents have a capitalization of less than P3,000,000.00, while small and medium enterprises comprise a total of 36% of the respondents. Only four out of 68 respondents or 6% belongs to the large enterprise. The other seven respondents, however, did not provide data.

In the Philippine Development Plan 2011-2016 (NEDA, 2014), the prevalence of micro enterprises has been given viable attention. Reportedly, the micro-, small- and medium-scale enterprises (MSMEs) comprise 99.6% of the 820,254 business enterprises in 2011. Particularly, the micro enterprise has the biggest portion of the total MSMEs with 91% share.

Generally, micro enterprises in the manufacturing sector, as defined by Aldaba (2008), are relatively less geographically concentrated compared to small and medium enterprises. In contrast, micro enterprises that ventured in the electroplating industry are heavily concentrated in the Bulacan area, following a specific trend of electroplating operation – precious metal electroplating for jewelries.

With lesser capital, micro enterprises of the Philippine's MSME can make entrepreneurial development through the use of indigenous resources. Additionally, support for the microenterprises especially to local government registered barangay micro enterprises is also provided in terms of incentives such as exemption from income tax, , exemption from payment of minimum wages, reduction in local taxes, financial support from government financial institutions and technological assistance from government agencies. These perquisites become an attractive means for entrepreneurs to explore businesses despite having small capitals.

In one study by Haveman (1995), he observed that finishing capacity does not seem to have correlation with greater profitability. In one example, he described how establishments with smaller assets are noted to have better return on profitability compared to those with bigger finishing capacity. As he further explained, highly capitalized shops focus on high volume finishing markets that often leads to lower financial return, while shops with lower capital are often inclined to develop more specialized finishing features with the help of specialty platers and more often realize a higher profit margin.

Employment

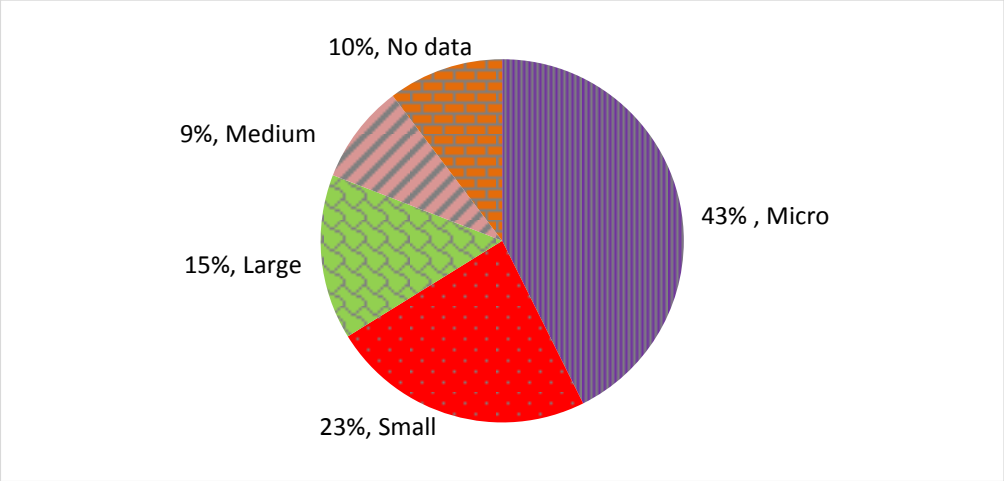


Figure 3. Distribution of Electroplating Shops According to Employment

Consistent with the classification of electroplating shops based on capital, Figure 3 similarly illustrates dominance of micro enterprises in terms of number of workers. As illustrated, 29 out of 68 or 43% of respondents reported that they employ less than nine workers only. Meanwhile, 23% of the respondents belong to the small category; 9% medium enterprises, while 15% are large enterprises.

Most respondents in this study, especially those in the small-scale jewelry manufacturing business, are home-based businesses. Considering that most of these shops are into the job-order type of business, a small number of technicians and operators who have sufficient knowledge on the different plating operations may be enough to handle the requirements of the customers. Figure 4 elaborates on the distribution of production personnel in the electroplating shops.

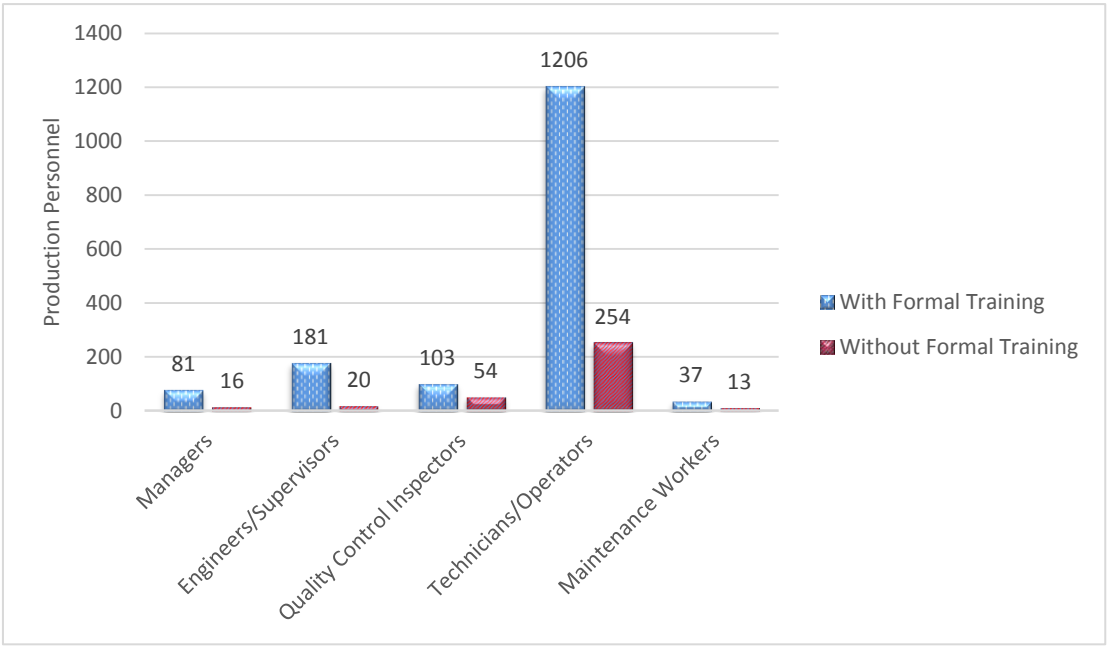


Figure 4. Distribution of Production Personnel in the Electroplating Industry

As elaborated, production personnel in the electroplating business are composed of managers, engineers/supervisors, quality control inspectors, technicians/operators, and maintenance workers. Noticeable from the graph is the high number of technicians and electroplating operators that have formal training. The total number of production workers from the electroplating shops and companies surveyed summed up to 1,965 personnel. Out of 1,965, 1,206 are technicians and operators that have formal training. This result is similar to the observation of Haveman (1995) in his metal finishing profiling study that the most common occupation in the metal finishing industry is that of a plating operator. Moreover, the data also indicate that managers, supervisors, quality control inspectors, and even maintenance workers have formal training for their specific tasks.

In the 1996 and 2004 electroplating study of MIRDC, semi-skilled workers were noted to be of greater number than skilled workers. The observed change in terms of manpower skills in this study now supports a better potential for the industry. However, given that the respondents did not specify the type of their plating operators' training, there seems to be a need for further assessment of the status of the industry's human resource.

Because of intricate electroplating techniques, most companies, even the micro enterprises, have highly skilled technical worker in the production area. A capable technician is needed in an electroplating shop to have a qualitative judgment on the precision of the deposit produced to meet finishing requirements. Commonly, for micro enterprises, shop owners who have knowledge in electroplating are doing the tasks of both the manager and technicians.

The survey participants were also asked to rate the skills of their production personnel. When their responses were summarized, it resulted to a Very Satisfactory rating which implies their recognition of the technical skills of their employees. When the need for technological advancement arise, it can be expected that production personnel can cope easily with knowledge upgrade in electroplating.

