

Management Affecting the Efficiency of Small Power Producer of Thailand

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ABSTRACT

The objectives of this research were 1) to study the factors affecting the efficiency of small power producers and 2) to study the approaches for the development of efficiency of small power producers. For the quantitative research, the sample group consisted of industrial plants using electricity from small power producers in the industrial estates of the central region and eastern region. The respondents were a total of 360 electrical administrative engineers of industrial plants. The data was collected from the questionnaires and was analyzed with descriptive statistics. For the qualitative research, the data was collected from the in-depth interviews with 4 groups of key informants including the electrical administrative engineers, of 12 industrial plants, the executives of small power generating companies, Director of the Energy Policy and Planning Office, Ministry of Energy, and Director of Power Purchase Agreement Department, the Electricity Generating Authority of Thailand, totaling 15 people. The research results revealed that 1) the quality management had the greatest influence on the entire efficiency of small power producers, followed by service quality, corporate brand equity, and reliability management, respectively. 2) The guidelines for improving efficiency of small power producers was to prepare a manual for working standards covering all parts to train the employees to conform to the manuals for meeting the specified working standards. The inspection and maintenance on the equipment must be performed on a regular basis with the availability of substituting machine and equipment which were always ready to use. The coordination must be made with PTT Public Company Limited to maintain the constant fuel pressure with a quick replacement system in case of interruption.

Keywords

Small Power Producer, Management, Service Quality

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Introduction

As Thailand has an increasing demand for electricity by approximately 1,200 megawatts per year, it is necessary to develop new power plants continuously (Pongdit Potchana, 2011). In 2012, Thailand imported energy accounted for 80% of the energy used domestically and accounted approximately for 1.6 trillion baht or accounted for more than half of the allocated budget of 2.6 trillion baht. However, only 20% of that could be produced in the country. As a result, Thailand has made efforts to promote renewable energy in order to reduce foreign energy imports. The energy crisis is a major problem because the original energy source generated from fossil fuel such as coal or natural gas is consumed energy. This makes renewable energy source an important future energy source which is seen to be more sustainable than conventional sources (EGAT Biznews, 2020).

The concerns over the electric power crisis have made the Cabinet approved the draft regulation for the purchase of electricity from small power producers (SPP). The 3 Electricity Authorities issued the regulations for the purchase of electricity from small power producers. The Electricity Generating Authority of Thailand (EGAT) issued the Notification to purchase electricity from SPP. Later, the purchase volume was expanded accordingly. The objective was to encourage small power producers to take part in power generation resulting in the use of energy source in the electricity generation to the maximum benefit. This could relieve the burden of government investment in the power production and distribution system (PPTC, Steam and electricity power plant, 2012).

Apart from the electricity generation to meet the demands of the Electricity Generating Authority, small power producers also have other services such as structuring, setting up power generation system, consultation, supervision, and maintenance of electrical systems for the factories. The small power producers often set up power plants in various industrial estates in order to be able to supply sufficient electricity to industrial plants in the settlement and facilitate customers in solving problems from electricity usage such as power drop due to insufficient voltage or damaged power poles, etc. From this reason, the small power producers have to consider the management in various areas in order to achieve maximum efficiency in the operation.

Research objective

1. To study the factors affecting the efficiency of small power producers.
2. To study the approaches for the development of efficiency of small power producers.

Literature Review

Concepts and theories on quality management

The researchers applied the concepts of quality management throughout the organization and the model of success in the use of Delone and McLean information system (DeLone & Mclean, 1992) to measure quality management. The model of information system success (IS Success Model) consisted of 6 components; system quality, information quality, use, user satisfaction, individual impact, and organizational impact. The success was measured in the quality of the

information quality system and user satisfaction. This was because quality system and information system were essential to the management of corporate information affecting the performance of employees in the organization. If the users were satisfied with the use of the system, it would play an important role for the achievement in implementing the system in the organization. In summary, the quality management refers to the management system to produce the employees in the organization to participate in the improvement and development of quality of the work system or the production process to be more efficient.

Concepts and theories on service quality

Parasuraman, Zeithaml, and Berry (1988) defined the service quality as perception or attitude about customer's products or services in the service industry. The service quality in the customer's views is the result of a comparison between the expectations of the customers before using the service and the actual performance the customer received. Parasuraman et al. (1988) developed a model that measured service quality called SERVQUAL developed from 22 items to remain only 5 dimensions; 1. Tangibles, 2. Reliability, 3. Responsiveness, 4. Assurance, 5. Empathy.

Concepts and theories on quality corporate brand equity

The competition today is more intense. Various products and services are similar. Therefore, modern marketing strategies are focused on developing brands for higher equity according to the brand equity concept. The brand equity concept that has been widely accepted is the concept of Aaker (Aaker, 1991; 1996) and Keller (Keller, 1993). Aaker (Aaker, 1991) suggested that brand equity was

comprised of four key elements; brand loyalty, brand awareness, perceived quality, and brand association. The good brand will create satisfaction for both manufacturers and customers. It can reduce the risk of transaction which is the equity from the ability to mitigate the risks and uncertainties associated with consuming a product under that brand (Kapferer, 2008). Keller (Keller, 1993) proposed that brand equity was brand knowledge which could be divided into 2 components; Brand awareness and brand image.

