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How Gas Meter Manufacturers Can Avoid Price Wars Under Demand Monopoly Conditions

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ABSTRACT

Gas meters are measuring tools that are crucial to people's livelihoods. In recent years, with the comprehensive popularization of the digital economy, gas services have also entered the era of IoT intelligence. The demand for smart gas meters continues to be strong, but gas meter manufacturers are deeply mired in price wars. This article uses industry analysis methods to analyze the reasons, phenomena, and impacts of price wars in the gas meter industry from both the supply and demand sides. Combined with practical cases of enterprises, basic strategies to avoid price wars are proposed.

KEYWORDS

Demand monopoly; Price wars; Gas meter industry

1. INTRODUCTION

As an indispensable measuring tool in daily life, gas meters are directly related to gas safety and cost settlement, and are an important component of people's livelihood. In recent years, the acceleration of urbanization, the implementation of the West East Gas Pipeline policy, and the transition from coal to gas in rural areas have promoted the continuous increase in the popularity of natural gas in China. With more and more households starting to use natural gas, it has driven the rapid expansion of the demand for gas meters in the market. On the other hand, with the development of communication technology and the maturity of NB IoT technology, smart gas meters have begun to be applied on a large scale, promoting the gas meter industry to enter the era of IoT intelligence.

On the other hand, it has been 30 years since China's first IC card smart gas meter was introduced, over 20 years since the first CPU card smart gas meter was launched, and 10 years since the deployment of the first IoT smart gas meter system. However, 50% of gas meters in China are still traditional mechanical gas meters, and even many residential gas meters in cities have exceeded their service life, resulting in inaccurate measurement and potential safety hazards such as gas leakage. This indicates that in the era of intelligence, the market demand space for gas meters is still very large. However, the author's on-site research and interviews with gas meter companies such as Chongqing Bairuite Technology Co., Ltd. and Chongqing Jingyi Instrument Co., Ltd. indicate that the common phenomenon among gas meter manufacturing enterprises is being deeply mired in price wars and struggling. Why did this situation occur?

2. REASONS FOR PRICE WARS AMONG GAS METER COMPANIES

2.1. The Supply Side Characteristics of the Gas Meter Industry

The fundamental reason for price wars is competition. In microeconomics, the basic indicator for measuring the level of competition in an industry is industry concentration. Industrial concentration refers to the degree to which a company dominates a certain industry in terms of production volume, sales volume, total assets, and other aspects. Usually, industrial concentration is measured by indicators such as a company's technological level, employee size, and market share. The market concentration of a company indicates its position in the market and its strength in market dominance. In traditional industrial organization theory, industrial concentration indicates the degree of market competition in an industry: high industrial concentration indicates that the main market sales and other economic activities are controlled by a small number of enterprises, which have a dominant position in the market, mainly reflected in price decision-making power, which reduces the degree of market competition. On the contrary, if there are a large number of enterprises in an industry without dominant leaders, then the market competition level of this industry is high.

2.1.1. Technical level.

There are over 1000 gas meter production enterprises in China, which can be divided into three tiers based on their research and development capabilities and product manufacturing technology levels:

Table 1. Competition Levels of Gas Meter Enterprises in China

Hierarchical structure	Representative enterprises	features
First level	Jinka Intelligent, Jicheng Electronics, Weixing Intelligent, Xintian Technology, Pioneer Electronics	Listed company with strong technological research and development capabilities, leading manufacturing processes, brand influence, and rich product lines
Second level	Avant garde Krom, Zhenlan Instrument, etc	Strong research and development capabilities; Experienced in manufacturing
Third level	Small gas meter factory, a manufacturing enterprise with gas meter production capacity	Numerous in quantity; Small scale; Weak technology

2.1.2. Employee scale.

From the perspective of the number of employees, it can be found that the scale of gas meter manufacturing enterprises in China is mainly concentrated in the range of 100-499 people, with one enterprise having more than 10000 employees. As shown in Table 2, in terms of personnel size, gas meter manufacturing enterprises generally follow a normal distribution, but the number of leading enterprises is relatively small.

