



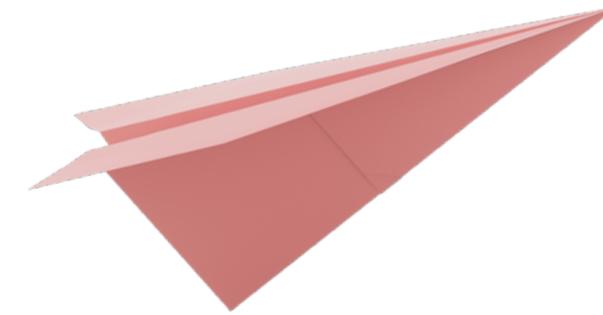
Portofolio

'CRR'

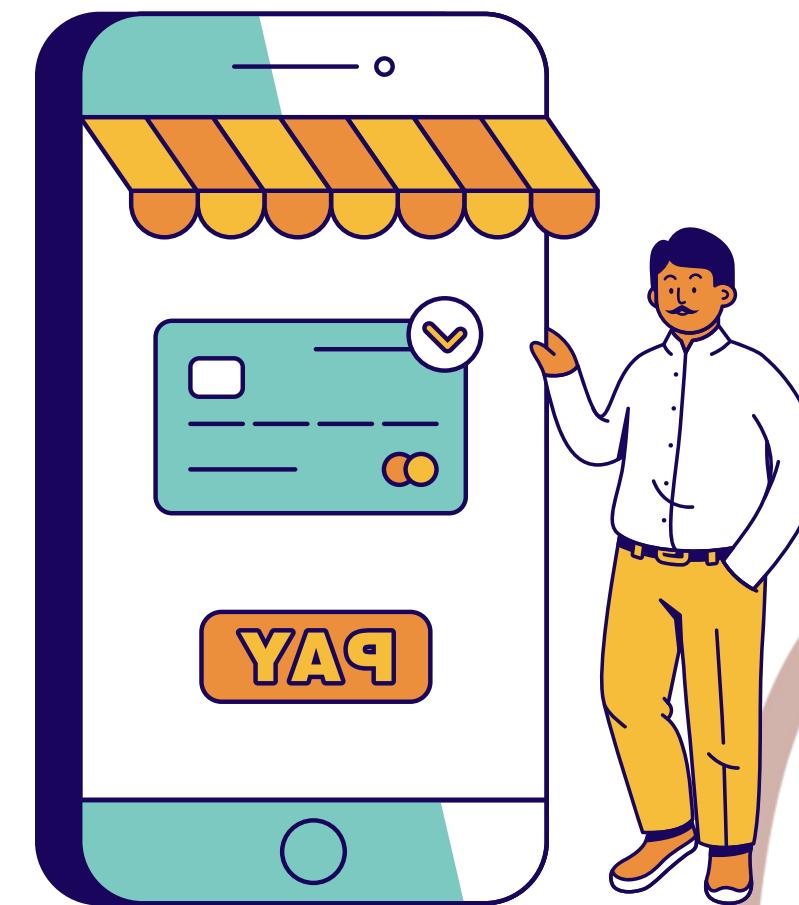
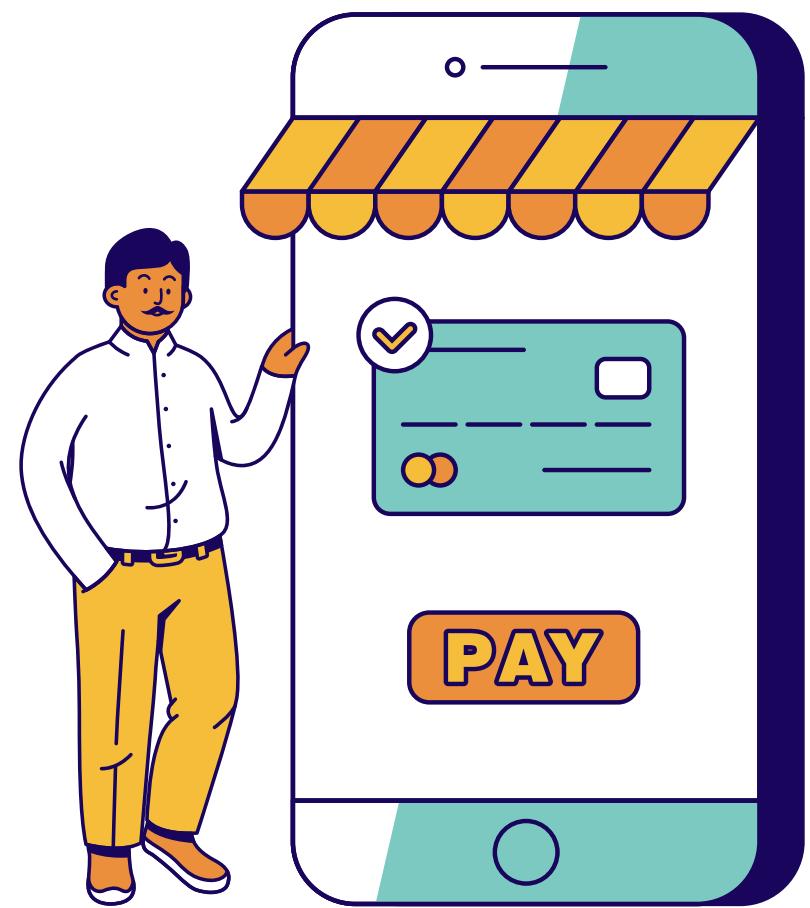
# E-COMMERCE SHIPPING

Meningkatkan Profit  
Perusahaan dengan  
Customer Retention Rate  
(CRR)