III. MARKET ANALYSIS

Annual Production

Most respondents are too cautious to disclose information on their annual production. Out of 68 respondents, only 41 provided data on their total sales for three consecutive years. Figure 5 presents the annual production of electroplating shops from 2012 to 2014.

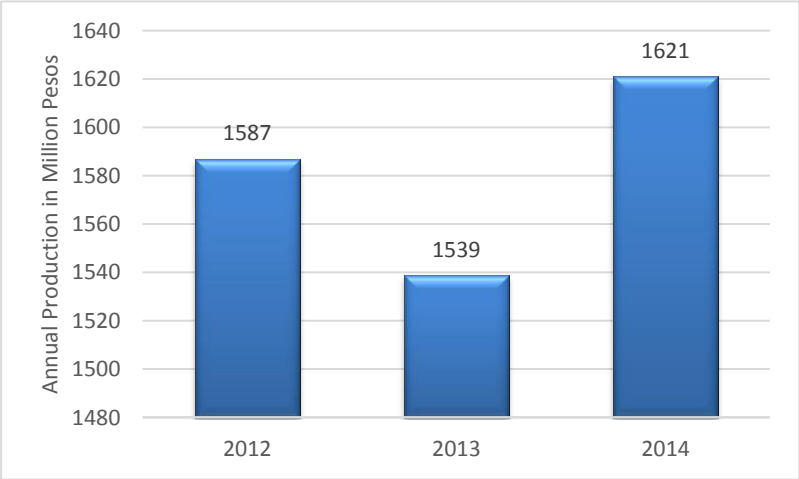


Figure 5. Annual Production of Electroplating Shops, 2012-2014

As presented, the sales figure in 2014 posted a positive increase of P82 million compared to the recorded sales in 2013. A drop in sales from 2012 to 2013 is seen from the figure.

The electroplating industry has been through a vicissitude phase in the past. The electroplating industry study (MIRDC, 1996) revealed that the industry experienced a substantial shrink in production in 1992 as an effect of rotating power outages. Facing the challenge, the industry planned and executed some strategies to recover from the slump, counteract the downturn, and achieve a cheerful increase in production in the years that followed.

The increase in total sales from 2013 to 2014 is an indication of the byline of electroplating technology with rising automotive sales and growing semiconductor industry. The changing business dynamics, however, does not put the industry in a stable position as technology also needs to catch up with increasing demands in the manufacturing sector.

Sectors Being Served

The electroplating industry in the Philippines serves different sub-sectors such as automotive and transport, industrial machinery, plastic, metalworking, food, Gifts/Toys/Hardware (GTH), semiconductor and electronics, jewelry and other emerging industries like the aerospace industry. Figure 6 shows the sectors served by the electroplating industry.

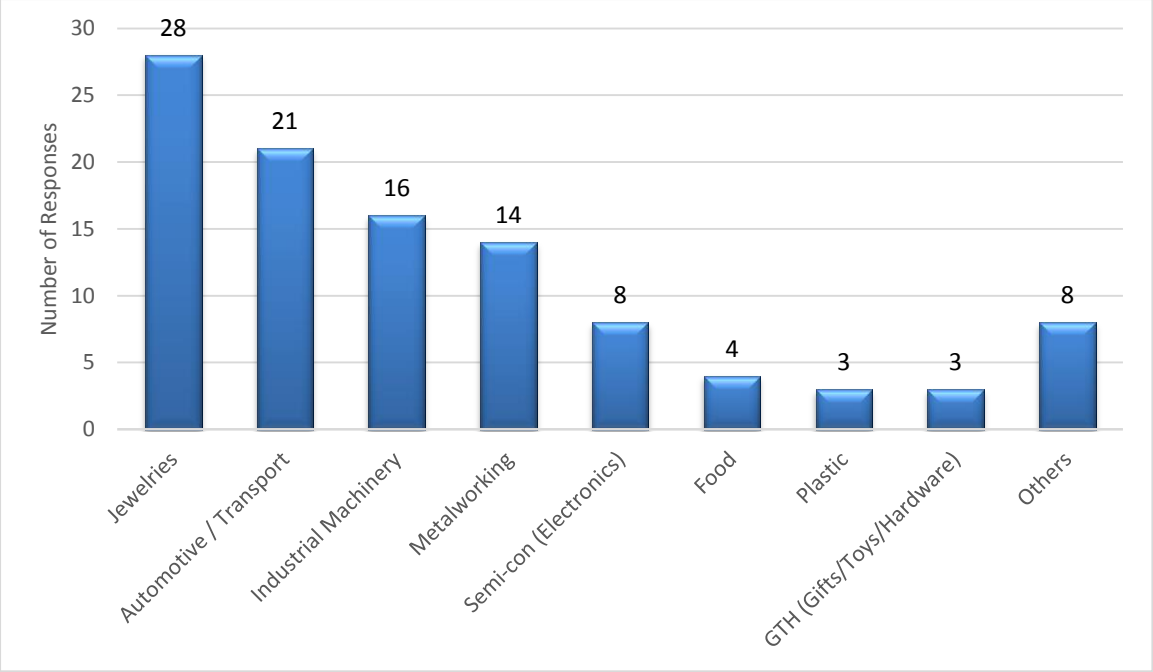


Figure 6. Sectors Served by the Electroplating Industry

As shown, the electroplating industry caters to mostly the jewelry industry, having 28 responses from the survey participants. Others that are frequently served by the electroplating industry are: the automotive industry with 21 responses; industrial machinery with 16 responses; metalworking industry with 14 responses; and semi-conductor and electronics industry with eight responses.

The low ranking of the semi-conductor and electronics industry as depicted in Figure 6 may appear contradictory to how it was described in the above discussions. As previously mentioned, this industry is primarily composed of establishments located inside the Philippine Economic Zone Authority (PEZA) sites, most of which have declined to participate in the study. Additionally, the semi-conductor and electronics industry is commonly comprised of medium to large enterprises that make tremendous contribution to the industry in terms of employment and production.

Target Customers

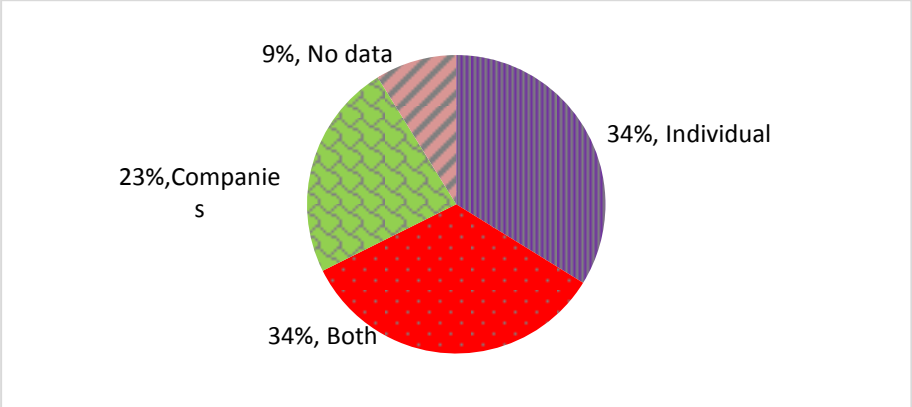


Figure 7. Type of Customers in the Electroplating Industry

Figure 7 shows the Type of Customers in the Electroplating Industry. As presented, 34% of electroplating shops serve both companies and individuals. On the other hand, 34% of the respondents are only serving individuals, while 23% of the respondents claimed that they only serve companies. Six respondents did not provide data for this item.

Individual customers are billed directly for the services offered by the electroplaters. Companies, on the other hand, are charged for the entire service provided by electroplating shops. As described by the respondents, it is difficult to maintain regular individual customers as electroplating services do not entail demands on a regular basis. Having companies as customers, therefore, allows continuous existence of electroplating shops as companies usually have continuing demands for production. In most cases, having companies as customers also have disadvantages. Respondents who only provide services to companies shared their business experiences specifically on how unstable the electroplating industry could be. Taking the automotive industry as an example, when production of a certain model of vehicle is discontinued, it will also tremendously impact the production of automotive parts. Consequently, the slowdown could immediately cause decline on the activities of shops which are producing electroplated automotive parts. As part of a more effective business strategy, shop owners are accommodating both individual customers and companies to sustain their business. This, however, should be in parallel to the demands of the industry, which means offering various plating operations that match various requirements of the customers.

