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# Mapping PT PLN (Persero) Consumer Willingness to Make Electricity Account Payments (Willingness To Pay) Based on Regional Characteristics Using the Ranking Analysis Method

**Rahmada Mulia Whardana Moljoadie**
Electrical Engineering, Faculty of Electricity and Renewable Energy, Institut PLN Technology, Indonesia
Email: Rahmada.mulia@gmail.com

**Keywords**

*Account Receivable, Electricity Account, Willingness to Pay, Regional Characteristics, Ranking Analysis Method*

**ABSTRACT**

*Like companies that are oriented to the buying and selling business in general, PT PLN (Persero) or PLN also has the same business risk, namely the existence of accounts receivables arising from electricity buying and selling transactions with consumers. By getting cash in from billing electricity bills, PLN's operations will of course be maintained so that service to customers can be even better. To support securing the company's cash flow, it is necessary to carry out an analysis related to external factors that influence the willingness to pay electricity bills by looking at the characteristics of regional conditions so that mitigation can be carried out to control electricity receivables. One of the relevant methods to obtain a mapping of consumers' willingness to make electricity bill payments is to use the ranking analysis method, which is an analysis of several rankings on methods including conducting surveys, interviews with experts based on the Delphi method ( 2 rounds of interviews) and statistical calculations using the independent sample t-test and the final test using the Borda calculation method. In this study, the factors that most influenced customer behavior related to their willingness to pay electricity bills were obtained based on regional characteristics, namely regional education and culture factors, economic factors and consumer income then the electricity service reliability factor. The mapping of these factors can be used by companies as one of the considerations for making decisions to develop operational strategies in an effort to control the values of electricity account receivables.*

## INTRODUCTION

In doing sell buy goods nor services , then will happen A transactions involved seller and buyer. Transactions that occur the is results agreement second split party or more Good done in a way cash nor with system instalment or installments. In selling buy also get to know accounts payable system , because has There is agreement or agreement as buyer can use goods/ services the moreover formerly new Then do payment, so goods / services the become a debt for buyer/ user if Not yet done payment. This also applies if buyer use system installments or installments, fees goods or services not yet paid off become receivables business for seller.

According to the Big Indonesian Dictionary (KBBI), receivables is an amount of money or funds that are lent and can be obtained billed . In context business , understanding receivables that is bill of money by a company to expected consumers can paid or paid off in one at most year moment bill



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published . Whereas arrears , according to the KBBI, constitute installments that have not yet been made paid . Companies must Can arrange the best current assets, cause current assets will used For operational company . When operating company can walk with OK , then expected company can produce and improve profitability (Harapan and Prasetiono 2016).

Usual PT PLN (Persero). called with PLN, namely company property of the moving State in the field provision Genre power electricity For need public common in Indonesia. As a business entity , PLN owns business main that is provision power electricity through generator, distribute through transmission and distribution power electricity to consumer For used . For operate business main , PLN does transaction sell buy with consumer order activities provision power electricity can Keep going walk and can Keep going fulfil need society in Indonesia. Transaction patterns sell buy PLN with consumer is PLN selling goods in the form of Genre power electricity to consumer Good with service payment postpaid nor prepaid. Service postpaid in question here is, PLN consumers use power electricity moreover first and pay in accordance with those used, whereas service prepaid , PLN consumers do purchase energy electricity moreover formerly in accordance need with do payment up front new can enjoy Genre the electricity (Sihombing, Sitompul, and Sinaga 2022).

Like business oriented company sell buy in general , PLN also has it risk the same business that is exists arrears from receivables account that appears from transaction sell buy power electricity with consumer. Arrears the No Can avoided Because PLN consumers who own one of the different characteristics is factor economy from consumer That yourself . Apart from that, force majeure is also one of the reasons reason appearance arrears on transactions sell buy power electricity including disasters natural nor disaster others. Based on data during in 2022, PLN noted ratio arrears compared to with income business with percentage monthly highest in the month February is amounting to 4.04% as described in research, whereas For percentage lowest happened in June with ratio 2.61% (Sundt and Rehdanz 2015; Abdullah and Mariel 2010; Hensher, Shore, and Train 2014; Graber et al. 2018).

On research this, got it PLN still looks at it own ratio arrears to the total income already Enough low with the average in 2022 being 3%. Based on GMT Research, for company World electricity on term time 2010 to 2015 , average ratio arrears to total sales is 25%. Even with average ratio of 3% in 2022 , PLN remains own task heavy For maintain mark that . This thing naturally For still maintain level quality PLN services to consumers , because with good cash flow, then PLN will still can give maximum service and with reliability supply Genre electricity to consumer (Hampton et al. 2022). Apart from that , PLN also remains must support government programs For provide supply electricity to Indonesian society with affordable price in accordance with trustworthy Article 33 of the 1945 Constitution which reads "Economy held nationally based on on democracy economy with principle togetherness, efficiency fair, insightful environment, independence, as well with guard balance progress and unity economy national"(Giannopoulos et al. 2013).

Since it was launched in 2008 in Indonesia, it turns out there is receivables pile of customers until in 2022. Noted based on data, values receivables prepaid on December 31 2022 is reached Rp. 1.93 Trillion , the value Far more tall compared to receivables customer postpaid with value IDR 541 billion.

Become question , why service prepaid payment in advance still own receivables, it turns out 96.6% receivables prepaid originate from P2TL findings or Order Electrical Power Usage, ie violations committed by customers so that must published bill follow up installments so that make it A receivables. Meanwhile, the remaining 3.4% originate from bill continuation from implementation migration and installments Cost Connection (BP) (Blocher et al. 2019).

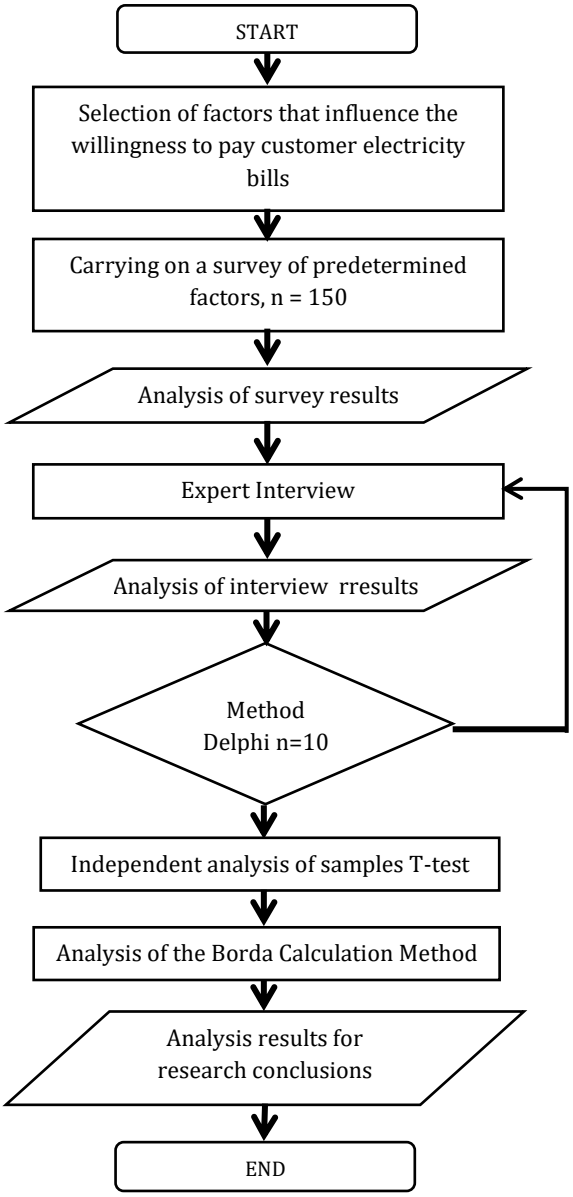
In 2019 , PLN published Regulation Directors related Consumer Administration Guidelines , as since perdir the published, PLN will do penalty or fine termination to customer prepayments in arrears the receivables exceed the stipulated time limit . Receivables Balance Trend Prepaid every the