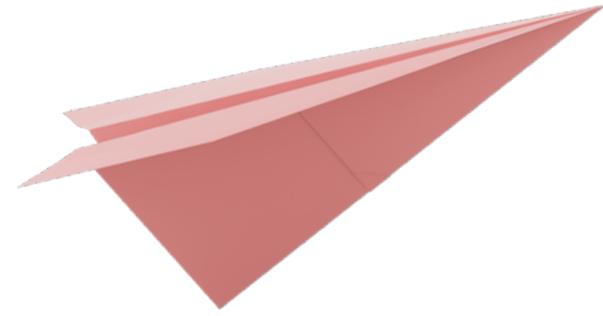




# Data Scientist



**Yudhi Ahmadi**



# 01

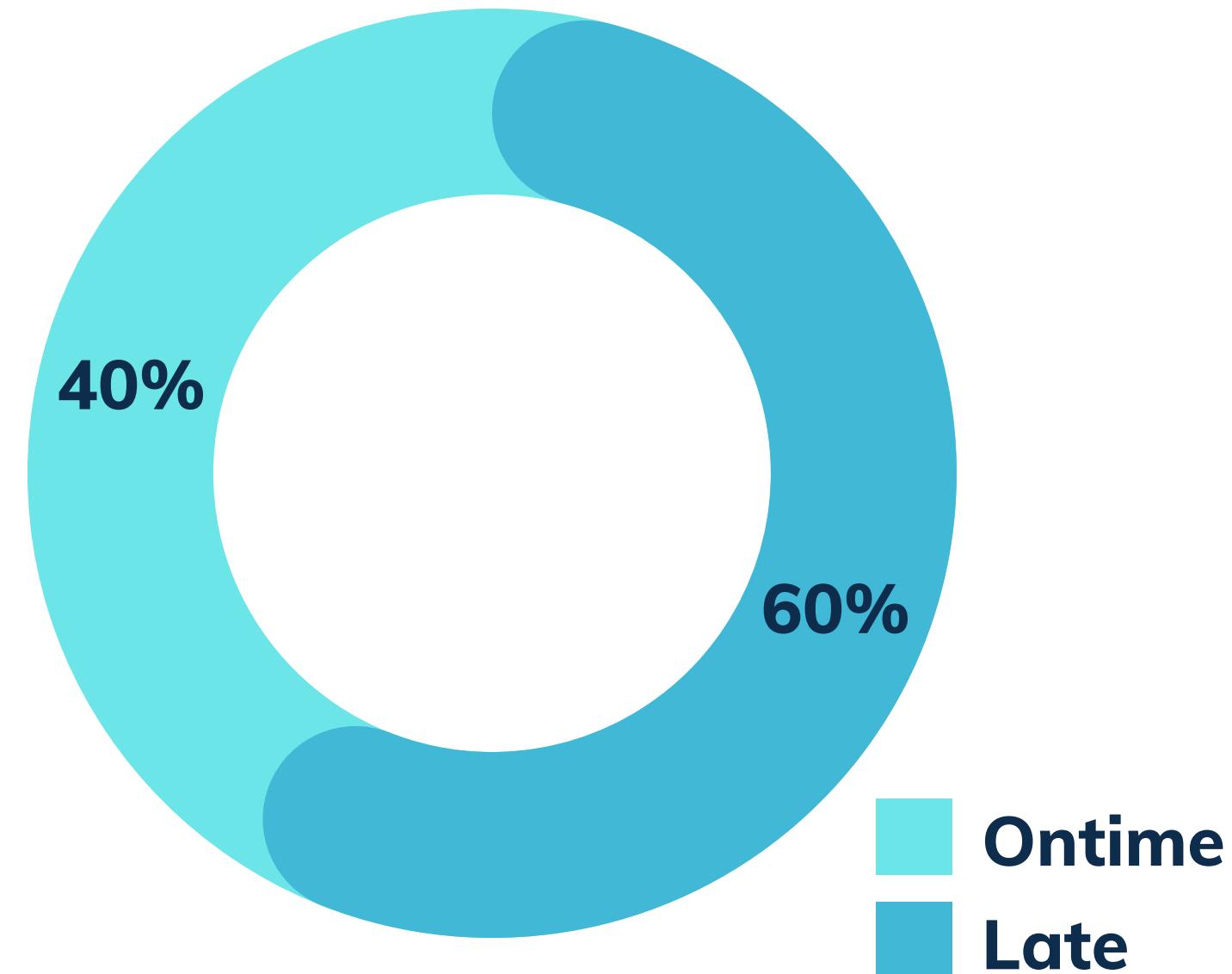
# Background



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## Percentage of Reached On Time



Persentase pengiriman barang mengalami **keterlambatan lebih besar dibandingkan pengiriman tepat waktu**



# REPORT : US CONSUMER ARE RELUCTANT TO ORDER MISSION-CRITICAL ITEM FOR DELIVERY

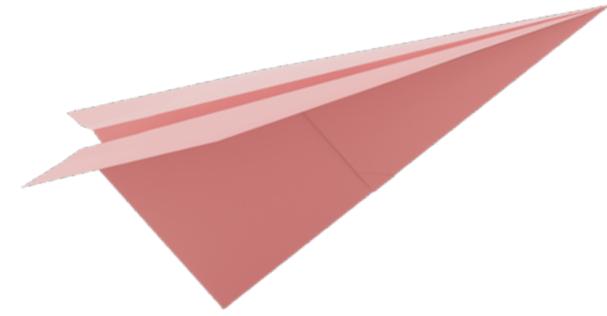
Akibat pengiriman yang terlambat :

- 34 % pelanggan menghindar untuk melakukan order lagi
- 19% pelanggan memberitahu kerabatnya untuk tidak menggunakan jasa perusahaan tersebut



Kalau begini terus  
bisa bisa toko kita  
semakin sepi ???





# 02

# Goals



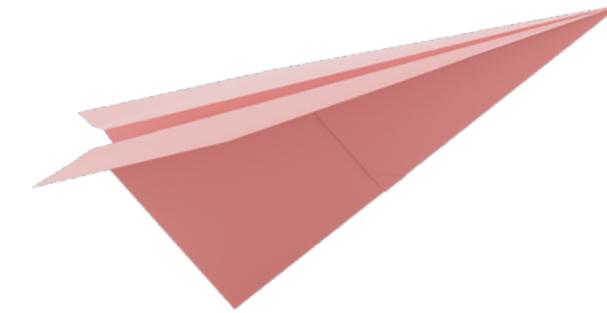
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# GOALS :

Meningkatkan Customer Retention Rate (CRR)  
untuk meningkatkan Profit Perusahaan





03

# Business Metrics & Objective



# Business Metrics

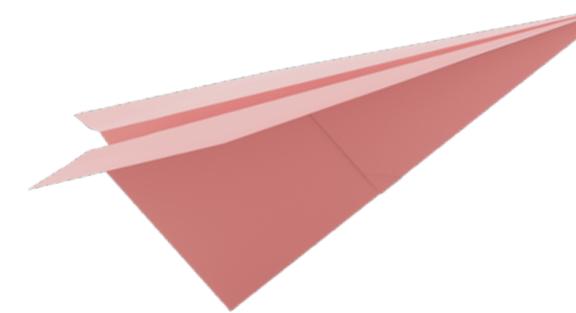
- % Reached on Time
- % Customer Retention Rate



# Objectives :

- Prediksi pada keterlambatan pengiriman barang
- Pemberian voucher diskon bagi pengiriman yang telat
- Mengetahui nilai kenaikan Customer Retention Rate (CRR)





