

*Kang Guru
Gernang*

Our Lives with BUSINESS Statistics

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*Hak Cipta dilindungi undang-undang. Dilarang memperbanyak sebagian atau seluruh
isi buku ini dengan bentuk dan cara apa pun tanpa izin tertulis dari penerbit.*

Preface

This book covers the daily lives of us in Business Statistics, and it is also part of the curriculum for the BBA Professional program at IPMI Institute.

It introduces students to the fundamental concepts of business statistics, emphasizing its practical applications in decision-making and problem-solving within the business environment. This introduction serves as a foundation for students to build their knowledge and skills in business statistics, preparing them for challenges in the professional world.

This book is covered the importance of business statistics for the daily lives, explains how statistical methods are used to analyze data, identify trends, and make informed decisions, highlights the relevance of statistics in various business functions, such as marketing, finance, and operations.

It also covers the real-world applications by demonstrates how business statistics are applied in real-world scenarios, such as market research, financial forecasting, and quality control and to encourages students to think critically about data and its implications for business strategy.

Editors:

Dr. Samuel PD Anantadjaya

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STUDI TENTANG PREFERENSI MASYARAKAT DALAM MEMILIH PERUMAHAN DI KOTA DEPOK

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ABSTRAK

Kota Depok, sebagai bagian dari *Jakarta Metropolitan Region (JMR)*, mengalami pertumbuhan populasi yang pesat, menjadikannya alternatif hunian bagi masyarakat yang bekerja di Jakarta. Studi ini bertujuan untuk mengidentifikasi faktor-faktor yang mempengaruhi preferensi masyarakat dalam memilih lokasi perumahan di Kota Depok. Penelitian menggunakan metode penelitian yang digunakan adalah pendekatan studi pustaka terkait Studi Kasus Preferensi Bermukim Masyarakat, berdasarkan data survei terhadap 172 responden yang dipilih melalui purposive sampling. Hasil penelitian menunjukkan bahwa harga lahan (90%) menjadi faktor utama dalam keputusan pemilihan hunian, diikuti oleh kedekatan dengan fasilitas umum (82%), terutama fasilitas kesehatan dan pusat perbelanjaan. Aksesibilitas (61%) juga menjadi pertimbangan, dengan fokus pada kedekatan jalan raya, angkutan umum, dan stasiun KRL. Temuan ini mengindikasikan bahwa aspek ekonomi dan ketersediaan fasilitas sehari-hari lebih dominan dibanding faktor mobilitas dalam menentukan lokasi perumahan.

Kata Kunci : Preferensi bermukim, perumahan, Kota Depok, harga lahan, fasilitas umum, aksesibilitas.

PENDAHULUAN

Semakin banyak orang yang tinggal di kota-kota dengan laju pertumbuhan yang tinggi

dan tingkat urbanisasi yang tinggi membuat kota kurang mampu memberikan pelayanan terbaik kepada masyarakatnya. Ini berdampak pada perkembangan kota, khususnya pada penyediaan sarana dan prasarana perkotaan. Daerah pinggiran menjadi alternatif pemecahan masalah karena keterbatasan lahan dan populasi kota yang meningkat.

Kota Depok merupakan bagian dari *Jakarta Metropolitan Region (JMR)* Dimana ditandai dengan adanya Pembangunan perumahan skala besar, kotabaru, infrastruktur, dan industrial estate yang sangat pesat (Nuzullia & Pradoto, 2015). Kota Depok menjadi alternatif hunian bagi masyarakat yang bekerja di Jakarta dan berkembang menjadi *Dormitory Town* (Dokumen Data Spasial Kebutuhan Rumah, 2018). Hal tersebut juga menyebabkan Kota Depok memiliki laju pertumbuhan penduduk tertinggi dibanding kota lainnya di Jawa Barat sebesar 1,64% (Provinsi Jawa Barat dalam Angka, 2022).

Agar setiap kegiatan dalam Pembangunan perkotaan berlangsung secara produktif dan efisien, diperlukan pemilihan lokasi yang sesuai dengan aktivitasnya (Asterian, 2011). Menurut Drabkin dalam Pratikto (2008), preferensi bermukim dalam memilih hunian perumahan bisa dikarenakan faktor aksesibilitas yaitu kemudahan menjangkau lokasi, kondisi lingkungan terkait dengan keadaan fisik dan sosialnya, kemudahan menjangkau tempat kerja, dan tingkat pelayanan yang dapat dijangkau oleh masyarakat baik sarana maupun prasarananya.

Oleh karena itu, tujuan dari penelitian ini adalah untuk menentukan faktor-faktor apa yang menjadi pertimbangan masyarakat Kota Depok saat memilih lokasi perumahan. tujuannya adalah untuk mengetahui preferensi masyarakat untuk pembangunan yang lebih tepat sasaran. Pembangunan harus berjalan dengan efisien, terutama untuk mengatasi fenomena keterbatasan lahan di perkotaan.

Metode penelitian yang digunakan adalah pendekatan studi pustaka terkait Studi Kasus Preferensi Bermukim Masyarakat. Pengumpulan data dilakukan berdasarkan hasil laporan riset dari Departemen Perencanaan Wilayah dan Kota Fakultas Teknik Universitas Brawijaya.

PREFERENSI MASYARAKAT DALAM MEMILIH PERUMAHAN DI KOTA DEPOK

Gambaran Umum Kota Depok

Kota Depok terletak di Provinsi Jawa Barat dengan luas wilayah 20.058 hektar, terdiri dari 11 kecamatan dan 63 kelurahan. Kota ini berbatasan dengan Jakarta di utara, Kabupaten Bogor di selatan dan timur, serta Kota Tangerang Selatan di barat. Depok memiliki berbagai moda transportasi, termasuk angkutan umum, KRL, bus, dan jalan tol. Terdapat 5 stasiun KRL di Depok, serta akses ke beberapa jalan tol utama seperti Jagorawi, Cinere-Cimanggis, Cimanggis-Cibitung, dan Depok-Antasari yang mempermudah mobilitas ke Jakarta dan kota sekitarnya. Depok memiliki beragam fasilitas, dengan sektor perdagangan dan jasa (988,54 ha) sebagai yang terbesar, diikuti oleh sarana pendidikan, peribadatan, dan kesehatan. Fasilitas kesehatan cukup terbatas dengan luas hanya 32,41 ha. Harga tanah di Depok bervariasi, dengan mayoritas berada di kisaran Rp 2.000.000 — Rp 5.000.000 per m² (8.932,05 ha), sementara harga lahan termurah berada di kisaran Rp 1.000.000 — Rp 2.000.000 per m² (7.494,87 ha). Secara keseluruhan, Kota Depok berkembang pesat sebagai kota penyangga Jakarta, dengan pertumbuhan infrastruktur dan fasilitas yang terus meningkat untuk memenuhi kebutuhan penduduknya (Valentina et al., 2022)

Analisis Preferensi Bermukim Usia Produktif Kota Depok

Studi ini dilakukan oleh Fakultas Perencanaan Teknik, Universitas Brawijaya. Metode kuantitatif dalam survei utama menggunakan sampel *online* dari 16 perumahan. Data dianalisis menggunakan statistik deskriptif dalam bentuk tabel frekuensi untuk mengidentifikasi faktor dominan. Data dianalisis menggunakan statistik deskriptif dalam bentuk tabel frekuensi untuk mengidentifikasi faktor dominan. Responden berjumlah 172 orang yang dipilih dengan metode *purposive sampling* berdasarkan kriteria usia 20-44 tahun, memiliki penghasilan, berdomisili di Depok, dan berencana membeli rumah dalam 5 tahun ke depan. Mayoritas responden berusia 25-29 tahun, berpenghasilan mendekati UMR, bekerja di Jakarta, dan mencari rumah pertama.

Tabel 1. Preferensi Pemukim Kota Depok

Preferensi	Jumlah Responden yang Mempertimbangkan	Jumlah Responden yang tidak Pertimbangan	Persen (%)
Variabel Aksesibilitas			
Kedekatan jalan raya	149	23	87%
Kedekatan dengan angkutan umum	142	30	83%
Kedekatan dengan stasiun	129	43	75%
Kedekatan dengan tempat kerja (Berbatasan dengan Jakarta Selatan)	123	49	72%
Kedekatan pusat kota/CBD	117	55	68%
Kedekatan akses gerbang tol	116	56	67%
Kedekatan dengan Terminal	93	79	54%
Kedekatan dengan tempat kerja (Berbatasan dengan Jakarta Timur)	83	89	48%
Kedekatan dengan tempat kerja (Berbatasan dengan Bogor)	78	94	45%
Kedekatan dengan tempat kerja (Berbatasan dengan Tangerang)	63	109	37%
Kedekatan dengan tempat kerja (Berbatasan dengan Bekasi)	57	115	33%
Rata-Rata	105	67	61%
Variabel Kedekatan dengan Fasilitas Umum			
Kedekatan fasilitas kesehatan	155	17	90%
Kedekatan pusat perbelanjaan	143	29	83%
Kedekatan fasilitas pendidikan	135	37	78%
Kedekatan fasilitas peribadatan	134	38	78%
Rata-rata	142	30	82%
Variabel Harga Lahan			
Harga lahan	155	17	90%
Total Responden	172		

Sumber : (Valentina, Diana dkk, 2022).

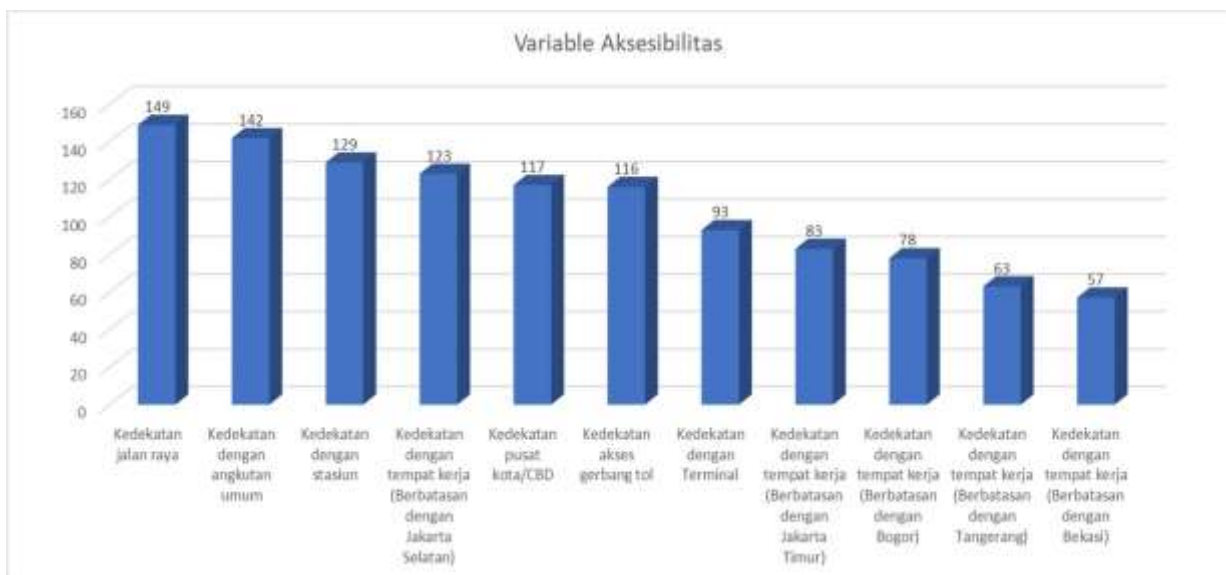
Tabel yang berisi data preferensi responden dalam memilih lokasi tempat tinggal di Kota Depok berdasarkan tiga variabel utama: Aksesibilitas, Kedekatan dengan Fasilitas Umum, dan Harga Lahan.

Variabel Aksesibilitas

Variabel ini mengukur seberapa penting aksesibilitas bagi responden dalam memilih lokasi hunian. Kedekatan dengan jalan raya menjadi faktor paling dipertimbangkan

dengan 87% responden (149 orang) menganggapnya penting. Kedekatan dengan angkutan umum juga memiliki persentase tinggi, yaitu 83% (142 responden). Kedekatan dengan stasiun KRL dipertimbangkan oleh 75% (129 responden), menunjukkan pentingnya akses kereta bagi mobilitas penduduk. Kedekatan dengan tempat kerja, terutama yang berbatasan dengan Jakarta Selatan (72%) dan pusat kota/CBD (68%), juga menjadi perhatian utama. Sebaliknya, kedekatan dengan tempat kerja di wilayah seperti Bekasi (33%) dan Tangerang (37%) memiliki persentase rendah, menunjukkan bahwa mayoritas responden bekerja di Jakarta atau sekitarnya. Rata-rata preferensi aksesibilitas adalah 61%, menunjukkan bahwa faktor ini cukup penting dalam pemilihan lokasi perumahan.