month experience increase , while the trend is repayment receivables prepaid experience decrease , with setting performance targets receivables prepaid in 2023 , expected receivables prepaid will can more controlled and of course at a time support acceleration of cash in flow company .

## METHODS

This research flow chart was prepared to understand the research process carried out (Bryman 2016; Bell, Bryman, and Harley 2022). The flow chart used in carrying out the research is as presented in Figure 3.1 below :

**Table 1Research Flow Chart**




## RESULTS

### Criteria Screening Survey

The next stage was to conduct a survey of respondents spread throughout Indonesia who were PLN employees who were currently handling consumer receivables collection work in their respective

work units or had previously done this work. The number of respondents who were successfully collected was 156 respondents with questions as follows:

The results of the survey via online media (online *)* are as follows:

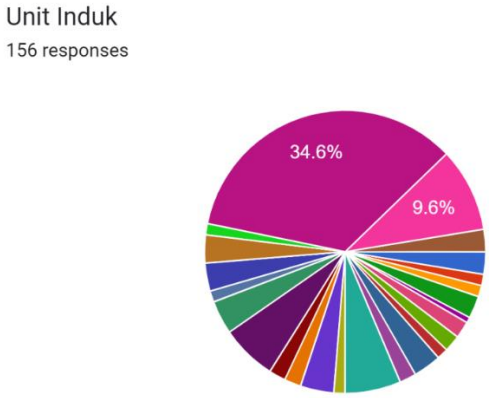



**Figure 1. Amount respondents based on work units**

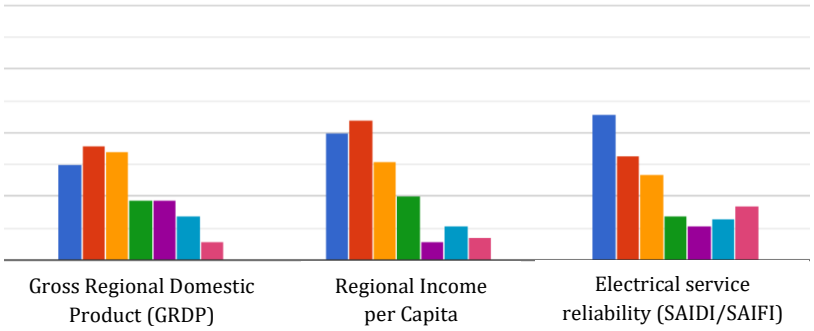



**Figure 2. Appearance results survey question First**

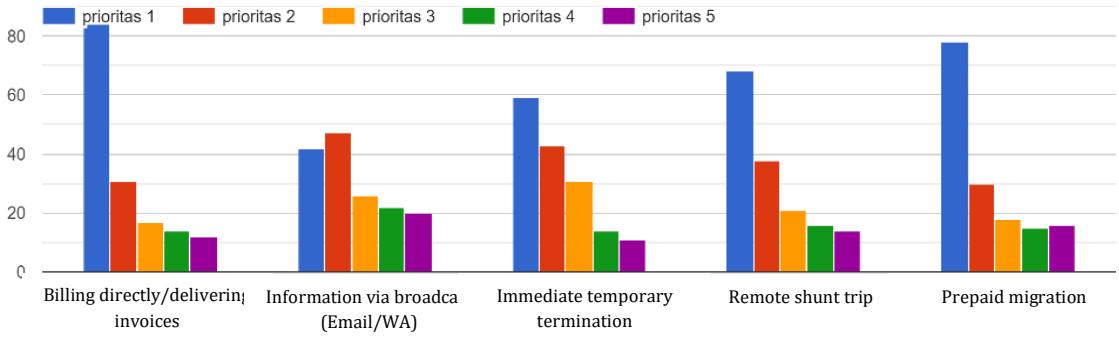



**Figure 3. Appearance results survey question second**

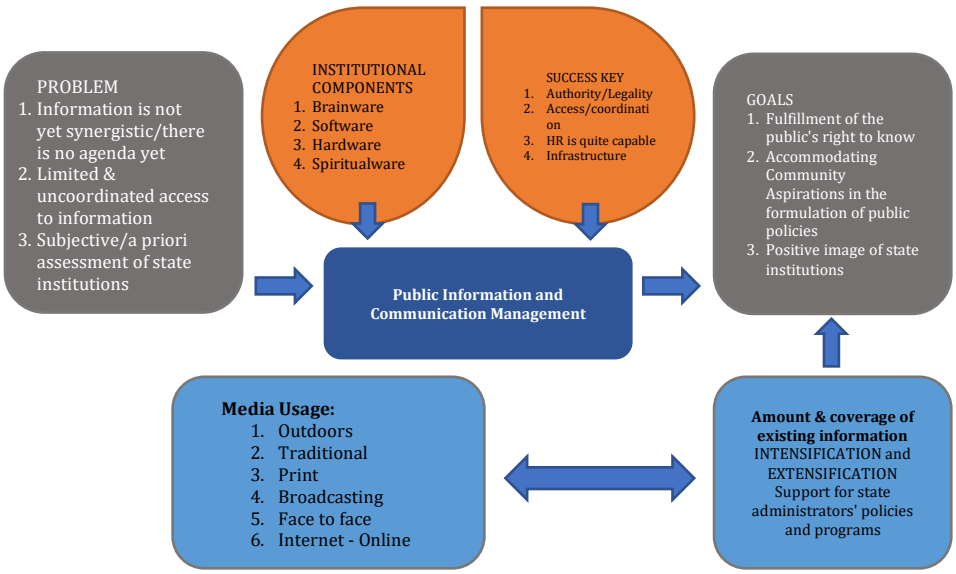
Based on the results of the survey conducted, it produces a score or survey value as the poverty ratio is considered by respondents to be the most influencing factor with a total value of 76. The second factor is the size of the regional minimum wage or UMR with a value of 62. To recapitulate the survey results, it is presented in the table as follows. below this.

