

# Market Potential of PDAM Infrastructure Financing with Trade Credit

Didin Saepudin, Nenny Handajani, Tata Zaenal Mutaqin

Department of Management  
Universitas Sangga Buana YPKP  
Bandung, Indonesia  
didin.saepudin@usbykp.ac.id

**Abstract**—The achievement of the target of fulfilling drinking water needs in Indonesia is not easily met. One of the main problems is the financing of PDAM infrastructure development. Many infrastructure financing models have offered, but not necessarily in accordance with the conditions of the company. The developed trade credit model is expected to be a solution for meeting these financing needs, but before marketing is necessary to know its market potential first. This study aims to analyze the market potential of PDAMs that can be financed using the developed trade credit model. The object of research is all PDAMs in Indonesia. The research method used is descriptive analysis with a market potential typology approach and categorization of PDAM performance. The results of the analysis were; the strong-wide market potential of 69 PDAMs (18.95%), the weak-wide 129 PDAMs (35.5%), the strong-limited market potential of 81 PDAMs (22.33%), and the weak-limited market potential of 81 PDAMs (22.33%). The type of market potential of PDAM is strong-wide with a healthy performance category 49 PDAMs (13.95%) have a high chance of being financed through the developed trade credit.

**Keywords**—market potential; infrastructure financing; trade credit

## I. INTRODUCTION

In order to achieve the RPJMN target of 100% safe access to drinking water in 2019, many challenges faced by the Indonesian government. One of the challenges faced is the problem of funding, needed are ± Rp. 253.85 trillion, while the APBN is unable to cover all funding. The existing funding gap is expected to come from the Regional Government, Banking Credit, Public-Private Partnership (PPP) and other alternative sources of financing. The one other alternative is to cooperate with third parties through trade credit, given by a business entity to procure goods and services with credit payments (installments) used by business organizations as a source of short-term financing. Trade credit can be an alternative financing to increase service coverage with a faster payback period.

According to Schwartz, trade credit is a complement to bank debt and capital market debt [1]. Saito and Bandeira provide that trade credit can reduce the efficiency of monetary aggregate control but on the other hand can mitigate the effects of discrimination caused by restrictive monetary policies, which tend to affect small and medium enterprises [2]. Nadiri

stated that the company provides trade credit to customers because there is no funding for the funding, customers do not have access to financial institutions so they cannot buy their products [3]. Smith and Long et al. see from another aspect that the trade credit provides a role as a guaranteed product for suppliers whose reputation is unknown. Even though the trade credit in this study is a product of the developed trade credit model as a result of the second phase of research that is long-term and for infrastructure financing [4,5].

Every company needs to conduct a feasibility study before entering the business. The feasibility study does not only financial aspects but also market potential, therefore a feasibility study regarding the market potential for developed trade credit also needs to do, so that these trade credit products can be marketed according to the expected target.

According to Philip Kotler and Gary Armstrong, a target market is a group of buyers with the same needs or characteristics served by the company [6]. The core of the market and marketing aspects is to find out how much market enter, the market structure and market opportunities that exist, future market prospects and how to do marketing strategies. S. Tamer, states that there are three issues considered when determining the right strategy for making investments, namely: first, the market potential estimation and access [7]. Second, entering the market and third, market establishments. The first step is in line with the steps that will be taken in this study, namely assessing the market potential of PDAM infrastructure financing.

There are several indicators used to see market potential. Keith Head and Thierry Mayer, use a country's per capita income as a proxy of market potential indicators [8], this is also supported by the results of research by Dan Liu and Christopher M. Meissner that per capita income influence market potential significantly [9]. E.H. Abbasi and N. Ansari measure market potential by using an index consisting of 8 indicators, namely; market size, market growth rate, market intensity, market consumption capacity, commercial infrastructure, number of personal computers, economic freedom, market receptivity [10]. The eight indicators are weighted to obtain an index of market potential indicators. The biggest is the market size, the second biggest is market intensity and commercial infrastructure.