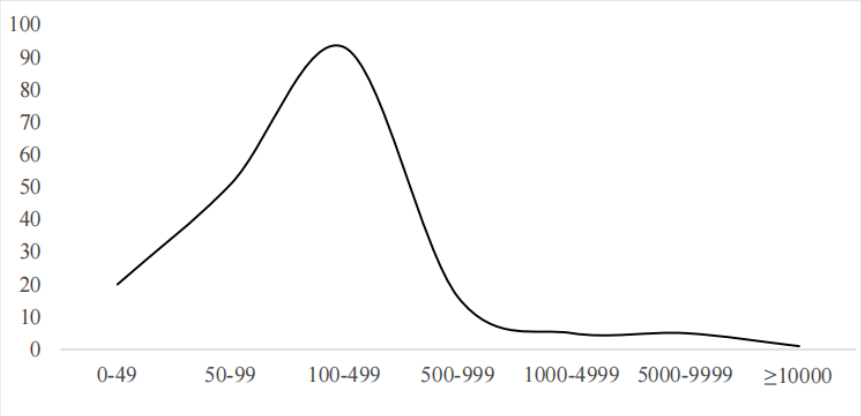

Figure 1. Scale of Gas Meter Manufacturing Enterprises (Number of Employees)

2.1.3. Market share

According to the industry concentration classification standard proposed by American economist Bain, when the sum of the market shares of the first four companies in an industry exceeds 70%, the concentration of the industry is relatively high. According to this standard, the top four listed companies in China's gas meter industry, including Jinka Intelligent, Jicheng Electronics, Weixing Intelligent, and Xintian Technology, have a combined market share of approximately 39% in the gas meter market, indicating a relatively low level of industry concentration.

Another manifestation of the low concentration of the industrial gas meter industry is its relatively dispersed geographical distribution. According to statistical yearbooks and industry reports, there are gas meter manufacturing enterprises in 25 provinces of China, among which 33 gas meter manufacturing enterprises in Zhejiang Province have reached a certain scale, accounting for 14.5%. This indicates that there are no regional industrial clusters with outstanding representativeness.

Low industrial concentration means fierce market competition, and companies have relatively weak bargaining power in the upstream and downstream of the industry, often falling into the quagmire of price wars.

2.2. Demand Side Industrial Characteristics of Gas Meters

2.2.1. Demand chain

By sorting out the gas meter industry chain and dividing the supply and demand relationship based on gas meter trading nodes, Figure 2 can be obtained:

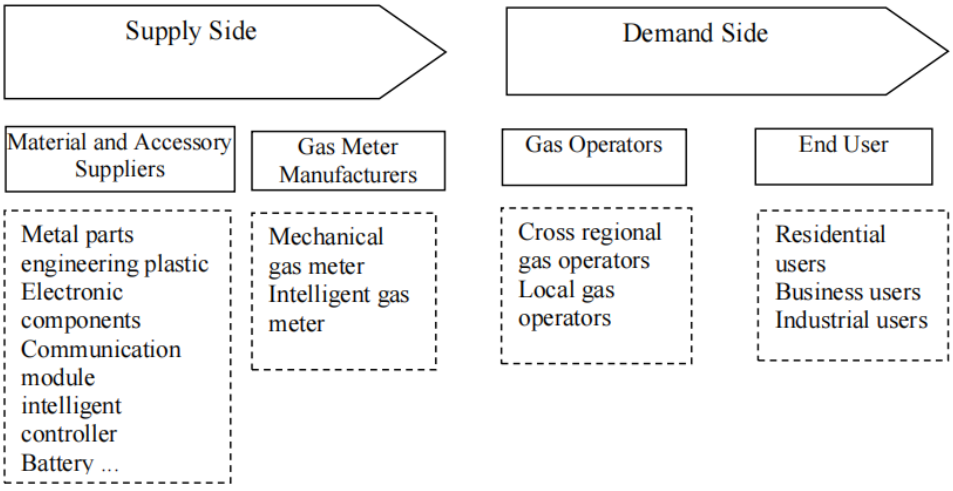

Figure 2. Supply and demand relationship of gas meters

Figure 2 shows that the demand side of gas meters mainly consists of gas company operators and end residential and commercial users. Usually, on a global scale, end users do not directly purchase equipment from gas manufacturers, and the gas meters they use are mainly provided by gas companies. Therefore, for the manufacturing of gas meters, their trading partners are not end-users, but gas operators. Therefore, the gas meter market is a typical B2B market.