**Table 1Implementation Results Survey**

| No. | Factor affecting | Survey scores |
|---|---|---|
| 1 | Regional poverty ratio | 76 |
| 2 | Regional/Provincial Minimum Wage | 62 |

| | | |
|---|---|---|
| 3 | Electrical service reliability | 46 |
| 4 | Regional Income per Capita | 40 |
| 5 | Regional Happiness Index | 32 |
| 6 | Regional density ratio (area/population) | 31 |
| 7 | Gross Regional Domestic Product (GRDP) | 30 |

**Table 2Service strategy information and communication public by the Ministry of Communication and Information**




The Cultural Development Index (IPK) is prepared by referring to the Culture Development Indicators (CDIs) framework developed by UNESCO. Based on this framework, CDIs are compiled by 22 indicators grouped into the seven dimensions mentioned above with weight percentages as in the following table:

**Table 4. Percentage weight dimensions in GPA measurement**

| Dimensi | % Weight |
|---|---|
| 1st Dimension : Culture Economic | **10%** |
| 2nd Dimension : Education | **20%** |
| 3rd Dimension : Sociocultural Resilience | **20%** |
| 4th Dimension : Cultural Heritage | **25%** |
| 5th Dimension : Cultural Expression | **10%** |
| 6th Dimension : Literacy Culture | **10%** |
| 7th Dimension : Gender | **5%** |

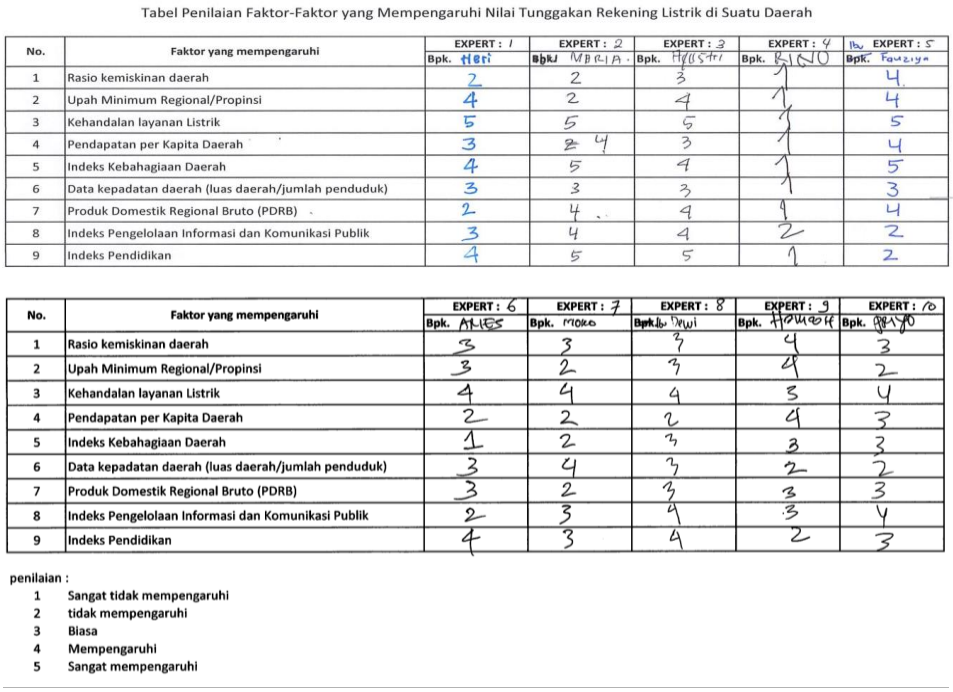
## Discussion

### Expert Interviews

Using the Delphi Method, in this research interviews were conducted with competent experts in the field of receivables collection. These experts are PLN employees consisting of manager and senior manager level officials as well as expert director staff who have many years of experience in collecting PLN consumer receivables.

The interviews were carried out at the PLN Head Office located on Jl. Trunojoyo Blok MI No. 135 Kebayoran Baru, South Jakarta. The number of *experts* who were interviewed was 10 people, taking into account that this number was >5% of the number of respondents from the survey conducted at the beginning of the research.

The results of the first interview along with evidence from its implementation are as shown in the picture below.



Tabel Penilaian Faktor-Faktor yang Mempengaruhi Nilai Tunggakan Rekening Listrik di Suatu Daerah

| No. | Faktor yang mempengaruhi | EXPERT : 1 Bpk. Heri | EXPERT : 2 Bpk. MIRA | EXPERT : 3 Bpk. HARIS | EXPERT : 4 Bpk. RINO | EXPERT : 5 Bpk. Fauziya |
|---|---|---|---|---|---|---|
| 1 | Rasio kemiskinan daerah | 2 | 2 | 3 | 1 | 4 |
| 2 | Upah Minimum Regional/Propinsi | 4 | 2 | 4 | 1 | 4 |
| 3 | Kehandalan layanan Listrik | 5 | 5 | 5 | 1 | 5 |
| 4 | Pendapatan per Kapita Daerah | 3 | 4 | 3 | 1 | 4 |
| 5 | Indeks Kebahagiaan Daerah | 4 | 5 | 4 | 1 | 5 |
| 6 | Data kepadatan daerah (luas daerah/jumlah penduduk) | 3 | 3 | 3 | 1 | 3 |
| 7 | Produk Domestik Regional Bruto (PDRB) | 2 | 4 | 4 | 1 | 4 |
| 8 | Indeks Pengelolaan Informasi dan Komunikasi Publik | 3 | 4 | 4 | 2 | 2 |
| 9 | Indeks Pendidikan | 4 | 5 | 5 | 1 | 2 |

| No. | Faktor yang mempengaruhi | EXPERT : 6 Bpk. ALES | EXPERT : 7 Bpk. MOKO | EXPERT : 8 Bpk. Dwi | EXPERT : 9 Bpk. HARYADI | EXPERT : 10 Bpk. [illegible] |
|---|---|---|---|---|---|---|
| 1 | Rasio kemiskinan daerah | 3 | 3 | 3 | 4 | 3 |
| 2 | Upah Minimum Regional/Propinsi | 3 | 2 | 3 | 4 | 2 |
| 3 | Kehandalan layanan Listrik | 4 | 4 | 4 | 3 | 4 |
| 4 | Pendapatan per Kapita Daerah | 2 | 2 | 2 | 4 | 3 |
| 5 | Indeks Kebahagiaan Daerah | 1 | 2 | 3 | 3 | 3 |
| 6 | Data kepadatan daerah (luas daerah/jumlah penduduk) | 3 | 4 | 3 | 2 | 2 |
| 7 | Produk Domestik Regional Bruto (PDRB) | 3 | 2 | 3 | 3 | 3 |
| 8 | Indeks Pengelolaan Informasi dan Komunikasi Publik | 2 | 3 | 4 | 3 | 4 |
| 9 | Indeks Pendidikan | 4 | 3 | 4 | 2 | 3 |

penilaian :
1 Sangat tidak mempengaruhi
2 tidak mempengaruhi
3 Biasa
4 Mempengaruhi
5 Sangat mempengaruhi

