Fundamental Problems in the Operation of the Automotive Parts Industry Small and Medium Businesses in Bangkok and Surrounding Provinces

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Abstract—The purposes of this study were to: 1) investigate operation conditions of SME automotive part industry in Bangkok and vicinity and 2) to compare operation problem levels of SME automotive part industry in Bangkok and vicinity according to the sizes of the enterprises. Samples in this study included 196 entrepreneurs of SME automotive part industry in Bangkok and vicinity derived from simple random sampling and calculation from R. V. Krejcie and D. W. Morgan's tables. Research statistics included frequency, percentage, mean, standard deviation, and T-test. The results revealed that in general the problem levels of SME automotive part industry in Bangkok and vicinity were high. When considering in details, it was found that the problem levels were high at every aspect, i.e. personal, production, export, finance, and marketing respectively. The comparison of the problem levels according to the sizes of the enterprises revealed statistically significant differences at .05. When considering on each aspect, it was found that the aspect with the statistical difference at .05 included 5 aspects, i.e. production, marketing, finance, personal, and export. The findings also showed that small enterprises faced more severe problems than those of medium enterprises.

Keywords—Automotive part industry, operation problems, SME, perimeter.

I. INTRODUCTION

THE main strategy of the Department of Industrial promotion during 2010-2014 consists of: 1) the strategy on the development of SME potential 2) the strategy on the development of the community enterprise potential 3) the strategy on the enterprise promotion and 4) the strategy on creating factors and system supporting the industrial business. The main policy of the government is to drive the economy of the country by developing the SME. As a result, over 90% of the economic development fund was put on the development of SME [15]. With the high competition in business world, Thailand has to change its industrial structure in order to increase the potential on products and services to meet the demand of global market as well as to create value added [43]. Automotive industry is one of the main industries of Thailand with high capacity and experience from abroad automotive manufacturers. Moreover, automotive basic infrastructure can be regarded as a super star industry of Thailand that can compete in the world market. The Detroit of Asia Project is a strong evidence of targeting as a center of Asian automotive

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industry. With the higher demand of automobiles in Asia and Middle-east, automotive industry has been considered as the most important one in this region. So, the Ministry of Industry appointed Automotive Institute to set up master plan for automotive industry of Thailand from 2012-2015 resulting in 5-year automotive development plan under the vision of being the automotive production base in Asia. Since automotive body parts and accessories are the outstanding products of the country, Thailand should grab the opportunity to encourage the automotive part production with high quality and competitive price to export in this region in the form of complete knock down (CKD), plastic and rubber spare parts of both trucks and motorcycles. At present, there are 700 first tier and 1,000 second tier of automotive parts including sole Thai shareholders and Thai and foreign shareholders. However, the export production on body parts and accessories yield lower value compared to other part parts such as engine parts and electrical parts. Furthermore, first tier production should adapt the products with their own design instead of made-to-order as in the past. In addition, most automotive manufacturers tend to buy from their own suppliers. With this change and higher competition, some first tier automotive part industries have to change themselves to second tier instead [5].

With the general situation and the problems mentioned above, the researcher is interested to investigate problems in this area to set up some guideline for developing curriculum to produce human resources for the right demand of automotive part industry. In addition, the findings of this study can be used as database to solve problems and develop SME for sustainable economic of the country [3], [4], [6], [8], [9], [18]-[20], [23], [29], [31], [41], [42], [44], [45], [47].

II. METHODOLOGY

A. Purpose of the Research
1) To investigate operation conditions of SME automotive part industry in Bangkok and vicinity,
2) To investigate operation problems of SME automotive part industry in Bangkok and vicinity, and
3) To compare operation problem levels of SME automotive part industry in Bangkok and vicinity according to the sizes of the enterprises.

B. Hypothesis of the Research
The enterprises with different sizes do not reveal different problems and fundamental infrastructure in operation.

C. The Study Variables

1) Independent variables in this study included the sizes of the enterprises, i.e. small and medium enterprises.
2) Dependent variables in this study included: production, marketing, finance, personal, and export.