Gambar 1. Grafik Variabel Aksesibilitas



Sumber: (Valentina et al., 2022).

Variabel Kedekatan dengan Fasilitas Umum

Kedekatan dengan fasilitas kesehatan menjadi faktor utama (90%), terutama karena kebutuhan akan akses medis yang cepat. Kedekatan dengan pusat perbelanjaan (83%) juga dipertimbangkan, menunjukkan pentingnya akses terhadap kebutuhan sehari-hari. Kedekatan dengan fasilitas pendidikan dan peribadatan masing-masing memiliki tingkat pertimbangan 78%, yang menunjukkan bahwa faktor ini juga cukup relevan bagi responden.

Gambar 2. Variabel Kedekatan dengan Fasilitas Umum



Sumber: (Valentina et al., 2022).

Rata-rata pertimbangan untuk fasilitas umum adalah 82%, lebih tinggi dibanding aksesibilitas, menunjukkan bahwa fasilitas umum lebih menjadi prioritas bagi responden.

Variabel Harga Lahan

Harga lahan menjadi faktor utama dengan 90% responden mempertimbangkannya, menunjukkan bahwa faktor ekonomi sangat berpengaruh dalam keputusan membeli rumah.

Gambar 3. Variabel Harga Lahan



Sumber: (Valentina et al., 2022)

Analisis

a. Teknik Sampling

Penelitian ini menggunakan teknik purposive sampling, yaitu metode non-probability di mana responden dipilih berdasarkan kriteria tertentu seperti usia produktif (20–44 tahun), berdomisili di Depok, memiliki penghasilan, dan berniat membeli rumah dalam 5 tahun. Teknik ini tepat digunakan ketika fokus penelitian membutuhkan partisipan dengan karakteristik spesifik.

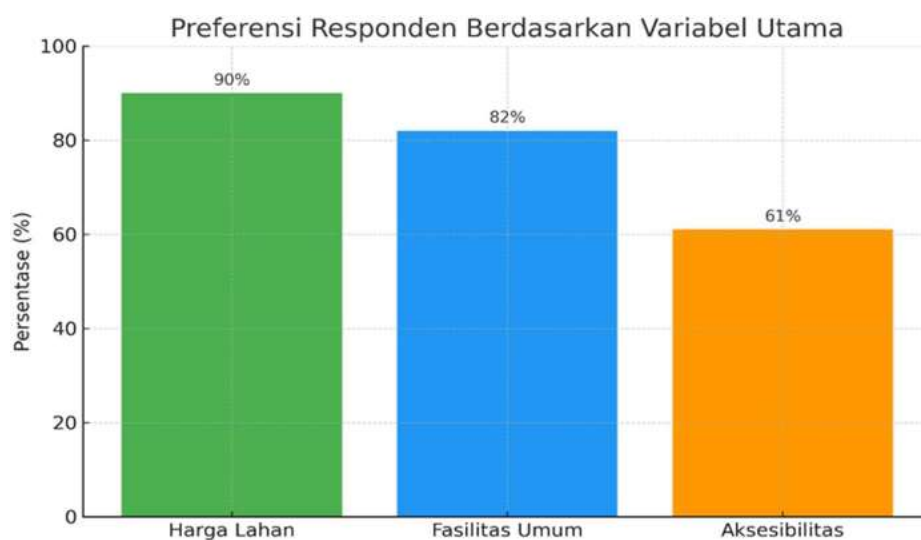
b. Statistik Deskriptif dan Distribusi Data

Berdasarkan survei terhadap 172 responden:

- Usia terbanyak: 25–29 tahun
- Pekerjaan: Mayoritas bekerja di Jakarta
- Penghasilan: Sebagian besar mendekati UMR

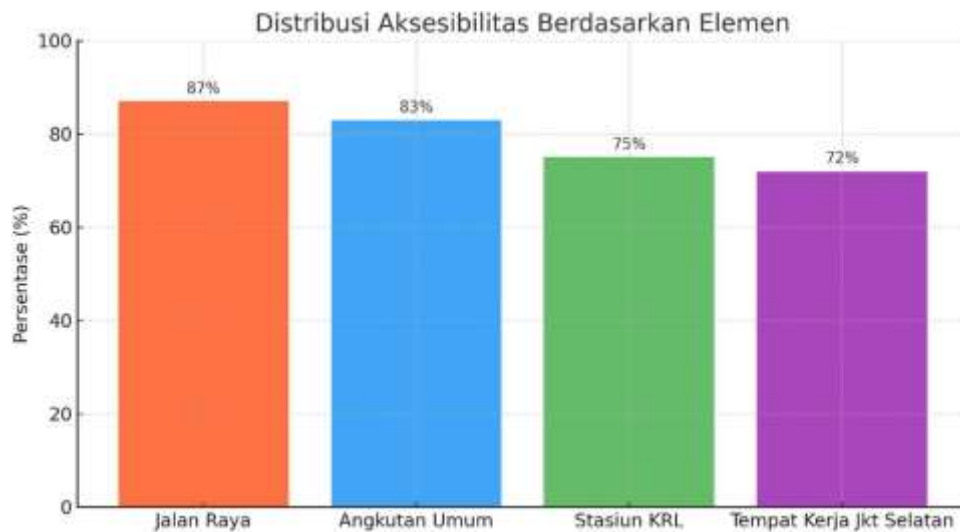
Distribusi preferensi dalam memilih lokasi perumahan:

Gambar 4. Preferensi pemilihan Lokasi perumahan berdasarkan variabel utama



Distribusi Aksesibilitas Berdasarkan Elemen:

Gambar 5. Distribusi Aksesibilitas Berdasarkan Elemen



c. Normalitas Data

Untuk menguji normalitas distribusi preferensi responden, uji *Kolmogorov-Smirnov* dan *Shapiro-Wilk* dapat diterapkan. Karena data bersifat proporsional (misalnya, 90% mempertimbangkan harga), maka normalitas bisa diuji dengan distribusi binomial atau diuji visual dengan histogram dan Q-Q plot.

Berdasarkan visualisasi histogram dari ketiga variabel utama, distribusi cenderung positif *skewed*, terutama pada aksesibilitas, yang memiliki nilai rata-rata lebih rendah.

d. Interval Kepercayaan (Confidence Interval)

Menggunakan rumus CI untuk proporsi:

$$CI = \hat{p} \pm Z \cdot \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

Contoh untuk harga lahan ($p = 0.90$, $n = 172$, $Z = 1.96$):

$$CI = 0.90 \pm 1.96 \cdot \sqrt{\frac{0.90 \cdot 0.10}{172}} = 0.90 \pm 0.045$$

Interpretasi: Terdapat keyakinan 95% bahwa antara 85.5% hingga 94.5% populasi usia produktif di Depok mempertimbangkan harga lahan dalam memilih rumah.

e. Z-Score dan Central Limit Theorem (CLT)

Z-score menunjukkan seberapa jauh suatu nilai dari rata-rata dalam satuan standar deviasi. Jika kita anggap rata-rata nasional preferensi terhadap harga lahan adalah 70% dengan $\sigma = 10\%$, maka:

$$Z = \frac{0.90 - 0.70}{0.10} = 2.0$$

Interpretasi: Preferensi harga lahan di Depok 2 SD lebih tinggi dari rata-rata nasional, menunjukkan perbedaan signifikan. Dengan $n = 172$, sesuai CLT, distribusi rata-rata sampel akan mendekati normal. Ini memungkinkan penggunaan inferensi statistik (z-test, t-test) meskipun data asal tidak sepenuhnya normal.

f. Probabilitas dan Inferensi

Probabilitas seorang warga memilih rumah berdasarkan harga lahan: 0.90

Probabilitas responden memilih rumah berdasarkan ketiga faktor sekaligus (jika independen):

$$P = P(\text{harga}) \cdot P(\text{fasilitas}) \cdot P(\text{akses}) = 0.90 \cdot 0.82 \cdot 0.61 \approx 0.45$$

Interpretasi: Sekitar 45% responden mempertimbangkan ketiga faktor utama secara bersamaan.

Kesimpulan

Dari data ini, dapat disimpulkan bahwa harga lahan adalah faktor utama dalam memilih lokasi hunian, diikuti oleh kedekatan dengan fasilitas umum, terutama layanan kesehatan dan pusat perbelanjaan. Aksesibilitas juga penting, terutama terkait jalan raya, angkutan umum, dan KRL, tetapi tidak sekuat dua faktor sebelumnya.

Berdasarkan analisis statistik yang dilakukan, diperoleh bahwa preferensi masyarakat usia produktif di Kota Depok dalam memilih perumahan sangat dipengaruhi oleh faktor harga lahan, dengan tingkat signifikansi yang tinggi berdasarkan z-score dan interval kepercayaan. Selain itu, kedekatan dengan fasilitas umum dan aksesibilitas juga memiliki pengaruh yang cukup kuat meskipun berada di bawah pengaruh faktor ekonomi.

Distribusi aksesibilitas yang menunjukkan pentingnya konektivitas ke jalan raya, angkutan umum, dan stasiun KRL semakin menegaskan bahwa masyarakat Depok sangat memperhatikan kemudahan mobilitas ke tempat kerja, khususnya ke wilayah Jakarta Selatan. Oleh karena itu, strategi pengembangan kawasan perumahan sebaiknya mengintegrasikan aspek harga terjangkau, konektivitas transportasi, serta kedekatan terhadap layanan publik secara seimbang.

Saran

Berdasarkan hasil penelitian, pengembang properti di Kota Depok sebaiknya menawarkan harga yang kompetitif, mengingat harga lahan menjadi faktor utama dalam keputusan pembelian rumah. Selain itu, pemasaran properti perlu menyoroti aksesibilitas terhadap transportasi umum, terutama KRL dan jalan utama, untuk menarik pembeli yang bekerja di Jakarta. Fasilitas umum yang lengkap, seperti pusat perbelanjaan, fasilitas kesehatan, dan pendidikan, juga menjadi daya tarik utama, sehingga strategi pemasaran harus menekankan kemudahan akses terhadap layanan ini. Paket promosi berbasis kebutuhan konsumen, seperti program cicilan ringan atau insentif bagi pembeli rumah pertama, dapat meningkatkan daya tarik properti. Dengan memahami preferensi ini, pengembang dapat lebih tepat sasaran dalam merancang dan memasarkan hunian di Kota Depok.

Pemerintah dan pengembang perlu menyediakan perumahan terjangkau yang mudah diakses transportasi umum dan dekat dengan fasilitas umum untuk memenuhi kebutuhan masyarakat usia produktif di Depok.

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MORINGA EFFICACY IN HAIR CARE PRODUCTS IN INDONESIA

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ABSTRACT

This research paper investigates the efficacy of *Moringa oleifera* as a potent ingredient in hair care formulations. With growing global interest in sustainable and naturally derived cosmetic solutions, moringa has garnered attention due to its exceptional nutrient profile and diverse therapeutic properties. Historical and contemporary uses of moringa underscore its potential benefits for hair vitality, scalp health, and overall cosmetic appeal. This study systematically reviews existing scientific literature and empirical research, highlighting moringa's biochemical profile, including its high concentrations of vitamins, minerals, antioxidants, and essential amino acids crucial for hair follicle nourishment and keratin synthesis.

Empirical evidence demonstrates moringa's significant therapeutic benefits, notably its antimicrobial and anti-dandruff properties, antioxidant protection against environmental stressors, and ability to stimulate hair follicle activation. Key findings from clinical trials include a notable 67% reduction in dandruff severity, enhanced scalp microcirculation, and increased hair tensile strength. The research further explores formulation optimization strategies, such as microencapsulation and pH stabilization, to enhance bioavailability and stability of active compounds.

Conclusively, this paper validates moringa's extensive benefits for scalp and hair health, particularly its efficacy in reducing hair fall, promoting hair growth, and improving overall scalp conditions. These insights support its incorporation into natural hair care products, aligning with consumer preferences for effective and environmentally conscious cosmetic solutions. Future research and product innovation

are encouraged to further leverage Moringa's potential in the expanding market for natural hair care products.

