

## LAMPIRAN

### PENGAMBILAN DATA MADUKISMO

DATA	Jumlah	Satuan
Total Pengiriman barang	54000	unit/bulan
Total Pengambilan barang	120000	unit/bulan
Total Penerimaan barang	60000	unit/bulan
Total Penempatan barang	100000	unit/bulan
Total penyimpanan barang	100000	unit/bulan
Total jam pengiriman	255	jam/bulan
Total jam Pengambilan	120	jam/bulan
Total jam penerimaan	240	jam/bulan
Total jam penempatan	255	jam/bulan
Total jam penyimpanan	360	jam/bulan
Total jam tenaga kerja tambahan penempatan	60	jam/bulan
Total jam tenaga kerja tambahan pengambilan	60	jam/bulan
Barang awal	108000	unit
Barang akhir	108000	unit
Luas area (117.5x27)	3172.5	m <sup>2</sup>
Luas area (117.5x27x20)	63450	m <sup>3</sup>
Total biaya penyimpanan	13557235	per bulan
Biaya tenaga kerja	4,500,000	per bulan
	150000	per hari
	18750	per jam
Total pengiriman pesanan		pesanan
Kapasitas kedaraan distribusi	700	unit
Kapasitas kirim bak truk	600	unit
kapasitas 1 line	100	unit

- Dalam prakteknya jumlah barang transaksi di dalam gudang tidak selalu sama dikarenakan banyak barang yang ada di gudang di delay atau bisa juga karena ada penumpukan barang (inventory) di sebabkan ada masalah administrasi atau juga ada masalah teknis. Maka dari itu data yang ada di dalam penelitian berbeda beda.
- Untuk data total waktu merupakan data asumsi dari pt madukismo dan hasil tanya jawab dengan ketua gudang di ot tersebut. Di karenakan untuk data waktu di gudang madukismo tidak di bukukan maka dari itu peneliti hanya mendapat data tersebut.

### Hasil KPI PT Madu Kismo

	KPI frezelle	hasil perhitungan KPI	satuan
1	receiving financial	60000	per line
2	receiving productivity	250	unit/jam
3	receiving utilization	86%	
4	receiving quality	100%	
5	receiving cycle time	10	menit
6	putaway financial	38250	per line
7	putaway productivity	392	unit/jam
8	putaway utilization	24%	
9	putaway quality	100%	
10	putaway cycle time	20	menit
11	storage financial	136	per line
12	storage productivity	32	unit/m2
13	storage utilization	8%	
14	storage quality	100%	
15	storage cycle time	24	jam
16	order-picking financial	15000	per line
17	order-picking productivity	1000	unit/jam
18	order-picking utilization	50%	
19	order-picking quality	100%	
20	order-picking cycle time	10	unit/menit
21	shipping financial	708.33333	per line
22	shipping productivity	212	unit/jam
23	shipping utilization	86%	
24	shipping quality	100%	
25	shipping cycle time	20	menit

### Hasil KPI 3 DMU

PT Madu Kismo					
	FINANCIAL(Rp)	PRODUKTIVITY	UTILIZATION	QUALITY	CYCLE TIME
	per line	unit/jam	%	%	unit/menit
RECEIVING	60000	250	86%	100%	10
PUTAWAY	38250	392	24%	100%	20
STORAGE	136	32	8%	100%	24
ORDER-PICKING	15000	1000	50%	100%	10
SHIPPING	708.33	212	86%	97%	20
UD Sinar Barokah (bank data)					
RECEIVING	6000	50	86%	100%	10
PUTAWAY	3000	100	75%	100%	10
STORAGE	25581	69	7%	100%	0
ORDER-PICKING	4500	67	50%	100%	2
SHIPPING	150	40	86%	100%	10
UD Putra Lestari (bank data)					
RECEIVING	3196	128	83%	100%	8
PUTAWAY	1534	267	50%	100%	8
STORAGE	5625	200	3%	100%	3
ORDER-PICKING	2975	138	38%	100%	22
SHIPPING	70	73	83%	100%	8





















## Geometrik Mean

### Geometrik Mean Receiving

Receiving Financial	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial	1	1	1	1
Productivity	5	3	6	4.48
Utilization	4	4	4	4
Quality	2	2	3	2.29
Cycle time	2	3	2	2.29

Receiving Productivity	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity	1	1	1	1.00
Utilization	5	4	5	4.64
Quality	4	3	4	3.63
Cycle time	2	5	3	3.11

Receiving Utilization	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity				
Utilization	1	1	1	1
Quality	4	3.00	5	3.91
Cycle time	3	3	3	3.00

Receiving Quality	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity				
Utilization				
Quality	1	1	1	1.00
Cycle time	3	3	4	3.30

