Discussion of the Competitive Performance and Competitive Strategies of Solar PV Manufacturers

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Abstract: Solar energy is the most important basic energy among various renewable and biomass energies, meaning wind power, ocean energy, and water energy, which all come from solar energy. Broadly, solar energy contains the abovementioned various renewable energies. Solar PV is a kind of ideal energy, and it has many advantages: it has low pollution, low energy consumption, it is sustainable, and it is not affected by energy shortages. Importance-Performance Analysis (IPA) is a method often used to measure satisfaction and improve competitive strategies. In order to completely analyze the business performance of Taiwan’s renewable energy enterprises, this research adopted the IPA method to analyze and investigate the evaluation of the case company’s competitive performance, and then, the results can be used as the basis for improvements to the case company.

1. Introduction

Solar energy is the most important basic energy among various renewable energies and biomass energy, meaning wind power, ocean energy, and water energy, which all come from solar energy. Broadly, solar energy contains the abovementioned various renewable energies. Solar energy a renewable energy because it can be converted and directly applied. When solar radiation energy is converted into thermal energy through a conversion device, it belongs to the solar energy utilization technique; when thermal energy is used for power generation, it is called solar thermal power generation, which also belonging to this technology field. When solar radiation energy is converted to utilize electrical energy, it belongs to solar PV generation technology, and because photoelectric converting devices usually adopt the principle of the photoelectric effect of the semiconductor device for photovoltaic conversion, it is also called solar PV technology.

Compared with the power generation of traditional energies, solar PV has the following 2 advantages:

(a) Renewable energy. The traditional coal, oil, gas, and other primary energies are formed through long geological processes, and their reserves on earth are limited. If these energies are measured according to existing exploitation abilities, they will quickly be depleted, thus, people must seek for and utilize sustainable and inexhaustible energies to replace fossil fuels before depletion. For contemporary societies, the new energy types of renewable sources, meaning wind power, solar energy, and biomass energy, are the ideal substitutes.

(b) No pollution. The use of traditional energies for power generation will cause fatal pollution and damage to ecological environments.

Importance-Performance Analysis (IPA) is a method often used to measure satisfaction and improve competitive strategies. In order to completely analyze the business performance of the case solar PV enterprise, this research adopts the IPA method to analyze and investigate the evaluation of the case company’s competitive performance, and then, the results can be used as the basis for improving the case company.

2. Literature Review

Enterprises must effectively allocate their limited resources to improve competitive power, gain orders from customers, and make profits continuously. Porter (1988) believed that the emphasis of
enterprise competition is the competition of value chain, including R&D, management of the supply chain, operations, marketing and sales, and after-sales service. In the research of the competitive power of manufacturing enterprise, Hill (1993) put forward the concept of “Order-winners and Qualifiers”. This concept is similar to the 5 competition dimensions of cost, quality, delivery period, elasticity, and service of the aforementioned manufacturing enterprise, which is the same as the competition of value chain of Porter (1988). Hill (2000) proposed specific steps to connect an enterprise’s manufacturing strategy and marketing strategy. By virtue of the framework of “Order-winners and Qualifiers”, Hill (2000) put forward 14 conditions of “Order-winners and Qualifiers” to help companies further understand market demand and analyze their market competition status, and then, proposed competitive strategies to win the orders of clients. The 14 attributes of Order-winners and Qualifiers include: price, delivery reliability, delivery speed, quality conformance, demand increases, product range, design, distribution, design leadership, being an existing supplier, marketing and sales, brand, technical liaison and support, and after-sales support.

### 3. Research Method

Martilla and James were the earliest to propose the relevant basic framework of Importance-Performance Analysis (IPA), and actually apply it. IPA draws the average scores of importance and performance of attributes in a two-dimensional diagram, where the vertical axis represents importance and the horizontal axis represents performance, as shown Figure 1.

The 4 quadrants in the IPA method have their respective definitions:

1. **Keep up the good work**: it means that customers attach great importance to the attributes in this area, and feel satisfied with enterprise performance. Therefore, the attributes in this quadrant belong to “Keep up the good work”.
2. **Concentrate here**: it means that customers attach great importance to the attributes in this area, but they are not satisfied with enterprise performance. Therefore, the attributes in this quadrant belong to “Concentrate here”.
3. **Low priority**: it means that customers attach little importance to the attributes in this area, and they are not satisfied with enterprise performance. Therefore, the attributes in this quadrant belong to “Low priority”.
4. **Possible overkill**: it means that customers attach little importance to the attributes in this area, but they feel satisfied with enterprise performance. Therefore, the attributes in this quadrant belong to “Possible overkill”.

According to the division of different regions, managers can make the best use of limited resources, and provide the order of priorities for improvements to enhance satisfaction. The IPA analysis method can easily show good or poor attributes, as well as improvement methods, thus, it is applied to other fields by many scholars as a tool to analyze attributes, improve the order of priorities, and meet the needs of customers.

<table>
<thead>
<tr>
<th>Importance</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentrate here</td>
<td>Keep up the good work</td>
</tr>
<tr>
<td>Low priority</td>
<td>Possible overkill</td>
</tr>
</tbody>
</table>

Figure 1. Analysis diagram of importance and performance.
4. Research Results and Discussion

4.1 Case study

Company A is one of the top 3 solar PV companies in Taiwan. This research takes Company A as the subject of case study to evaluate its competitive performance, and the evaluation results can be used as the basis for improving the case company.