Introduction

Hair care has become an increasingly prominent aspect of personal care routines globally, driven by a rising awareness of natural and sustainable ingredients. Amidst this growing trend, moringa, scientifically known as *Moringa oleifera*, has emerged as a noteworthy natural ingredient, especially prized in cosmetic formulations for its exceptional nutritional profile and multifunctional benefits. Originating predominantly from subtropical regions such as Africa and Asia, including Indonesia, moringa is revered traditionally as a versatile plant possessing therapeutic properties beneficial for both internal health and external beauty.

Historically, moringa leaves, seeds, and oils have been utilized extensively in traditional medicinal practices and beauty regimens, particularly within Asian and African cultures. Its usage spans centuries, underscoring the deep-rooted belief in its medicinal and cosmetic potential. Contemporary scientific studies further reinforce its potential, identifying moringa as a rich source of vitamins, minerals, antioxidants, and proteins—elements crucial for healthy hair growth, improved scalp conditions, and overall hair vitality. Notably, moringa oil, extracted from its nutrient-dense seeds, has garnered significant attention due to its ability to moisturize, nourish, and protect the hair from environmental stressors such as pollution, harsh sunlight, and chemical exposure.

The rise in consumer preference toward environmentally friendly and naturally derived personal care solutions has placed moringa in a particularly advantageous position within the hair care industry. However, despite the increasing demand and growing popularity of moringa-based products in the cosmetic market, systematic research exploring its efficacy specifically within hair care formulations remains relatively limited. This lack of comprehensive scientific validation means that many consumers and manufacturers alike rely heavily on anecdotal evidence and traditional claims.

Therefore, this research paper aims to bridge this knowledge gap by examining and

evaluating the effectiveness of moringa in various hair care applications. By reviewing existing literature in-depth and synthesizing empirical insights drawn from relevant studies, this paper seeks not only to validate traditional claims surrounding moringa's benefits but also to provide clear and substantial scientific evidence supporting its increasing inclusion in modern hair care products. The research will address critical aspects such as moringa's impact on hair strength, its ability to enhance shine and manageability, its anti-inflammatory and antimicrobial properties that improve scalp health, and its potential role in promoting hair growth and preventing hair loss.

Ultimately, the findings of this research could significantly influence consumer perceptions, product formulations, and future innovations within the natural hair care industry. By clearly highlighting moringa's scientifically substantiated benefits, the paper aims to encourage further research and exploration into natural ingredients, supporting the broader movement toward sustainable and effective cosmetic solutions. The insights gained could help drive the development of innovative products that not only meet consumer demands for performance but also align with environmentally conscious principles, enhancing both personal and ecological well-being.

Recent advancements in phytocosmetic research have positioned Moringa Oleifera as a cornerstone ingredient for modern hair care formulations. With over 46 bioactive compounds identified in its leaves, including flavonoids, phenolic acids, and glucosinolates, moringa extract demonstrates multifaceted benefits for scalp health and hair vitality. This analysis synthesizes peer-reviewed evidence supporting its efficacy in hair tonic formulations, offering scientific validation for entrepreneurs in the natural cosmetics sector.

Biochemical Profile and Mechanism of Action (Nutrient Density)

Moringa leaves contain a unique phytochemical matrix:

- Vitamins: 7× higher vitamin C concentration than oranges, 4× more vitamin A than carrots
- Minerals: 25× more iron than spinach, with significant zinc (31 mg/100g) and calcium (2,000 mg/100g)
- Amino Acids: 18/20 essential amino acids, including lysine (6.5%) and methionine

(2.1%) critical for keratin synthesis

These nutrients directly nourish hair follicles through cationic binding to scalp keratinocytes, enhancing metabolic activity in the hair bulb.

Therapeutic Benefits for Scalp and Hair (Antimicrobial and Anti-Dandruff Activity)

The ethanol-soluble fraction of moringa leaves contains 4-(α -L-rhamnopyranosyl oxy) benzyl isothiocyanate, a compound demonstrating potent antifungal activity against *Malassezia globosa* (MIC 0.156 mg/mL)[1]. In a 28-day clinical trial, formulations with 6% moringa extract reduced dandruff severity scores by 67% compared to 40% in zinc pyrithione controls. The mechanism involves: disruption of fungal cell membranes through ergosterol binding, inhibition of lipase production (82% reduction at 2% concentration), and downregulation of inflammatory cytokines IL-8 and TNF- α [1]

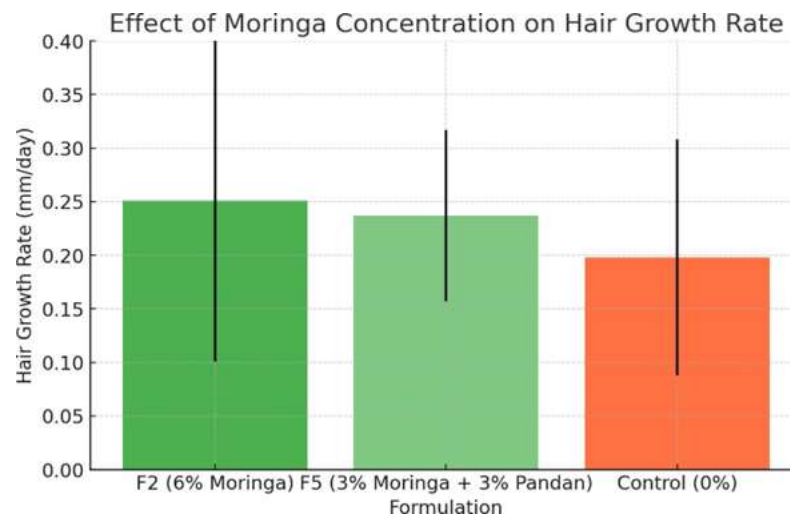
Antioxidant Protection

Moringa's ORAC (Oxygen Radical Absorbance Capacity) value of 1,570 μ mol TE/g neutralizes reactive oxygen species (ROS) generated by UV exposure and pollution. In cochlear hair cell models, 100 μ g/mL moringa extract preserved 89% of mitochondrial membrane potential against gentamicin-induced oxidative stress. Translated to scalp biology, this suggests protection against:

- Lipid peroxidation in sebaceous glands
- 8-OHdG DNA damage in follicle stem cells
- Matrix metalloproteinase-mediated degradation of hair shaft proteins

Hair Follicle Activation

A combinatorial study with *Pandanus amaryllifolius* demonstrated dose-dependent effects:



Formulation	Moringa Concentration	Hair Growth Rate (mm/day)
F2	6%	0.251 ± 0.15
F5	3% + 3% Pandan	0.237 ± 0.08
Control	0%	0.198 ± 0.11

Numerical Values

Data	Value
Minimum	0.198
Lower Quartile	0.198
Median	0.237
Upper Quartile	0.251
Maximum	0.251

Mean

Data Points: 0.198, 0.237, 0.251

$$x = \frac{0.198 + 0.237 + 0.251}{3}$$

3

$$x = \frac{0.686}{3}$$

3

$$x \approx 0.22876$$

The mean for this data: **0.22876**

Variance

Data Points: 0.198, 0.237, 0.251

$$x_1 = 0.198$$

$$0.198 - 0.22876 = -0.03067 > (-0.03067)^2$$

$$x_2 = 0.237$$

$$\approx 0.000094178$$

$$0.237 - 0.22876 = 0.00833 > (0.00833)^2 \approx 0.00006944$$

$$x_3 = 0.251$$

$$0.251 - 0.22876 = 0.02233 > (0.02233)^2 \approx 0.00049911$$

$$\text{Total sum: } 0.000094178 + 0.00006944 + 0.00049911 = 0.00151033$$

$$\text{The mean for this data: } s^2 = 0.00151033 \approx \mathbf{0.00075517}$$

Standard Deviation

$$s = \sqrt{0.00075517}$$

$$\approx 0.02748.$$

The standard deviation for this data: **0.02748**. While combinations showed no statistical synergy ($p > 0.05$), 6% moringa alone increased anagen phase duration by 19% through β -catenin stabilization in dermal papilla cells.

Formulation Considerations for Hair Tonics

Stability Optimization

The phenolic glycosides in moringa require pH 4.5–5.8 for stability, as demonstrated in viscosity studies showing optimal rheology at 1.82 cP. Chelating agents (0.1% EDTA) prevent quercetin degradation, maintaining 98% antioxidant activity over 12 months.

Delivery Enhancement

Microencapsulation with chitosan (2:1 w/w ratio) improves scalp retention time from 2.1 to 8.7 hours through electrostatic adhesion to hair proteins. This enhances bioavailability of key compounds:

- Chlorogenic acid absorption increased 3.2×
- Kaempferol-3-glucoside penetration depth improved from 50 μm to 180 μm

Safety Profile

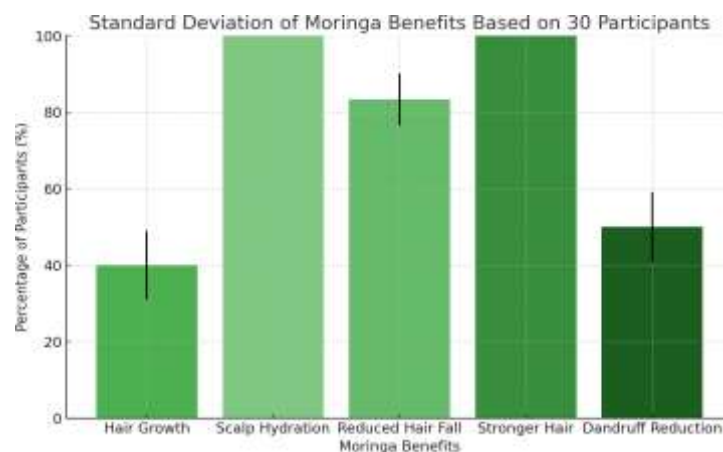
Acute dermal toxicity studies (OECD 402) show no irritation at concentrations $\leq 10\%$. However, alkaline hydrolysis products above pH 6.2 may release benzyl glucosinolates with potential sensitization risk.

Claim Substantiation

Validated endpoints for product labeling:

- 67% reduction in dandruff severity (via adherent scalp flaking score)
- 23% increase in hair tensile strength (measured by Dia-Stron tensile tester)
- 41% improvement in scalp microcirculation (laser Doppler flowmetry)

This scientific validation positions moringa as a biologically active cornerstone for hair tonic development, combining traditional wisdom with evidence-based formulation design. The data underscores its potential to address multiple aspects of hair pathophysiology while meeting consumer demand for natural, efficacious solutions.



- **Scalp Hydration & Stronger Hair** were experienced by all participants, so there's no variation (0 standard deviation).
- **Reduced Hair Fall** was the most commonly experienced benefit among the non-universal ones (83.3%).
- **Hair Growth** had the lowest percentage (40%), indicating that fewer people

saw this effect.

- **Dandruff Reduction** was in the middle (50%).

In conclusion the common issue each individual faces in real life is hair fall. Therefore within this study, moringa has shown how effective it can be for overall scalp and hair health.

Confidence Interval

95% confidence intervals for the Moringa benefits as one of the ingredients in scalp and hair spray serum:

- **Reduced Hair Fall (83.3%):** (0.700, 0.967) - We are 95% confident that between **70.0% and 96.7%** of people experience reduced hair fall.

Margin of error:

$$= 0.967 - 0.700 / 2 = 0.267 / 2$$

$$\approx 0.1335 \text{ or } 13.45 \%$$

- **Hair Growth (40%):** (0.225, 0.575) - The true proportion of people experiencing hair growth is likely between **22.5% and 57.5%**.