# 04

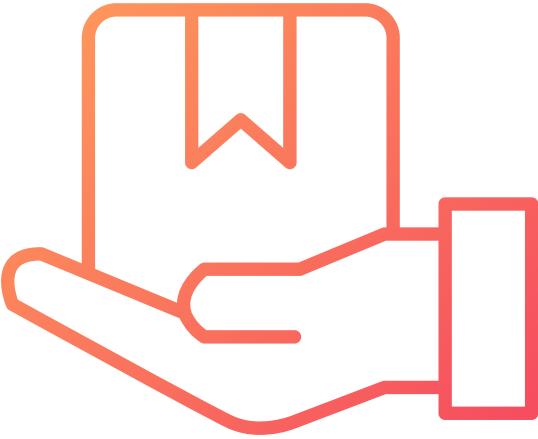
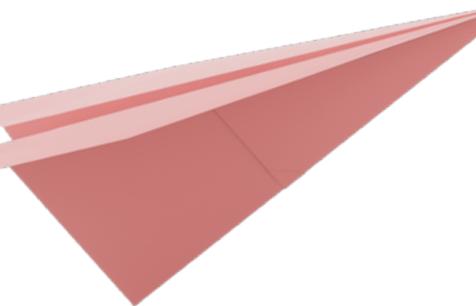
## EDA &

# Machine Learning



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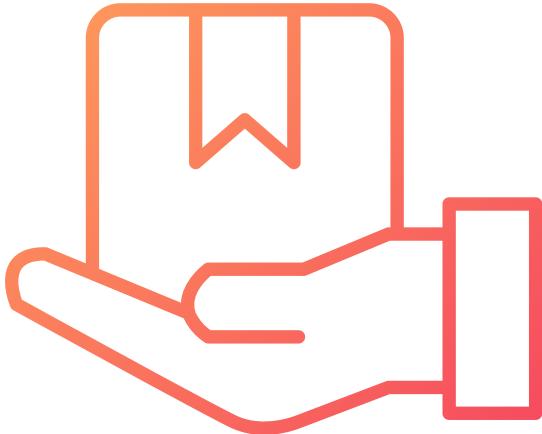
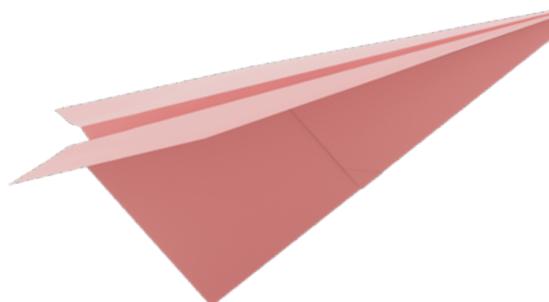




**Dari hasil EDA:**  
Adanya,

- penumpukan barang di Blok F
- Barang yang telat lebih banyak daripada barang yang Ontime (Not Late)

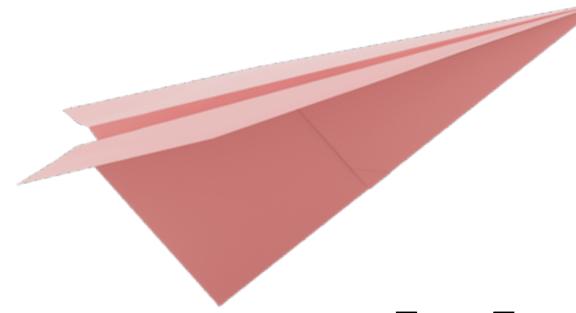




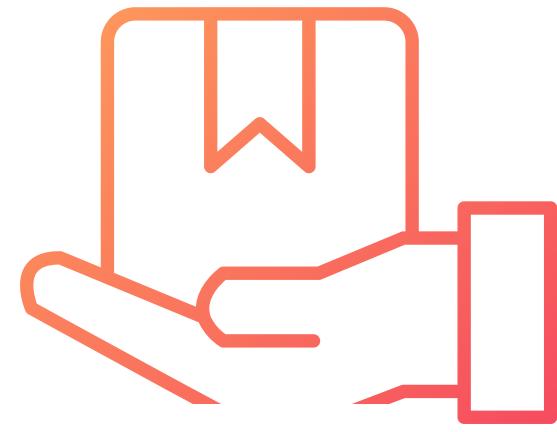
# Machine Learning Evaluation

Model	Accuracy	Precision	Recall	F1-Score
KNN	0,67	0,81	0,58	0,68
DT	0,66	0,75	0,64	0,69
RF	0,68	0,92	0,51	0,65
Gboost	0,65	0,72	0,67	0,70
NBC	0,66	0,94	0,46	0,62
XGboost	0,62	0,66	0,76	0,70

Didapatkan Model XGboost yang mempunyai nilai rata-rata evaluasi paling tinggi.