Previous research on trade shows that the role of credit trade is able to reduce structural trade barriers between companies and suppliers or consumers. Trade credit is short-term and for working capital needs. Trade credit needs to be developed so that it can be used to help finance PDAM infrastructure so that it is no longer short-term but long-term and for investment needs. The existence of the developed trade credit will be very useful if it is supported by an overview of its market potential, therefore it is important to study the trade credit market potential specifically for regional water companies.

**II. METHOD**

Determination of market potential in this study using typology analysis. The analytical method for evaluating typology includes using a quadrant of analysis such as what has been done by Benno Rahardyan et al. in mapping the waste generation typology/classification with two determinants of population density and waste generation [11]. This research also uses a quadrant analysis method with two factors or determinants of quadrants, namely the coverage of PDAM services for the region (Regency/City) as a proxy of market size and district/city per capita income as a proxy of market intensity. Both of these indicators were chosen based on the consideration that the two indicators have the biggest and second biggest weights based on research conducted by E.H. Abbasi and N. Ansari.

Market potential derived from the interaction of service coverage with the GDRP per capita divided into four quadrants, namely strong-wide market potential, strong-limited potential, weak-wide potential, and weak-limited potential. The strong-wide market potential shows high GDRP per capita and low coverage. Strong-limited market potential shows high GDRP per capita and high coverage. Weak-wide market potential shows low GRDP per capita and low coverage. Weak-limited market potential shows low GRDP per capita and high coverage.

The market potential model in this analysis uses a market potential typology using the Cartesian coordinate system, where service coverage is abscissa and GDRP per capita as ordinate. The meeting point between abscissa and ordinate is the point of origin (average coverage of regional services, average regional GRDP per capita). The average GRDP per capita area used is the average GRDP per capita by eliminating the outlier GRDP per capita value. From these Cartesian coordinates, the four quadrants described above. Quadrant I is categorized as weak-wide market potential, quadrant II included in the category of strong-wide market potential, Quadrant III included in the category of strong-limited market potential. Finally, quadrant IV is a weak-limited category.

The determination of the quadrant above is the basis for determining the high market potential for investment in

infrastructure financing in PDAMs. Quadrant II (strong-wide market potential) was chosen as the basis for the determination, by adding the level of performance of a healthy PDAM as a third variable or determining factor, so that a PDAM that has a high market potential is obtained, which is the PDAM in quadrant II and has a healthy performance category.

**III. RESULTS**

*A. PDAM Performance*

PDAM's working area division consists of four regions. Region one is the Sumatra region which consists of 10 provinces and 101 regencies/cities. The provinces included in region one is Aceh, North Sumatra, West Sumatra, Riau, Riau Islands, Jambi, South Sumatra, Bangka Belitung, Bengkulu, and Lampung. Region two is a Java region consisting of 6 provinces and 107 regencies/cities. Region three is the Kalimantan and Sulawesi region consisting of 10 provinces and 107 districts/cities. Region four is the region of Bali, Nusa Tenggara and Papua which consists of 7 provinces and 49 districts/cities.

PDAM performance assessed by an Agency for Implementing Drinking Water Supply Systems (BPPSPAM). The assessment based on four performance categories, namely finance, services, operations, and human resources. Based on the assessment, the distribution of PDAM's health categories came out, namely healthy, less healthy and ill. The health performance of all PDAMs presented in the following table:

TABLE I. PDAM HEALTH BASED ON BPPSPAM CRITERIA

Region	Healthy	Less Healthy	Ill	Total
1	36	39	26	101
2	98	8	1	107
3	41	41	25	107
4	27	13	9	49

<sup>a</sup> PDAM Performance (2017)

Table 1 shows that Region 2 has very high health values compared to other regions. It is understandable for Region 2 that Java Island has better financial service, operations, and human resources compared to other regions.

The range of services that have been developed by each PDAM is very diverse, where there are those who have reached 100 percent but some are still very low (under 10 percent). The coverage of this service shows the ratio of the number of underserved populations to the number of residents in the service area multiplied by 100%. The average service coverage is 42% for Region 1, 44% for Region 2, 47% for Region 3, and 52% for Region 4.

*B. Market Potential*

The results of the typology analysis of the market potential for each region shown in Figure 1 to Figure 4 below.