D. Population/Sample

1) Population in this study were 400 SMEs of automotive part industry in Bangkok and vicinity who are the members of Thai Automotive Part Association (Data on Feb 1, 2013) [5], [13], [46].
2) Sample groups in this study were 196 entrepreneurs of SME automotive part industry in Bangkok and vicinity derived from simple random sampling and calculation from R. V. Krejcie [40] and D. W. Morgan's tables of 99 small enterprises and 97 medium enterprises

E. Instruments and Data Analysis

Questionnaires were the main research tool in this study with the design and construction steps as follows:

1) Study the information from related literature, text books and researches.
2) Write the 1st draft of the questionnaires to cover the research objectives.
3) Present to the specialists for the item objective congruence index evaluation. The items with IOC value less than 0.5 were edited, so, the whole IOC values were between 0.60-1.00.
4) Try out the questionnaires with 30 pilot studies.
5) Find the reliability (α- coefficient) with the reliability value at 0.9009.
6) Produce the complete questionnaires.

This questionnaire consisted of 4 parts. Part 1 is the general information of the informants in the form of check list. Part 2 is the operation condition of automotive part industry in the form of checklist. Part 3 is the problems in SME automotive part industry in the form of rating scale. Part 4 is other suggestions in the form of open-ended questions.

F. Data Collection

The researcher asked for the official permission letter from the Faculty of Industrial Education, Rajmangala Technology University Suwannapoom for the distributing of the questionnaires. The questionnaires were sent to 196 enterprises and 156 copies were returned or 79.59% of the population.

G. Data Analysis

The data were analyzed by computer program after being checked for the completion. The data were transformed into coding for the analysis. The demographic information was in the form of checklist of which the data were analyzed to find frequency and percentage. The problem part was in the form of rating scales of which the data was analyzed to find arithmetic mean and SD based on the evaluation criteria by [7]. The comparison of the problems and the basic operating factors were analyzed to find the difference by T-test. Other

suggestions were in the form of open-ended which were analyzed by content analysis to find frequency and grouping. The interpretation of 5 rating scales

TABLE I
THE INTERPRETATION OF 5 RATING SCALES

Problem level	Rating values
Highest	5
High	4
Moderate	3
Low	2
Least	1

TABLE II
AVERAGE INTERPRETATION

The average interpretation	Level
4.50 – 5.00	Highest
3.50 – 4.49	High
2.50 – 3.49	Moderate
1.50 – 2.49	Low
1.00 – 1.49	Least

The comparison between the small and the medium size industry focused on general conditions, size of the business, types of the business, and duration in running the business. Data were analyzed to find the difference by using independent sample T-test.

Suggestions were in the form of open-ended questions analyzed by content analysis in the form of frequency distribution.

III. RESULTS

A. The General Demographic Information

The general demographic information revealed that most automotive industrial entrepreneurs were male with the age between 30-40 and bachelor degree.

B. Most Enterprises

Most enterprises have operated their businesses for 3-6 years with the production on molding and welding automotive parts.

C. The Results Revealed that in General

The results revealed that in general the problem levels of SME automotive part industry in Bangkok and vicinity were high. When considering in details, it was found that the problem levels were high at every aspect, i.e. personal, production, export, finance, and marketing respectively.

D. The Comparison of the Problem

The comparison of the problem levels according to the sizes of the enterprises revealed statistically significant differences at .05. When considering on each aspect, it was found that the aspect with the statistical difference at .05 included 5 aspects, i.e. production, marketing, finance, personal, and export.

1) Production aspect: it was found that the enterprises with different sizes showed different problem levels at the

statistical significance of .05 especially on the aspect of alloy.

2) Marketing: it was found that the enterprises with different sizes showed different problem levels at the statistical significance of .05.
3) Finance: it was found that the enterprises with different sizes showed different problem levels at the statistical significance of .05 especially on cash flow and accounting.
4) Personal: it was found that the enterprises with different sizes showed different problem levels at the statistical significance of .05.
5) Export: it was found that the enterprises with different sizes showed different problem levels at the statistical significance of .05 especially on export promotion by the government.