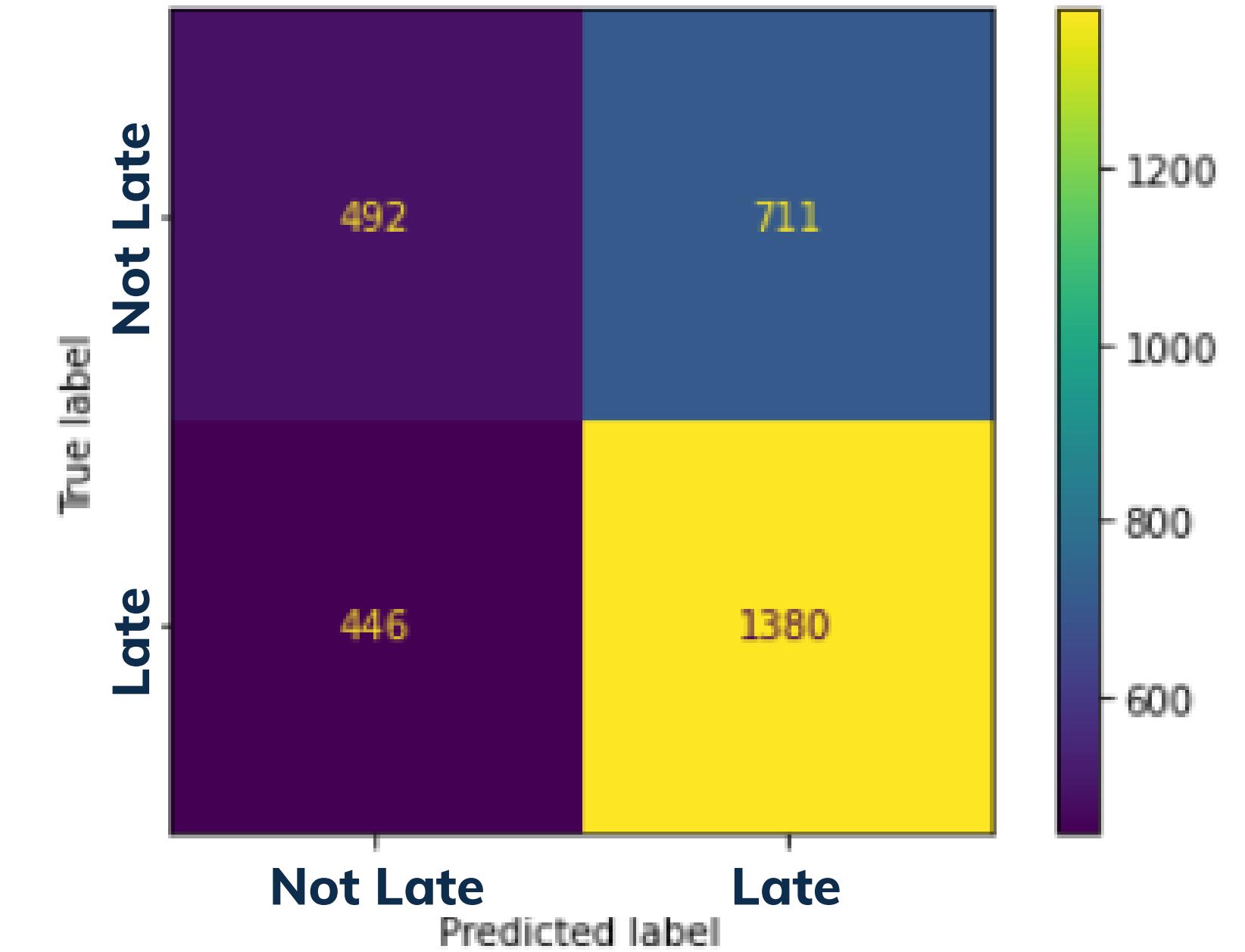


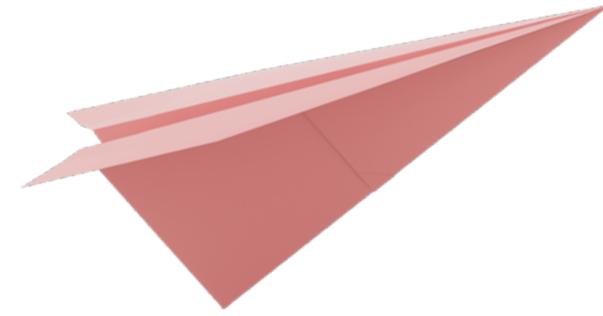
# Machine Learning Evaluation



Berdasarkan Hasil Confussion Matrix pada Model Random Forest, Terlihat nilai **TP 492**, dan **FP 711**. Kedua nilai ini digunakan untuk perhitungan precision not late.

$$Precision = \frac{True\ Positive}{True\ Positive + False\ Positive}$$





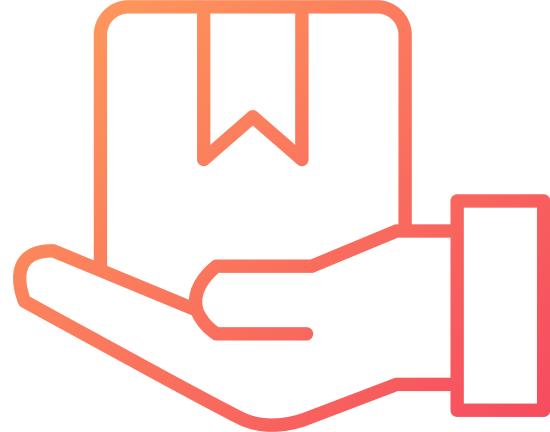
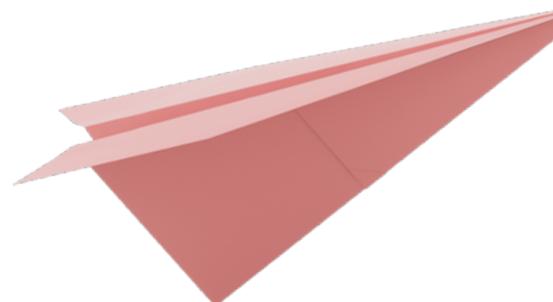
# 05