Gas operators mainly include Kunlun Energy (Kunlun Energy Co., Ltd.), China Gas (China Gas Holdings Co., Ltd.), China Resources Gas (China Resources Gas Holdings Co., Ltd.), New Energy (New Energy Holdings Co., Ltd.), and Ganghua Gas (Ganghua Smart Energy Co., Ltd.), referred to as the "Five Gas Groups". These five major gas groups operate across regions nationwide. In addition, there are small gas operators specializing in a specific region.

The reason for this phenomenon is the high barriers to entry. The entry barriers to the gas supply market mainly include high investment, long construction period, and high financial barriers. At the same time, the gas industry is relatively special with high levels of danger, and gas supply is a basic livelihood service that affects thousands of households, requiring universal services. However, universal service has the characteristic of high cost and low return in some regions, which often leads to market failure. Therefore, the country is implementing a licensing system.

Therefore, in sharp contrast to the low concentration of supply side industries, the number of gas operators is usually very small in every region of the market. Therefore, the concentration of gas operation service providers on the demand side of gas meters is very high.

2.2.2. Monopoly on the demand side

Monopoly is a special form of market structure that means a small number of enterprises or individuals have significant control over a certain industry or market. In the gas operation market, due to the government's direct control of market access and resource allocation through laws and administrative licensing systems, a monopoly situation has been formed. Gas operators have mandatory and exclusive rights, and other companies cannot enter the industry without government permission. Therefore, gas operators enjoy privileges and preferential treatment granted by the government, such as pricing power, market access restrictions, service standards, etc. These privileges give administrative monopolies a significant advantage in the market.

The different characteristics of industrial concentration on the supply side and demand side determine that gas meter manufacturers and gas operators have different bargaining power in the gas meter procurement market. Therefore, for gas meter manufacturers, falling into a price war is almost inevitable.

3. THE PHENOMENON OF PRICE WAR IN THE GAS METER INDUSTRY AND ITS IMPACT

In the B2B gas meter market, gas companies usually purchase gas meters through open bidding. Taking the gas meter procurement bidding project released by a domestic gas company on August 5, 2024 as an example. In its release of the gas meter procurement bidding specification, the procurement evaluation criteria are clearly stated, and Table 2 is excerpted and organized.

Table 2. Selected Evaluation Criteria for Procurement Bidding of a Domestic Gas Company [2]

Number	Item	Overview of Rating Criteria
1	Price	The bid price that meets the requirements of the bidding documents and has the lowest bid price is the evaluation benchmark price, which is divided into 30 points. The price points of other bidders are uniformly calculated according to the following formula: bid price score = (evaluation benchmark price/bid price) * 30 * 100%.
2	Performance	-
3	ability	-
4	ServicePlan	Based on the evaluation of the completeness of technical support and training plans, the feasibility and effectiveness of supply plans, and the ability to provide emergency supplies, a score of 10-1 will be given;
5	after-sale service	Based on whether the product has obtained a five-star evaluation certificate for the after-sales service evaluation system, whether the after-sales service plan is complete, the after-sales service response is timely, and the warranty period commitment is practical and feasible, a score of 10-1 is obtained
6	Security	-

In Table 2, in addition to the three indicators of enterprise performance, comprehensive ability, and security, which are determined by the endowment foundation of the enterprise, the three aspects of quotation, overall service plan, and after-sales service are directly related to the price strategy or cost control strategy of the gas meter company when bidding, and the weight reaches 50%.

In the bid splitting index, the lowest bid is used as the benchmark for quotation, which means that gas meter manufacturers have to adopt a low price strategy in order to win the bid.

In order to obtain better scores in the two evaluation indicators of overall service and after-sales service, gas meter manufacturers have to provide higher standard solutions in technical support, training services, supply plans, emergency supply capabilities, and after-sales service, which means that the cost is rising. Taking emergency supply capacity as an example, in order to meet the urgent supply requirements of gas companies, they need to increase investment in raw material reserves, production capacity, product warehousing capacity, logistics capacity, and other aspects, resulting in a significant increase in costs. This alone may lead to losses.