Industry Competition

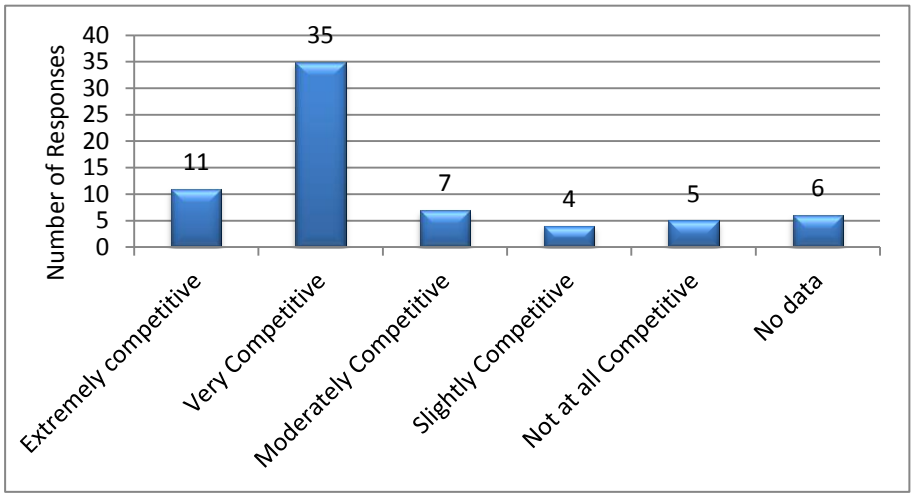


Figure 8. Electroplating Industry Competition

As depicted in Figure 8, 35 out of 68 or 52% of respondents view the electroplating industry as a very competitive industry, while 11 respondents (16%) consider it as extremely competitive. The other seven respondents (10%) perceive it as moderately competitive; four respondents (6%) see it as slightly competitive while the other five respondents (7%) expressed that they do not see the electroplating industry as a competitive industry at all. The remaining six respondents (9%) did not share their thoughts on how competitive the industry is.

The perception that the industry is a very competitive business is influenced by a mix of different aspects such as technology and market forces that either threaten or promote a certain business. For most respondents, considering the industry as competitive does not only refer to existence of similar businesses in the area but also the widespread existence of foreign products that are more likely killing their business in terms of price competition.

Import/Export

Tables 5 and 6 show a four-year comparison of import and export data of electroplated products from 2011 to 2014 derived from the Foreign Trade Statistics of the Philippine Statistics Authority (PSA). Figure 9 shows the graphical illustration of Import and Export of Electroplated Products.

Table 5. Import of Electroplated Products, 2011-2014

	2011	2012	2013	2014
Quantity (GK)	423,559,260	283,158,715	456,490,199	801,825,776.92
CIF Value ($)	805,791,067	278,112,999	425,151,616	838,524,507

Table 6. Export of Electroplated Products, 2011-2014

	2011	2012	2013	2014
Quantity (GK)	11,318,120	9,998,485	28,728,507	72,738,809.78
FOB Value ($)	12,653,676	6,346,368	258,726,474	553,949,616

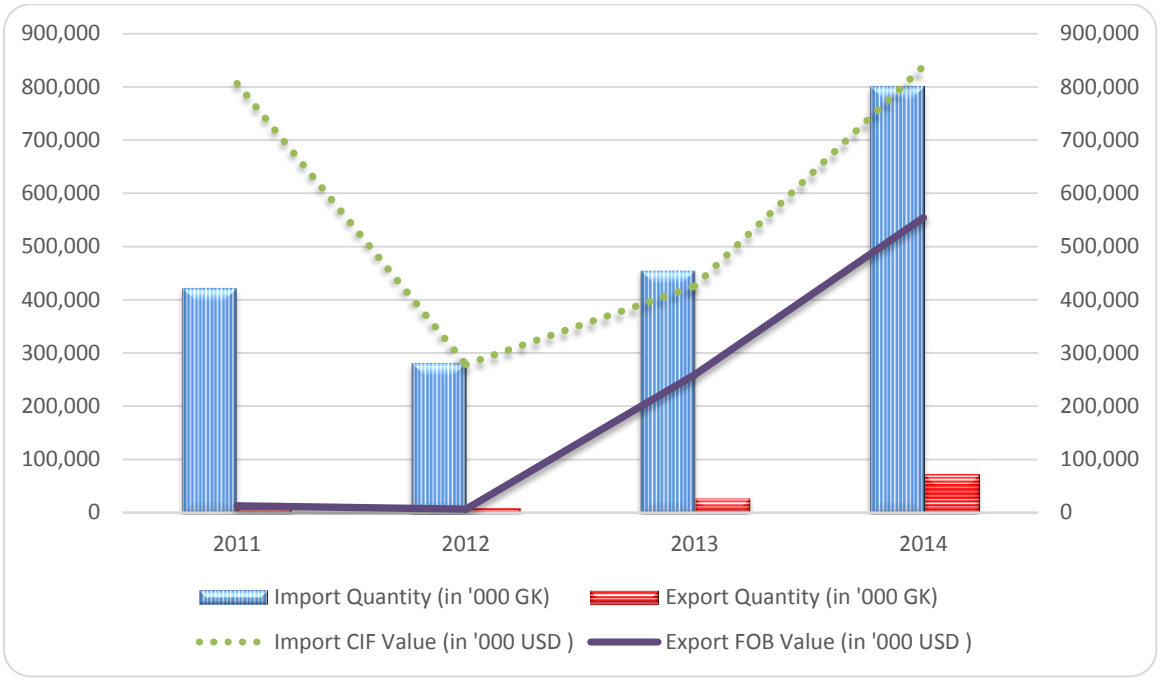


Figure 9. Import and Export of Electroplated Products, 2011-2014

As shown, the highest importation volume (see Table 5) was noted in 2014 with a quantity of 801,825,776.92 in Gross kg. and CIF value of USD 838.5 million. The same year also registered the highest exportation (see Table 6) for electroplated products with 72,738,809.78 in Gross kg. and FOB value of USD 553.9 million.

After leveling off in 2011 and being further dragged down in 2012 (see Figure 9), the export value for electroplated products was able to take off from USD 6.3 million to a double digit growth at USD 258.7 million in 2013. This further increased in 2014 to USD 553.9 million.

Also, from the data provided by the PSA, it was noted that, in 2014, the top sources of imported electroplated products are China, Japan, Republic of Korea, Taiwan, Switzerland, Malaysia,

Thailand, Hongkong, Indonesia and the USA, while the Philippines is mostly exporting electroplated products to Japan, Taiwan. Thailand, Hong Kong, USA, China, Korea, Canada, Mexico, and Australia. Nickel oxide sinters and other intermediate products of nickel metallurgy are the top commodities that registered a total of USD 320 million or 58% of the total FOB value of exported electroplated products in 2014.

The import and export figures illustrate a dynamic trend in the demand and supply of electroplated products especially in 2014, although these strongly suggest that most electroplated products are still imported from other countries and cannot be produced locally. Table 7 reveals the number of export-oriented electroplating shops per region.

Table 7. Export-Oriented Electroplating Firms

Region	Number of Export-Oriented Electroplating Firms
CAR	1
NCR	2
Region III	1
Region IV	4
Region VI	0
Region VII	9
Region XI	0
Total	17

As revealed, there are 17 electroplating firms (24% of the respondent-companies) that are export-oriented, the largest number of which is in Region VII (Cebu) followed by Region IV and NCR. Most respondents are exporting electroplated products primarily to the USA, followed by European countries, Japan and China. Exported products, however, were not specified. Export-oriented electroplating firms are typically located inside Special Economic Zones.