## Simulation & Business Recommendation

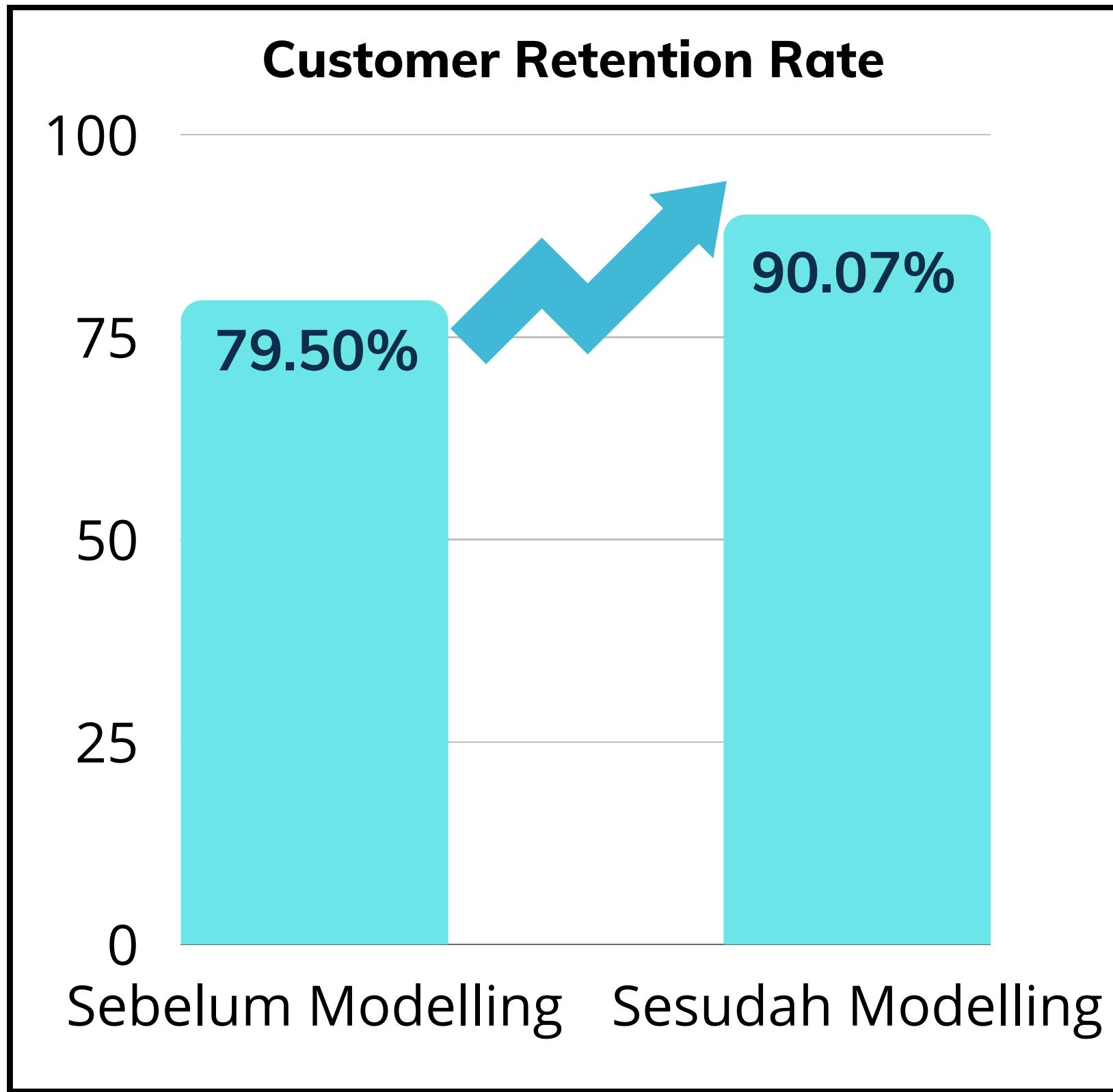


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# Perhitungan Customer Retention Rate



$$[(CE-CN)/CS] \times 100 = \text{Customer Retention Rate}$$

the number of new customers acquired during the period  
↓  
CE - the number of customers at the end of the period  
CN - the number of customers at the start of the period  
↑  
↑

**Sebelum Modelling**

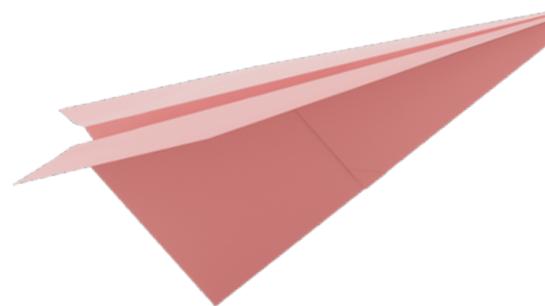
Asumsi 34% pelanggan tidak order lagi\*

**Setelah Modelling**

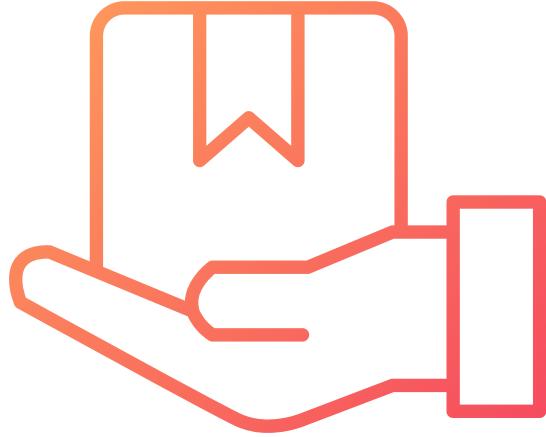
(Presisi telat 60%) Asumsi pemberian diskon meningkatkan 25% CLV\*\*

Source :

- \*SupplyChainBrain
- \*\*cmswire

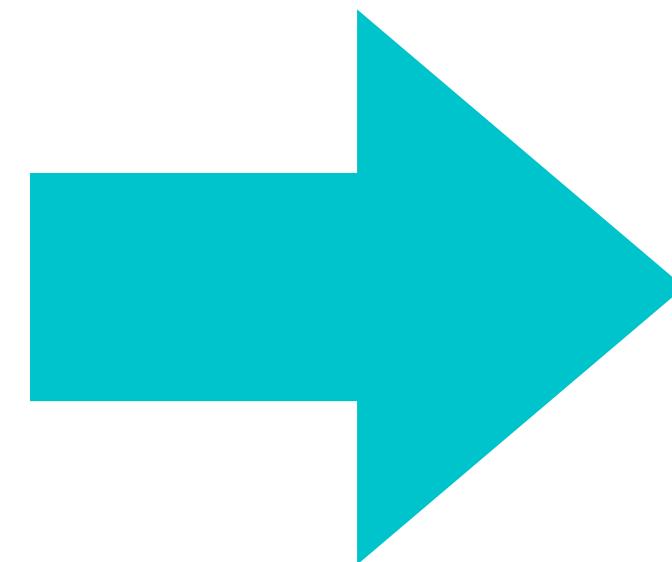


# Pengaruh Peningkatan Customer Retention Rate



**10.6%**

Peningkatan CRR

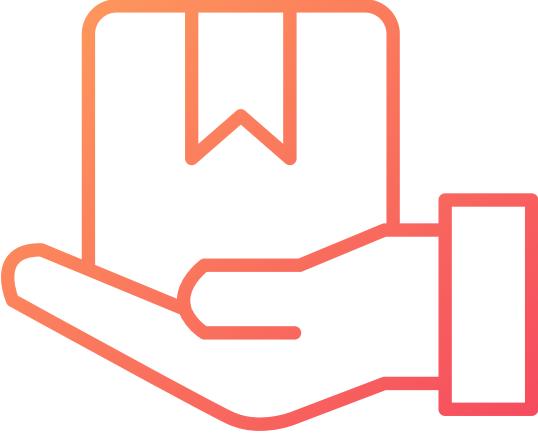
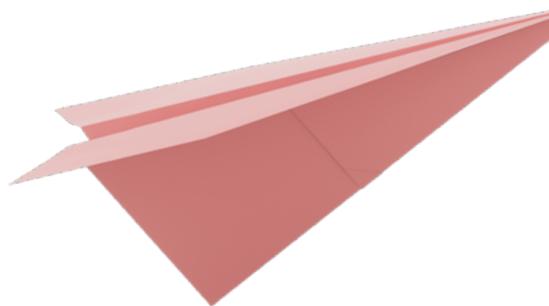


**>25%**

Profit Perusahaan

Peningkatan CRR 5% diasumsikan dapat meningkat profit perusahaan minimal 25%\*

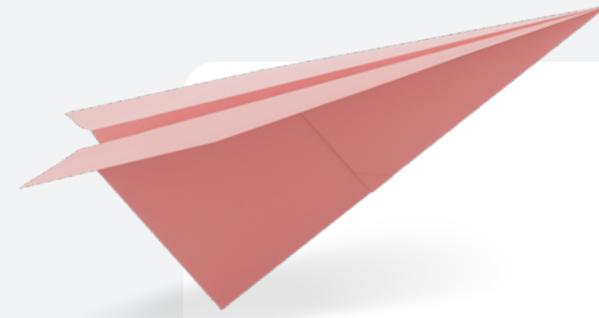
Source: \*[BusinessNewsDaily](#)