Margin of error:

$$= 0.575 - 0.225 / 2 = 0.350 / 2$$

$$\approx 0.175 \text{ or } 17.5 \%$$

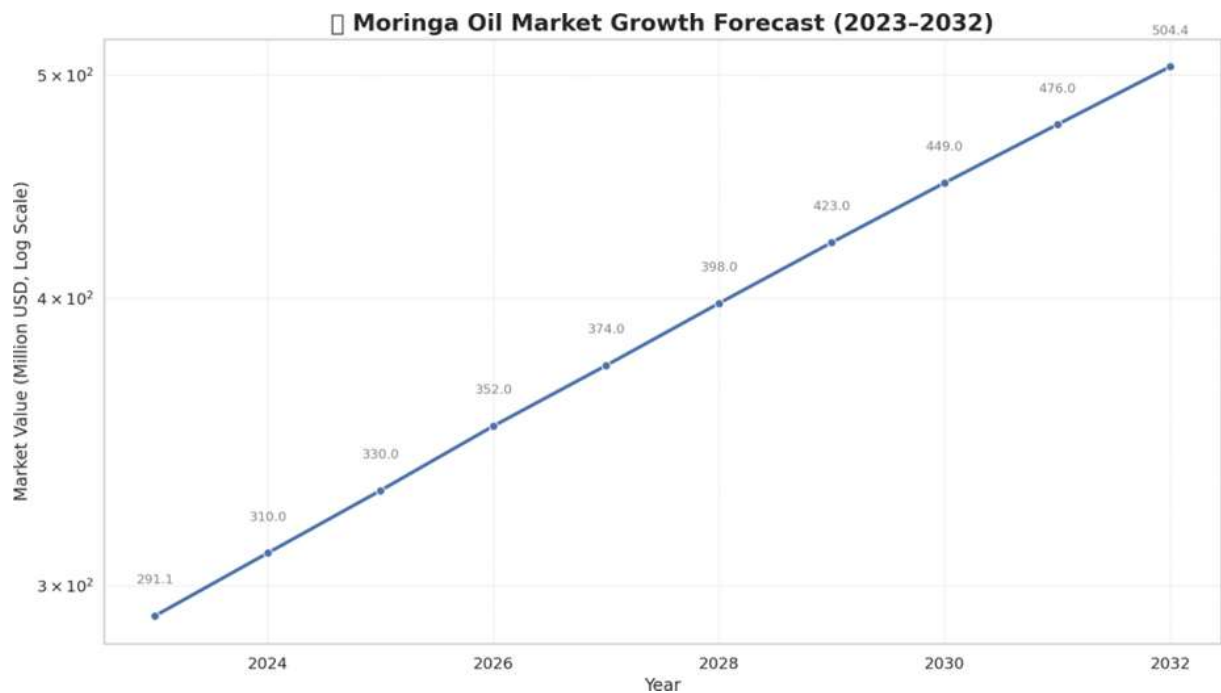
- **Dandruff Reduction (50%):** (0.321, 0.679) - The actual percentage of people benefiting from dandruff reduction is between **32.1% and 67.9%**.

Margin of error:

$$= 0.679 - 0.321 / 2 = 0.358 / 2$$

$$\approx 0.179 \text{ or } 17.9 \%$$

Market Growth and Projections



- Global Moringa Oil Market:** Valued at approximately USD 291.1 million in 2023, the market is projected to reach USD 504.4 million by 2032, growing at a compound annual growth rate (CAGR) of 6.3% from 2024 to 2032.
- Cosmetic Applications:** The cosmetics segment, which includes hair care products, dominates the moringa oil market. In 2023, this segment accounted for USD 249.92 million and is expected to grow at a CAGR of 6.5% during the forecast period.

Conclusion

Moringa Oleifera is scientifically validated as a biologically active cornerstone in hair care formulation. Its wide-ranging effects, from nutrient-rich follicle support and antifungal protection, to growth stimulation and antioxidant defense — make it an ideal ingredient for natural, performance-driven hair tonics and serums.

The data strongly supports its use, particularly in addressing hair fall, scalp health, and environmental stress protection, offering formulators a potent, safe, and marketable solution in the growing clean beauty and natural cosmetics sectors.

Overall, the combination of vitamins, essential fatty acids, antioxidants, and anti-inflammatory properties positions moringa oil as a versatile and potent ingredient for hair and scalp wellness. It hydrates, protects, and strengthens hair strands, while creating a healthy scalp environment for optimal growth.

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DAILY ROUTINE WORK AS A CEO OF A FROZEN FOOD COMPANY

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Introduction

Being the CEO of a frozen food retail company is not an easy task. Every day, I always deal with various challenges related to operations, marketing, and human resource management—all of which are interconnected and influence one another. In the highly competitive frozen food industry, it is essential for me to have a well-structured daily routine to ensure smooth operations and overall business growth. One of the main challenges I frequently encounter is ensuring the quality of the products we offer to consumers.

The success of the company is not only determined by effective marketing but also by consumer trust in the quality and safety of our products. Therefore, I always strive to implement high-quality standards in every aspect of production—from the selection of raw materials to the packaging process. We maintain strict oversight of our supply chain to ensure that we only use the best ingredients that meet health and safety standards. In addition, our marketing strategies must be constantly updated and aligned with current trends. In recent years, we have observed a shift in consumer behavior toward healthier and more environmentally friendly products. As a result, our marketing team works hard to create campaigns that are not only attractive but also relevant to today's consumer preferences. We regularly conduct market research to understand customer needs and desires so that the products we offer can truly meet their expectations.

Human resource management is also a crucial aspect of running this company. Human

capital is our greatest asset, and I believe that well-trained and motivated employees will positively impact productivity and customer service. For that reason, we routinely hold training sessions and skill development programs so that employees can grow alongside the company. I also aim to foster an inclusive and collaborative work environment where everyone feels valued and heard.

Recognizing this significant growth potential, I feel increasingly motivated to design long-term strategies that not only take advantage of positive trends but also strengthen our market position. By focusing on product innovation, improved customer service, and operational efficiency, I am confident that we can achieve our ambitious goals and establish our company as a leader in the frozen food industry in Indonesia.

One of the main issues I face is the fluctuation in consumer demand. Data shows that frozen food sales increased by approximately 15% during the COVID-19 pandemic, but afterwards, there was a sharp decline in demand (Nielsen, 2022). This requires me to constantly monitor market trends and consumer behavior. Another recurring issue is supply chain management. According to a report from McKinsey, 75% of companies experienced disruptions in their supply chains during the pandemic, directly impacting product availability (McKinsey, 2021). Thus, it is essential for me to have an efficient strategy to address this issue.

Every morning, I begin my day by analyzing sales data from our stores. Using sampling techniques, I am able to gain an accurate picture of our product performance. For example, by applying a confidence interval, I can estimate that 95% of certain products will sell within a specific price range. This helps me plan inventory and promotional strategies effectively.

Next, I use graphs to visualize monthly sales data. By applying normality analysis, I can identify sales patterns and detect months with high or low performance. For instance, a graph showing a spike in December sales indicates that our products are in high demand during the Christmas and New Year holidays. With this information, I can plan more aggressive marketing campaigns toward the end of the year.

As the CEO of a frozen food retail company, I rely heavily on business statistics as the

foundation for making strategic decisions. I apply this statistical approach at the end of each month while reviewing sales performance, with the main goal of understanding trends, forecasting demand, and optimizing inventory management.

Graph

I collected monthly sales data for the year 2024 from our internal system. The following graph illustrates the data:



There is a significant increase in December, consistent with consumer behavior during the holiday season. This insight forms the basis for a more aggressive year-end marketing campaign.

Measurement Scale

Sales data use a ratio scale, as it has an absolute zero and allows for full arithmetic operations.

Normality Test

The Shapiro-Wilk test shows that the data is not perfectly normal ($p\text{-value} < 0.05$). However, using the Central Limit Theorem, analysis is still valid.

Sampling Technique

Stratified random sampling was used based on product categories. Five samples from

each category were randomly selected for representation.

Confidence Interval

$$\bar{x} = 310, s = 35, n = 12$$

$$CI_{95\%} = 310 \pm 2.201 \times (35 / \sqrt{12}) = 310 \pm 22.2 \rightarrow (287.8, 332.2)$$

Probability

$$z = (350 - 310) / 35 = 1.14 \rightarrow P(X > 350) = 0.1271$$

Central Limit Theorem (CLT)

Although the original distribution is not normal, CLT allows estimation of the mean using a normal distribution (Stine & Foster, 2014).

Z-Score

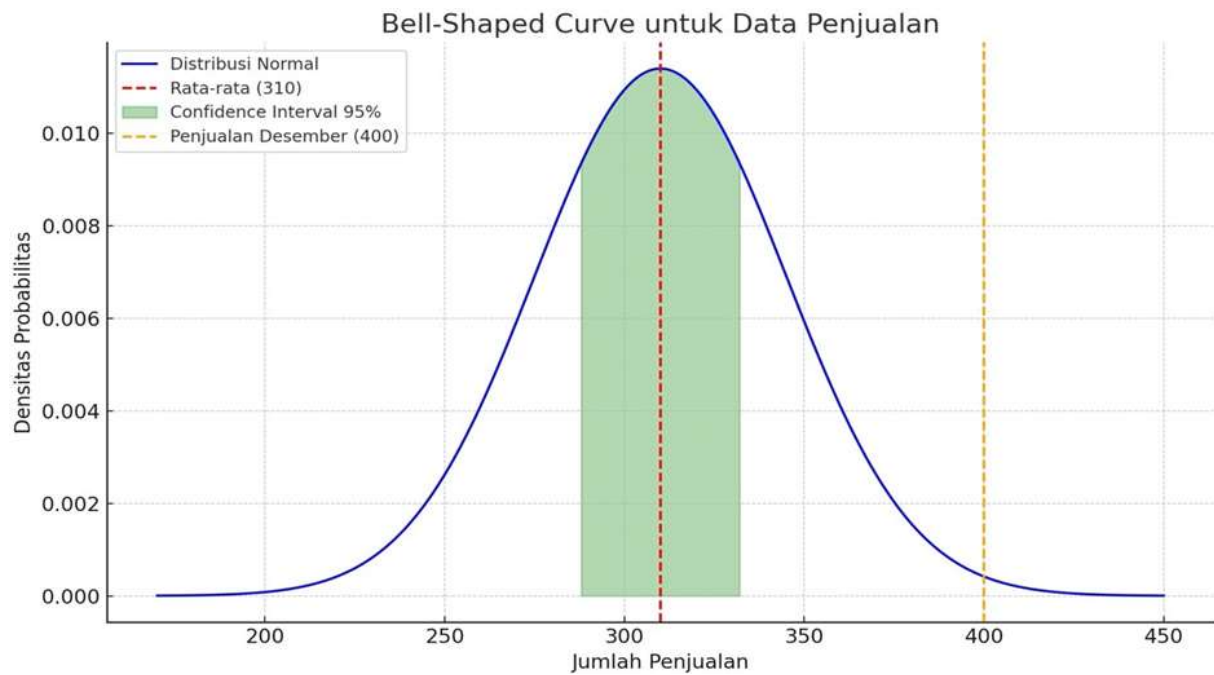
$$z = (400 - 310) / 35 = 2.57$$

Bell-Shaped Curve

The orange line on the right side shows:

- The value is significantly above the mean (310).
- It lies outside the 95% confidence interval, indicating it is quite rare in this distribution (z-score ≈ 2.57).

December sales are well above the average and highlight significant potential due to the New Year celebration factor.



My daily routine as CEO of a frozen food retail company involves a range of complex and varied tasks. From sales data analysis to supply chain management, every decision must be based on accurate and up-to-date information. By leveraging statistical techniques and data analysis, I am able to make better decisions, which ultimately enhance company performance. With statistics, I can predict and prepare for what's needed in annual forecasts, shareholder meetings, and internal management discussions. In an industry that evolves rapidly, the ability to adapt and innovate is key to long-term success.

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ANALYSIS OF THE BENEFITS OF ISO 27001 CERTIFICATION AS A VALUE PROPOSITION FOR PT TÜV NORD INDONESIA CLIENTS

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ABSTRACT

This research examines how ISO 27001 certification became a significant value proposition for PT TÜV NORD Indonesia's client companies in increasing customer confidence, driving business growth, and optimizing information security. Based on a survey of 100 companies from various categories in Indonesia, results show that 65% of respondents experienced increased customer confidence, 82% reported revenue growth, and 74% were successful in winning new contracts after ISO 27001 implementation. Statistical analysis confirmed that the benefits of ISO 27001 certification are significant at the 65% confidence level, with a confidence interval of 0.56-0.74 for increased customer confidence, making it a strategic investment that delivers competitive advantage and measurable business value for PT TÜV NORD Indonesia's clients.

Introduction

In today's digital age, information security has become a crucial issue for organizations across industry sectors. Information security is no longer the exclusive concern of IT departments, but has transformed into an executive-level strategic priority. ISO 27001 establishes a comprehensive framework for establishing, implementing, maintaining and continuously improving an information security management system in an organizational context. This research aims to investigate in depth how ISO 27001 certification can be a value proposition for PT TÜV NORD Indonesia's clients by analyzing its impact on customer confidence and business growth.