**Figure 4. Documentation results interview with experts**

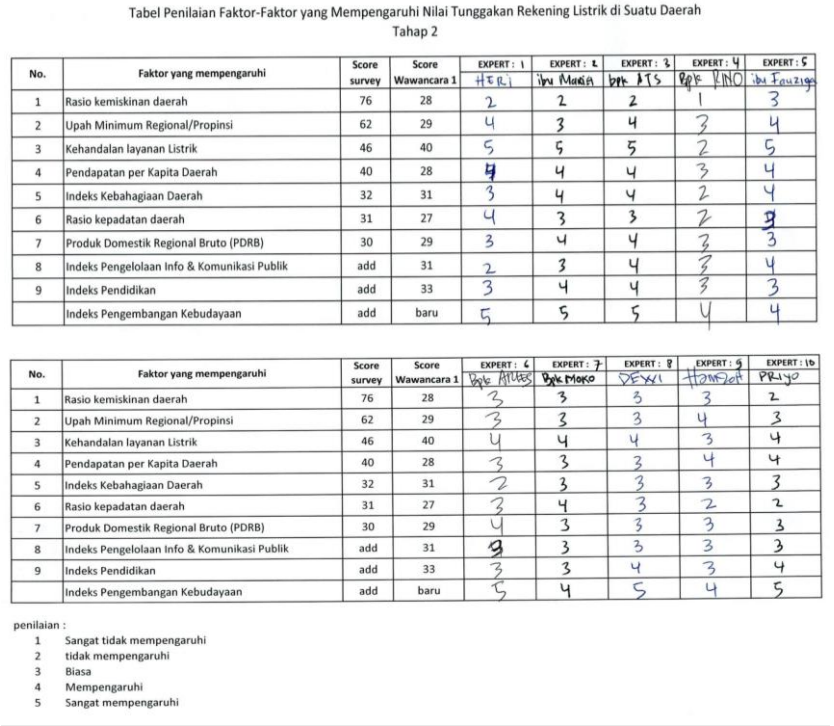
The recapitulation of the results of the first interview with *the expert* is as shown in the table below.

**Table 5. Recapitulation results interview First**

| No. | Factor affecting | Number of Values |
|---|---|---|
| 1 | Regional poverty ratio | 28 |
| 2 | Regional/Provincial Minimum Wage | 29 |
| 3 | Electrical service reliability | 40 |
| 4 | Regional Income per Capita | 28 |
| 5 | Regional Happiness Index | 31 |
| 6 | Regional density ratio (area/population) | 27 |
| 7 | Gross Regional Domestic Product (GRDP) | 29 |

| | | |
|---|---|---|
| 8 | Public Information and Communication Management Index | 31 |
| 9 | Education Index | 33 |
| | **Average** | **30.67** |

In accordance with the method used, namely the Delphi method, interviews were conducted twice to ensure whether the assessment made in the first interview was appropriate or the *expert* reviewed the answers at the first meeting with the results as shown in the evidence picture below. An additional influencing factor is the cultural development index, because the education index is one of the dimensions of cultural development.



Tabel Penilaian Faktor-Faktor yang Mempengaruhi Nilai Tunggakan Rekening Listrik di Suatu Daerah
Tahap 2

| No. | Faktor yang mempengaruhi | Score survey | Score Wawancara 1 | EXPERT : 1 HERI | EXPERT : 2 Ibu Marsia | EXPERT : 3 Bpk ATS | EXPERT : 4 Bpk YINO | EXPERT : 5 ibu Fauziah |
|---|---|---|---|---|---|---|---|---|
| 1 | Rasio kemiskinan daerah | 76 | 28 | 2 | 2 | 2 | 1 | 3 |
| 2 | Upah Minimum Regional/Propinsi | 62 | 29 | 4 | 3 | 4 | 3 | 4 |
| 3 | Kehandalan layanan Listrik | 46 | 40 | 5 | 5 | 5 | 2 | 5 |
| 4 | Pendapatan per Kapita Daerah | 40 | 28 | 4 | 4 | 4 | 3 | 4 |
| 5 | Indeks Kebahagiaan Daerah | 32 | 31 | 3 | 4 | 4 | 2 | 4 |
| 6 | Rasio kepadatan daerah | 31 | 27 | 4 | 3 | 3 | 2 | 3 |
| 7 | Produk Domestik Regional Bruto (PDRB) | 30 | 29 | 3 | 4 | 4 | 3 | 3 |
| 8 | Indeks Pengelolaan Info & Komunikasi Publik | add | 31 | 2 | 3 | 4 | 3 | 4 |
| 9 | Indeks Pendidikan | add | 33 | 3 | 4 | 4 | 3 | 3 |
| | Indeks Pengembangan Kebudayaan | add | baru | 5 | 5 | 5 | 4 | 4 |

| No. | Faktor yang mempengaruhi | Score survey | Score Wawancara 1 | EXPERT : 6 Bpk Alfian | EXPERT : 7 Bpk MOKO | EXPERT : 8 DEXA | EXPERT : 9 Hamdan | EXPERT : 10 PRIYO |
|---|---|---|---|---|---|---|---|---|
| 1 | Rasio kemiskinan daerah | 76 | 28 | 3 | 3 | 3 | 3 | 2 |
| 2 | Upah Minimum Regional/Propinsi | 62 | 29 | 3 | 3 | 3 | 4 | 3 |
| 3 | Kehandalan layanan Listrik | 46 | 40 | 4 | 4 | 4 | 3 | 4 |
| 4 | Pendapatan per Kapita Daerah | 40 | 28 | 3 | 3 | 3 | 4 | 4 |
| 5 | Indeks Kebahagiaan Daerah | 32 | 31 | 2 | 3 | 3 | 3 | 3 |
| 6 | Rasio kepadatan daerah | 31 | 27 | 3 | 4 | 3 | 2 | 2 |
| 7 | Produk Domestik Regional Bruto (PDRB) | 30 | 29 | 4 | 3 | 3 | 3 | 3 |
| 8 | Indeks Pengelolaan Info & Komunikasi Publik | add | 31 | 3 | 3 | 3 | 3 | 3 |
| 9 | Indeks Pendidikan | add | 33 | 3 | 3 | 4 | 3 | 4 |
| | Indeks Pengembangan Kebudayaan | add | baru | 5 | 4 | 5 | 4 | 5 |

penilaian :
1 Sangat tidak mempengaruhi
2 tidak mempengaruhi
3 Biasa
4 Mempengaruhi
5 Sangat mempengaruhi

**Figure 5. Documentation results interview second with *expert***

The recapitulation of the results of the second interview with *the expert* is as shown in the table below.

**Table 6. Recapitulation results interview second**

| No. | Factor affecting | Number of Values |
|---|---|---|
| 1 | Regional poverty ratio | 24 |
| 2 | Regional/Provincial Minimum Wage | 34 |
| 3 | Electrical service reliability | 41 |
| 4 | Regional Income per Capita | 36 |
| 5 | Regional Happiness Index | 31 |
| 6 | Regional density ratio | 29 |
| 7 | Gross Regional Domestic Product (GRDP) | 33 |
| 8 | Public Information and Communication Management Index | 31 |

| | | |
|---|---|---|
| 9 | Education and culture index | 46 |
| | **Average** | **33.89** |

**Implementation of the Regional Characteristics Index on Electricity Receivables**

From the results of using the Delphi method which has been implemented in this research, the author will make a comparison between the index value and the actual receivables data per each province. The receivables data used will be calculated as a percentage to compare the amount of arrears with turnover in the province. The receivables used are electricity receivables as per data on 31 December 2022 based on reports published by PLN through the 2022 statistical report which can be downloaded from the web www.pln.co.id. Meanwhile, sales per report for 2022 are also obtained from the PT PLN (Persero) statistical report which is downloaded on the page www.pln.co.id. The PLN Main Unit receivables data as of December 31 2022 is as shown in the table below.