# Business Recommendation

- Memberikan voucher diskon pada pengiriman yang terlambat dapat meningkatkan profit perusahaan minimal sebesar 25%
- Mengatur ulang distribusi barang pada warehouse block sehingga tidak ada penumpukan barang di salah satu block saja



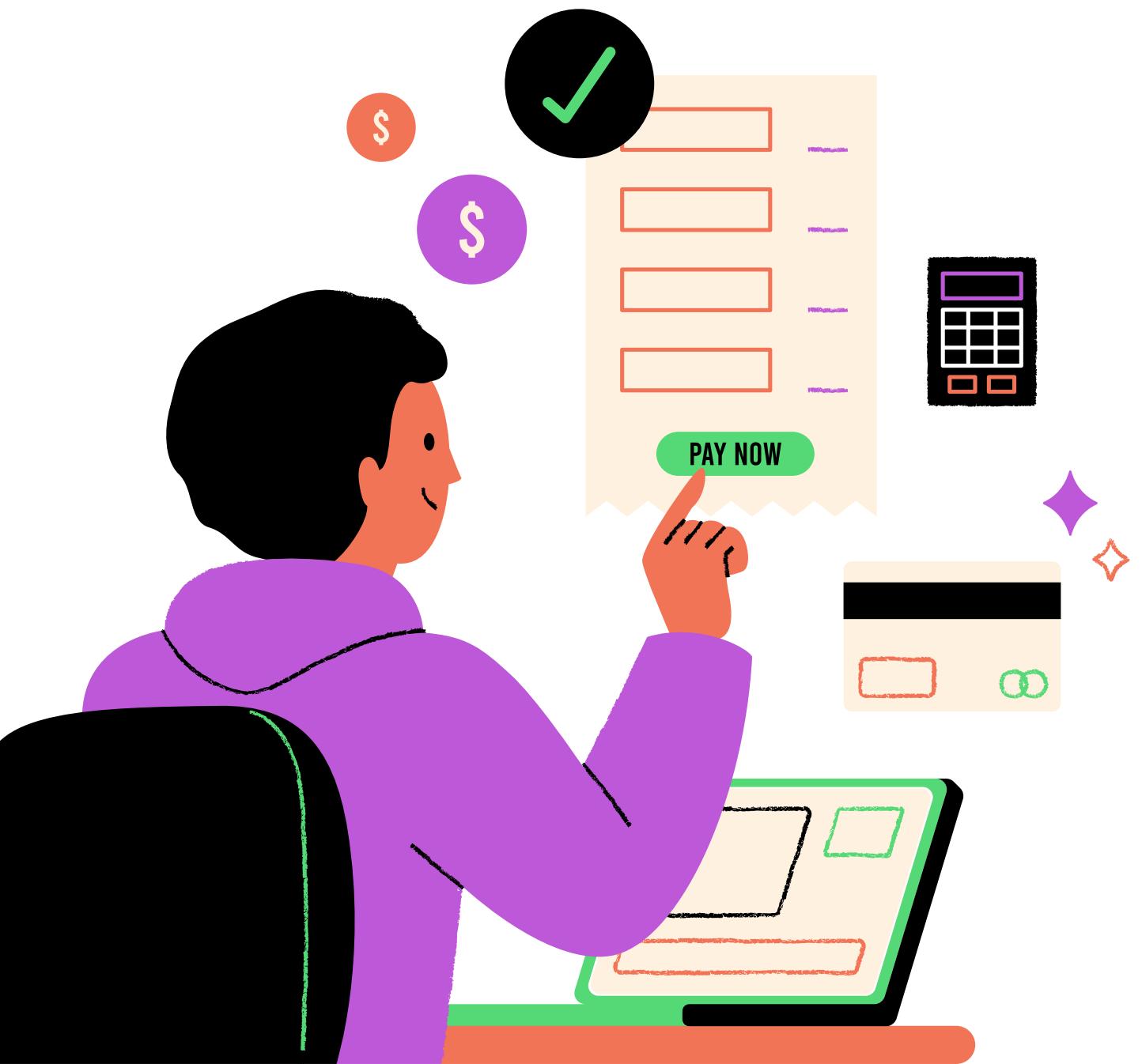


**Thank You!  
Ada Pertanyaan ?**

Linkedin : Yudhi Ahmadi