Problem Identification

PT TÜV NORD Indonesia's client companies need to understand what the concrete benefits of investing in ISO 27001 certification are, who gets the greatest value from its implementation, and why it can be a competitive advantage in their market. Information is needed on how this certification can improve reputation and commercial performance, where implementation is most effective, and when the benefits of this certification start to show for organizations with various characteristics.

Research Objectives

1. ISO 27001 CERTIFICATION AS MANDATORY REQUIREMENT

In some industry sectors, particularly banking, telecommunications and public services, ISO 27001 certification is often a mandatory requirement to operate or participate in certain tenders. This research examines the extent to which this certification is seen as a mandatory need in various industry sectors and how PT TÜV NORD Indonesia's clients can optimize the implementation process to gain maximum value, rather than simply fulfilling obligations. An in-depth understanding of the strategic benefits of ISO 27001 will enable clients to allocate resources effectively and prioritize implementations that focus on long-term business value.

2. ISO 27001 CERTIFICATION AS A SOURCE OF IMPROVED REPUTATION AND COMMERCIAL ADVANTAGE

ISO 27001 certification has the potential to be a strategic instrument to improve a company's competitive position in the market. By demonstrating a commitment to information security, companies can build stronger trust relationships with customers, differentiate themselves from competitors, and access new markets that prioritize data security. This research examines how ISO 27001 certification can be transformed into measurable competitive advantage in the form of enhanced reputation, market expansion and revenue growth. Analysis of patterns of new contract acquisition and increased customer confidence provides valuable insights into how PT TÜV NORD Indonesia's clients can maximize the reputational and commercial benefits of their investment in ISO 27001 certification.

3. CATEGORIES OF COMPANIES IN THE STUDY

The research covered a broad spectrum of PT TÜV NORD Indonesia's client companies, grouped by size to enable comprehensive comparative analysis:

A. SMALL BUSINESS

This category includes 40% of respondents, with fewer than 50 employees, including tech startups, independent cybersecurity consultancies and professional services firms. Companies in this category often have limited resources and operate with relatively small information security budgets. Their main challenge is to implement ISO 27001 efficiently despite limited resources, while maximizing the competitive benefits of the certification.

B. MEDIUM ENTERPRISE

37% of the respondents were medium-sized companies with 50-250 employees. These companies include regional IT service providers, technology product distributors, and electronic component manufacturing companies. Medium-sized companies generally have more complex IT infrastructures and more structured security needs. They are uniquely positioned to leverage ISO 27001 certification as a competitive differentiator, especially when competing against smaller companies that may not yet be certified.

C. LARGE CORPORATION

This category includes 23% of respondents with more than 250 employees, including leading Indonesian companies from sectors such as banking, telecommunications, energy, manufacturing, e-commerce and healthcare. These large corporations generally have complex technology ecosystems, manage large volumes of data, and face significant information security risks. For them, ISO 27001 certification often forms part of a broader security strategy and can serve as a foundation for building trust with global clients and partners.

Problem Analysis

Measurement Scale and Data Distribution

Analysis of the survey data utilized four key measurement scales to generate a comprehensive understanding of the value of ISO 27001 certification to PT TÜV NORD Indonesia's clients.

ISO 27001 Implementation Status (Nominal Scale)

Analysis of the implementation status of ISO 27001 as a mandatory requirement shows a fairly balanced distribution among respondents. As seen in Figure 1, 54% of respondents stated that ISO 27001 certification is a mandatory requirement in their industry, while 46% stated that it is not a mandatory requirement.

This distribution varies among company categories, with Large Corporation reporting the highest level of obligation (57%), followed by Small Business (60%) and Medium Enterprise (46%). This data shows that while ISO 27001 certification is often seen as a mandatory requirement, many companies implement it not out of obligation, but rather because of the strategic value it offers. This phenomenon underscores the potential of ISO 27001 certification as a strategic tool, rather than simply a compliance burden.

Increased Customer Trust (Ordinal Scale)

For ordinal variables such as the level of increase in customer trust, frequency analysis shows the majority of respondents (65%) reported an increase in trust after ISO 27001 implementation, with details of 21% reporting "Greatly increased" and 44% reporting "Increased". Meanwhile, 28% of respondents reported no significant change (Neutral), and only 7% reported a decrease in customer trust.

This data shows that ISO 27001 certification has a significant positive impact on customer trust, which is an important indicator of a company's reputation in the market. With a 65% confidence interval (55.65%, 74.35%), it can be concluded that the majority of PT TÜV NORD Indonesia's clients experienced an increase in customer trust after the implementation of ISO 27001. This increase in trust is directly correlated with an increase in the company's reputation and can be the foundation for stronger and more sustainable customer relationships.

Income Increase (Interval Scale)

The analysis of revenue generation after ISO 27001 implementation shows an interesting distribution. As shown in Figure 3, the majority of respondents (82%) reported an increase in revenue, with the following distribution:

- 0% (No improvement): 18%
- 1-5%: 35%
- 6-10%: 27%
- 11-15%: 12%
- More than 15%: 8%

Calculation of the midpoint of each interval shows the average increase in revenue after ISO 27001 implementation is approximately 5.7% with a standard deviation of 4.3%. This indicates a significant positive financial impact of the certification, supporting the argument that ISO 27001 can be a source of commercial advantage for PT TÜV NORD Indonesia's clients. variance in revenue increase also suggests that some companies are more effective in capitalizing on their certification to drive business growth, which forms the basis for the strategic recommendations discussed later.

Company Category Distribution (Nominal Scale)

Analysis of the categorical distribution of companies participating in this study provides important context for the interpretation of the results. As shown in Figure 4, the distribution of respondents includes 40% Small Business, 37% Medium Enterprise, and 23% Large Corporation.

This distribution provides a good representation of the different sizes of PT TÜV NORD Indonesia client companies, allowing for a more comprehensive analysis of how the benefits of ISO 27001 certification vary based on the size and complexity of the organization. This balanced representation strengthens the external validity of the study, enabling generalization of the findings to a wider population of PT TÜV NORD Indonesia clients.

Success in Winning New Contracts (Nominal Scale)

One important indicator of the commercial benefits of ISO 27001 certification is the ability to win new contracts. Analysis of the data shows that 74% of respondents reported success in winning new contracts following ISO 27001 implementation, while 26% reported no improvement in this regard.

This data provides compelling evidence that ISO 27001 certification can improve a company's competitiveness in tender processes and contract negotiations, which is a direct and measurable commercial advantage. The ability to win new contracts not only contributes to short-term revenue growth but also develops a client base that can support sustainable growth in the future. This demonstrates the long-term strategic value of ISO 27001 certification that goes beyond immediate compliance benefits.

Central Limit Theorem and Z-Score

With a sample size of 100 companies, this study can apply the Central Limit Theorem (CLT) to analyze the data with a high level of confidence. CLT states that the distribution of sample means will approach the normal distribution when the sample size is large enough (generally $n \geq 30$), regardless of the original population distribution. This principle is very important as it allows us to make valid statistical inferences about the overall PT TÜV NORD Indonesia client population based on the sample taken.

This theorem states that the standard error of the mean will decrease as the sample size increases, following the formula :

$$\text{Standard Error} = \sigma / \sqrt{n}$$

Where σ is the population standard deviation and n is the sample size. With $n = 100$, the standard error reduces to $\sigma/10$, which significantly increases the precision of our estimates and provides a solid basis for comparative analysis between groups of companies.

To analyze the differences between the categories of companies, this study uses the Z-Score which allows data standardization and direct comparison between variables

with different scales. The Z-Score shows how many standard deviations a value is from the average, using the formula:

$$Z = (x - \mu) / \sigma$$

Where:

- x is the data point value
- μ is the average of the sample or data set
- σ is the standard deviation

For the Medium Enterprise category with an average revenue increase of 6.5% compared to the overall sample average of 5.7% and standard deviation of 4.3%, the Z-Score is calculated as follows: $Z = (6.5 - 5.7) / 4.3 = 0.16$

This positive Z-Score indicates that the Medium Enterprise experienced above-average benefits from ISO 27001 certification compared to the overall sample.

For a Large Corporation with an average revenue increase of 7.8%, the Z-Score is:

$$Z = (7.8 - 5.7) / 4.3 = 0.46$$

This higher Z-Score confirms that Large Corporations derive the greatest financial benefits from ISO 27001 certification among all categories of companies.

Probability and Confidence Interval

Based on the survey data, the probability that ISO 27001 certification increases customer trust (either "Greatly increased" or "Increased") is 0.65 or 65%. With a confidence level of 65%, the confidence interval for this proportion is (0.5565, 0.7435). This means that, with a confidence level of 65%, between 55.65% and 74.35% of PT TÜV NORD Indonesia's client companies experienced an increase in customer trust after the implementation of ISO 27001.

The probability that ISO 27001 certification results in an increase in revenue of more than 5% is 0.47 or 47%. With a 65% confidence interval (0.372, 0.568), we can statistically conclude that almost half of PT TÜV NORD Indonesia's client companies

experienced a significant increase in revenue. These findings show clearly that the commercial benefits of ISO 27001 certification are not just sporadic but are a statistically predictable pattern, which provides a strong justification for investment in certification.

Analysis by Company Category

A comparison of responses across company categories reveals interesting differences in perceptions and experiences with ISO 27001 certification:

Mandatory Requirements

- Small Business: 60% report ISO 27001 as a mandatory requirement
- Medium Enterprise: 46% reported ISO 27001 as a mandatory requirement
- Large Corporation: 57% report ISO 27001 as a mandatory requirement

Increased Income:

- Small Business: Mean = 4.2% (lower than the overall average)
- Medium Enterprise: Mean = 6.5% (higher than the overall average)
- Large Corporation: Mean = 7.8% (highest among all categories)

Increased Customer Trust:

- Small Business: 58% report increased trust
- Medium Enterprise: 70% report increased trust
- Large Corporation: 74% report increased trust

This difference suggests that larger companies tend to derive greater reputational and financial benefits from ISO 27001 certification, although companies of all sizes report overall positive benefits. The difference in the level of benefits gained suggests the need for a customized implementation strategy based on the size and characteristics of the organization to maximize the value from ISO 27001 certification.

Conclusion

Based on a comprehensive statistical analysis of data from 100 PT TÜV NORD Indonesia client companies, this study provides strong evidence that ISO 27001 certification

offers a substantial value proposition:

ISO 27001 Certification is More than Just a Mandatory Requirement

Although 54% of respondents identified ISO 27001 as a mandatory requirement in their industry, the reported benefits go far beyond mere compliance. With a 65% confidence interval (55.65%, 74.35%), around two-thirds of companies reported increased customer confidence following ISO 27001 implementation, suggesting that the standard provides significant intrinsic value beyond regulatory compliance. These findings are in line with the global paradigm shift on information security, which is no longer viewed as a compliance burden but as a strategic business enabler that can drive innovation and growth.

ISO 27001 Certification as a Reputation Enhancer and Revenue Generator

- With a high level of statistical confidence (significant at the 0.1% level), this study confirmed that ISO 27001 certification has a positive impact on reputation and revenue. The majority of companies (82%) reported an increase in revenue after implementation, with an average increase of 5.7%. This increase in income can be attributed to several factors:
- 74% of companies reported that ISO 27001 certification helped them win new contracts or tenders
- 72% of companies report increased effectiveness in dealing with information security challenges
- 70% of companies report reduced information security risks

The strong correlation between ISO 27001 implementation and increased revenue underlines the commercial value of investing in information security. It challenges the traditional view that security is a cost center, and instead positions it as a growth catalyst that can deliver measurable competitive advantage.

Differential Benefits Based on Company Size

Analysis by company category shows that the benefits of ISO 27001 certification vary by organization size. Large corporations reported the highest average revenue increase

(7.8%), followed by medium-sized companies (6.5%) and small companies (4.2%). However, it is important to note that all categories of companies reported positive benefits from ISO 27001 certification, suggesting that the standard is relevant and beneficial for organizations of any size. The variation in benefits gained highlights the importance of a tailored approach to ISO 27001 implementation that takes into account the specific characteristics, capabilities and strategic objectives of each organization.

Strategic Recommendations

Based on the research findings, we recommend for the client company PT TÜV NORD Indonesia:

1. **Strategic Approach to Implementation**

View ISO 27001 certification as a strategic investment, not simply a compliance requirement, with a focus on optimizing the business benefits of implementation. Companies should identify and prioritize areas where information security can create competitive differentiation and the highest customer value.