E. Other Suggestions

1) The shortage of operation labor at the frequency of 7.
2) Expensive raw materials at the frequency of 6
3) Expenses on new production design at the frequency of 5.
4) There should be the criteria on the import of this product for Republic of China, Taiwan, India, etc. with the frequency of 4 and 5.
5) The government should have strong policy in supporting SME with the frequency of 3.

From Table III, it can be seen that the enterprises have high problems in the business operation at the overall level of 3.82, SD = 0.92. When considering in each aspect, it was found that every aspect revealed high problem level on personal (mean=3.88, S.D. = 0.89) followed by production ($\overline{X}$ =3.86, S.D.= 0.92), export ($\overline{X}$ =3.82, S.D.=0.91), finance ($\overline{X}$ =3.79, S.D.=0.94), and marketing ($\overline{X}$ =3.76, S.D.=.94) respectively

As can be seen in Table IV, that the comparison of the problem levels according to the sizes of the enterprises revealed statistically significant differences at .05. When considering on each aspect, it was found that the aspect with the statistical difference at .05 included 5 aspects, i.e. production, marketing, finance, personal, and export. The finding revealed that small enterprises faced more severe problems than those of medium enterprises.

Figs. 1-13 show the problems and analytical for automotive part operation SME automotive part industry in Bangkok and vicinity.

TABLE III
PROBLEMS OF AUTOMOTIVE PART OPERATION

Problems of automotive part operation	$\overline{X}$	S. D.	Problem level
1.Production	3.86	0.92	high
2.Marketing	3.76	0.94	high
3.Finance	3.79	0.94	high
4.Personal	3.88	0.89	high
5.Export	3.82	0.91	high
Total	**3.82**	**0.92**	**high**

TABLE IV
THE COMPARISON BETWEEN THE PROBLEMS OF SMALL AND MEDIUM ENTERPRISES

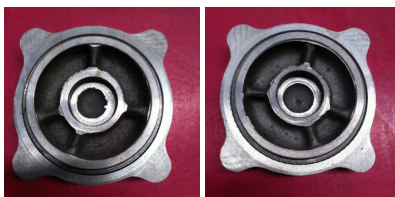| Problems of small and medium enterprises	small		medium		t-Value	p-Value
	$\overline{X}$	S.D	$\overline{X}$	S.D.		
1.Production	3.97	0.86	3.75	0.98	5.680	0.000*
2.Marketing	3.92	0.82	3.61	1.06	2.275	0.025*
3.Finance	3.98	0.86	3.61	1.02	3.229	0.002*
4.Personal	3.89	0.86	3.87	0.92	4.141	0.000*
5.Export	3.94	0.85	3.71	0.97	2.032	0.044*
Total	**3.94**	**0.21**	**3.71**	**0.44**	**3.660**	**0.000***

* A statistical level .05

Fig 1 Parts through casting is too rigid, making o-ring grooves machined through an uneven surface (a, and b) [17]

Fig. 2 Jig for tire production damage, holes, cracks meat parts (a) and jig for tire production, with thoughtful Image (b) [49]
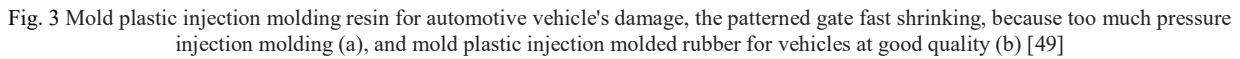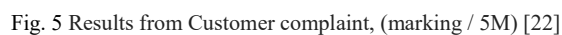
Fig. 3 Mold plastic injection molding resin for automotive vehicle's damage, the patterned gate fast shrinking, because too much pressure injection molding (a), and mold plastic injection molded rubber for vehicles at good quality (b) [49]

Fig. 4 Preview analysis in the process of bearing for automobile, (production/ 5 M) [22]