This is a typical case of gas meter procurement, where the bargaining power of gas meter manufacturers is evident: there is almost no bargaining space. The huge and far-reaching impact this brings to gas companies:

-Profit margin compression: The price war leads to a continuous decline in product prices, severely compressing the profit margin of gas companies, and may even result in losses.

-Product quality decline: In order to reduce costs and cope with price wars, product quality may be sacrificed, resulting in unstable product performance, shortened service life, and other issues.

-Brand image damage: Gas companies that have been involved in price wars for a long time may have their brand image damaged and be seen by the market as low-end and cheap products.

-Limited innovation capability: Price wars lead to more resources being invested in reducing costs for gas, resulting in a compression of technological innovation and product research and development resources, which in turn limits the innovation capability of enterprises.

4. COUNTERMEASURES FOR GAS METER MANUFACTURERS TO AVOID PRICE WARS

To avoid price wars, gas meter manufacturers may adopt the following strategies:

4.1. Differentiated Competition

Differentiated competition is an important way for gas meter manufacturers to avoid price wars. Through technological innovation and product design, manufacturers can develop products with unique features and advantages to meet the diverse needs of consumers. For example, developing gas meters with intelligent remote transmission, high-precision measurement, anti-theft and theft prevention functions can enhance the market competitiveness of products and avoid falling into price wars.

Case: Against the backdrop of the national promotion of the dual carbon strategy, Jinka Intelligent participated in a national project to conduct specialized research and development on high-pressure pipeline network metering terminal products. After two years of research and development, we finally broke through the bottleneck technology. In March 2020, the ultrasonic flowmeter completed the first domestic natural gas flow calibration at the Wuhan branch of the National Oil and Gas Large Flow Measurement Station, bringing its measurement performance to the international advanced level.[3]

4.2. Cost Control

Cost control is the key for gas meter manufacturers to avoid price wars. By optimizing production processes, improving production efficiency, and adopting advanced production technologies and equipment, manufacturers can reduce production costs and improve the cost-effectiveness of their products. Meanwhile, reasonable supply chain management is also an important link in cost control. By establishing long-term cooperative relationships with suppliers, ensuring the quality and supply stability of raw materials, procurement costs can be reduced.

Case: The intelligent gas meter manufacturer Qinchuan Internet of Things has built a digital intelligent manufacturing factory of "equipment automation + management informatization + Internet" by drawing on advanced concepts such as international lean production. With technical support based on a number of patented product technologies, it has developed production processes to ensure the construction of production automation with stable and reliable production processes. The automatic production line adopts the cutting-edge technologies of industrial manufacturing such as Internet technology, sensor technology, robot, special detection means, vision technology, computer aided manufacturing, AGV, two-dimensional code tracing, etc. The production process is under real-time control, quality information is fed back from time to time, and information is transmitted in a timely manner. Significantly reduced production costs, improved product quality and competitiveness [4].

4.3. Market Segmentation

Market segmentation is another effective strategy for gas meter manufacturers to avoid price wars. By gaining a deep understanding of market demand and consumer behavior, manufacturers can segment the market into different segments and launch different product lines and pricing strategies for each segment. This can meet the needs of different consumers and reduce price competition in a single market.

Case: Weixing Intelligent is a leading intelligent gas overall solution provider in China, launching different products for different user groups to meet the needs of different consumers, effectively avoiding price wars. At present, the product line covers four major metering and intelligent control series products and related solutions in civil, commercial, and industrial fields, including IC card

intelligent gas meters, RF remote intelligent gas meters, IoT intelligent gas meters, and ultrasonic gas meters. They are distributed in 31 provinces, municipalities, and autonomous regions across the country, hundreds of urban gas companies, and exported to multiple overseas countries and regions [5].