Concepts and theories on reliability management

Reliability is a key element of the quality of the relationship between customers and business organizations. The reliability management is an important issue that organizations should pay attention to. Reliability is one of the essential elements of business operation (Reichheld & Scheffer, 2000), especially when it cannot be controlled by the organization. However, the reliability arises from many dimensions. It is a complex social component encouraging customers to be willing to purchase goods or services from the service provider they are bound to. In other words, the reliability arises from integrity and benevolence of the service provider. The reliability is the trust of the customers in the integrity of the service provider organization and the readiness to pay full attention to customer's needs including consistency that will remain honest as well as the unremitting attention and care of the customer needs (Gefen, Karahanna & Straub, 2003). Thus, the customers who have reliability in a particular brand or organization will have a strong commitment to continue supporting that brand or organization (Moreira & Silva, 2015).

Planning Office, Ministry of Energy, and 4. Director of Power Purchase Agreement Department, the Electricity Generating Authority of Thailand, totaling 15 people.

Research methodology

For the quantitative research, the population used in this study is industrial plants using electricity from small power producers in the industrial estates of the central region and eastern region totaling 43 industrial estates having 6,641 industrial factories (Industrial Estates of Thailand, 2020). The questionnaire respondents were a total of 360 electrical administrative engineers of industrial plants using electricity from small power producers. The data was collected using the criteria of 20 times of the observed variables (Kline, 2005). Multistage sampling was used. The data was collected with questionnaires. They were tested for content validity with IOC values ranging from 0.80-1.00. The reliability of the meter was found to have the reliability coefficient (Cronbach Alpha value) of the measured observation parameters used. In this research, the values were between 0.875 and 0.951, and the whole version was 0.983 analyzed by structural equation model.

For the qualitative research, the in-depth interviews made on the key informants including the 1. electrical administrative engineers of 12 industrial plants as those who have good understanding on the efficiency of power generation of small power producers, 2. the executives of small power generating companies, 3. Director of the Energy Policy and

Research results

1. For the results of the model analysis, when considering entirely, it was found that all indices for consistency between the model and the empirical data (Diamantopoulos & Siguaw, 2000, Schumacker & Lomax, 2010) passed the criteria including (1) relative Chi-square (Chi-square / df) which was 1.65, (2) root mean square error of approximation (RMSEA) which was 0.043, (3) standardized root mean square residual (SRMR) which was 0.043, (4) goodness of fit index (GFI) which was 0.94, (5) adjusted goodness of fit index (AGFI) which was 0.92, (6) comparative fit index (CFI) which was 0.99, (7) parsimony goodness-of-fit (PGFI) which was 0.65, and (7) Critical N (CN) which was 290.36.

purchasing behaviors in more volume and the higher frequency of service usage (Griffin, 1995). The idea is that if consumers are satisfied with any business, it will also affect the number of repeat consumers' use as well. The results of the study are consistent with the researches of Gorla, Somers and Wong (Gorla, Somers & Wong, 2010) and Phuong and Dai Trang (Phuong, & Dai Trang, 2018).

3. The corporate brand equity had direct influence on the efficiency of small power producers. This is because the products with high brand equity can be improved in the competitive efficiency. It helps building the brand knowledge and encourages customers to respond to brands more. Meanwhile, smaller power producers that can create more positive awareness among customers will create an advantage in the competition and make customers choose to come back to the service again in the future (Aaker, 1991). Thus, modern marketing strategies focus on developing a brand that has a higher value according to the brand equity concept. This is consistent with the concept of Aaker (Aaker, 1991; 1996) and Keller (Keller, 1993) proposing that a distinctive brand can easily promote a product to build a reputation leading to the success of the organization. This is because the brand of high value will help to satisfy the customers. It reduces trade-off risk or brand value, the risk and uncertainty associated with consuming a product under that brand (Kapferer, 2008). The effort to create brand value for the brand to be well-known and have good image from the customer's perspective will make the customers remember more than other brands. It is inevitably the opportunity to be chosen more than any other brand in the same industry (Kimpakorn & Tocquer 2009) and eventually leads the customer to have loyalty to that brand (Hsu, et al., 2011; Tan, Devinaga, & Hishamuddin, 2012). It is also a key variable on customers' future purchasing decision (Kim, Kim, Kim, Kim, & Kang, 2008). This is consistent with the results of the studies of Alhaddad (Alhaddad, 2015) Chien and Chi (Chien, & Chi, 2019), and Wu et al (Wu, et al., 2011).

4. The reliability management influenced the efficiency of small power producers because small power producers can manage that reliability leading to increased competitiveness of the organization. Reliability is a key component of the quality of the relationship between customers and business organizations. The reliability management is an important issue that small power producers should pay attention to. It is one of the essential elements of business operation (Reichheld & Schefter, 2000) especially when it is something that the organization cannot control. Reliability encourages customers to be willing to purchase a product or service from a provider. That reliability is the customer's belief in the honesty of the small power producers. It includes integrity, ready to pay full attention and care to customer needs including consistency that will remain honest as well as the unwavering interest and attention to customer needs (Gefen, Karah-anna & Straub, 2003). Therefore, the customers who have reliability in the brands of small power producers will have strong intention to support the brand of such organization consistently (Moreira & Silva, 2015). The reliability on the service provider is driven by the organization's efforts to build customer reliability as a service provider with the proficiency in a

specific area of service (Chaudhuri & Holbrook, 2001). Such efforts must be able to meet the needs and build the faith and trust of customers as well. Thus, it can be said that the reliability in the service provider can be successfully built (Chai & Kim, 2010). Reliability in the quality of products and services is another important factor that affects customer acceptance. This is consistent with the study of Carrizo-Moreira, et al (Carrizo-Moreira, et al., 2017) and Alhaddad (Alhaddad, 2015).

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