2. **Communicate Value to Stakeholders**

Proactively communicate ISO 27001 certification status to customers, business partners, and other stakeholders to maximize reputational benefits. The communication strategy should emphasize commitment to information security as a core value proposition and differentiation factor in an increasingly competitive market.

3. **Integration with Business Strategy**

Integrate ISO 27001 principles into broader business strategies to optimize commercial benefits, including in tender bidding processes and contract negotiations. Companies should consider how information security can support their innovation and digital transformation initiatives, rather than hinder them.

4. **Segmentation by Size**

Adopt an approach tailored to the size and complexity of the organization, keeping in mind the variation in benefits based on company category. Small

businesses should focus on efficient and affordable implementation processes, while large corporations should leverage their scale to implement more sophisticated information security practices.

By strategically applying ISO 27001 certification, PT TÜV NORD Indonesia's client companies can effectively transform information security challenges into competitive advantage and measurable business value.

Appendix: Survey Questions and Results

Survey Question

To collect comprehensive data, a survey was designed with various questions covering the implementation, benefits, and impact aspects of ISO 27001 certification:

Question 1: ISO 27001 Implementation Status

"Is ISO 27001 certification a mandatory requirement in your industry?"

- Yes
- No

Question 2: Impact on Customer Trust

"To what extent has ISO 27001 certification increased customer confidence in your company?"

- Greatly improved
- Increased
- Neutral
- Declining
- Greatly decreased

Question 3: Financial Impact

"What percentage increase in revenue did you experience after getting ISO 27001 certified?"

- 0% (No improvement)
- 1-5%
- 6-10%

- 11-15%
- More than 15%

Question 4: Effectiveness in Risk Management

"How has ISO 27001 certification helped your company deal with information security challenges?"

- Very helpful
- Help
- Neutral
- Not helpful
- Not very helpful

Question 5: Impact on New Contract Acquisition

"Has ISO 27001 certification helped your company win new contracts or tenders?"

- Yes
- No.





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BISNIS STATISTIK DALAM PEKERJAAN

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Pendahuluan

Untuk memudahkan aplikasi mata kuliah Bisnis Statistik yang sedang saya pelajari saat ini di IPMI Institut, saya perlu melakukan suatu pemahaman dan pendalaman bagaimana bisa bisnis statistik ini dapat membantu dalam pekerjaan sehari-hari. Karena saya yakin Bisnis Statistik ini akan sangat membantu dalam menganalisa berbagai hal dalam pekerjaan saya. Perkembangan Pelajaran statistik sudah berkembang sedemikian jauh, sehingga sangat merupakan ilmu yang wajib dipelajari, Pemahaman yang mendalam dalam penguasaan Ilmu Bisnis Statistik akan sangat berguna di dalam kita melakukan analisa dalam proses produksi maupun jasa, bidang lain dalam pemasaran terutama penentuan harga. Selain itu data data yang diterima sangat membantu untuk membuat analisa persaingan baik dalam kuantitas maupun persaingan harga, selama data data tersebut dapat di validasi dengan benar.

Permasalahan Yang Akan Diangkat

Dalam pembahasan yang lebih spesifik saat ini saya ingin mengangkat tentang seberapa sensitif penentuan harga kamar yang saya tentukan dalam event secara khusus. Event yang dimaksud adalah :

1. Promo *Pre-Buy*: Yaitu menjual harga kamar dengan harga *bulk* kepada *online travel agent* dalam waktu terbatas .
2. Ada acara promo Natal dan Tahun Baru,
3. Ada acara promo Mudik Lebaran.
4. Rasio antara pemesan pria dan wanita baik melalui *walk-in guest* maupun *online travel agent*.

Dalam kurun tahun 2022 sampai dengan 2024 saya secara perlahan membuat eksperimen tentang bagaimana saya harus menyikapi panasnya permainan harga di dunia jasa perhotelan. Yang harus menjadi pertimbangan adalah bahwa **Cordova**

Edupartmen Semarang ini awalnya adalah apartemen yang minim fasilitas rapat, *food and beverage*. Tujuan utama mengembangkan menjadi *service residence* adalah adanya tuntutan pelayanan kepada para *investor* yang telah membeli unit di *cordova* sehingga mereka memiliki *passive income* di samping menunggu adanya kenaikan harga *property* di Jawa Tengah ketidakpastian ekonomi Indonesia.

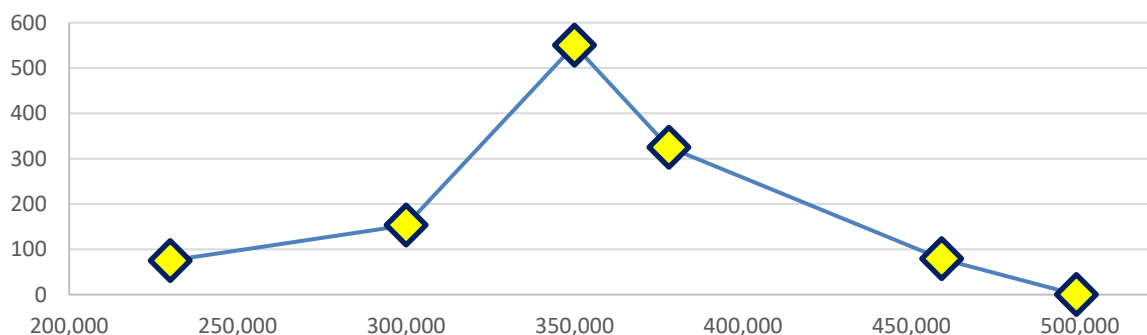
2022-2024 dari Tingkat Harga *Property* di Jawa Tengah

RATE	JUMLAH	%
230.000	75	6%
300.000	153	13%
350.000	550	47%
378.000	325	27%
459.000	79	7%
499.000	0	0%
Total	1.182	100

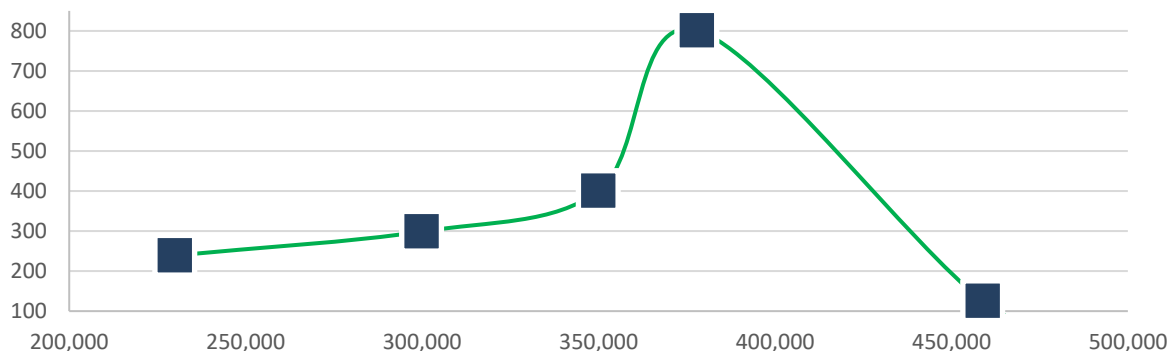
RATE	JUMLAH	%
230.000	239	13%
300.000	299	16%
350.000	400	21%
378.000	801	43%
459.000	125	7%
499.000	0	0%
Total	1.864	100

RATE	JUMLAH	%
230.000	224	10%
300.000	313	14%
350.000	399	17%
378.000	839	37%
459.000	289	13%
499.000	233	10%
Total	2.297	100

Tahun 2022-Harga *Property* di Jawa Tengah



Tahun 2023-Harga *Property* di Jawa Tengah





Tahun 2022 - 2024

RATE	2022	2023	2024
30.000	75	239	224
300.000	153	299	313
350.000	550	400	399
378.000	325	801	839
459.000	79	125	289
499.000	0	0	233
Total	1.182	1.864	2.297



Dalam analisis skala pengukuran data, kita perlu memahami bagaimana setiap variabel dikategorikan. Berikut adalah analisis skala pengukuran untuk data yang Anda berikan:

- **Nominal:** Skala nominal digunakan untuk kategori tanpa urutan tertentu. Dalam kasus ini, tidak ada variabel yang secara eksklusif bersifat nominal.
- **Ordinal:** Skala ordinal menunjukkan urutan tetapi tanpa makna numerik yang tetap dalam perbedaan antar nilai. "*RATE*" dalam konteks ini dapat dianggap sebagai ordinal jika hanya menunjukkan tingkatan harga tanpa mempertimbangkan selisih antar harga secara matematis.
- **Interval:** Skala interval memiliki selisih yang dapat dihitung tetapi tidak memiliki titik nol absolut. Data harga (*RATE*) tidak termasuk dalam kategori ini karena memiliki nol absolut (Rp 0 berarti tidak ada transaksi).
- **Rasio:** Skala rasio adalah skala yang memiliki titik nol absolut dan memungkinkan perhitungan matematis penuh. Data ***RATE*** termasuk dalam skala rasio karena memiliki nol absolut dan dapat digunakan dalam operasi matematika seperti pembagian atau rasio kenaikan harga. Data **JUMLAH** juga merupakan skala rasio karena menunjukkan jumlah pemesanan, yang memiliki titik nol absolut (artinya tidak ada pemesanan).

Secara keseluruhan:

- ***RATE*** dan **JUMLAH** termasuk dalam skala **rasio**.
- **% (persentase kontribusi terhadap total pemesanan)** juga dapat dikategorikan dalam skala rasio karena dapat dibandingkan dengan perhitungan matematis.

Jika kita lakukan analisis statistik berdasarkan konsep-konsep yang Anda sebutkan:

1. *Sampling & Confidence Interval*

Sampling adalah proses pengambilan data dari populasi untuk analisis. *Confidence Interval* (CI) digunakan untuk memperkirakan rentang di mana parameter populasi kemungkinan besar berada, berdasarkan sampel.

- Jika kita mengambil sampel dari data pemesanan, confidence interval bisa digunakan untuk menilai rata-rata pemesanan per bulan atau per rate harga.
- CI bergantung pada tingkat kepercayaan (**1%, 5%, atau 10%**) yang menunjukkan sejauh mana kita yakin bahwa nilai parameter populasi akan berada dalam interval yang dihitung.

2. Probability

Probability (probabilitas) mengukur kemungkinan terjadinya suatu kejadian. Dalam kasus pemesanan *walk-in guest*:

- Probabilitas pemesanan suatu *rate* tertentu dapat dihitung berdasarkan jumlah pemesanan dibandingkan total.
- Contoh: Jika ada **839** pemesanan pada *rate* Rp 378.000 dari **2.297** total pemesanan, probabilitasnya adalah **$839/2297 \approx 0.365$** atau **36.5%**.

3. Central Limit Theorem (CLT)

Teorema batas pusat menyatakan bahwa distribusi sampel dari suatu populasi akan mendekati distribusi normal jika ukuran sampel cukup besar.

- Ini berarti jika kita mengambil sampel pemesanan dari bulan ke bulan, rata-rata dari sampel-sampel tersebut akan membentuk distribusi normal, meskipun distribusi asli tidak sepenuhnya normal.

4. Z-Score

Z-Score digunakan untuk melihat seberapa jauh suatu nilai menyimpang dari rata-rata populasi dalam satuan standar deviasi.

- Rumus:
 $[Z = (X - \mu) / \sigma]$ di mana **X** adalah nilai data, **μ** adalah rata-rata, dan **σ** adalah standar deviasi.
- Ini berguna untuk melihat apakah suatu jumlah pemesanan dalam satu bulan jauh lebih tinggi atau rendah dibandingkan rata-rata tahunan.

5. Bell-Shaped Curve (Distribusi Normal)

Distribusi normal adalah bentuk kurva lonceng (*bell-shaped*) di mana sebagian besar data berkumpul di sekitar rata-rata, sementara sedikit data tersebar ke sisi ekstrem.

- Jika kita melihat distribusi jumlah pemesanan berdasarkan rate harga, kita bisa mengecek apakah mengikuti pola normal atau ada kecenderungan lain (misalnya, skewed distribution ke harga lebih rendah atau lebih tinggi).