Fig. 5 Results from Customer complaint, (marking / 5M) [22]
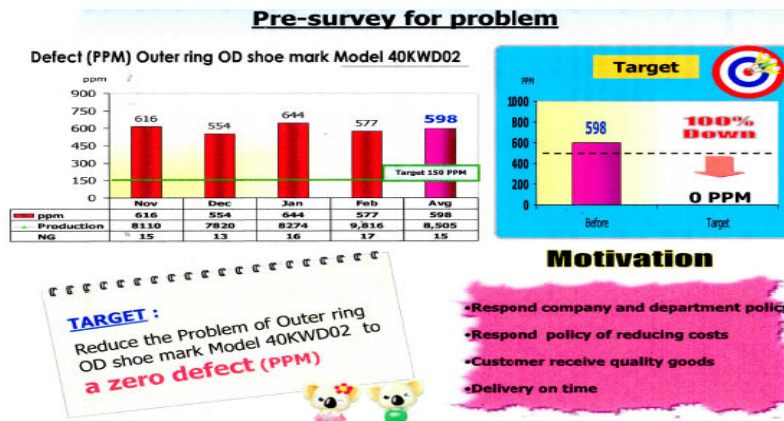
Fig. 6 Resolve in the production process, to reduce the problem of Outer ring OD shoe mark, (personal & production /5M) [22]
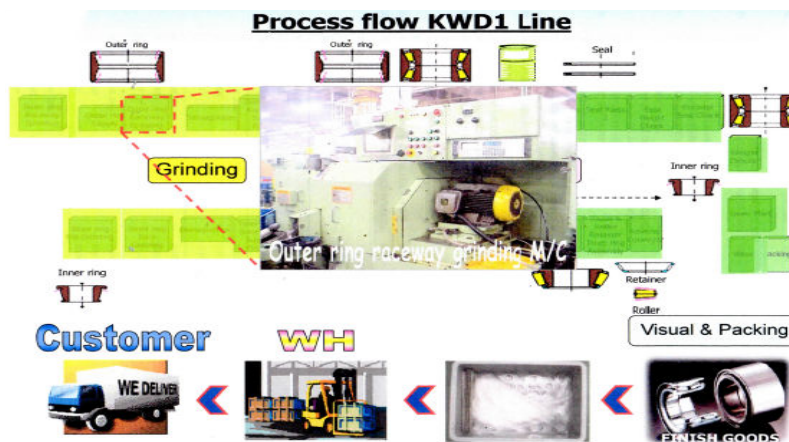
Fig 7 Process flow in Line show, as expected, to lower production costs, (finance & export/ 5M) [22]
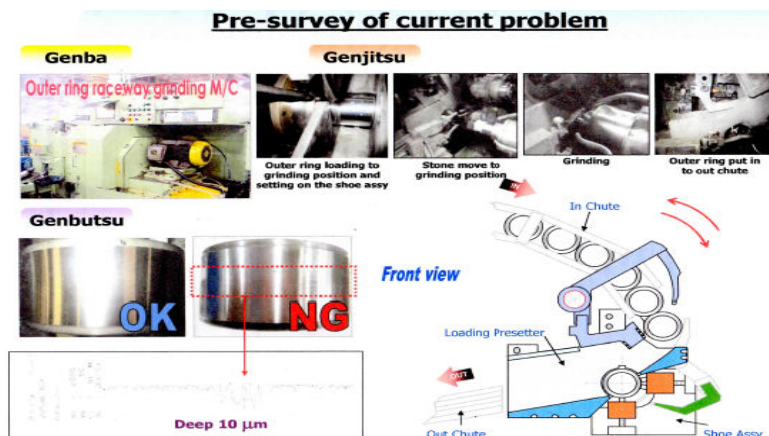
Fig. 8 Pre-survey of current problem, (production & personal / 5M) [22]
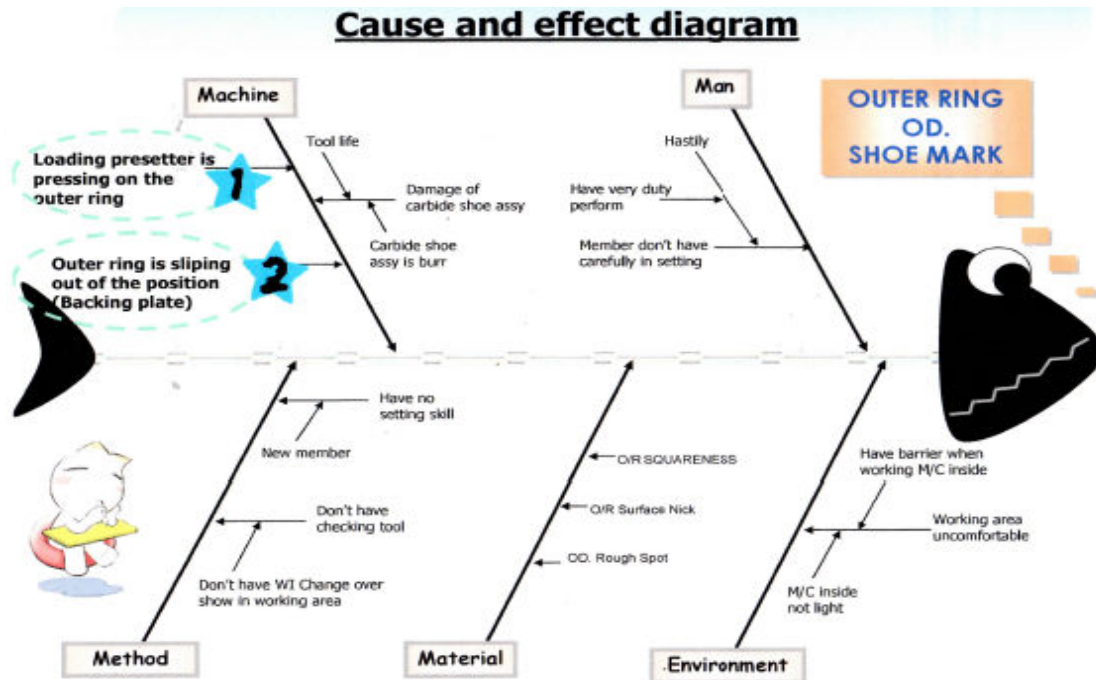
Fig. 9 The cause and effect diagram, to help solve outer ring OD shoe mark, (5M), and the researcher is interested to investigate problems in this area to set up some guideline for developing curriculum to produce human resources for the right demand of automotive part industry [22]