**Tabel 35 : Piutang Langganan (juta Rp)** **2022**

| Satuan PLN | Umum | TNI & Polri | Non TNI & Polri | PEMDA | BUMN | Jumlah |
|---|---|---|---|---|---|---|
| UIW Aceh | 161.151,33 | 21.279,82 | 3.424,29 | 70.521,57 | 8.238,44 | 264.615,45 |
| UIW Sumatera Utara | 904.750,01 | 21.289,36 | 15.568,94 | 68.548,73 | 20.688,23 | 1.030.845,27 |
| UIW Sumatera Barat | 184.525,45 | 5.201,96 | 6.749,86 | 24.611,06 | 51.729,25 | 272.817,57 |
| UIW Riau dan Kepulauan Riau | 637.575,88 | 15.231,31 | 6.295,52 | 39.200,99 | 78.376,33 | 776.680,04 |
| UIW Sumatera Selatan, Jambi, dan Bengkulu | 670.860,22 | 18.362,96 | 11.656,41 | 84.626,95 | 28.969,19 | 814.475,73 |
| UIW Bangka Belitung | 59.796,66 | 2.471,47 | 1.339,35 | 4.001,94 | 3.005,38 | 70.614,79 |
| UID Lampung | 466.313,46 | 3.149,33 | 5.453,13 | 26.296,40 | 4.499,32 | 505.711,64 |
| UIW Kalimantan Barat | 187.198,56 | 10.872,56 | 4.286,35 | 14.427,97 | 3.605,72 | 220.391,17 |
| UIW Kalimantan Selatan dan Tengah | 319.223,66 | 14.999,30 | 7.922,60 | 31.751,80 | 14.866,82 | 388.764,17 |
| UIW Kalimantan Timur dan Utara | 360.722,44 | 31.372,55 | 8.001,96 | 30.981,37 | 23.328,19 | 454.406,52 |
| UIW Sulawesi Utara, Tengah dan Gorontalo | 358.666,24 | 19.098,44 | 9.789,95 | 49.177,80 | 7.612,41 | 444.344,83 |
| UIW Sulawesi Selatan, Tenggara dan Barat | 943.931,94 | 29.499,57 | 16.324,04 | 41.877,76 | 47.909,21 | 1.079.542,52 |
| UIW Maluku dan Maluku Utara | 73.502,45 | 25.623,38 | 6.803,73 | 6.877,33 | 6.795,00 | 119.601,89 |
| UIW Papua dan Papua Barat | 87.655,94 | 36.182,24 | 6.766,32 | 13.683,30 | 7.607,08 | 151.894,87 |
| UID Bali | 450.050,10 | 6.893,12 | 7.559,02 | 16.225,68 | 6.775,45 | 487.503,36 |
| UIW Nusa Tenggara Barat | 124.929,93 | 5.005,68 | 2.774,05 | 14.276,40 | 3.837,81 | 150.823,87 |
| UIW Nusa Tenggara Timur | 21.968,90 | 5.535,99 | 4.207,45 | 5.814,19 | 7.928,63 | 45.455,17 |
| PT PLN Batam | 364.315,59 | 5.363,82 | 2.000,90 | 3.899,19 | 582,20 | 376.161,70 |
| Luar Jawa | 6.377.138,74 | 277.432,86 | 126.923,87 | 546.800,42 | 326.354,66 | 7.654.650,55 |
| UID Jawa Timur | 3.084.214,34 | 48.005,94 | 39.118,89 | 110.122,26 | 116.937,26 | 3.398.398,68 |
| UID Jawa Tengah dan Yogyakarta | 2.018.331,02 | 33.301,49 | 42.807,71 | 101.185,29 | 43.661,96 | 2.239.287,48 |
| UID Jawa Barat | 4.900.456,15 | 71.048,80 | 42.577,22 | 122.983,15 | 56.709,12 | 5.193.774,44 |
| UID Banten | 2.880.122,07 | 11.698,79 | 11.019,29 | 23.767,64 | 87.975,59 | 3.014.583,38 |
| UID Jakarta Raya | 3.421.644,64 | 220.648,64 | 133.190,24 | 95.155,46 | 24.594,54 | 3.895.233,52 |
| Jawa | 16.304.768,23 | 384.703,66 | 268.713,35 | 453.213,80 | 329.878,47 | 17.741.277,50 |
| Indonesia | 22.681.906,97 | 662.136,52 | 395.637,22 | 1.000.014,22 | 656.233,13 | 25.395.928,06 |

*Catatan: Data diambil dari Aplikasi Pengelolaan Pelanggan Terpusat ( AP2T)*

**Figure 6. PLN Main Unit Electricity Receivables Report as of December 31, 2022**

When compared with sales, the average speed of billing days is obtained based on data contained in the PLN statistical report with results as in the table below:

| Satuan PLN | Penjualan (juta Rp) | Piutang (juta Rp) | Rata-rata (hari) |
|---|---|---|---|
| UIW Aceh | 3.169.860,30 | 264.615,45 | 30,47 |
| UIW Sumatera Utara | 13.657.082,12 | 1.030.845,27 | 27,55 |
| UIW Sumatera Barat | 3.997.069,69 | 272.817,57 | 24,91 |
| UIW Riau dan Kepulauan Riau | 8.732.099,94 | 776.680,04 | 32,47 |
| UIW Sumatera Selatan, Jambi, dan Bengkulu | 10.734.493,35 | 814.475,73 | 27,69 |
| UIW Bangka Belitung | 1.880.964,69 | 70.614,79 | 13,70 |
| UID Lampung | 5.836.114,55 | 505.711,64 | 31,63 |
| UIW Kalimantan Barat | 3.473.571,51 | 220.391,17 | 23,16 |
| UIW Kalimantan Selatan dan Tengah | 5.717.645,35 | 388.764,17 | 24,82 |
| UIW Kalimantan Timur dan Utara | 5.740.416,33 | 454.406,52 | 28,89 |
| UIW Sulawesi Utara, Tengah dan Gorontalo | 4.518.353,18 | 444.344,83 | 35,89 |
| UIW Sulawesi Selatan, Tenggara dan Barat | 10.764.478,40 | 1.079.542,52 | 36,60 |
| UIW Maluku dan Maluku Utara | 1.562.502,32 | 119.601,89 | 27,94 |
| UIW Papua dan Papua Barat | 2.486.011,53 | 151.894,87 | 22,30 |
| UID Bali | 7.147.173,78 | 487.503,36 | 24,90 |
| UIW Nusa Tenggara Barat | 2.383.894,84 | 150.823,87 | 23,09 |
| UIW Nusa Tenggara Timur | 1.460.257,21 | 45.455,17 | 11,36 |
| PT PLN Batam | 4.180.901,45 | 376.161,70 | 32,84 |
| Luar Jawa | 97.442.890,53 | 7.654.650,55 | 28,67 |
| UID Jawa Timur | 44.002.627,20 | 3.398.398,68 | 28,19 |
| UID Jawa Tengah dan Yogyakarta | 32.423.939,74 | 2.239.287,48 | 25,21 |
| UID Jawa Barat | 62.900.363,72 | 5.193.774,44 | 30,14 |
| UID Banten | 29.870.292,40 | 3.014.583,38 | 36,84 |
| UID Jakarta Raya | 44.698.953,02 | 3.895.233,52 | 31,81 |
| Jawa | 213.896.176,08 | 17.741.277,50 | 30,27 |
| Indonesia | 311.339.066,61 | 25.395.928,06 | 29,77 |