# Perhitungan CRR



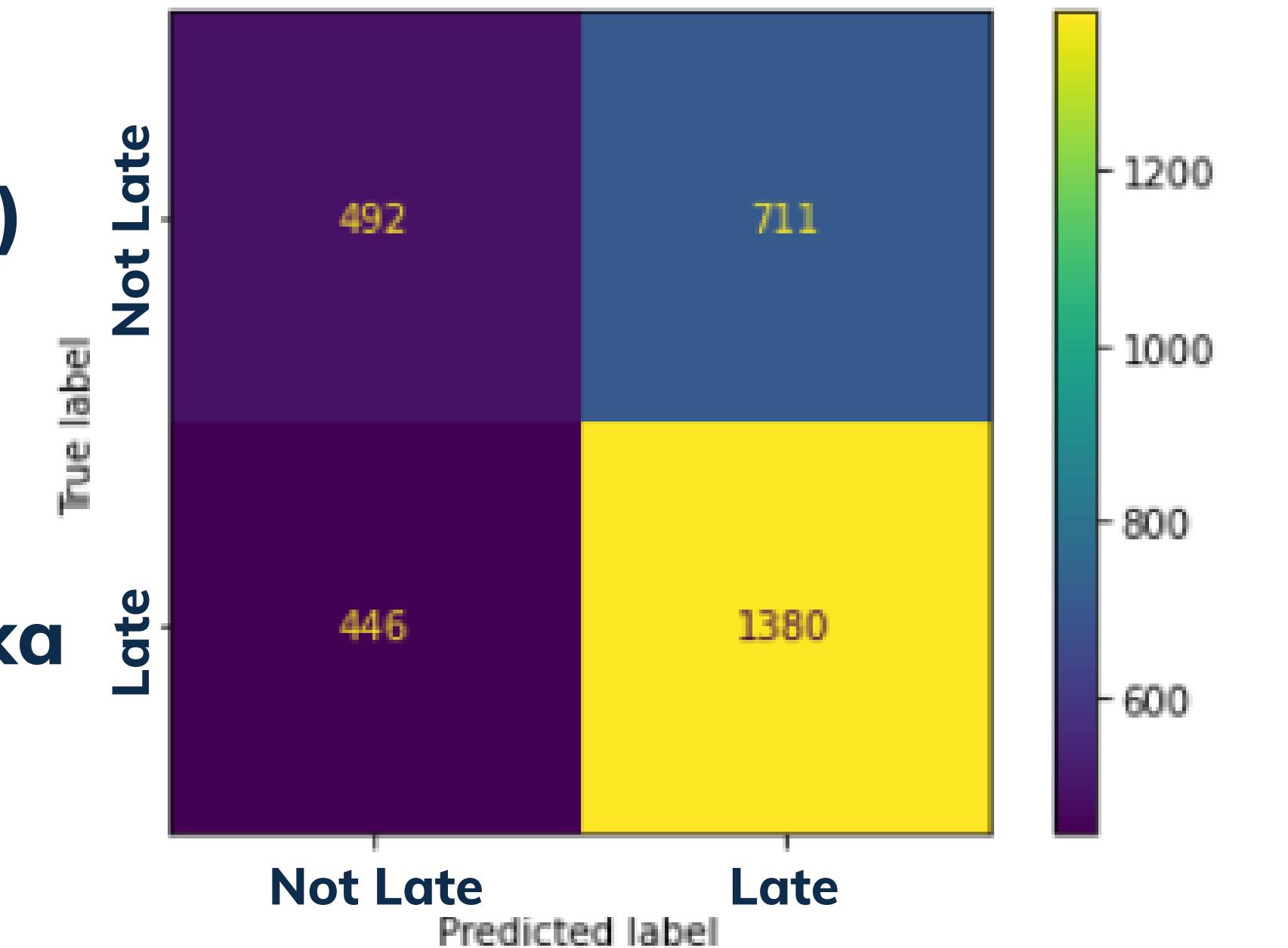
# Precision Not Late & Late

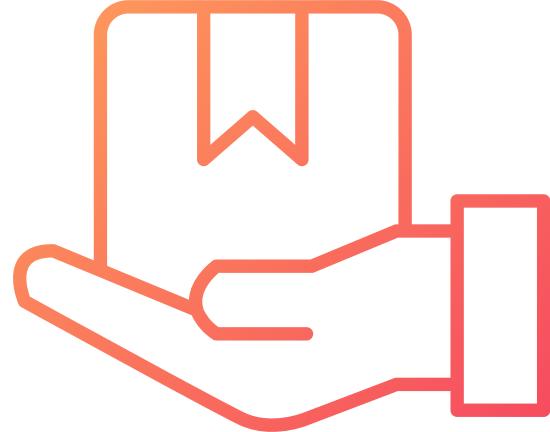
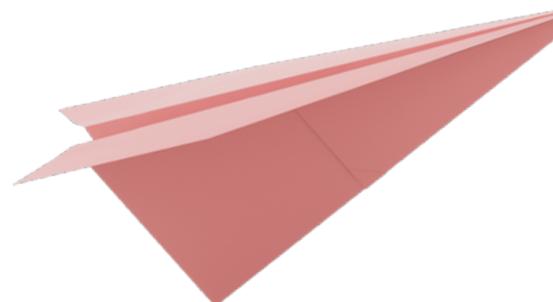
- $TP = 492$       Precision =  $TP/(TP+FP)$
- $FN = 446$       Precision = 0.40
- $FP = 711$
- $TN = 1380$

Berdasarkan perhitungan, maka precision pengiriman telat/Late :