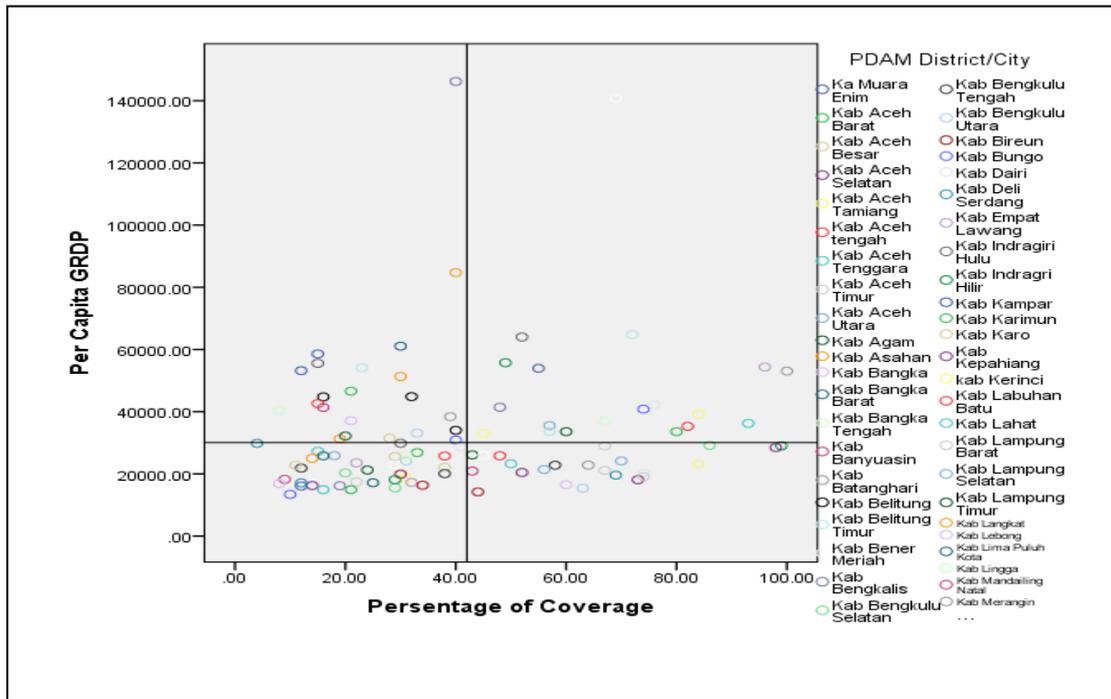


Fig. 1. Typology of market potential in region 1.

In region 1, PDAM which has a strong-wide market potential of 22, the weak-wide market potential of 37

PDAMs, the strong-limited market potential of 19 PDAMs and the weak-limited market potential of 23 PDAMs.