This questionnaire adopts a Likert 7-point scale, with a total of 14 items, and 30 of Taiwan’s solar PV experts are taken as the questionnaire respondents, including 10 professors, 15 senior managers of solar PV companies, and 5 government officials. A total of 30 formal questionnaires are distributed, and 26 valid questionnaires are retrieved, for an effective recovery rate of 86.67%.

This research takes the average (5.29) of importance and the average (5.08) of performance, as counted in the questionnaire, as the standard coordinates to judge whether the performance of each indicator is good or poor. Please see Table 1 for details.

According to the IPA analysis results, Company A belongs to “Keep up the good work” in the 4 attributes of (1) Price, (4) Quality Conformance, (7) Design, and (9) Design Leadership. This is also the advantage of Company A, and it must maintain such competitive performance to help company win more orders.

Company A has competitive disadvantages in the 3 attributes of (6) Product Range, (13) Technical Liaison and Support, and (14) After-sales Support, and thus, belongs to “Concentrate here”. Company A must invest more resources to improve the competitive power of the 3 attributes, in order to improve their competitive performance.

In the 3 attributes of (10) Being an Existing Supplier, (11) Marketing and Sales, and (12) Brand, the importance is higher and performance is lower, and thus, belongs to “Low priority”. While the performance of Company A is poor, the attribute belongs to lower importance, thus, it is placed in the last ranking order. When the company has additional resources, improvements can be made.

In the 4 attributes of (2) Being an Existing Supplier, (3) Delivery Speed, (5) Demand Increases, and (8) Distribution, the importance is lower, but performance is higher, thus, it belongs to “Possible overkill”. While the performance of Company A is good, this alone cannot bring more orders to the company, and the company should consider transforming their resources to other competitive attributes. Please see Table 1 for details.

<table>
<thead>
<tr>
<th>Item</th>
<th>Criteria</th>
<th>Importance</th>
<th>Performance</th>
<th>Competitive strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Price</td>
<td></td>
<td>5.6</td>
<td>5.2</td>
<td>Keep up the good work</td>
</tr>
<tr>
<td>2 Delivery Reliability</td>
<td></td>
<td>4.7</td>
<td>5.1</td>
<td>Possible overkill</td>
</tr>
<tr>
<td>3 Delivery Speed</td>
<td></td>
<td>4.9</td>
<td>5.1</td>
<td>Possible overkill</td>
</tr>
<tr>
<td>4 Quality Conformance</td>
<td></td>
<td>5.8</td>
<td>5.7</td>
<td>Keep up the good work</td>
</tr>
<tr>
<td>5 Demand Increases</td>
<td></td>
<td>5.1</td>
<td>5.1</td>
<td>Possible overkill</td>
</tr>
<tr>
<td>6 Product Range</td>
<td></td>
<td>5.4</td>
<td>4.9</td>
<td>Concentrate here</td>
</tr>
<tr>
<td>7 Design</td>
<td></td>
<td>5.8</td>
<td>5.9</td>
<td>Keep up the good work</td>
</tr>
<tr>
<td>8 Distribution</td>
<td></td>
<td>4.7</td>
<td>5.2</td>
<td>Possible overkill</td>
</tr>
<tr>
<td>9 Design Leadership</td>
<td></td>
<td>6.0</td>
<td>5.9</td>
<td>Keep up the good work</td>
</tr>
<tr>
<td>10 Being an Existing Supplier</td>
<td></td>
<td>4.5</td>
<td>4.5</td>
<td>Low priority</td>
</tr>
<tr>
<td>11 Marketing and Sales</td>
<td></td>
<td>4.6</td>
<td>4.1</td>
<td>Low priority</td>
</tr>
<tr>
<td>12 Brand</td>
<td></td>
<td>4.6</td>
<td>4.6</td>
<td>Low priority</td>
</tr>
<tr>
<td>13 Technical Liaison and Support</td>
<td></td>
<td>6.2</td>
<td>5.0</td>
<td>Concentrate here</td>
</tr>
<tr>
<td>14 After-sales Support</td>
<td></td>
<td>6.2</td>
<td>4.8</td>
<td>Concentrate here</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>5.29</td>
<td>5.08</td>
<td></td>
</tr>
</tbody>
</table>

5. Conclusion

Solar energy is a kind of ideal energy, and it has many advantages: it has low pollution and low energy consumption, and it is sustainable, and thus, is not affected by energy shortages. Compared with the power generation of traditional energies, solar power generation has renewable and zero pollution advantages.
In order to completely analyze the business performance of solar PV enterprises, this research adopted the IPA method to analyze and investigate the case company’s competitive performance and competitive strategy, and the results can be used as the basis for improving the case company. The research results show: Company A belongs to “Keep up the good work” in the 4 attributes of (1) Price, (4) Quality Conformance, (7) Design, and (9) Design Leadership. This is an advantage for Company A, and it must maintain this competitive performance to help the company win more orders. However, Company A has competitive disadvantages in the 3 attributes of (6) Product Range, (13) Technical Liaison and Support, and (14) After-sales Support, and thus, belongs to “Concentrate here”. Company A must invest more resources to improve the competitive power of these 3 attributes, in order to improve its competitive performance.

References