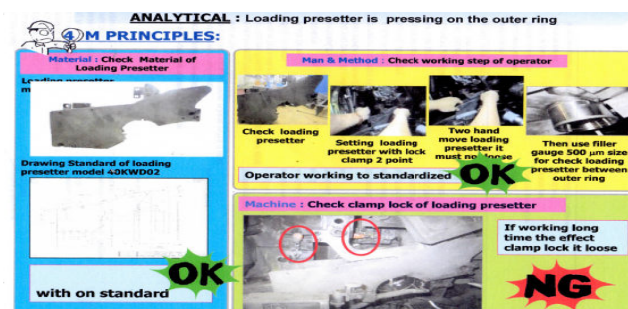Fig. 10 Test case1: Loading presetter is pressing on the outer ring ,(persona/ 5M) [22]

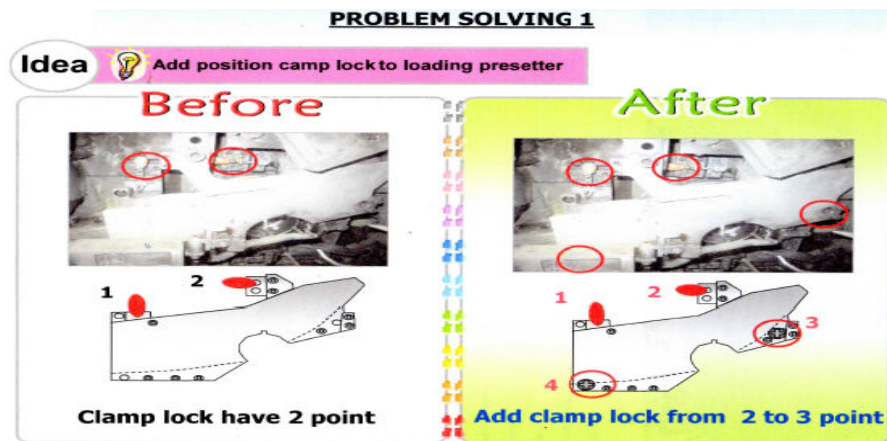Fig. 11 The analytical: Loading presetter is pressing on the outer ring, (5M) [22]