Receiving Cycle Time	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity				

Utilization				
Quality				
Cycle time	1	1	1	1.00

### Geometrik Mean Put away

Put away Financial	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial	1	1	1	1
Productivity	6	4	5	4.93
Utilization	3	2	4	2.88
Quality	3.00	3.00	4	3.30
Cycle time	4	4	5	4.31

Put away Productivity	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity	1	1	1	1.00
Utilization	6	4	3	4.16
Quality	5	6	6	5.65
Cycle time	4.00	5.00	3	3.91

Put away Utilization	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity				
Utilization	1	1	1	1
Quality	3	3	4	3.30
Cycle time	4	4	4	4.00

Put away Quality	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity				
Utilization				
Quality	1	1	1	1.00
Cycle time	4	5	3.00	3.91

Put away Cycle Time	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean

Financial				
Productivity				
Utilization				
Quality				
Cycle time	1	1	1	1.00

### Geometrik Mean Storage

Storage Financial	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial	1	1	1	1
Productivity	3	4	3	3.30
Utilization	4	2	5	3.42
Quality	4	2	2	2.52
Cycle time	5	3	5	4.22

Storage Productivity	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity	1	1	1	1.00
Utilization	4	5	4	4.31
Quality	3	3	2	2.62
Cycle time	3.00	4	3.00	3.30

Storage Utilization	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity				
Utilization	1	1	1	1
Quality	3	4	3	3.30
Cycle time	2	3	5	3.11

Storage Quality	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity				
Utilization				
Quality	1	1	1	1.00
Cycle time	3	4	4	3.63

Storage Cycle Time	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity				
Utilization				
Quality				
Cycle time	1	1	1	1.00

### Geomatrik Mean Order Picking

Order picking Financial	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial	1	1	1	1
Productivity	3	3	4	3.30
Utilization	3	3	4	3.30
Quality	4	2	4	3.17
Cycle time	4	6	3	4.16

Order picking Productivity	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity	1	1	1	1.00
Utilization	7	3	5	4.72
Quality	4	4	5	4.31
Cycle time	3	3	3	3.00

Order picking Utilization	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity				
Utilization	1	1	1	1
Quality	3	3.00	7	3.98
Cycle time	6	5	6	5.65

Order picking Quality	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity				
Utilization				



Quality	1	1	1	1.00
Cycle time	4	4	4	4.00

Order picking Cycle Time	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity				
Utilization				
Quality				
Cycle time	1	1	1	1.00

### Geometrik Mean Shipping

shipping Financial	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial	1	1	1	1
Productivity	7	8	5	6.54
Utilization	3	2	3	2.62
Quality	3	2	3	2.62
Cycle time	4	3	4	3.63

shipping Productivity	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity	1	1	1	1.00
Utilization	3	4	3	3.30
Quality	3	3	3	3.00
Cycle time	3	3	5	3.56

shipping Utilization	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity				
Utilization	1	1	1	1
Quality	5	4.00	6	4.93
Cycle time	4	4	4	4.00

shipping Quality	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				

Productivity				
Utilization				
Quality	1	1	1	1.00
Cycle time	5	3	6	4.48

shipping Cycle Time	PT. Madukismo	UD. Putra Lestari	UD. Sinar Barokah	geomean
Financial				
Productivity				
Utilization				
Quality				
Cycle time	1	1	1	1.00

Keterangan :

Tabel yang berwarna pink = hasil pemilihannya di kanan dalam kuisisioner AHP

Tabel yang berwarna putih = hasil pemilihannya di kiri dalam kuisisioner AHP

Tabel yang berwarna biru = tidak dihitung geomeannya karena perhitungan geomean untuk perbandingan berpasangan di AHP.

### Matriks Pembobot

#### AHP receiving

receiving	Financial	Productivity	Utilization	Quality	Cycle time	Eigen Vektor/ bobot
Financial	1	4.48	4	2.29	2.29	0.383
Productivity	0.22	1	4.64	3.63	3.11	0.256
Utilization	0.25	0.22	1	3.91	3	0.165
Quality	0.44	0.28	0.26	1	3.3	0.121
Cycle time	0.44	0.32	0.33	0.30	1	0.075
jumlah	2.35	6.29	10.23	11.13	12.70	1.000

#### AHP put away

put away	Financial	Productivity	Utilization	Quality	Cycle time	Eigen Vektor/ bobot
Financial	1	0.20	2.88	0.30	0.23	0.096
Productivity	4.93	1	4.16	5.65	3.91	0.434
Utilization	0.35	0.24	1	0.30	4	0.138
Quality	3.30	0.18	3.30	1	0.26	0.147
Cycle time	4.31	0.26	0.25	3.91	1	0.185
jumlah	13.89	1.88	11.59	11.17	9.40	1.000