4.4. Value Added Services

Providing value-added services is an important means for gas meter manufacturers to enhance customer stickiness and avoid price wars. In addition to providing high-quality products, manufacturers can also offer value-added services such as testing, technical output, and training to enhance customer satisfaction. Through value-added services, manufacturers can establish closer cooperative relationships with customers, increase customer loyalty, and reduce the impact of price wars. Case: In 2017, a customer from Kazakhstan wanted to enter the gas meter business field, but lacked experience in gas meter production and operation. Shanghai Zhenlan invited to visit and inspect its factory in Shanghai, expressing its intention to cooperate. In 2018, Zhenlan Instrument assisted Kazakhstan customers in purchasing gas meter testing equipment and established testing rooms and after-sales service centers locally. In 2019, at the suggestion and organization of Zhenlan Instrument, experts and engineers from the National Metrology Bureau of Kazakhstan came to Shanghai Institute of Metrology and Testing Technology for training and learning. With the joint efforts of both parties, Kazakhstan has established a national standard for gas meters. After years of effort, significant achievements have been made in cross-border communication between Zhenlan Instrument and Kazakhstan customers in recent years. Zhenlan Instrument has become the first enterprise to promote the successful application of intelligent IoT gas meters in Kazakhstan [6].

4.5. Collaboration and Alliance

Collaboration and alliances are effective ways for gas meter manufacturers to jointly cope with price wars. By establishing cooperative relationships or alliances with other related enterprises, manufacturers can share resources, technology, and market channels, reducing production and marketing costs. At the same time, cooperation and alliances can enhance the market position and discourse power of enterprises, and improve their bargaining power in price negotiations.

Practical case: Shandong Jicheng Electronics, as a provider of smart city energy big data, has established a cooperative relationship with Inspur Technology. Jicheng Electronics applies Inspur Cloud Chain to serve the "full energy field" informationization of electricity, water, gas, and heat, jointly ensuring the reliability and interconnection needs of customer business applications, meeting the transformation needs of manufacturing industries such as smart application research and development design, supply chain management, quality control, warehousing logistics, and operation and maintenance services. The platform connects more than 732000 industrial equipment and develops 26 industrial application models, forming a two-way traceability system and smart service system based on identification resolution, achieving resource sharing and market win-win [7].

4.6. Brand Building

Brand building is a long-term strategy for gas meter manufacturers to avoid price wars. By shaping a unique brand image and corporate culture, manufacturers can enhance the visibility and reputation of their products, and strengthen consumers' trust and recognition of their products. Through brand building, manufacturers can establish emotional connections and loyalty with consumers, thereby reducing the impact of price wars on the brand.

Case: Pioneer Electronics shapes its brand from three aspects: technological innovation, product quality, and customer service. The company has an experienced R&D team with cross disciplinary knowledge background and professional skills, constantly researching and developing equipment and

processes independently, keeping pace with advanced technology, and ensuring that products are always at the forefront of the industry. Especially in the technological innovation of ultrasonic gas meters, Pioneer Electronics has improved the measurement accuracy of gas meters and reduced the workload of later correction by applying for patents and improving correction methods. This further enhances the stability of products and customer satisfaction. In terms of product quality, Pioneer Electronics adheres to the production and quality concept of "quality determines the survival of enterprises" and strictly controls every aspect of product production. The company has established a comprehensive quality management system, strictly following relevant standards and processes from raw material procurement, production process control to product factory inspection, to ensure that product performance and quality reach the optimal level. In terms of customer service, Pioneer Electronics focuses on close cooperation with customers and users, providing safe, intelligent, and efficient products and services. By utilizing cutting-edge technologies such as the Internet of Things and big data, it provides customers with fully functional intelligent solutions, helping them quickly understand operational conditions, optimize resource allocation, and achieve refined management [8].

5. SUMMARY

The demand market for gas meters has significant monopolistic characteristics, which results in weaker bargaining power for gas meter manufacturing companies. In order to gain market opportunities, gas meter manufacturers often fall into a low price competition mode, which brings great difficulties to the enterprise. In this case, gas meter manufacturers can adopt various methods such as technological innovation and brand building to form differentiation strategies, effectively avoiding price wars.

CONFLICTS OF INTEREST

This paper is the result of the author's independent research, and the relevant content cited in the paper has been annotated and cited in accordance with academic standards.

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