Fig. 12 The problem solving 1: idea add position camp lock to loading presetter, (persona/ 5M) [22]

Fig. 13 The analytical: outer ring is slip out of the position (backing plate), (persona/ 5M) [22]
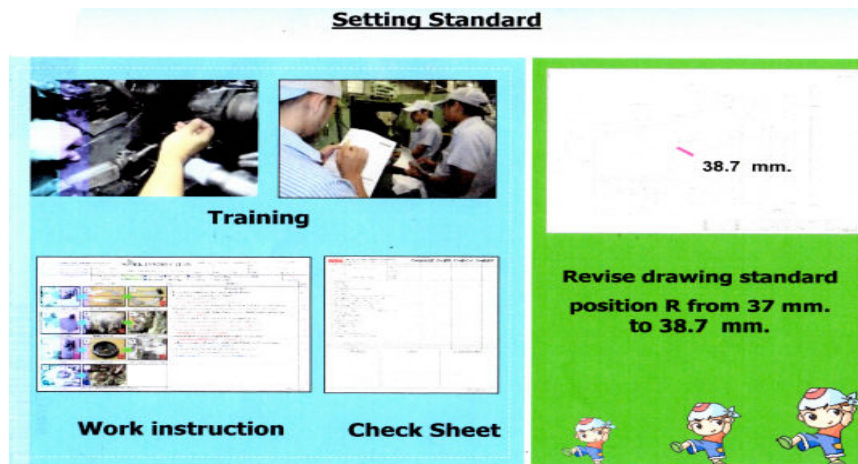

Fig 14 The sitting standard to success in job, (5M) [22]

IV. DISCUSSION

1) On the personal aspect, it was found that the problems were on shortage of auto part designers, labor, recruitment, and personal evaluation. With these problems, 16 automotive entrepreneurs have produced skilled labors of diploma and certificate levels with the expectation of 100,000 persons in 3 years (2012-2014) to support the demand of automotive industry of AEC in the

future. These findings were supported by [12], [14], [28], [39].

2) On the production aspect, it was found that there were problems on production technology such as machinery, devices, alloy, local vendor such as automotive part manufacturers, parts of suspension system, parts of auto body, parts of driving equipment, transmission system, electronics system, and accessories of synthesized metal, planning, nonmetal, and other production factors such as electricity, telephone, tap water, waste water treatment. This supports the works by [2], [10], [26], [35], [36], [38] as shown in Figs. 1-3.

3) For export aspect, the problems related to the lack of the government promotion, government officials' corruption, export volume, export process, import tax on raw materials, and the competition with other countries. This supports the work by [1], [24], [27], [37].

4) On the financial aspect, the problems related to cash flow, accounting, investment resource, investment fund, and loan. This supports the works by [16], [21], [25], [30], [34].

5) On the marketing aspect, the problems related with marketing channels, price setting, new market approach, marketing promotion such as exhibition. This supports the works by [11], [32], [33], [48].

V. CONCLUSION

1) The government should support the small and medium size automotive part manufacturers by providing more information about the industry to create competitiveness by improving the product quality to compete in the global market.

2) The government should provide low interest loan with longer term of payment and more easy and flexible loan conditions. This can help liquidity of the SME in particular investment such as machine, raw materials, and cash flow during operation.

3) The government should encourage the educational institutes to provide program in automotive part industry or related work to support the needs of the enterprises. the government should increase higher budget to develop higher quality personnel.

4) The government should provide training center for technicians on design, assembly, and maintenance of the machine for the production of automotive parts.

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