Application of Hoshin Kanri for Continuous Improvement in Procurement of Automotive Industry

Piyathip Theppinta and Jeerapat Ngaoprasertwong

Abstract—This research is purposed to analyze, improve and apply the policy deployment of automotive industry step by step. The steps in research approach are as follows: 1. Measuring the whole system, 2. Setting core objectives, 3. Understanding the environmental situation in which the business operates, 4. Define resources to perform core objectives, 5. Transforming the policy to the implementation, 6. Deploy policy to department. With these steps, mechanisms and forms, the result of applying policy deployment in TQM methodology style by deploying from purchasing division level to department level, the result shows that saving cost ratio can be increased from 0.3% to 3.18% and evaluation scores increased from 12.86 to 28.14.

Keywords—Hoshin kanri, Procurement, Automotive industry.

I. INTRODUCTION

During several past years, the organizations have had to be changed in many aspects in order to increase their productivity and competitiveness. This includes the development and improvement of operational system which is considered to be one of the main factors to stably sustain every operation. The continual development will lead to the competitiveness among the changing situations. The purchasing department is, consequently, one of the important departments influencing the success of the whole organization. If the purchasing department can operate more efficiently, it will lead to more profits gained by the organization. The case study company is a car manufacturer from Japan. The case study department is the purchasing department in the division level of procurement of raw materials and general equipments. Only the data from Mat system is considered. According to previous performance of the purchasing department, it can be obviously seen that the operation in cost performance has not yet achieved the specified goal. There is a loss in operational cost of the organization. This research is conducted by applying the Hoshin kanri to improve the procurement.

II. METHODOLOGY & LITERATURE REVIEW

The Hoshin Kanri [1] is the system of policy management considering the direction, target, and means. It emphasizes on the mutual operation of resources with the concept of total quality management to achieve the highest goal by supporting and linking the potential of organization as well as implementing the policy to the practice with unity following the concepts of PDCA. The operational guidelines consist of 6 following steps: 1. Whole system measurement 2. Setting the main purpose 3. Understanding the situations, 4. Specifying the resources to the achievement, 5. Transforming the policy to the implementation 6. Creating the operational plan by transforming the policy to the implementation of the purchasing department.

Other researches similar in concept to this research are, for example, The research of Kanya [2] to study the development key performance indicators base on balanced scorecard in plastic case study case study, and Pattama [3] to study the design of a purchasing information system for an automotive factory and assist in making decision of procurement, Suthida [4] to study the Performance measurement for continuous improvement in purchasing system of cement industry, Tsung-Ming Yang, Chao-Ton Su [5] to study the application of hoshin kanri for productivity improvement for a semiconductor manufacturing by applying in the operation to reduce the operational processes of engineering, Barry J. Witcher, Vinh Sum Chau [6] to study the competence management by using the Hoshin kanri in developing the main capabilities.

III. CASE STUDY

The case study company was established in 2007 from the policy of head office in Japan in order to be the center of 9 Asian countries. Its main responsibility is in the development and manufacturing of cars. It will also become the center in planning the projects to be leading car manufacturer as well as being the center in procurements of parts and supporting the production line.

The procurement pattern is the centralization. Every division informs their purchasing requests of materials to the center for the procurement of products and services. According to product delivery, the products will be transported to the user's factory located in the specified district. The responsibility in delivery is not included in the

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scope of this research because the operational pattern is the centralization with the supply division in each area responsible for receiving the products in each factory area.

IV. CASE METHODOLOGY

Whole system measurement. Setting the team and collecting the data for the whole system measurement. The team consists of some experienced persons and experts from related bureaus participating in the research. They are 10 executives of purchasing division. The team brainstorms according to the following factors; Internal Problem, Customer need, Environment, and Past performance. Then, the quantitative data of each factor is taken in consideration. The expert team uses the data from each factor and the principle of 4M; man, money, materials, and machineries or internal management for the SWOT ANALYSIS. The data of previous performance of the purchasing department is collected from 2008 to 2010, it is found that the cost performance does not agree with the goal. Therefore, it will be emphasized in order to improve the performance agreeing with the organization’s goal.

The purchasing department is one of the important departments in reducing the cost and increasing the profits to the organization. Presently, the goal is set to reduce the cost in procurement from the annual negotiation equaling to 2.00% from the procurement value. The procurement value is likely to be higher following the production volume. According to the procurement value in each year, the operation has not yet reached the goal. The mentioned goal has been implemented since 2008 to reduce the cost from the bargain of purchasing department. The loss amounts 593,734,768 baht.

Setting core objectives. According to the transformation of internal policy in each management level to the connection of each organization, division, and department, it is found that the details of connection can be described numerals.

Understanding the environmental situation in which the business operates. Understanding the current situations is to consider the problems and the solution. According to the Hoshin Kanri concept, the problems found in the department is necessarily identified for ordering the sequence of important and selecting for the policy transformation. The step of understanding the current situations consists of 5 issues; thought of the executives, mission of the department (including the internal customer demand), change in the future environment, vision of the organization, and the problems in continual improvement following the cycle of quality management (PDCA) assigned by the executives. It is presently found that the cost performance of the department has not yet achieved.

Define resources to perform core objectives, This is related to 2 activities: activities responding to the strategy and daily activities to the suitable allocation of resources.