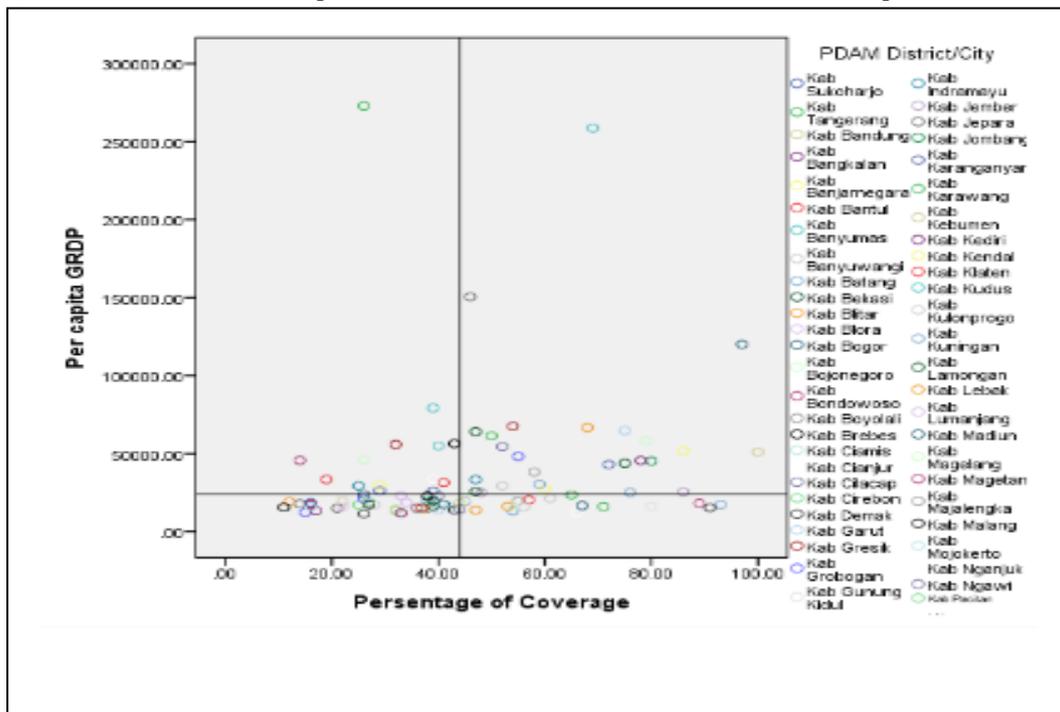


Fig. 2. Typology of market potential in region 2.

In region 2, PDAM which has a strong-wide market potential of 15, the weak-wide market potential of 47 PDAMs, the

strong-limited market potential of 26 PDAMs, and the weak-limited market potential of 19 PDAMs.

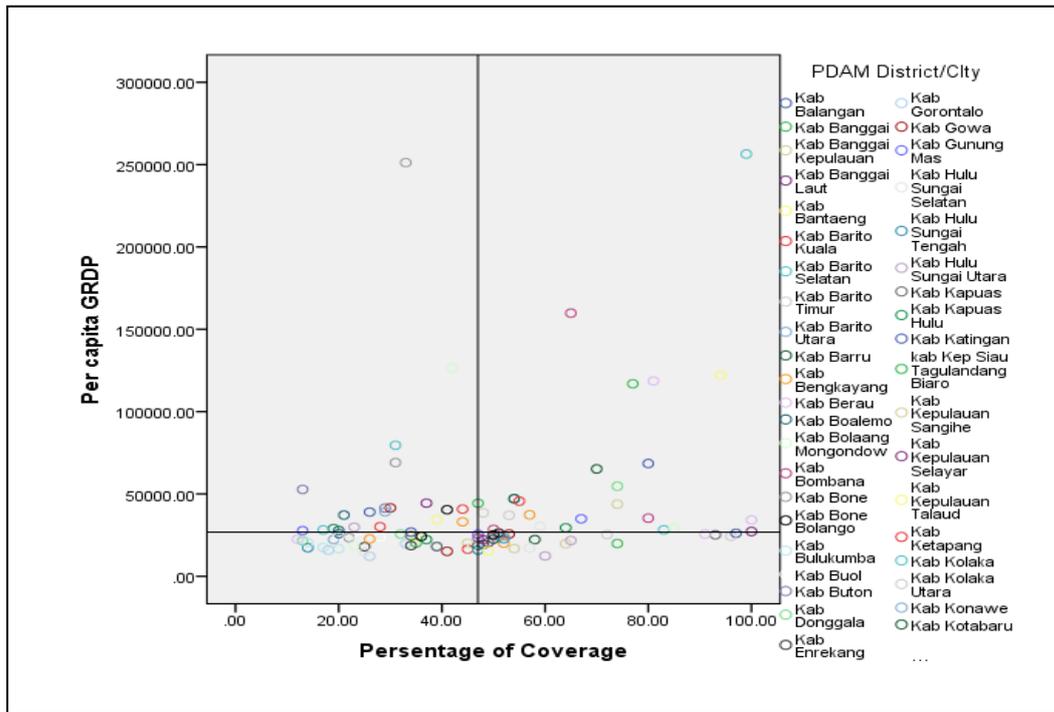


Fig. 3. Typology of market potential in region 3.

In region 3 PDAM which has a strong-wide market potential of 15, the weak-wide market potential of 47

PDAMs, the strong-limited market potential of 26 PDAMs and the weak-limited market potential of 19 PDAMs.