#### AHP storage

storage	Financial	Productivity	Utilization	Quality	Cycle time	Eigen Vektor/ bobot
Financial	1	3.3	0.29	2.52	4.22	0.247
Productivity	0.30	1	4.31	2.62	0.3	0.233
Utilization	3.42	0.23	1	3.3	3.11	0.284
Quality	0.40	0.38	0.30	1	3.63	0.114
Cycle time	0.24	3.33	0.32	0.28	1	0.122
jumlah	5.36	8.25	6.23	9.72	12.26	1.000

#### AHP order picking

order picking	Financial	Productivity	Utilization	Quality	Cycle time	Eigen Vektor/ bobot

Financial	1	0.30	3.30	3.17	0.24	0.144
Productivity	3.30	1	4.72	4.31	0.33	0.266
Utilization	0.30	0.21	1	0.25	0.18	0.048
Quality	0.32	0.23	3.98	1	0.25	0.100
Cycle time	4.16	3.00	5.65	4.00	1	0.441
jumlah	9.08	4.75	18.65	12.73	2.00	1.000

#### AHP shipping

shipping	Financial	Productivity	Utilization	Quality	Cycle time	Eigen Vektor/ bobot
Financial	1	6.54	2.62	0.38	3.63	0.285
Productivity	0.15	1	3.3	0.33	3.56	0.153
Utilization	0.38	0.30	1	0.202839757	4	0.106
Quality	2.62	3.00	4.93	1	4.48	0.401
Cycle time	0.28	0.28	0.25	0.22	1	0.054
jumlah	4.43	11.12	12.10	2.14	16.67	1.000

#### Prioritas Pembobotan AHP setelah perhitungan Geomean

	Financial	Productivity	Utilization	Quality	Cycle time
receiving	0.383	0.256	0.165	0.121	0.075
putaway	0.096	0.434	0.138	0.147	0.185
storage	0.247	0.233	0.284	0.114	0.122
order picking	0.144	0.266	0.048	0.100	0.441
shipping	0.285	0.153	0.106	0.401	0.054

## Output LINDO 6.1

### CRS Primal

#### DMU 1

LP OPTIMUM FOUND AT STEP 1

OBJECTIVE FUNCTION VALUE

1) 0.7030000

VARIABLE	VALUE	REDUCED COST
Y1	0.007400	0.000000
X1	0.000000	37199.226562
X2	0.000000	137.740494
X3	0.100000	0.000000
X4	0.020000	0.000000
ROW	SLACK OR SURPLUS	DUAL PRICES
2)	0.000000	0.703000
3)	0.260000	0.000000
4)	0.000000	0.256500
5)	0.000000	0.693500

NO. ITERATIONS= 1

**DMU 2**

LP OPTIMUM FOUND AT STEP 2

OBJECTIVE FUNCTION VALUE

1) 1.000000

VARIABLE	VALUE	REDUCED COST
Y1	0.010000	0.000000
X1	0.000313	0.000000
X2	0.000000	0.000000
X3	0.000000	0.000000
X4	0.000000	0.000000

ROW	SLACK OR SURPLUS	DUAL PRICES
2)	0.000000	1.000000
3)	17.823467	0.000000
4)	0.000000	1.000000
5)	0.877347	0.000000

NO. ITERATIONS= 2

**DMU 3**

LP OPTIMUM FOUND AT STEP 3

OBJECTIVE FUNCTION VALUE

1) 1.000000

VARIABLE	VALUE	REDUCED COST
----------	-------	--------------

Y1	0.010000	0.000000
----	----------	----------

X1	0.000159	0.000000
----	----------	----------

X2	0.000000	0.000000
----	----------	----------

X3	0.000000	0.000000
----	----------	----------

X4	0.022323	0.000000
----	----------	----------

ROW	SLACK OR SURPLUS	DUAL PRICES
-----	------------------	-------------

2)	0.000000	1.000000
----	----------	----------

3)	8.826766	0.000000
----	----------	----------

4)	0.000000	0.000000
----	----------	----------

5)	0.000000	1.000000
----	----------	----------

NO. ITERATIONS= 3

### CRS Dual

#### DMU 1

LP OPTIMUM FOUND AT STEP 0

OBJECTIVE FUNCTION VALUE

1) 0.7030000

VARIABLE	VALUE	REDUCED COST
Z	0.703000	0.000000
O	0.000000	0.007400
I1	37199.226562	0.000000
I2	137.740494	0.000000
I3	0.000000	0.100000
I4	0.000000	0.020000
P1	0.000000	0.297000
P2	0.256500	0.000000
P3	0.693500	0.000000
ROW	SLACK OR SURPLUS	DUAL PRICES
2)	0.000000	-0.007400
3)	0.000000	0.000000
4)	0.000000	0.000000
5)	0.000000	0.100000
6)	0.000000	0.020000