<table>
<thead>
<tr>
<th>TABLE I</th>
<th>STRATEGY AND DAILY ACTIVITIES MANAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td>Create new value/(mid-long term viewpoint)</td>
</tr>
<tr>
<td><strong>Focus</strong></td>
<td>Innovation</td>
</tr>
<tr>
<td><strong>Management Cycle</strong></td>
<td>PDCA (1st cycle)</td>
</tr>
</tbody>
</table>

This is a framework for requesting the support and approval from the executives in the purchasing department by using the coordination between each position with the catch-ball system. The important thing is to create the mutual understanding by sharing the information together. As a result, the operational management of the purchasing division of raw materials and general equipment can be divided as Fig. 2.

- Routine operation, 37.50%
- Strategic operation, 62.50%

Fig. 2 The allocation of resources

Transforming the policy to the implementation. The transformation of policy is conducted by using 6 main elements; vision, mission, policy, strategy, method, and activity following the cycle of quality management (PDCA) from framework of policy deployment as Fig. 3[1].
Each group is assigned with the responsibility following the goal of their department in order to achieve the main goal of the organization. The framework of division level is also specified as Table I.

### TABLE I

<table>
<thead>
<tr>
<th>Details of policy</th>
<th>Performance Index</th>
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<tbody>
<tr>
<td>Continually promoting the quality with suppliers, improving the quality system of suppliers, and improving the build-in quality to suppliers Provision of suitable sources for buying parts by expanding the domestic purchasing sources as well as improving the bargain and price revision</td>
<td>Numbers of defect products</td>
</tr>
<tr>
<td>Continually promoting the activities of safety with suppliers, operating, and assessing the safety of suppliers Continually improving the delivery system to suppliers Enabling suppliers to understand the management principle of corporate social responsibility.</td>
<td>Value of saved cost</td>
</tr>
<tr>
<td></td>
<td>Numbers of fatal accidents</td>
</tr>
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<td></td>
<td>Levels of just in time points</td>
</tr>
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<td></td>
<td>Numbers of suppliers with illegal performance</td>
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Creating the operational plan by transforming the policy to the implementation of the purchasing department. The transformation of policy in the division level can be conducted by implementing the activities in each subject to create the operational plan following the activities transformed to the department level.

Operational plan of activities in cost reduction for the group of equipments used for cutting and the change of purchasing sources from foreign countries to the domestic purchase. The comparison must be taken to the domestic production sources with the trade among companies. The price bargain can be performed by letting the current trading partner to propose the domestically-produced products with lower cost. Other suppliers in the company group are also granted with the opportunity to propose the replacing products in the classification of types and purchasing value in order to be selected for the test in production line. After the test, it can be found that 13 items have passed the test with the saved value amounting to 1.71 million baht. The purchasing value reduces from 46.22 million baht to 44.51 million baht. The saved value amounts to 3.70% of the purchasing value.

Operational plan in reviewing the price structure for the bargain. The current price structure must be reviewed following the operational plan by studying the price structure of chemical raw materials purchased from the producers. The factors used in the consideration are the exchange rate and the cost of raw materials. According to the improvement of production process of glass cleaning solution W637, it is found that the change in the raw materials as well as the improvement on production process by reducing the steps in the production can reduce the production time and the price per unit is also cheap of 0.99 baht/liter. This can influence the purchasing value of the group of chemical raw materials. The purchasing value reduces from 123.91 million baht to 120.21 million baht per year or equaling to the saved value of 2.99%.

According to the performance in 2011, it is found that the operation in the department continually follows the annual operational plan resulting in the goal achievement. The cost of procurement can be reduced with the reduced purchasing value equaling to 3.18% achieving the goal.

### V. CONCLUSION

According to the application of Hoshin Kanri for the continual improvement on the procurement in the division level, the operational process implemented in the improvement and development can be summarized as follows: (1) creating the operational plan following the goal in policy transformation, (2) creating the monitoring system of the operation for the suitable control, (3) creating the manual of correct operational methods, (4) continually performing the activity of cost reduction with suppliers, (5) continually arranging the meetings with factory department and suppliers for the communication of information.

The mentioned solution of problems leads to the continual improvement in the quality, the punctuality in delivery, the enhancement in the safety, and the control of cost following the target set by the purchasing department. The saved cost
increases by 3.18%. The internal communication between each department in the organization is also improved. The department executives have similar opinion in improving the operational plan for the division development to be more suitable before being implemented with the policy transformation. The average increases from 12.86 to 28.14 points (from 35 points). The team of executives makes an approval for the implementation of this operational plan in 2011. They also think of implementing the operational plan, gained from the policy transformation to create the guideline for the improvement and development of operation in the department level. This leads to the viewpoint in the continual improvement and development of procurement following the application of Hoshin Kanri concept.

VI. Recommendations

The case study purchasing department should improve the documents whenever the operational process changes in order that the documents can be correct and beneficial for the highest control of operation as well as being beneficial for the communication in the whole organization.

The case study purchasing department should arrange the training or giving the knowledge in the activity of cost reduction to the suppliers as the knowledge and understanding in this aspect is currently limited only for the team in the case study company. This can motivate other suppliers to think of developing their operational process as well.

Acknowledgements

This research has been successfully conducted with the advice from Associate Professor Jeerapat Ngaoprasertwong, thesis advisor, who always gives beneficial advice to the researcher during the thesis conducting process. The researcher would like to extend the appreciation to the team in brainstorming and continual support and encouragement.

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