IV. TECHNICAL PROFILE

Type of Plating Applications

Electroplating represents a number of industrial applications to enhance the surface of a manufactured component. These applications are generally classified as decorative, anti-rusting/anti-corrosion, and functional plating. Figure 10 shows the plating applications in local electroplating shops.

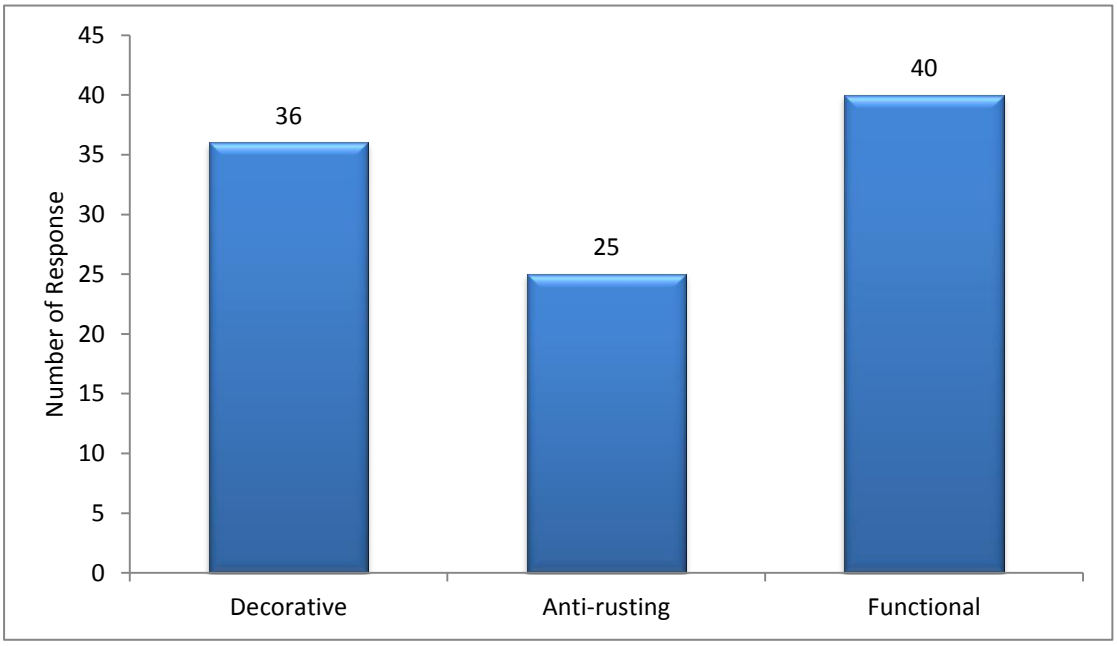


Figure 10. Type of Plating Applications

As shown, the most common type of plating application is functional plating which is carried out in 40 electroplating shops. There are 36 plating shops engaged in decorative plating, while 25 shops are doing anti-rusting application. The majority of electroplating shops in the Philippines can offer different types of plating applications to accommodate the demands of the costumers.

Electroplating for functional purposes offers the widest variation of usage. Among these are abrasion resistance, conductivity, contact resistance, non-stick resistance oil retentiveness, rubber adhesion, softness and lubricity, solderability, and rebuilding worn parts. Solderability is one of the primary characteristics that can be offered by different plating operations such as cadmium, copper, copper alloys, gold and its alloys, lead, lead-tin, nickel (electrolytic), nickel (electroless), tin and tin alloys. Moreover, the aforementioned plating operations are widely applied to manufacturing industry, repair work, and electrical connections.

Type of Plating Operations

The electroplating industry grew after the spur of capital-intensive businesses in the last two decades. Along with the rapid development in the manufacturing industry, the demands for electroplated products similarly expanded, hence the need to diversify the plating operations. Figure 11 shows the type of plating operations carried out by the local electroplating shops.

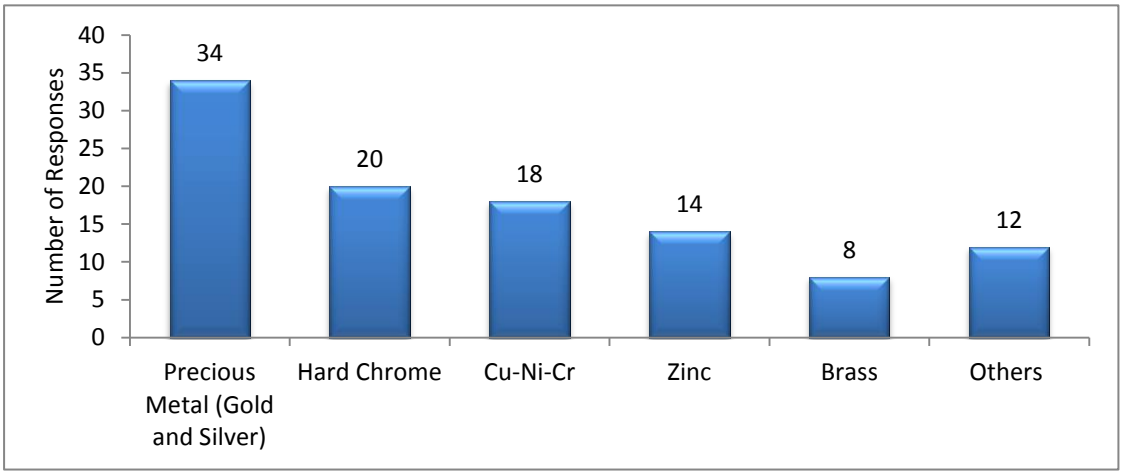


Figure 11. Type of Plating Operations

As shown, the most common type of electroplating operation is precious metal electroplating (gold and silver). There are 34 electroplating shops that utilize this type of plating operation, followed by hard chrome plating employed by 20 shops. Copper-Nickel-Chrome (Cu-Ni-Cr) plating follows with 18 responses; zinc plating with 14 responses and brass plating, used by eight shops.

To elaborate further, precious metal electroplating is one of the most popular types of plating operation as this technique makes even the thinnest coating highly effective. The respondents who stated that they are utilizing this type of plating operation are not just from the jewelry industry, but also from the electronics industry. This type of plating operation also provides excellent corrosion protection hence, its popular use in different industries. Similarly, hard chrome plating, mostly utilized in automotive and aerospace industries, is also notable for rendering metals highly tarnish-resistant.

Copper-nickel-chrome (Cu-Ni-Cr) plating, on the other hand, is a type of multi-layered coating applied to either metal or plastic components. This type of plating operation does not only provide corrosion resistance but also results to an attractive visual appearance. As further described by Kanani (2004), Cu-Ni-Cr plating plays a significant factor in automotive design, and such coating also applies many of the surface properties of massive metals to plastic components.

Table 8 is provided to explain the different characteristics and applications of electroplating operations. The contents are compiled from various sources.

Table 8. Characteristics and Applications of Electroplating Operations

Metal Coating		**Characteristics**	**Typical Applications**
Brass Plating		The largest amount of brass plating is for decorative use, but also applies to important engineering uses.	For engineering purposes, it can be used to secure rubber adhesion and to coat steel wire cord. For decorative purposes, it can be used for home and office items because of its attractive gold color.
Hard Chrome		Extreme hardness, resistance to wear, corrosion protection, improved lubricating properties	Hydraulic cylinders, diesel engine cylinders, piston rings, mold making, vehicles, shafts, and bearings, etc.
Copper, Nickel, Chrome		Good corrosion protection, scratch resistance, electrically conductive, decorative finish	Motor vehicles, plastic components, steel furniture, shop fittings
Zinc		Excellent corrosion protection for steel; economic and safe	Connecting elements, auto and construction industry, plant engineering
Precious Metal	Silver, silver alloys	Good conductivity for heat and electricity, antibacterial, decorative finish with enhanced value.	Ornamentation of jewelry, plates, cups and accessories like medals and trophies, electrical and electronic parts, household goods
	Gold	Flexible, non- reactive with other elements, good electrical conductivity, resistance to corrosion, enhanced value	Jewelry (gold plating of silver is used in manufacturing artificial jewelry), electrical and electronic parts, household goods
Alloys – zinc, copper		Excellent corrosion protection, decorative finish, wear resistant	Extreme corrosion resistance combined with high thermal stress, e.g., car exhausts, engine elements, and electronics parts. Zinc is commonly used on nuts, bolts, metal brackets, etc.
Bronze		Resistance to wear and corrosion, flexible	Yellow bronze is a suitable imitation of gold in plating bathroom fittings, furniture, hardware, etc.
Tin		Soft, flexible, solderable, corrosion resistant, non-toxic, and ductile	Household appliances, electronics, printed circuits, food industry

Electroplating Equipment

Both the rectifiers and plating tanks are considered as the most important equipment in an electroplating facility. The rectifier supplies the necessary electric current while the electroplating tanks hold the corrosive solutions of chemicals. Table 9 presents the Year of Acquisition of Electroplating Equipment.