**Figure 7. Average Billing Speed Receivables PLN consumers in 2022**

Meanwhile, for the receivables ratio based on the data above, the receivables ratio obtained per each PLN parent unit is as shown in the table below:

**Table 7. Ratio Receivables Consumer compared to with Income Sale**

| Parent Unit | Rp Sales | Rp. Receivables | % Ratio |
|---|---|---|---|
| Aceh | 3,169,860.30 | 264,615.45 | 8.35% |
| North Sumatra | 13,657,082.12 | 1,030,845.27 | 7.55% |
| Boast | 3,997,069.69 | 272,817.57 | 6.83% |
| S2JB | 10,734,493.35 | 814,475.73 | 7.59% |
| Babylon | 1,880,964.69 | 70,614.79 | 3.75% |
| Lampung | 5,836,114.55 | 505,711.64 | 8.67% |
| Riau and Riau Islands | 8,732,099.94 | 776,680.04 | 8.89% |
| West Kalimantan | 3,473,571.51 | 220,391.17 | 6.34% |
| Central Kalimantan | 5,717,645.35 | 388,764.17 | 6.80% |
| Kaltimra | 5,740,416.33 | 454,406.52 | 7.92% |
| North Sulawesi | 4,518,353.18 | 444,344.83 | 9.83% |
| South Sulawesi, Rabar | 10,764,478.40 | 1,079,542.52 | 10.03% |
| MMU | 1,562,502.32 | 119,601.89 | 7.65% |
| PPB | 2,486,011.53 | 151,894.87 | 6.11% |
| NTT | 1,460,257.21 | 45,455.17 | 3.11% |
| NTB | 2,383,894.84 | 150,823.87 | 6.33% |
| East Java | 44,002,627.20 | 3,398,398.68 | 7.72% |
| Central Java and DIY | 32,423,939.74 | 2,239,287.48 | 6.91% |
| West Java | 62,900,363.72 | 5,193,774.44 | 8.26% |
| Jaya | 29,870,292.40 | 3,014,583.38 | 10.09% |
| Bali | 7,147,173.78 | 487,503.36 | 6.82% |

| | | | |
|---|---|---|---|
| Banten | 44,698,953.02 | 3,895,233.52 | 8.71% |
| **Combined** | **307,158,165.17** | **25,019,766.36** | **8.15%** |

In contrast to the previous average speed of collecting consumer receivables, if you look at the receivables ratio, which is IDR Receivables compared to IDR Sales, then UID Jakarta Raya has the highest ratio with a value of 10.09%, different from the highest average collection days found at UID Banten. Meanwhile, for the lowest value, there is a similarity between the average collection days and the receivables ratio, namely PLN UIW NTT is ranked first as the unit with the lowest value.

In this research, regional characteristic index trials will be carried out only on parent units that oversee 1 province, including the Main Distribution Unit/Region of Aceh, North Sumatra, West Sumatra, Bangka Belitung, Lampung, West Kalimantan, NTT, NTB, East Java, Java West, Greater Jakarta, Bali and Banten. These 13 units will be assessed based on the Regional Characteristics Index determined by the Expert . Obtained from this research are as in the table below.

**Table 8. Recapitulation of data per region**

| UNIT x PROVINCE | a | b | c | | d | e | f | g | h | i |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAIDI | SAIFI | | | | | | |
| ACEH | 14.75 | 3,413,666 | 7.54 | 6.55 | 26.06 | 71.24 | 10.7 | 184.98 | 79.65 | 52.61 |
| NUMUT | 8.33 | 2,710,493 | 14.78 | 9.84 | 37.94 | 70.57 | 4.8 | 859.87 | 67.20 | 50.33 |
| BOAST | 6.04 | 2,742,476 | 8.95 | 5.75 | 32.38 | 71.34 | 7.4 | 252.75 | 65.95 | 54.60 |
| BABYLON | 4.61 | 3,498,479 | 1.95 | 3.35 | 38.67 | 73.25 | 11.0 | 85.07 | 64.20 | 54.70 |
| LAMPUNG | 11.44 | 2,633,284 | 9.66 | 5.82 | 28.06 | 71.64 | 3.8 | 371.90 | 47.50 | 55.38 |
| KALBAR | 6.81 | 2,608,601 | 21.18 | 19.57 | 26.78 | 72.49 | 26.6 | 231.22 | 92.20 | 49.72 |
| NTT | 20.23 | 2,123,994 | 7.63 | 9.15 | 13.30 | 70.31 | 8.9 | 110.89 | 74.95 | 48.93 |
| NTB | 13.82 | 2,371,407 | 6.39 | 4.72 | 18.65 | 69.98 | 3,4 | 140.15 | 58.35 | 61.26 |
| East Java | 10.49 | 2,040,244 | 3.35 | 3.33 | 42.72 | 72.08 | 1,2 | 2,454.50 | 57.00 | 57.88 |
| JABAR | 7.98 | 1,986,670 | 12.81 | 8.62 | 32.18 | 70.23 | 0.7 | 2,209.82 | 61.55 | 52.04 |
| JAKARTA | 4.61 | 4,900,798 | 2.90 | 2.02 | 182.91 | 70.68 | 0.1 | 2,914.58 | 32.15 | 57.13 |
| BALI | 4.53 | 2,713,672 | 1.03 | 1.08 | 34.16 | 71.44 | 1.3 | 219.80 | 74.70 | 66.40 |
| BANTEN | 6.24 | 2,661,280 | 1.11 | 1.00 | 39.52 | 68.08 | 0.8 | 665.92 | 47.40 | 48.95 |

**Data Testing**

From the data for each of the regional characteristic criteria above, testing was then carried out by comparing it with the percentage of receivables as previously calculated using INDEPENDENT-SAMPLE T TEST analysis via the SPSS application (Imam 2018).