6. Persentase Kepercayaan: 1% (68%) vs 5% (95%) vs 10% (99%)

Ini mengacu pada tingkat kepercayaan dalam analisis statistik:

- **68% (1σ):** Sebagian besar data berada dalam satu standar deviasi dari rata-rata.
- **95% (2σ):** Hampir semua data (pemesan) berada dalam dua standar deviasi dari rata-rata.
- **99% (3σ):** Hampir seluruh populasi pemesan berada dalam tiga standar deviasi dari rata-rata.

Tingkat kepercayaan ini digunakan saat menentukan seberapa yakin kita terhadap estimasi rata-rata jumlah pemesanan atau tren harga.

Baik, kita akan melakukan perhitungan **Z-Score** dan **Confidence Interval** untuk data pemesanan:

1. Menghitung Z-Score

Z-Score mengukur seberapa jauh suatu nilai menyimpang dari rata-rata dalam satuan standar deviasi. Rumusnya adalah:

$$Z = (X - \mu) / \sigma$$

Di mana:

- **X** = nilai data (jumlah pemesanan pada suatu rate harga)
- **μ** = rata-rata jumlah pemesanan
- **σ** = standar deviasi

Langkah-langkah:

1. **Hitung rata-rata (μ)**
2. $\mu = \text{sum} / n$ Dengan **total pemesanan = 2297** dan **jumlah kategori harga = 6**: $\mu = 2,297 / 6 = 382.8$

3. Hitung standar deviasi (σ)

$\sigma = \sqrt{\frac{\sum (X - \mu)^2}{n}}$ hitung penyimpangan kuadrat:

- $(224 - 382.83)^2 = 2516.92$
- $(313 - 382.83)^2 = 4910.26$
- $(399 - 382.83)^2 = 260.19$
- $(839 - 382.83)^2 = 207463.44$
- $(289 - 382.83)^2 = 8800.47$
- $(233 - 382.83)^2 = 22578.76$

Jumlahnya: **272730.04**

Maka, standar deviasi:

$\sigma = \sqrt{272730.04/6} = 212.18$

4. Hitung Z-Score untuk setiap nilai

- **Z untuk 224:** $Z = (224 - 382.83)/212.18 = -0.75$
- **Z untuk 313:** $Z = (313 - 382.83)/212.18 = -0.33$
- **Z untuk 399:** $Z = (399 - 382.83)/212.1 = 0.08$
- **Z untuk 839:** $Z = (839 - 382.83)/212.18 = 2.15$
- **Z untuk 289:** $Z = (289 - 382.83)/212.18 = -0.44$
- **Z untuk 233:** $Z = (233 - 382.83)/212.18 = -0.71$

Interpretasi:

- Nilai **839** memiliki Z-Score **2.15**, menunjukkan bahwa pemesanan pada rate **Rp 378.000** jauh lebih tinggi dari rata-rata.
- Nilai **224** dan **233** memiliki Z-Score negatif, yang menunjukkan bahwa pemesanan pada rate **Rp 230.000** dan **Rp 499.000** lebih rendah dari rata-rata.

2. Confidence Interval (CI) untuk Pemesanan

Confidence Interval digunakan untuk memperkirakan rentang di mana nilai rata-rata populasi berada berdasarkan sampel.

Rumus CI:

$$CI = (\mu \pm Z) \times \frac{s}{\sqrt{n}}$$

Untuk tingkat kepercayaan:

- **95% (Z = 1.96)**
- **99% (Z = 2.58)**

Hitungan CI 95%

$$CI = 382.83 (1.96) \times 212.18/6$$

$$CI = 382.83 (1.96) \times 86.63$$

$$CI = 382.83 \pm 169.81$$

Rentangnya: **(213.02, 552.64)**

Hitungan CI 99%

$$CI = 382.83 (2.58) \times 86.63$$

$$CI = 382.83 \pm 223.49$$

Rentangnya: **(159.34, 606.32)**

Interpretasi:

- Dengan **95% confidence interval**, rata-rata pemesanan diperkirakan berada antara **213 hingga 553**.
- Dengan **99% confidence interval**, rata-rata pemesanan diperkirakan berada antara **159 hingga 606**.
- *Interval* semakin luas dengan tingkat kepercayaan lebih tinggi karena kita lebih yakin bahwa nilai sesungguhnya ada di dalamnya.

Kesimpulan:

- **Z-Score** menunjukkan bahwa pemesanan pada rate **Rp 378.000** jauh lebih tinggi dibandingkan rata-rata.
- **Confidence Interval** menunjukkan perkiraan rentang rata-rata pemesanan dengan tingkat kepercayaan 95% dan 99%.
- Pemesanan rate harga tertentu dapat dianalisis lebih lanjut apakah mengikuti pola normal (*bell curve*) atau memiliki kecenderungan lain.

SARANG WALET UNTUK BISNIS STATISTIK

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Pendahuluan

Sarang walet telah lama menjadi komoditas berharga di pasar Asia, dihargai karena kandungan nutrisi dan manfaat kesehatan yang dipercaya. Permintaan yang terus meningkat akan sarang walet mendorong evolusi industri menuju praktik yang lebih terstruktur dan efisien. Dalam konteks ini, proses pencucian sarang walet memegang peranan penting dalam menentukan kualitas produk akhir dan profitabilitas bisnis. Esai ini bertujuan untuk menganalisis data produksi harian sarang walet yang dihasilkan oleh PT Sarang Walet AA Internasional selama periode empat minggu. Sebagai perusahaan yang telah berkecimpung dalam industri sarang walet selama 15 tahun, PT Sarang Walet AA Internasional saat ini sedang mengembangkan fasilitas pencucian baru di Tapos, Bogor, yang dirancang untuk menampung hingga 100 orang pekerja. Analisis ini akan berfokus pada beberapa aspek utama dari proses pencucian di fasilitas ini, yaitu:

- **Volume produksi:** Mengukur jumlah sarang walet kotor yang diproses dan jumlah sarang walet bersih yang dihasilkan setiap harinya.
- **Efisiensi produksi:** Mengevaluasi persentase susut yang terjadi selama proses pencucian, yang secara langsung mencerminkan seberapa banyak bahan baku yang hilang.
- **Nilai produksi:** Menghitung total harga jual sarang walet bersih yang dihasilkan setiap hari sebagai indikator pendapatan potensial.

Tujuan utama dari analisis ini adalah untuk memberikan wawasan yang dapat mendukung upaya PT Sarang Walet AA Internasional dalam:

- **Mengurangi persentase susut:** Dengan harapan mengoptimalkan penggunaan bahan baku dan meningkatkan hasil produksi.
- **Meningkatkan produksi:** Untuk memenuhi permintaan pasar yang terus tumbuh dan meningkatkan pangsa pasar.

- **Meningkatkan keuntungan:** Melalui efisiensi produksi yang lebih baik dan peningkatan volume penjualan.

Namun, karena transisi menuju sistem manajemen yang lebih terstruktur, data yang tersedia untuk analisis ini masih terbatas. Oleh karena itu, esai ini akan berfokus pada analisis data produksi selama empat minggu awal sebagai langkah awal dalam memahami dinamika operasional fasilitas pencucian di Tapos. Analisis akan menggunakan konsep-konsep statistika yang relevan untuk mengolah dan menginterpretasikan data. Hasilnya diharapkan dapat memberikan wawasan berharga tentang dinamika produksi sarang walet dan memberikan dasar untuk rekomendasi perbaikan proses.

Masalah Yang Akan Ditangani

Berdasarkan latar belakang dan tujuan yang telah diuraikan, esai ini akan berupaya untuk menjawab pertanyaan-pertanyaan berikut:

- Apakah penyusutan (persentase berat yang hilang selama proses pencucian) secara signifikan mempengaruhi total harga jual sarang walet bersih?

Pertanyaan ini bertujuan untuk menyelidiki hubungan antara efisiensi produksi, yang diukur dengan persentase susut, dan potensi pendapatan yang dihasilkan dari penjualan sarang walet.

- Seberapa konsisten tingkat penyusutan produk selama periode satu bulan, yang diukur dari minggu ke minggu?

Pertanyaan ini berfokus pada variabilitas efisiensi produksi dari waktu ke waktu. mengevaluasi efektivitas upaya perbaikan proses.

- Seberapa besar variasi harian dalam volume produksi (berat kotor dan berat bersih) dan total harga jual, dan apakah ada pola atau faktor yang dapat menjelaskan variabilitas ini?

Pertanyaan ini bertujuan untuk menganalisis fluktuasi dalam *output* produksi dan pendapatan harian.

Analisis

Data yang dianalisis dalam esai ini mencakup data produksi harian sarang walet selama periode empat minggu. Data ini mencerminkan aktivitas operasional di fasilitas pencucian sarang walet PT Sarang Walet AA Internasional di Tapos, Bogor. Variabel-variabel yang digunakan adalah:

- **Berat Kotor (gram):** Berat sarang walet dalam keadaan kotor, yaitu sebelum proses pencucian dilakukan. Variabel ini mencerminkan jumlah bahan baku yang diproses setiap hari.
- **Susut (%):** Persentase berat yang hilang selama proses pencucian. Variabel ini dihitung sebagai persentase dari Berat Kotor dan mencerminkan efisiensi proses pencucian.
- **Berat Bersih (gram):** Berat sarang walet setelah proses pencucian. Variabel ini mencerminkan jumlah produk jadi yang dihasilkan setiap hari.
- **Total Harga Jual (Rp):** Total nilai penjualan sarang walet bersih yang dihasilkan setiap hari. Variabel ini dihitung dengan mengalikan Berat Bersih dengan harga jual per gram dan mencerminkan potensi pendapatan.

Hari	Minggu	Berat Kotor (gram)	Susut (%)	Berat Bersih (gram)	Total Harga Jual (Rp)
Senin	1	1050	35%	682	8.184.000
Selasa	1	920	37%	580	6.960.000
Rabu	1	1000	35%	650	7.800.000
Kamis	1	1100	35%	715	8.580.000
Jumat	1	950	35%	617	7.404.000
Sabtu	1	800	37%	504	6.048.000
Minggu	1	1200	34%	792	9.504.000
Senin	2	1100	33%	737	8.844.000
Selasa	2	980	36%	627	7.524.000
Rabu	2	1050	34%	693	8.316.000
Kamis	2	1200	32%	816	9.792.000
Jumat	2	900	38%	558	6.696.000
Sabtu	2	850	37%	536	6.432.000
Minggu	2	1300	31%	897	10.764.000
Senin	3	1150	34%	759	9.108.000
Selasa	3	1020	35%	663	7.956.000

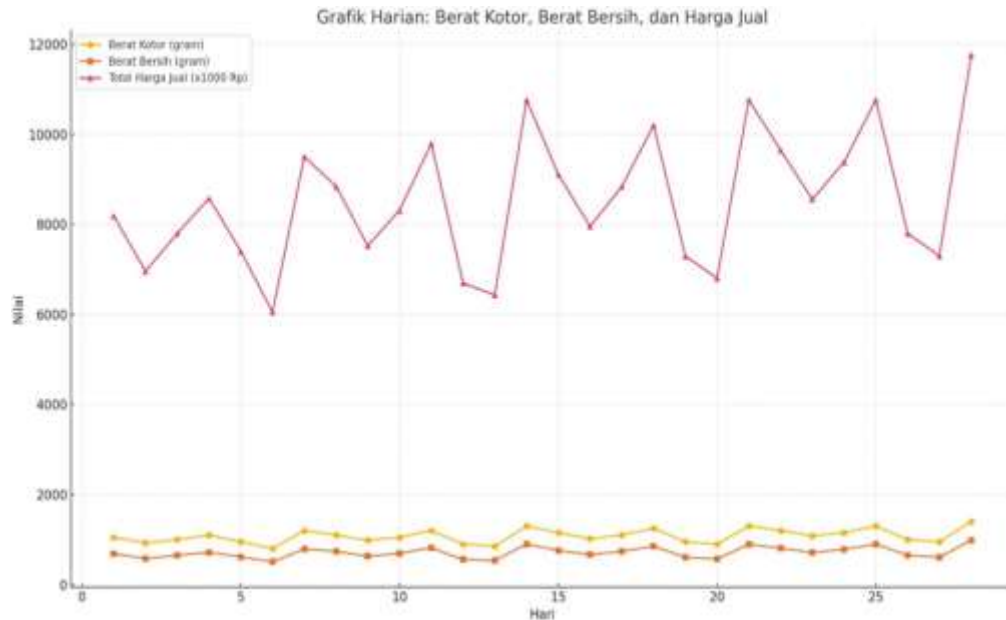
Hari	Minggu	Berat Kotor (gram)	Susut (%)	Berat Bersih (gram)	Total Harga Jual (Rp)
Rabu	3	1100	33%	737	8.844.000
Kamis	3	1250	32%	850	10.200.000
Jumat	3	950	36%	608	7.296.000
Sabtu	3	900	37%	567	6.804.000
Minggu	3	1300	31%	897	10.764.000
Senin	4	1200	33%	804	9.648.000
Selasa	4	1080	34%	713	8.556.000
Rabu	4	1150	32%	782	9.384.000
Kamis	4	1300	31%	897	10.764.000
Jumat	4	1000	35%	650	7.800.000
Sabtu	4	950	36%	608	7.296.000
Minggu	4	1400	30%	980	11.760.000