Table 9. Year of Acquisition of Electroplating Equipment

Equipment	Quantity	Year Acquired				
		1980-1990	1991-2000	2001-2010	2011-2014	no answer
Rectifier	**513**	**10**	**320**	**47**	**5**	**131**
Plating Tank (not specified)	156	0	106	0	0	50
Plastic/Wooden Plating Tank	722	31	541	69	37	44
Non-lined Steel Tank	63	0	56	6	1	0
Steel Tank with PVC	115	0	66	31	5	13
Cement Tank Lined with Fiberglass	21	0	0	12	0	9
Plating Tank Total	**1077**	**31**	**769**	**118**	**43**	**116**
Total	**1590**	**41**	**1089**	**165**	**48**	**247**

As presented, though most survey participants did not specify the age of their rectifiers and plating tanks, the existing rectifiers in local electroplating shops are mostly acquired from 1991-2000. Moreover, the plating tanks are reportedly purchased also in the same decade; others were mostly acquired in 2001-2010. Table 10 further reports the present condition and acquisition status of rectifiers and plating tanks.

Table 10. Present Condition and Acquisition Status of Electroplating Equipment

Equipment	Quantity	Present Condition		Acquisition Status			
		Working	Defective	Imported	Local	New	Second Hand
Rectifier	**513**	**509**	**4**	**323**	**67**	**400**	**24**
Plating Tank (not specified)	156	156	0	0	50	50	0
Plastic/Wooden Plating Tank	722	704	0	559	108	598	24
Non-lined Steel Tank	63	62	0	56	6	56	0
Steel Tank with PVC	115	113	1	0	68	39	7
Cement Tank Lined with Fiberglass	21	21	0	0	12	19	0
Plating Tank Total	**1077**	**1056**	**1**	**615**	**244**	**762**	**31**
Total	**1590**	**1565**	**5**	**938**	**311**	**1162**	**55**

As reported, 509 out of 513 or 99% of the rectifiers and 1,056 out of 1,077 or 98% of the total plating tanks are in working condition. Overall, rectifiers and plating tanks in local electroplating shops were acquired brand new and were imported from other countries. It can also be noticed that some plastic/wooden plating tanks were purchased locally and bought second hand.

Raw Materials and Supplies

Aside from information on production, sales and revenue, most customers opted not to provide information on the chemicals they use in their plating operation. There are a few, however, who answered this survey item but did not specify the classification and quantity of raw materials and chemicals that they source from their suppliers. This section therefore is provided to describe how raw materials and chemicals are sourced by local electroplating shops.

Table 11. Source of Electroplating Raw Materials and Supplies

Raw Materials	Imported	Local	Chemicals/Supplies	Imported	Local
Brass		✓	Acid Zinc		✓
Bronze		✓	Black Nickel		✓
Chrome		✓	Boric Acid		✓
Copper		✓	Bright Nickel		✓
Gold	✓	✓	Buffing Compound		✓
Iron		✓	Chromic Acid		✓
Medium Carbon Steel	✓	✓	Copper Anode		✓
Mild Steel	✓	✓	Cyanide		✓
Nickel		✓	Emery powder		✓
Non-ferrous		✓	Mid & High P Ni	✓	✓
Plastics	✓	✓	Muriatic Acid		✓
Platinum		✓	Ni Chloride		✓
Radium		✓	Nickel Anode		✓
Sheet Metal	✓	✓	Nickel Brighteners		✓
Silver		✓	Nickel Chloride		✓
Tin	✓	✓	Nickel Sulfate		✓
Tool Steel		✓	Nitric Acid		✓
Zinc		✓	Sulfuric Acid		✓
Zinc/Tin/Silver/Gold	✓	✓	Zinc Anode		✓

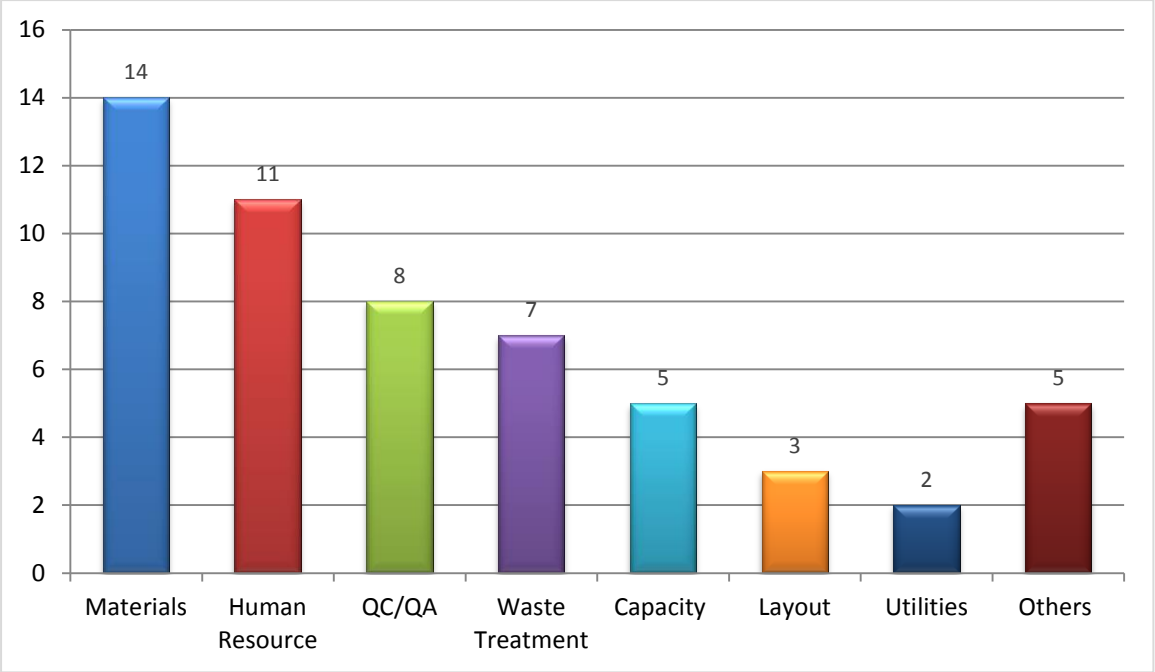
The data in Table 11 reveal that most raw materials and chemicals can be locally sourced. As part of changing industrial structure, local suppliers of raw materials and chemical solutions appear to be upstream as they are mostly capable of providing what the local electroplaters need. The supplies of chemicals, however, may be available locally but are still subject to strict regulation in connection with environmental policies.

The demand for electroplating chemicals and supplies can be highly correlated to the business development of the sub-sectors catered to by the electroplating industry. In order to support economic development, the electroplating industry has to ensure that its systems and processes are capable to meet the demand of different industries it intends to serve.

V. PRODUCTION PROBLEMS, INDUSTRY STRENGTHS AND CHALLENGES

Production Problems

The respondents reported several uncertainties that cloud the growth potential for their electroplating business. These challenges may not appear unprecedented if compared to the challenges that were described in the previous electroplating industry reports, but still impose a threat that should be given relevant attention. Figure 12 illustrates the most common production problems encountered by the respondents.