The provisions used in this research are to look at the significance value of t with the following explanation:

a. If the significance value of t < 0.05, it means that there is a significant influence between one independent variable and the dependent variable.
b. If the significance value of t> 0.05, it means that there is no significant influence between one independent variable and the dependent variable.
    a. Regional Poverty Ratio

        From the results of the analysis via SPSS, the t-count value was -0.4 with a significance of 0.35. Because the significance value is 0.35 > 0.05, it can be concluded that H0 is accepted so that there is no significant influence between the two groups. The point estimate using Cohen's d for the Regional Poverty Ratio is -0.22.
    b. Regional/Provincial Minimum Wage

        From the results of the analysis via SPSS, the t-count value was obtained at 1 with a significance of 0.17. Because the significance value is 0.17 > 0.05, it can be concluded that H0

is accepted so that there is no significant influence between the two groups. For the point estimate using Cohen's d for the Regional Minimum Wage is 0.56.

c. Electrical Service Reliability - SAIDI
From the results of the analysis via SPSS, the t-count value was obtained at 0.86 with a significance of 0.2. Because the significance value is 0.2 > 0.05, it can be concluded that H0 is accepted so that there is no significant influence between the two groups. The point estimate using Cohen's d for SAIDI is 0.48.

d. Electrical Service Reliability – SAIFI
From the results of the analysis via SPSS, the t-count value was obtained at 0.69 with a significance of 0.25. Because the significance value is 0.25 > 0.05, it can be concluded that H0 is accepted so that there is no significant influence between the two groups. The point estimate using Cohen's d for SAIFI is 0.38.

e. Regional Income Capita
From the results of the analysis via SPSS, the t-count value was obtained at 1.04 with a significance of 0.16. Because the significance value is 0.16 > 0.05, it can be concluded that H0 is accepted so that there is no significant influence between the two groups. The point estimate using Cohen's d for Income per Capita is 0.58.

f. Regional Happiness Index
From the results of the analysis via SPSS, the t-count value was -0.76 with a significance of 0.23. Because the significance value is 0.23 > 0.05, it can be concluded that H0 is accepted so that there is no significant influence between the two groups. The point estimate using Cohen's d for the Regional Happiness Index is -0.42.

g. Regional Density Ratio
From the results of the analysis via SPSS, the t-count value was obtained at 0.4 with a significance of 0.35. Because the significance value is 0.35 > 0.05, it can be concluded that H0 is accepted so that there is no significant influence between the two groups. For the point estimate using Cohen's d for the Area Density Ratio it is 0.23.

h. Gross Regional Domestic Product (GRDP)
From the results of the analysis via SPSS, the t-count value was obtained at 0.9 with a significance of 0.19. Because the significance value is 0.19 > 0.05, it can be concluded that H0 is accepted so that there is no significant influence between the two groups. The point estimate using Cohen's d for GRDP is 0.5.

i. Public Information and Communication Management Index (PIKP)
From the results of the analysis via SPSS, the t-count value was -0.67 with a significance of 0.26. Because the significance value is 0.26 > 0.05, it can be concluded that H0 is accepted so that there is no significant influence between the two groups. The point estimate using Cohen's d for the PIKP Index is -0.37

j. Educational and Cultural Development Index (IPK)
From the results of the analysis via SPSS, the t-count value was -1.3 with a significance of 0.11. Because the significance value is 0.11 > 0.05, it can be concluded that H0 is accepted so that there is no significant influence between the two groups. The point estimate using Cohen's d for the Cultural Development Index is -0.73 . Recapitulation of test results using the SPSS application with Independent Sample T Test analysis is as shown in the table below.

**Table 9. Recapitulation of test results Independent sample T Test using SPSS**

| No. | Factor affecting | t value | Sign | Point Estimates |
|---|---|---|---|---|
| 1 | Regional poverty ratio | -0.4 | **0.35** | -0.22 |

| | | | | |
|---|---|---|---|---|
| 2 | Regional/Provincial Minimum Wage | 1.0 | **0.17** | 0.56 |
| 3 | Reliability of Electrical services -SAIDI | 0.86 | **0.2** | 0.48 |
| 4 | Reliability of Electrical services -SAIFI | 0.69 | **0.25** | 0.38 |
| 5 | Average | 0.77 | **0.22** | 0.43 |
| 6 | Regional Income per Capita | 1.04 | **0.16** | 0.58 |
| 7 | Regional Happiness Index | -0.76 | **0.23** | -0.42 |
| 8 | Regional density ratio | 0.4 | **0.35** | 0.23 |
| 9 | Gross Regional Domestic Product (GRDP) | 0.9 | **0.19** | 0.5 |
| 10 | Public Information and Communication Management Index | -0.67 | **0.26** | -0.37 |
| 11 | Education and Culture Index | -1.3 | **0.11** | -0.73 |

From the table above, if you pay attention to the significance value as those with smaller values have a better influence than larger values, then the Cultural Development Index has the smallest value which is close to 0.05 so that the cultural development index is the factor that most influences the size electricity receivables.

**Research Results using the Ranking Analysis Method**

If compared with the implementation of the survey and the results of interviews with *experts* using the Delphi method (2x interviews) and testing using the t-test, the following comparison is obtained:

**Table 10. Recapitulation comparison results study**

| No. | Factor affecting | Survey | Interview Expert | T-Test Sign |
|---|---|---|---|---|
| 1 | Regional poverty ratio | 76 | 24 | 0.35 |
| 2 | Regional/Provincial Minimum Wage | 62 | 34 | 0.17 |
| 3 | Electrical service reliability | 46 | 41 | 0.22 |
| 4 | Regional Income per Capita | 40 | 36 | 0.16 |
| 5 | Regional Happiness Index | 32 | 31 | 0.23 |
| 6 | Regional density ratio | 31 | 29 | 0.35 |
| 7 | Gross Regional Domestic Product (GRDP) | 30 | 33 | 0.19 |
| 8 | Public Information and Communication Management Index | 12 | 31 | 0.26 |
| 9 | Education and Culture Index | 68 | 46 | 0.11 |

By considering the similarity of factors related to income or economic level of the community, including regional poverty ratio, regional/provincial minimum wage, regional per capita income and gross regional domestic product (GRDP), taking into account the research objectives to obtain more specific analysis results, then The average calculation was carried out on these four factors with the results as shown in the table below.

**Table 11. Grouping factor in accordance with similarity character**

| No. | Factor affecting | Survey | Expert interviews | T-Test Sign |
|---|---|---|---|---|
| 1 | Regional poverty ratio | 76 | 24 | 0.35 |
| 2 | Regional/Provincial Minimum Wage | 62 | 34 | 0.17 |
| 3 | Regional Income per Capita | 40 | 36 | 0.16 |
| 4 | Gross Regional Domestic Product (GRDP) | 30 | 33 | 0.19 |
| | Average | 52 | 32 | 0.22 |

So the final results of the research based on the three methods are as shown in the table below.