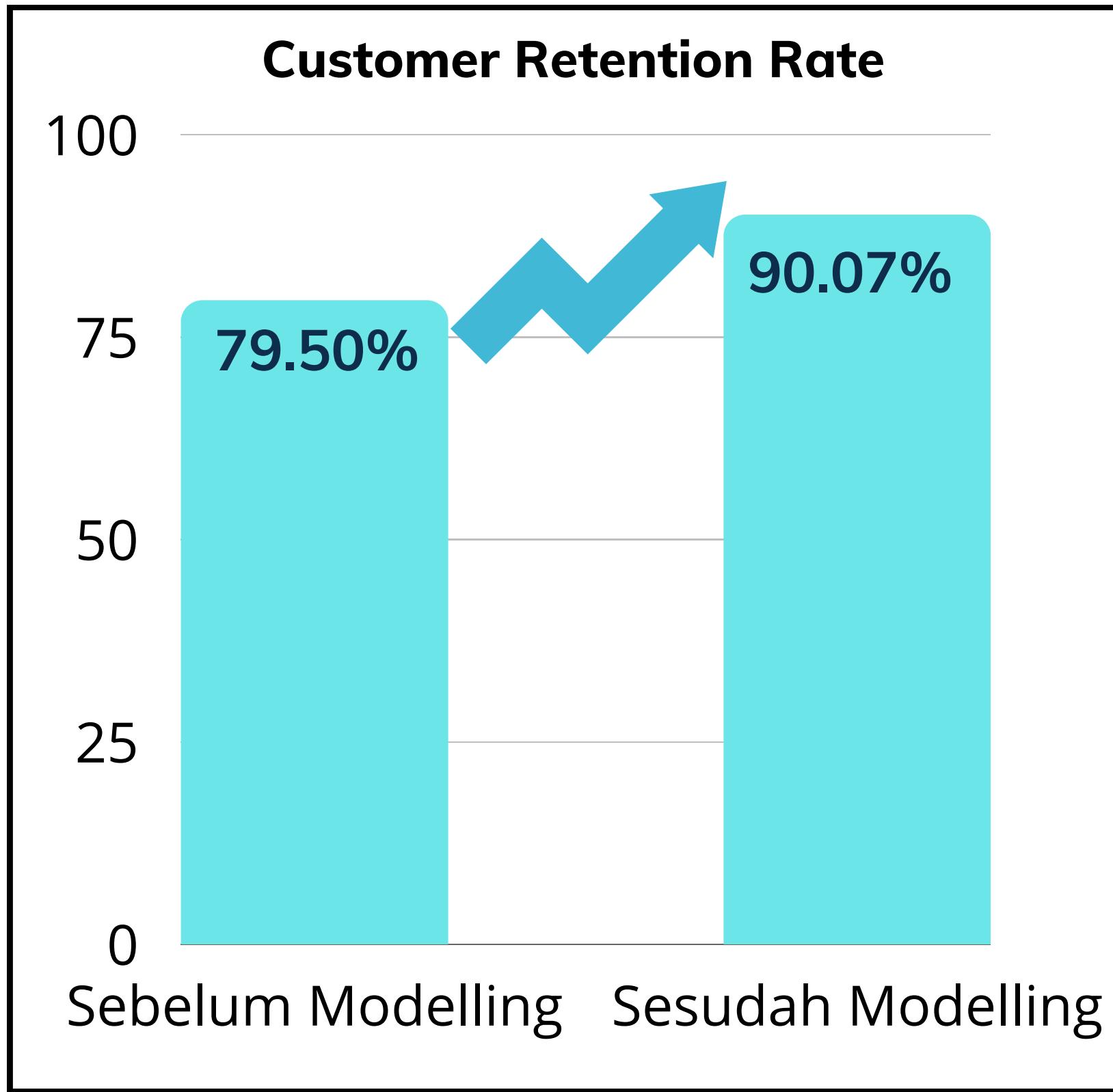
Late = 1-0.40

Late = 0.60





# Perhitungan Customer Retention Rate



$$[(CE-CN)/CS] \times 100 = \text{Customer Retention Rate}$$

the number of new customers acquired during the period  
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↑  
↑

**Sebelum Modelling**

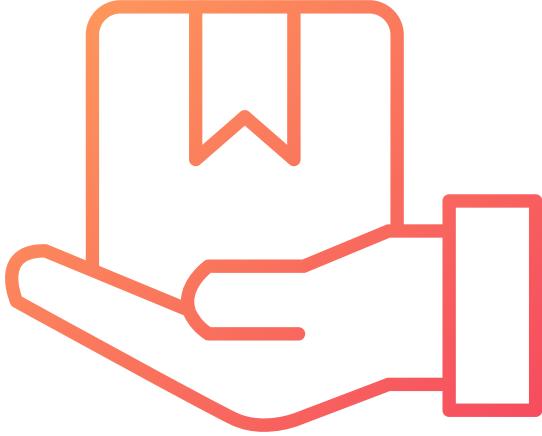
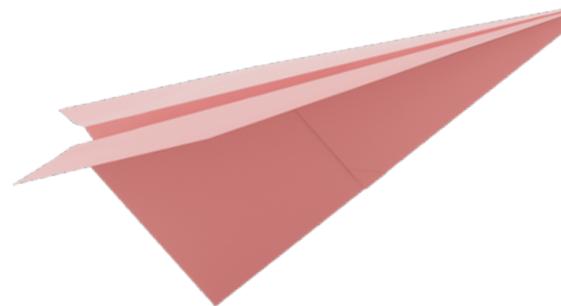
Asumsi 34% pelanggan tidak order lagi\*

**Setelah Modelling**

(Presisi telat 60%) Asumsi pemberian diskon meningkatkan 25% CLV\*\*

Source :

- \*SupplyChainBrain
- \*\*cmswire



# Perhitungan Customer Retention Rate

$$CRR = \frac{Customer\ Akhir - Customer\ Baru}{Total\ Customer\ Awal} \times 100\%$$

\*Asumsi  
**CLV berbanding lurus** dengan Retention Time Period (berapa lama rata-rata pelanggan bertahan dengan bisnis) kita asumsikan sama dengan CRR (tingkat kemampuan bisnis mempertahankan pelanggan)

CLV = Customer Lifetime Value (Dollar) / Total Belanja Customer

Semakin lama retention, semakin meningkat CLV  
=

Semakin lama retention, semakin meningkat CRR

**Sebelum Modelling**, dengan asumsi karena terlambat 34% pelanggan tidak order lagi (churn rate):

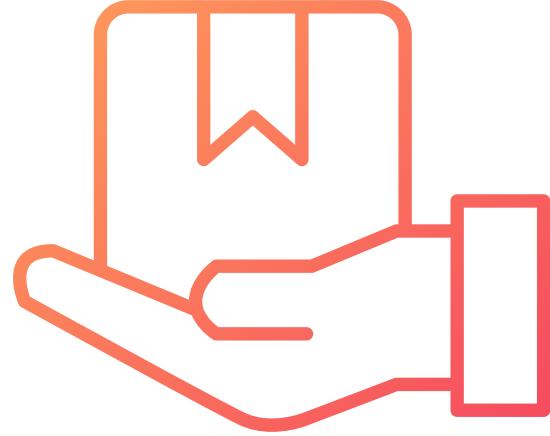
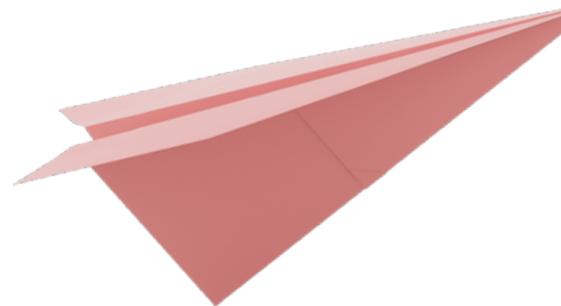
1.  $34\% \times 6087 = 2069$  pelanggan tidak order lagi

2.  $10096 - 2069 = 8027$  pelanggan tetap order

3.  $(8027/10096) \times 100\% = 79.51\%$  CRR awal

Note :

- 34% Churn rate dari [supplychainbrain.com](http://supplychainbrain.com)
- Jumlah pengiriman telat (raw) = 6087
- Total pengiriman (telat dan tepat waktu) = 10096
- CRR = Customer Retention Rate



# Perhitungan Customer Retention Rate

$$LTV = A\$ \times T\# \times R$$

Lifetime Value      Average Value of Sale      Number of Transactions      Retention Time Period

$$CLV = LTV \times M$$

Customer Lifetime Value      Lifetime Value      Profit Margin

\*Asumsi

**CLV berbanding lurus dengan Retention Time Period** (berapa lama rata-rata pelanggan bertahan dengan bisnis) **kita asumsikan sama dengan CRR** (tingkat kemampuan bisnis mempertahankan pelanggan)

**Setelah Modelling (presisi prediksi telat 60%),** dengan asumsi karena terlambat 34% pelanggan tidak order lagi (churn rate) & dengan diskon meningkatkan CLV 25%:

1.  $60\% \times 6087 = 3652$  pelanggan diprediksi telat oleh ML

2.  $34\% \times 4869 = 1241$  pelanggan tidak order lagi

3.  $25\% \times 1655 = 310$  pelanggan tidak jadi churn karena ada diskon

4.  $10096 - 1241 + 310 = 9165$  pelanggan tetap order

5.  $(9165/10096) \times 100\% = 90.07\%$  CRR setelah ML

Note :

CLV 25% dari [BusinessNewsDaily](#).

34% Churn rate dari [supplychainbrain.com](#)