Note: multiple response

Figure 12. Production Problems

As illustrated, the most common problem in production are materials (14 responses); followed by human resource (11 responses); QA/QC with eight responses and waste treatment with seven responses. The respondents also encountered problems in terms of capacity (five responses), layout (three responses) and utilities (two responses).

Industry Strengths and Opportunities

Table 12 shows the Strengths and Opportunities of Electroplating Shops.

Table 12. Strengths and Opportunities of Electroplating Shops

Strengths and Opportunities	Frequency*
Customer	35
Delivery Time	27
Craftsmanship	47
Accuracy of Machines	10
Durable Products	28
Human Resource	20
*Multiple Response	-

As shown, 47 out of 67 survey participants consider craftsmanship as the electroplating industry's main strength followed by customer with 35 responses. Most respondents have very few regular customers. However, these customers' continued patronage of their products and services are keeping their business gainful. 28 respondents consider their products to be durable while 27 consider delivery time as strength. Human Resource and accuracy of machines were also named as the industry's strengths and opportunities, with 20 and 10 responses, respectively.

Craftsmanship and customer are two of the indicated strengths for the local electroplating industry. The former provides opportunities to MSMEs more than it does to large industries as the focus of large industries is to maintain a high number of customer base by making electroplated products readily available through continuous production. MSMEs, on the other hand, focus on providing high quality items to customers requiring customized products, hence, consider craftsmanship as the main strength of their business.

Weaknesses and Threats

While the promising nature of the local electroplating industry provides opportunities, it also constitutes a set of challenges. Table 13 shows the Weaknesses and Threats in the Electroplating Industry.

Table 13. Weaknesses and Threats in the Electroplating Industry

Weaknesses and Threats	Frequency*
Lack of Customers	16
High Cost of Production	24
Sourcing of Raw Materials	19
Stiff Competition	25
Untrained Personnel	4
Government Regulation	11
*Multiple Response	-

The respondents were mostly aware of the weaknesses that threaten the stability of their business. As shown, among the most frequent challenges faced by the industry are stiff competition (25 responses); high cost of production (24 responses); sourcing of raw materials (19 responses) and lack of customers (16 responses). According to the respondents, these challenges were not actually unforeseen circumstances as they were aware beforehand that these weaknesses are already part of any business. What really encouraged them to push through the business are the opportunities arising from the development of the subsectors catered to by the electroplating industry. As depicted by the data, stiff competition is the major

threat for the electroplating industry. In the earlier section of this paper, it was also noted that the respondents view the industry as a very competitive business. When asked to expound their answers, the responses vary depending on the size of their companies. The microenterprises in Bulacan, for example, admitted struggling on competition with same businesses in their area as the opportunity for plating operations, which is limited to job-orders, is irregular. The SMEs on the other hand, commonly signify being fraught with competition in terms of having no standard price for the electroplated products.

VI. BUSINESS OUTLOOK, EXPECTATIONS AND FUTURE PLANS

Business Outlook

Figure 13 reflects the respondents' stance on the status of the electroplating industry from the previous year (January 1-December 31, 2014) and the current year (January 1 – December 31, 2015).

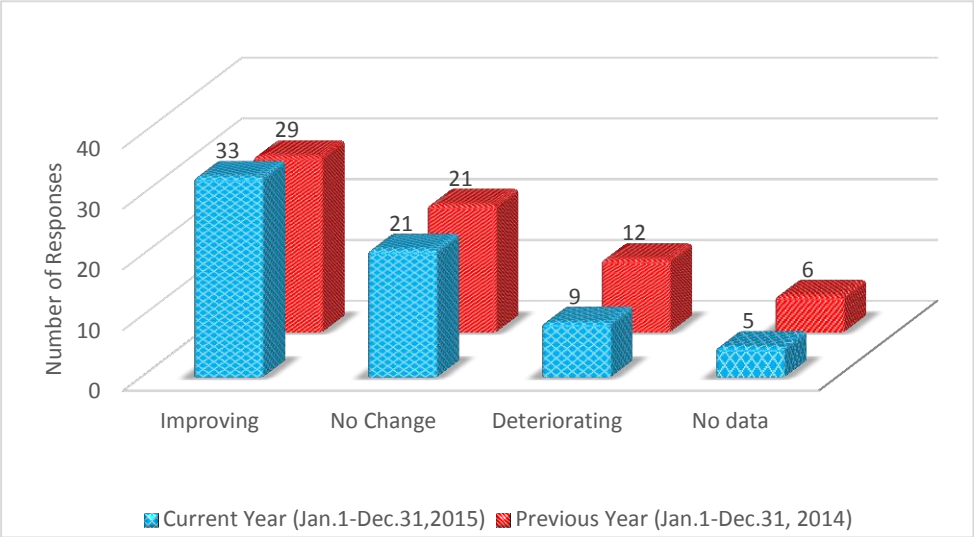


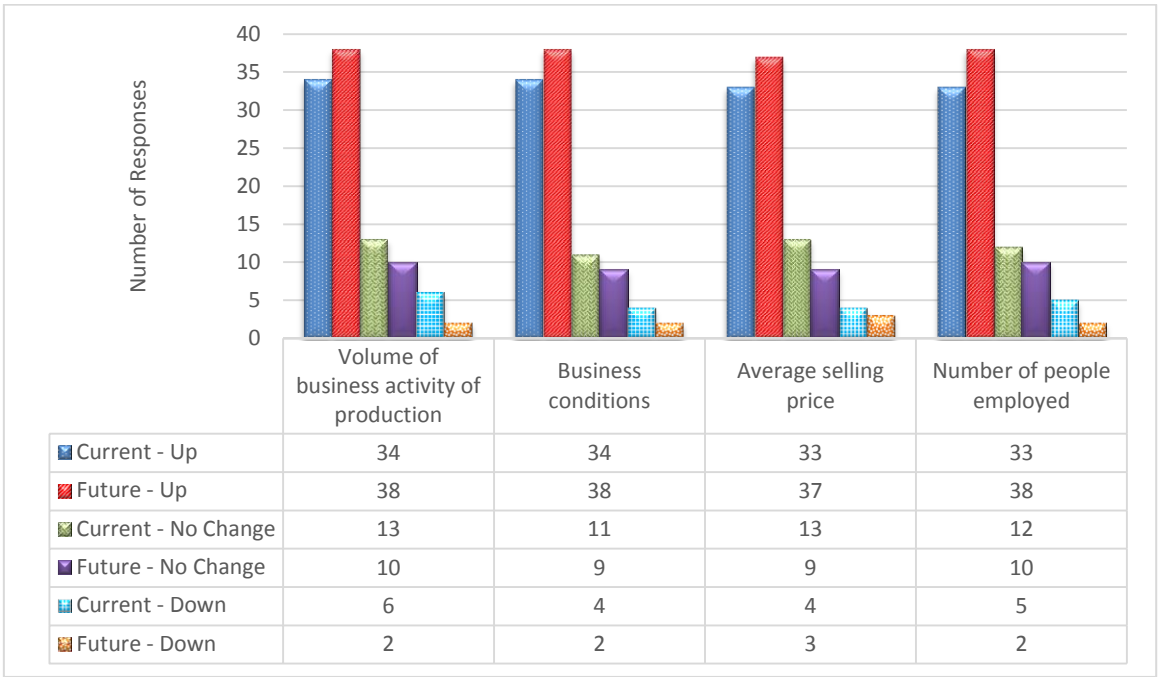
Figure 13. Business Outlook of Respondents

As reflected, electroplating shop owners have more positive outlook in 2015 than the previous year. In 2014, 29 shops or 43% of the respondents believe that their business has improved; 21 or 31% feel that there was no change in their business condition, while 12 respondents or 18% think that their business is deteriorating. There are six respondents who did not share their business outlook for 2014. Comparatively, for the current year, the number of respondents who believe that their business condition improved increased by 6%. While the same number registered a "no change" outlook, those respondents who are saying that their business is deteriorating decreased by 5%. On the other hand, five respondents did not share their thoughts about their business outlook in 2015.