**Table 2Research results end with using 3 methods**

| No. | Factor affecting | Survey | Interview Expert | T-Test Sign |
|---|---|---|---|---|
| 1 | Economic conditions/income | 0.22 | 52 | 32 |
| 2 | Electrical service reliability | 0.22 | 46 | 41 |
| 3 | Regional Happiness Index | 0.23 | 32 | 31 |
| 4 | Regional density ratio | 0.35 | 31 | 29 |
| 5 | Public Information and Communication Management Index | 0.26 | 12 | 31 |
| 6 | Education and Culture Index | 0.11 | 68 | 46 |

From the data above, with the results ordered based on ranking, the results obtained are as shown in the table below:

**Table 13. Comparison results study based on Ranking**

| No. | Factor affecting | Survey | Expert interviews | T-Test Sign | Rate |
|---|---|---|---|---|---|
| 1 | Economic conditions/income | 2 | 2 | 3 | 2.3 |
| 2 | Electrical service reliability | 3 | 3 | 2 | 2.7 |
| 3 | Regional Happiness Index | 4 | 4 | 4 | 4.0 |
| 4 | Regional density ratio | 6 | 5 | 6 | 5.3 |
| 5 | Public Information and Communication Management Index | 5 | 6 | 5 | 6.0 |
| 6 | Education and Culture Index | 1 | 1 | 1 | 1.0 |

This is in accordance with the results of the second interview with *experts* , as the formation of culture in society is the main factor that makes PLN consumers carry out routine payment of electricity bills with a rate of 1.0. Another influencing factor is economic conditions/income with a rate of 2.3, followed by the reliability of electricity services from PLN itself with a value of 2.7.

**Data testing using the Borda calculation method**

If an analysis is carried out based on regions, in this research the regions in Indonesia are grouped into 3 regions, namely:

1. Sumkal Regional which consists of all provinces on the islands of Sumatra and Kalimantan
2. Jamali Regional which consists of all provinces on the islands of Java, Madura and Bali

3. Sulmapana Regional which consists of all provinces on the islands of Sulawesi, Maluku, Papua and Nusa Tenggara

The results of the analysis using the Borda calculation method, according to the literature obtained from the Toolshero article with the title Borda Calculation Method (Janse, 2019)are as follows:

**Table 3Calculation results weight with use Borda method**

| Priority Selection | Calculation Results | | | Weight Calculation Results | | |
|---|---|---|---|---|---|---|
| | Selvice Reliability | Economic Conditions | Education and Culture | Service Reliability | Economic Conditions | Education and Culture |
| Sumkal | | | | | | |
| **1** | 9x7 | 4x7 | 13x7 | 63 | 28 | 91 |
| **2** | 3x6 | 7x6 | 3x6 | 18 | 42 | 18 |
| **3** | 3x5 | 8x5 | 4x5 | 15 | 40 | 20 |
| **4** | 3x4 | 3x4 | 0x4 | 12 | 12 | 0 |
| **5** | 3x3 | 0x3 | 3x3 | 9 | 0 | 9 |
| **6** | 2x2 | 2x2 | 3x2 | 4 | 4 | 6 |
| **7** | 3x1 | 0x1 | 0x1 | 3 | 0 | 0 |
| | | | **Final Score Sumkal** | **124** | **126** | **144** |
| Jamali | | | | | | |
| **1** | 10x7 | 6x7 | 13x7 | 70 | 42 | 91 |
| **2** | 2x6 | 8x6 | 7x6 | 12 | 48 | 42 |
| **3** | 6x5 | 7x5 | 5x5 | 30 | 35 | 25 |
| **4** | 1x4 | 3x4 | 0x4 | 4 | 12 | 0 |
| **5** | 2x3 | 2x3 | 1x3 | 6 | 6 | 3 |
| **6** | 3x2 | 1x2 | 2x2 | 6 | 2 | 4 |
| **7** | 5x1 | 3x1 | 2x1 | 5 | 3 | 2 |
| | | | **Final Score Jamali** | **133** | **148** | **167** |
| Sulmapana | | | | | | |
| **1** | 8x7 | 11x7 | 15x7 | 56 | 77 | 105 |
| **2** | 10x6 | 9x6 | 5x6 | 60 | 54 | 30 |
| **3** | 3x5 | 2x5 | 3x5 | 15 | 10 | 15 |
| **4** | 1x4 | 2x4 | 0x4 | 4 | 8 | 0 |
| **5** | 0x3 | 0x3 | 1x3 | 0 | 0 | 3 |
| **6** | 0x2 | 2x2 | 2x2 | 0 | 4 | 4 |
| **7** | 3x1 | 1x1 | 1x1 | 3 | 1 | 1 |
| | | | **Final Score Sulmapana** | **138** | **154** | **158** |

**Interpretation of Research Results**

From the results of research using both the ranking analysis method and calculations using the Borda method, it was found that there were 3 (three) major regional characteristic factors that influence the willingness of PLN consumers to pay electricity bills, namely educational and cultural factors, economic factors and community income and then electricity service reliability factors (Bornmann et al. 2014; Chen et al. 2019). Education and cultural factors are the first factors in this research, supported by several journals such as (Ajzen 1980; Zeithaml 1988) as consumer behavior or consumer behavior can influence the consumer's purchasing power, including electricity bill payments (Al Irsyad et al. 2020). Apart from being related to consumer behavior, it turns out that company culture also influences the size of receivables, as stated in the research journal by (Jeyachitra et al. 2010; Juliati 2021; Viklund and Wallvik 2014; Anand and Gupta 2002; Atkinson 2011).

The next results of this research are economic factors and community income (poverty ratio, minimum wage, per capita income, people's purchasing power and others), both based on survey results, interview results, calculation approaches from the t-test and calculation tests using the Borda method, both show that economic factors are one of the factors that influence the size of consumer receivables, this is supported by several research journals, including (Sopranzetti 1998; Mian and Smith Jr 1992; Sopranzetti 1999; Khairani and Veralita 2015; Unsulbar, Purwati, and Dahlia 2018).

**CONCLUSION**

Willingness to pay electricity bills by PLN consumers can be influenced by regional characteristics in order of the most influencing, among others is education index and cultural development index , economic factors and income , reliability of electricity services , regional

happiness index , regional density ratio , public information and communication management index , the use of ranking analysis methods from several methods can be used to test the dominant factors in determining priority levels between criteria that refer to regional/provincial characteristics, namely survey method, Delphi-based interview method with experts two interviews), calculation analysis method using independent sample t-test, namely comparing statistical data with actual arrears data per region, then finally Testing was carried out using the Borda calculation method to see regional conditions based on survey results. From these results, initial mapping can be carried out to obtain the right strategy for billing consumer electricity bills based on the consumer's willingness to pay behavior according to the characteristics of the consumer's area.

From the results of 3 methods, namely conducting surveys, expert interviews, and t-test sample calculations, the average ranking results were obtained where the main factor influencing consumers' willingness to pay electricity bills was the development of education and culture with an average value of 1.0, then followed by economic conditions and income factors, namely with the same average value of 2.3. The third factor with a value of 2.7 is related to the reliability of electricity services, namely the reliability of electricity services which is measured through the realization of SAIDI and SAIFI in each region. Meanwhile, the results of calculations using the Borda method get the same results as the average calculations using ranking. This shows that the 3 main factors that influence the willingness of PLN consumers to make electricity payments, thus influencing the size of receivables, are educational and cultural factors, economic factors and community income and electricity service reliability factors.

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