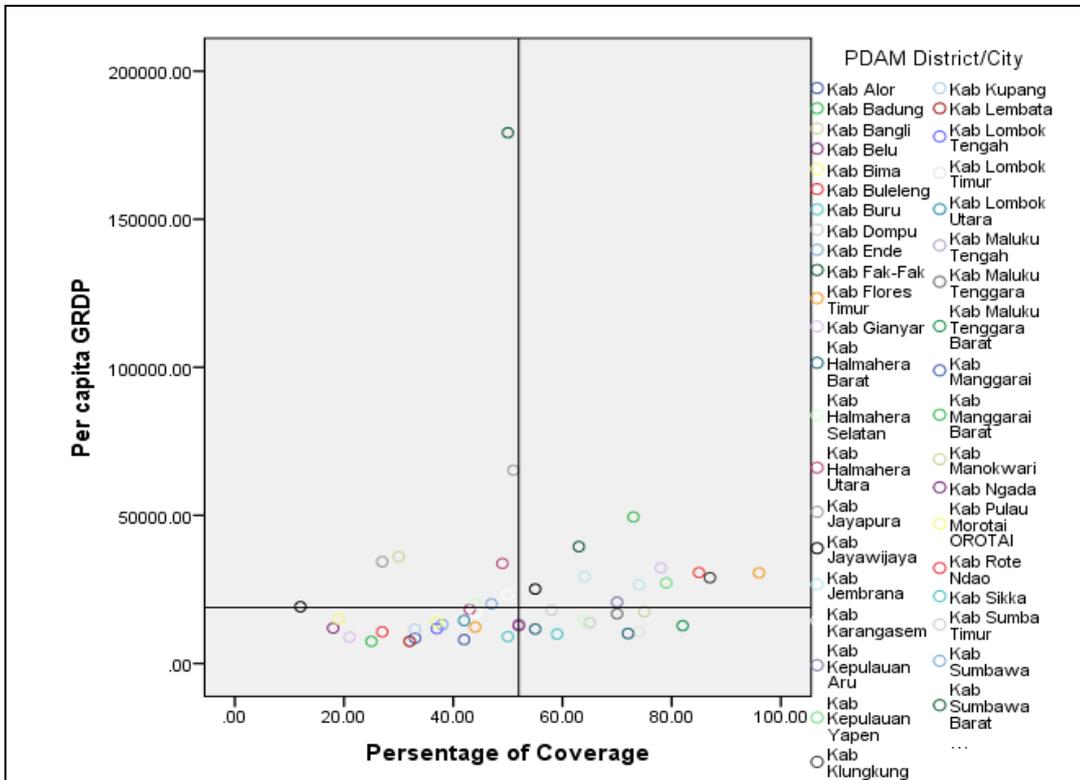


Fig. 4. Typology of market potential in region 4.

In region 4, PDAM has a strong-wide market potential of 9, the weak-wide market potential of 18 PDAMs, the strong-limited market potential of 11 PDAMs and the weak-limited market potential of 11 PDAMs.

#### IV. DISCUSSION

##### A. Market Potential and Health Performance of PDAMs

Financial capabilities and sound corporate management are other conditions that make investors interested in investing in PDAM infrastructure financing through trade credit. If the market potential obtained from the market potential typology results, we relate to the health value of the PDAM, the investment market potential for financing PDAM infrastructure is high, using trade credit. Below is shown the average coverage of services, GRDP per capita of PDAM in each region that has a healthy performance.

TABLE II. AVERAGE COVERAGE OF SERVICES AND GRDP PER CAPITA PDAM IN QUADRANT II AND HEALTHY PERFORMANCE

Region	Average Service Coverage	Average GRDP per Capita
1	33%	Rp. 53,613,000
2	32%	Rp. 61,811,000
3	31%	Rp. 92,592,000
4	42%	Rp. 35,466,000

In region 1, there are 6 or 27.27% of PDAMs have high market potential. The six PDAMs have a healthy performance and the service coverage is still low, an average of 33% and the average GDRP per capita of the population in the relatively high of Rp. 53,613,000. If the willingness to pay water of PDAM based on the tariff of Rp. 5,000 per m<sup>3</sup> and per capita water consumption of 60 liters per day, the amount of expenditure for water consumption per capita per year is Rp. 1,080,000 or 2 percent of GRDP per capita, meaning that the ability and willingness of the community to buy drinking water from PDAM is very high because of only a small portion of GRDP per capita spent on drinking water needs of PDAM. Thus region 1 with 6 PDAMs with healthy performance has a high potential for financing infrastructure development with funding sources coming from trade credit.