From the earlier section of this report, it was discussed that production in 2014 had a lively increase compared to the production noted in 2013. Though most respondents in this study did not provide data on their annual production, they were keen in observing the business flow in the electroplating industry. As what most survey participants were saying, there was a weak demand for electroplated products in 2013, so the increase in sales in the year that followed made the entrepreneurs more observant of the trend in electroplating business instead of being too confident that the business is heading straight to a progressive path. Considering that the respondents see improvements for the electroplating business in 2015, it shows that the industry can now easily identify snag in the business trend and make necessary adjustments to avoid slump in production.

Business Expectation

Figure 14 presents the Business Expectation of the Respondents.



	Volume of business activity of production	Business conditions	Average selling price	Number of people employed
Current - Up	34	34	33	33
Future - Up	38	38	37	38
Current - No Change	13	11	13	12
Future - No Change	10	9	9	10
Current - Down	6	4	4	5
Future - Down	2	2	3	2

Figure 14. Business Expectation of the Respondents

As presented, the respondents are looking forward to an improving condition of the electroplating industry as the responses pertaining to volume of business activity of production, business condition, average selling price and number of people employed for the year 2015-2019 all illustrate higher expectations compared to the previous year, 2014. The respondents who answered that they are not expecting any improvement for the industry are less in 2015-2019 than in 2014, same with those who are predicting that the industry will be on a downward spiral.

Future Actions for the Next 5 Years (2016-2020)

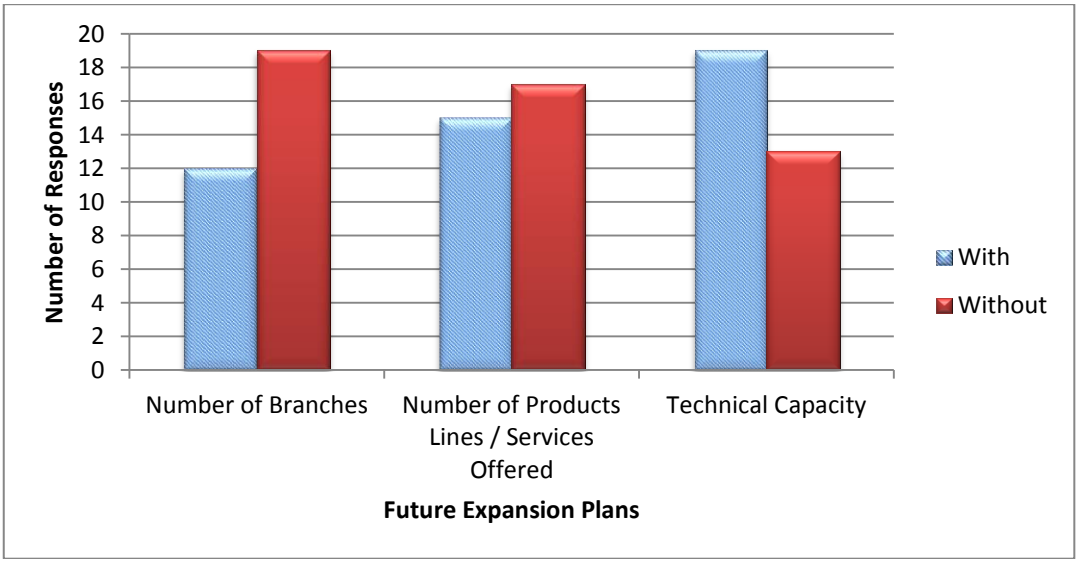


Figure 15. Future Action for the Industry, 2016-2020

A large number of respondents are still unsure with the kind of improvement that they want for their business. As expressed by most respondents, improvement in business will always depend on how progressive the electroplating industry will be. However, it can be seen from Figure 15 that the type of expansion plans that will be prioritized in the local electroplating industry are those that involve raising technical capacity (e.g. innovation and purchase of equipment). Clearly, the electroplaters are aware of the priority areas that will bring more opportunities for the industry. Increasing products and services will obviously come after development of new technology for the electroplating industry and acquisition of equipment that can accommodate the demands of the modern day manufacturing industry.

VII. MIRDC INITIATIVES

Electroplating may be seen as one of the important processes contributing to the success of the manufacturing industry but the government beholds its hazardous industrial process. Different government agencies have created policies to reduce environmental pollution which includes the Department of Environment and Natural Resources' policies to minimize hazards to human health and environment from the improper use, management, disposal and subsequent release and exposure to harmful substance. As such, one of the DENR's policies include chemical control order for cyanide and cyanide compounds.

To adapt well with new approaches to grasp opportunities for technological advancement, the electroplating industry needs a little push from a visible hand – the MIRDC. As part of the metal finishing processes employed in the Center, the MIRDC made initiatives to develop environment-friendly electroplating technologies by introducing alternatives for cyanide plating solutions (i.e., non-cyanide copper solution and non-cyanide gold solution).

To ensure continuous manpower development, the MIRDC also conducts regular seminars on Electroplating Processes. The training is aimed towards familiarization with the principles and processes of electroplating, decorative chromium, hard chromium, gold, silver and zinc plating.

VIII. DISCUSSION

Overall, the electroplating industry is doing its fair share of contributing to the health of the nation's economy. Based on the survey participants' responses, the industry is painted with its own blend of strengths and opportunities, with craftsmanship and customer occupying the top two slots in the list. The list also includes the industry's capability to produce durable products, meet delivery time requirements, and promote the dependability of its human resource, among others. These are the qualities that the industry needs to build on, for these are the very same elements that will provide the industry a strong foundation amidst the dynamic and fast-paced technologically-driven local and global arenas where it is bound to play in.

Alongside the strengths, the industry players themselves identified several challenges that the industry must overcome. This most recent study of the Philippine electroplating industry conducted by the MIRDC brought to focus issues such as: stiff competition; high cost of production; and difficulty in sourcing raw materials, among others, as the local industry's most pressing challenges. As mentioned in Part V of this report, these issues did not hinder the business owners to start a venture. Bigger than these challenges are the opportunities associated with the rise of other industries downstream to the electroplating industry. The lucrative business landscape that surrounds the automotive, aerospace, and semiconductor and electronics industries, mostly located in the NCR, Regions IV and VII, provides a large market potential for electroplated products. In addition, the small jewelry businesses in Bulacan give a glimpse of a bright future for the electroplating industry.

It is to be noted, however, that these challenges pose great threats to the industry if not addressed appropriately. Two issues that need to be carefully resolved are, in addition to the ones named above, those related to the lack of waste water treatment facilities and rigid price competition. With these and still some other concerns that have not been completely addressed, it may be too early to say that the local electroplating industry is on a path heading straight towards an excellent road to competitiveness.

It pays to keep watch of the country's neighbors and learn from their best practices. For instance, developments undertaken by the electroplating industries of countries with more advanced facilities are leaning toward the protection of the environment and saving energy while they carry out measures to adapt to modern demands. The local electroplating industry may pattern its strategies for longer-term planning after these countries, because apparently, an environment-friendly and energy-efficient kind of development is the direction that the local electroplating industry should go.

In an industry report by Haveman (1996), he discussed that the core process of electroplating may remain largely unchanged since the basic chemical principles of metal finishing have been left unchanged over the years. What he was trying to pinpoint is the role of innovation as a means of technical advantage for the industry. As an example, he made a highly structured elaboration on the importance of research and development activities in response to environmental regulations that pressure the growth of the industry. This holds true especially for the Philippine electroplating industry whose players should bear in mind that the kind of equipment acquired alone does not dictate the direction of their development. What is more important is that through the electroplating businesses' collective efforts, the industry must exhibit growth by means of building up the capability to innovate at a rate that surpasses that of its various downstream industries.