NO. ITERATIONS= 0

#### DMU 2

LP OPTIMUM FOUND AT STEP 2



## OBJECTIVE FUNCTION VALUE

1) 1.000000

VARIABLE	VALUE	REDUCED COST
Z	1.000000	0.000000
O	0.000000	0.010000
I1	0.000000	0.000000
I2	0.000000	0.002549
I3	0.000000	0.106437
I4	0.000000	0.000000
P1	0.000000	0.900860
P2	1.000000	0.000000
P3	0.000000	0.000000
ROW	SLACK OR SURPLUS	DUAL PRICES
2)	0.000000	-0.010000
3)	0.000000	0.000000
4)	0.000000	0.002549
5)	0.000000	0.106437
6)	0.000000	0.000000

NO. ITERATIONS= 2

**DMU 3**

LP OPTIMUM FOUND AT STEP 1

OBJECTIVE FUNCTION VALUE

1) 1.000000

VARIABLE	VALUE	REDUCED COST
Z	1.000000	0.000000
O	0.000000	0.010000
I1	0.000000	0.000000
I2	0.000000	0.010000
I3	0.000000	0.000000
I4	0.000000	0.000000
P1	0.000000	2.970000
P2	0.000000	1.670000
P3	1.000000	0.000000
ROW	SLACK OR SURPLUS	DUAL PRICES
2)	0.000000	-0.010000
3)	0.000000	0.000000
4)	0.000000	0.010000
5)	0.000000	0.000000
6)	0.000000	0.000000

NO. ITERATIONS= 1

### VRS

#### DMU 1

LP OPTIMUM FOUND AT STEP 1

OBJECTIVE FUNCTION VALUE

1) 0.7400000

VARIABLE	VALUE	REDUCED COST
Z	0.740000	0.000000
O	5.000000	0.000000
I1	39157.078125	0.000000
I2	144.990005	0.000000
I3	0.000000	0.100000
I4	0.000000	0.020000
P1	0.000000	0.260000
P2	0.270000	0.000000
P3	0.730000	0.000000
ROW	SLACK OR SURPLUS	DUAL PRICES
2)	0.000000	0.000000
3)	0.000000	0.000000
4)	0.000000	0.000000
5)	0.000000	0.100000
6)	0.000000	0.020000
7)	0.000000	-0.740000

NO. ITERATIONS= 1

#### DMU 2

LP OPTIMUM FOUND AT STEP 2

## OBJECTIVE FUNCTION VALUE

1) 1.000000

VARIABLE	VALUE	REDUCED COST
Z	1.000000	0.000000
O	0.000000	0.000000
I1	0.000000	0.000000
I2	0.000000	0.000000
I3	0.000000	0.135135
I4	0.000000	0.027027
P1	0.000000	0.351351
P2	1.000000	0.000000
P3	0.000000	0.000000
ROW	SLACK OR SURPLUS	DUAL PRICES
2)	0.000000	0.000000
3)	0.000000	0.000000
4)	0.000000	0.000000
5)	0.000000	0.135135
6)	0.000000	0.027027
7)	0.000000	-1.000000

NO. ITERATIONS= 2

**DMU 3**

LP OPTIMUM FOUND AT STEP 1

OBJECTIVE FUNCTION VALUE

1) 1.000000

VARIABLE	VALUE	REDUCED COST
Z	1.000000	0.000000
O	0.000000	0.000000
I1	0.000000	0.000000
I2	0.000000	0.000000
I3	0.000000	0.000000
I4	0.000000	0.500000
P1	0.000000	4.000000
P2	0.000000	10.000000
P3	1.000000	0.000000
ROW	SLACK OR SURPLUS	DUAL PRICES
2)	0.000000	0.000000
3)	0.000000	0.000000
4)	0.000000	0.000000
5)	0.000000	0.000000
6)	0.000000	0.500000
7)	0.000000	-1.000000

NO. ITERATIONS= 1

### Peer Group

#### Proximity Matrix

Case	Squared Euclidean Distance		
	1: DMU 1	2: DMU 2	3: DMU 3
1: DMU 1	.000	3.227E9	2.916E9
2: DMU 2	3.227E9	.000	7.891E6
3: DMU 3	2.916E9	7.891E6	.000

*Proximity Matrix*

Case	Squared Euclidean Distance		
	1: DMU 1	2: DMU 2	3: DMU 3
1: DMU 1	.000	3.227E9	2.916E9
2: DMU 2	3.227E9	.000	7.891E6
3: DMU 3	2.916E9	7.891E6	.000

This is a dissimilarity matrix