In region 2, there are 15 PDAMs have categorized as strong-wide and there are 13 PDAMs or 86.67% PDAMs have a healthy performance category. The thirteen PDAMs have a relatively low service coverage of 32%, and GRDP per capita of residents in the PDAM area is in the high category of an average of Rp. 61,811,000 per year. If PDAM water willingness to pay based on the same assumptions as in Region 1, the percentage of expenditure to pay for consumption of PDAM water in Region 2 is 1.73 percent of GRDP per capita, meaning that the ability and willingness of the community to buy PDAM water is very high, even higher than region 1. This means that only a small portion of the GRDP per capita spent on PDAM water needs. Thus region 2 with 13 PDAMs with healthy performance has a high market potential for infrastructure development with funding sources coming from trade credit.

In region 3, there are 23 PDAMs that have strong-wide market potential categories. Of the 23 types of market potential, only 4 PDAMs or 18.18 percent have healthy performance. The four PDAMs have an average service coverage that is still low at 31 percent, even lower compared to region 1 and region 2. On average the per capita income of the population in the PDAM area is quite high, namely Rp. 92,592,000 even higher than other regions. Assuming the same willingness to pay calculation as in region 1, the percentage of per capita population expenditure for PDAM drinking water needs is 1.2 percent, thus region 3 with 4 healthy performance PDAMs has a high market potential for financing PDAM infrastructure development with the source of funds coming from the trade credit.

Region 4 is the region that has the least number of PDAMs that included in the strong-wide market potential type of 9 PDAMs, but the number of PDAMs that fall into the category of healthy performers is relatively large, namely 6 PDAMs or 54.55 percent. The six PDAMs have a relatively high average service coverage compared to the previous three regions, namely 41%, but are still relatively large to achieve 100% service. The GDRP per capita of the population in the PDAM area is the lowest compared to the PDAM in the three previous regions, namely Rp. 35,466,000, but potential enough for the ability and desire to buy PDAM water for daily needs, which is 3 percent of GDRP per capita, this is based on the percentage of willingness to pay with the same assumption as in the calculation in region 1. Thus region 4 with 6 PDAMs with healthy performance has a high market potential for infrastructure development with funding sources coming from trade credit.

The whole of Indonesia, the number of PDAMs with market potential is 69 PDAMs and those that have healthy performance are 49 PDAMs or 13.46 percent of the total PDAMs in Indonesia (364). This market potential is expected to be an opportunity for investors to invest in PDAM infrastructure financing that has the potential to provide returns that meet the investment feasibility requirements with not too high risk.

The biggest potential of the four regions that have high market potential is region 2 because the number of PDAMs categorized as strong-wide market potential and healthy performers are many, namely 13 PDAMs, and the GRDP per capita of the population in the PDAM area is high. Whereas the smallest market potential is region 4, because the number of PDAMs that fall into the strong-wide and healthy category is relatively small, and the GRDP per capita of the population in the region is the lowest compared to other regions.

#### V. CONCLUSION

The number of PDAMs strong-wide market potential category is 68 PDAMs (18.73%), the category of market potential is weak-wide 129 PDAMs (35.5%), the category of market potential is strong-limited 81 PDAMs (22.33%), and the category of market potential is weak-limited 81 PDAMs (22.33%). The whole of Indonesia, the number of PDAMs with market potential is 69 PDAMs and those that have healthy performance are 49 PDAMs or 13.46 percent. In

region 1, there are 6 or 27.27 percent of PDAMs have high market potential. In region 2, there are 13 or 86.67 percent of PDAMs have high market potential. In region 3, there are 6 or 18.18 percent of PDAMs have high market potential. In region 4, there are 6 PDAMs or 54.55 percent of PDAMs have high market potential. These high market potential are expected to be an opportunity for investors to invest in PDAM infrastructure financing that has the potential to provide returns that meet the investment feasibility requirements with not too high risk.

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