IX. CONCLUSION

1. The issue on shortage of skilled technical personnel and operators in the electroplating industry has already been addressed as reflected by the increase in number of electroplaters that have formal training. Human resource, however, ranks second in the list of common problems encountered by most of the electroplating company managers. Human resource problems include attitude, absenteeism, and lack of skill. The third problem is the quality assurance/quality control. This means that most problems encountered under human resource have something to do with workers' performance related to the realization of the products.
2. The presented results of this study show that the chemicals used in most electroplating companies were locally sourced and may point out possibilities of a favorable supply to local electroplaters. This upshot, however does not completely represent a positive result due to the respondents' inexact responses, especially those who do not want to disclose harmful chemicals used in their business. The problem on the supply of raw materials is still an issue just as there were shortages in the supply not only of precious metals but including chemicals which are imported and locally distributed. These problems involve difficulty in sourcing, and the substandard qualities of the raw materials as depicted by the data.
3. The small- and medium-sized companies across the electroplating sector are capable of making investments to maintain their competitive position. Small and medium sized companies comprised 36% while micro enterprises constitute almost half (48%) of the total number of respondents. It has to be considered, however, that some concerns have to be overcome for the SMEs to be safely in control of the results of their investments. For instance, the list of weaknesses and threats given by the respondents shows that

stiff competition and lack of customers are at the top two ranks. These issues signify that the companies are having a hard time in winning their customers hence, losing big profits just to be able to accommodate customers.

4. Due to insufficient data, the MIRDC was not able to identify electroplated products or services that will have high profit to the electroplating sector. This will be given more efforts in future studies.

X. RECOMMENDATIONS

The MIRDC, through its Technology Information and Promotion Section (TIPS), recognizes the crucial role played by maintaining open communications with the industry players. The conduct of the 2015 Electroplating Industry Study was an opportunity for the MIRDC to discuss with the respondents their valuable insights on how to address existing challenges in the industry. An industry dialogue was also conducted to elaborate on the recommendations provided during the survey. After careful analysis of the respondents' insights, the following recommendations, specific to the companies and the government, arose:

1. Company Head/Production Manager/Human Resource

- Provide electroplating training for production personnel. Internally, the focus of the organization should be to improve its training function by incorporating good knowledge base with better skill set. This will help develop a problem-free operation. In most situations, company heads become hesitant to provide training to employees as they are usually tempted to transfer to other companies or work abroad where a more promising compensation is offered after completing trainings and gaining relevant experience from their present companies. Nevertheless, it is still suggested that continuous training be provided to local electroplaters to offer solution to manpower issues linked to incompetency due to lack of experience and training
- Conduct frequent monitoring/check-up of electroplating equipment. The solutions envisaged by companies when it comes to defective electroplating equipment are not always amenable since they are caught up between having the equipment (e.g. rectifier) repaired locally and replacing the unit with a new one. Local repair of electroplating equipment does not always seem like a practical solution because of unreliable outcome. In this case, some business owners opt to buy new rectifiers sourced abroad instead of having faulty equipment repaired.
- Hold regular technical meeting with management head to address any issues and provide immediate action for any technical challenges encountered in production;
- Provide continuous motivation to production personnel to perform better and ensure quality of electroplated products that they produce;
- Develop new marketing strategies that can engage more costumers. Local electroplaters observed that their products lag behind as imported products are offered at a relatively lower price. Company owners and suppliers of electroplating chemicals agreed that the best way to gain loyalty of customers is to provide quality service (e.g. after sales service). It is important to show their customers that they are compliant to quality standards thus, they provide warranty for their products and give immediate attention to any complaints on the products they deliver.
- Improve plans, trainings and update chemical analysis know-how; and
- Develop other products to be able to sustain the production as some products for electroplating are seasonal (e.g. religious items).

2. Government

- Provide assistance to local electroplating shops in upgrading facilities and electroplating equipment to ensure that the shops can have better capability in expanding their capacity for plating operations and to accommodate more sectors especially in the manufacturing sector. Respondents were particularly referring to DOST's Small Enterprise Technology Upgrading Program (SET-UP);

- Assist electroplating shops especially MSMEs to have waste water facility. Presently, one of the hindrances encountered in electroplating companies is that of environmental compliance particularly wastewater treatment. Company owners consider making a proposal for consideration by the government to put up a common service facility where they can bring their wastewater for treatment. This will particularly be helpful to business establishments concentrated in a particular area (e.g. Meycauayan, Bulacan); and
- Develop new technologies for electroplating through advanced research.

On a national level, two plans of action are recommended in order to achieve the goal of having a refined strategy for the electroplating industry. These are as follows:

1. Revitalization of the Philippine Electroplaters Association (PEA)

The Philippine Electroplaters Association, located in Cebu, is an important organization that assists the local electroplating industry by looking into the challenges that hamper its growth. Members of this association assisted one another through exchanged plant visits. It is not clear, however, if the association still exists as there are no longer updates or existing contact information available. It is important, nevertheless, to revive the association in order to ensure that the local electroplating firms can formulate effective strategies to assure that the industry has a solid and unified force to meet the new wave of industry opportunities.

As what was highlighted by company heads, there can be no strong company or establishment without support from the electroplating industry. Several points can be drawn from the re-establishment of the PEA. First, it will allow stronger leverage in negotiating with various government agencies (e.g. making a position paper for the establishment of a common service facility for wastewater treatment). It is also only through industry associations that the MIRDC is able to gather information and relevant issue, where implementation of multi-million projects are based.

2. Intensification of Technology Transfer

The government, through the MIRDC, working collaboratively with industry partners, should effectively strategize to ensure that the local electroplating industry can adopt new approaches and technologies for electroplating operations.

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APPENDICES

Appendix A

List of Electroplating Companies

Cordillera Autonomous Region (CAR)

Orly's Jewelry Shop
MCM Silver Craft
Arellano's Silver Craft
Tawid Crafts Corporation
Mar Menz Silvercraft

National Capital Region (NCR)

Anndro Philip Industrial Chrome Plating
Raigo Metal Finishing, Inc.
AA Industrial Chrome Plating Co.
Luxury Works Unlimited Corp.
Brilliance Metal Services
Metals Industry Research and Development Center
Bell Metalcraft
Chrome Dazzler Corporation
Rirsan Electroplating
Rhod Jane Metal Arts Enterprises
Rich Metal Products Corporation
Quality Chrome
Mamerto Pingol Metal Craft
Well-ever Electroplating Shop

Region III

Francis Gold and Silver
El Triple J Jewelry Shop
E&C Jewelry Shop
Ernielyn Jewelry Shop
Ricel's jewellery
Nestor Urian Plating Shop
Jewel Quest Marketing
Chizpaz Jewelry
June and Rose Acero Jewelry
276 Jewelry Shop
Laricels' Jewelry Repair Shop
Oya's Jewelry
Kyle Jewelry Shop
DFS Jewelry House
Dothies Jewelry Tools Supply & Repair Shop
GRA Jewelry Shop
M.H. Del Rosario Repair Shop
Marpin Jewelry

Region IV

CVC Precision Toolings
Hammon Plating Technology, Inc.
PSI Technologies
TR Santi and Sons
Bine Philippines, Inc.
Van der Horst Technologies Phils., Inc.
Ayashi Design Company
Iron lady Design and Finishing Works
Brillo Semi-con Plating
K.E.A. Industrial Corp.
Kapco Manufacturing, Inc.
Sanno Philippines Manufacturing Corporation

Region VI

Egger Farm Plating
Gascon Pipe Bending & Stainless House
Jmars Plating
AU Hand Gunner Gun Repair Shop

Region VII

High End Fashion Jewelry Production
Philippines, Inc.
Richman Exponent
Suarez Brothers Metal Arts, Inc.
Cebu Quality Electroplating
Suarez & Sons, Inc.
Cosonsa Manufacturing, Inc.
Bato International Corporation
Mika and Gela Corporation
Fairchild Semiconductor Phils., Inc.
Arden Classics, Inc.
Korlanda Corporation
Halsangz Plating Cebu Corporation

Region XI

RCG Electroplating Services
Beta Chrome, Inc.
JAS Machine Shop

MIRDC INDUSTRY STUDY TEAM

TOP MANAGEMENT

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Executive Director

Agustin M. Fudolig, Dr. Eng.
Deputy Executive Director for Technical Services

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