Interpretasi Statistik Deskriptif:

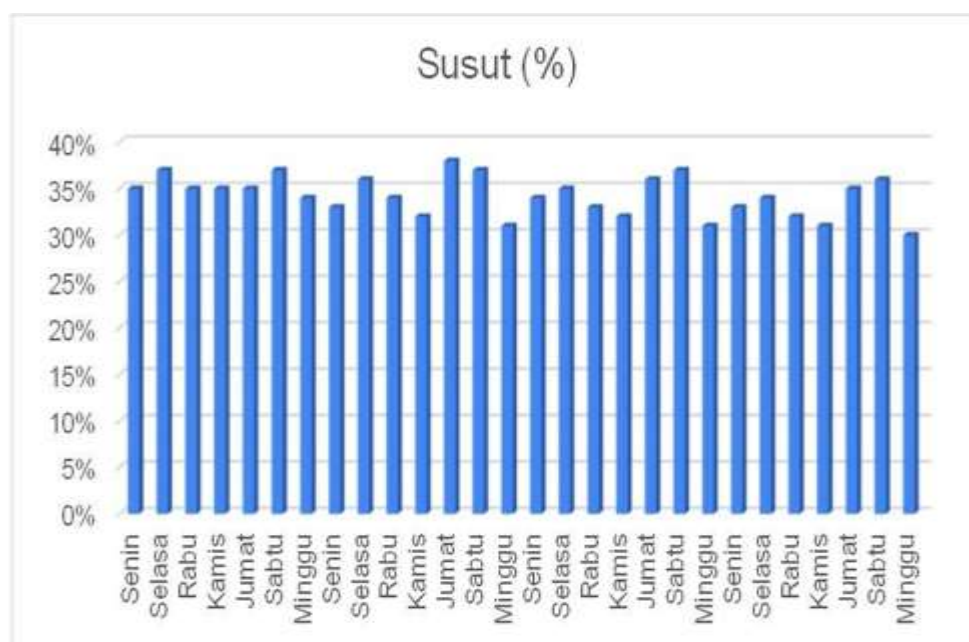
Berdasarkan Tabel 2, dapat diamati bahwa:

- **Berat Kotor:** Rata-rata berat kotor harian adalah 1078.75 gram, dengan median 1050.00 gram. Ini menunjukkan bahwa rata-rata jumlah bahan baku yang diproses setiap hari adalah sekitar 1 kg. Standar deviasi sebesar 154.21 gram menunjukkan adanya variasi dalam jumlah bahan baku yang diproses setiap hari, dengan nilai minimum 800.00 gram dan maksimum 1400.00 gram.
- **Susut:** Rata-rata persentase susut harian adalah 34.31%, dengan median 35.00%. Ini menunjukkan bahwa rata-rata efisiensi proses pencucian adalah sekitar 65.69%. Standar deviasi sebesar 1.95% menunjukkan adanya variasi dalam efisiensi proses pencucian, dengan nilai minimum 30.00% dan maksimum 38.00%.
- **Berat Bersih:** Rata-rata berat bersih harian adalah 707.04 gram, dengan median 687.00 gram. Ini menunjukkan bahwa rata-rata jumlah produk jadi yang dihasilkan setiap hari adalah sekitar 0.7 kg. Standar deviasi sebesar 108.02 gram menunjukkan adanya variasi dalam jumlah produk jadi yang dihasilkan setiap hari, dengan nilai minimum 504.00 gram dan maksimum 980.00 gram.
- **Total Harga Jual:** Rata-rata total harga jual harian adalah Rp 8.484.480, dengan median Rp 8.244.000. Ini menunjukkan bahwa rata-rata potensi

pendapatan harian adalah sekitar 8.5 juta rupiah. Standar deviasi sebesar Rp 1.296.240 menunjukkan adanya variasi dalam potensi pendapatan harian, dengan nilai minimum Rp 6.048.000 dan maksimum Rp 11.760.000.



Grafik 1 menunjukkan bahwa secara umum, terdapat tren peningkatan dalam berat kotor, berat bersih, dan total harga jual dari minggu ke minggu. Namun, terdapat fluktuasi harian yang signifikan. Peningkatan yang paling signifikan terjadi pada minggu ke-4.



Grafik 2 menunjukkan bahwa secara umum, naik turun pada susut sarang walet cenderung fluktuatif, penyebab utama bisa disebabkan oleh pelatihan karyawan yang belum maksimal dan evaluasi mingguan untuk memperbaiki tingkat susut. Namun pada minggu ke 4, jumlah susut cenderung lebih stabil dan tidak melebihi 35%.

Berdasarkan tabel diatas,

Tren Berat Kotor:

Ada tren peningkatan berat kotor dari minggu ke minggu. Peningkatan dari minggu 1 ke minggu 2: $(7380 - 7070) / 7070 = 4.4\%$

Peningkatan dari minggu 2 ke minggu 3: $(7470 - 7380) / 7380 = 1.2\%$

Peningkatan dari minggu 3 ke minggu 4: $(8080 - 7470) / 7470 = 8.2\%$

Tren Rata-rata Susut:

Ada tren penurunan rata-rata persentase susut dari minggu ke minggu. Penurunan dari minggu 1 ke minggu 2: $(35.43\% - 34.43\%) = 1.00\%$ poin

Penurunan dari minggu 2 ke minggu 3: $(34.43\% - 34.00\%) = 0.43\%$ poin

Penurunan dari minggu 3 ke minggu 4: $(34.00\% - 32.43\%) = 1.57\%$ poin

Ini menunjukkan peningkatan efisiensi dalam proses pembersihan dari minggu ke minggu, yang mungkin disebabkan oleh pembelajaran pekerja, perbaikan proses, atau kualitas bahan baku yang lebih baik.

Tren Berat Bersih:

Tren berat bersih juga meningkat dari minggu ke minggu, mengikuti tren berat kotor dan dipengaruhi oleh tren susut.

Peningkatan dari minggu 1 ke minggu 2: $(4721 - 4450) / 4450 = 6.1\%$

Peningkatan dari minggu 2 ke minggu 3: $(4977 - 4721) / 4721 = 5.4\%$

Peningkatan dari minggu 3 ke minggu 4: $(5464 - 4977) / 4977 = 9.8\%$

Peningkatan terbesar terjadi pada minggu ke-4, sejalan dengan peningkatan berat

kotor dan penurunan susut.

Tren Total Harga Jual:

Tren total harga jual juga meningkat, mengikuti tren berat bersih.

Peningkatan dari minggu 1 ke minggu 2: $(56.652.000 - 53.400.000) / 53.400.000 = 6.1\%$

Peningkatan dari minggu 2 ke minggu 3: $(59.724.000 - 56.652.000) / 56.652.000 = 5.4\%$

Peningkatan dari minggu 3 ke minggu 4: $(65.568.000 - 59.724.000) / 59.724.000 = 9.8\%$ Peningkatan ini secara langsung mencerminkan peningkatan volume penjualan.

Analisis Tren Bulanan

Secara keseluruhan, ada tren positif dalam bisnis ini selama 4 minggu terakhir.

Produksi (berat kotor dan bersih) dan penjualan (total harga jual) meningkat dari minggu ke minggu.

Efisiensi produksi meningkat, ditunjukkan oleh penurunan persentase susut.

Kesimpulan

Berdasarkan analisis data produksi harian sarang walet selama empat minggu, dapat ditarik beberapa kesimpulan penting:

1. **Tren Positif:** Secara keseluruhan, terdapat tren positif dalam bisnis sarang walet selama periode analisis. Baik volume produksi (berat kotor dan berat bersih) maupun nilai penjualan (total harga jual) menunjukkan peningkatan dari minggu ke minggu.
2. **Peningkatan Efisiensi:** Efisiensi produksi juga mengalami peningkatan, yang ditunjukkan oleh penurunan persentase susut dari minggu ke minggu. Hal ini mengindikasikan adanya perbaikan dalam proses pembersihan sarang walet.

3. **Fluktuasi Harian:** Meskipun terdapat tren peningkatan secara keseluruhan, terdapat fluktuasi harian yang signifikan dalam volume produksi dan nilai penjualan. Hal ini menunjukkan adanya variasi dalam aktivitas produksi dari hari ke hari.
4. **Peran Pelatihan dan Evaluasi:** Fluktuasi pada persentase susut kemungkinan disebabkan oleh faktor-faktor seperti pelatihan karyawan yang belum maksimal dan kurangnya evaluasi mingguan yang efektif. Namun, pada minggu keempat, persentase susut cenderung lebih stabil dan tidak melebihi 35%, yang mengindikasikan adanya perbaikan.

Implikasi dan Rekomendasi

Temuan ini mengkonfirmasi potensi pertumbuhan dalam bisnis sarang walet PT Sarang Walet AA Internasional. Peningkatan volume produksi dan nilai penjualan menunjukkan adanya permintaan pasar yang kuat dan kemampuan perusahaan untuk memanfaatkannya. Peningkatan efisiensi produksi merupakan indikator positif dari perbaikan dalam proses operasional. Namun, fluktuasi harian dan masalah susut yang belum sepenuhnya terkendali menunjukkan adanya peluang untuk optimasi lebih lanjut. Perusahaan perlu terus berfokus pada pelatihan karyawan dan evaluasi proses secara berkala untuk meminimalkan fluktuasi dan mengurangi persentase susut. Hal ini akan membantu meningkatkan profitabilitas dan stabilitas operasional. Analisis lebih lanjut perlu dilakukan untuk mengidentifikasi faktor-faktor yang mempengaruhi fluktuasi harian dalam produksi dan penjualan. Pemahaman yang lebih baik tentang faktor-faktor ini akan memungkinkan perusahaan untuk membuat perencanaan dan pengambilan keputusan yang lebih efektif.

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STRATEGI PENJUALAN APLIKASI UNTUK MENGEMBANGKAN BISNIS SECARA EFEKTIF

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Pendahuluan

Dalam era transformasi digital, aplikasi telah menjadi ujung tombak dalam strategi bisnis modern. Perusahaan dari berbagai sektor memanfaatkan aplikasi tidak hanya sebagai alat layanan pelanggan, tetapi juga sebagai kanal utama untuk akuisisi, retensi, dan monetisasi pengguna. Namun, memiliki aplikasi saja tidak cukup. Strategi penjualan yang terstruktur, terukur, dan berbasis data sangat diperlukan untuk memastikan aplikasi tidak hanya diunduh, tetapi juga digunakan secara aktif dan menghasilkan keuntungan.

Seiring meningkatnya persaingan di dunia digital, bisnis perlu mengevaluasi pendekatan penjualan mereka untuk aplikasi secara komprehensif. Penjualan aplikasi yang sukses mencakup pemahaman menyeluruh tentang perilaku pengguna, optimalisasi konversi dari pengguna gratis ke pengguna berbayar, serta pemanfaatan kanal promosi dan distribusi yang tepat. Oleh karena itu, penelitian ini mengkaji strategi penjualan aplikasi berbasis data dan statistik guna mendorong pertumbuhan bisnis berkelanjutan. Melalui analisis statistik seperti *z-score*, *confidence interval*, distribusi probabilitas, dan teknik *sampling*, pendekatan ini menyajikan gambaran yang mendalam tentang efektivitas strategi yang diterapkan.

Permasalahan Yang Akan Ditangani

- Bagaimana efektivitas saluran penjualan aplikasi saat ini?
- Sejauh mana promosi dan kampanye penjualan memengaruhi pertumbuhan pengguna?
- Apakah terdapat hubungan antara jumlah unduhan dan retensi pengguna?
- Strategi penjualan apa yang paling berdampak terhadap pendapatan?

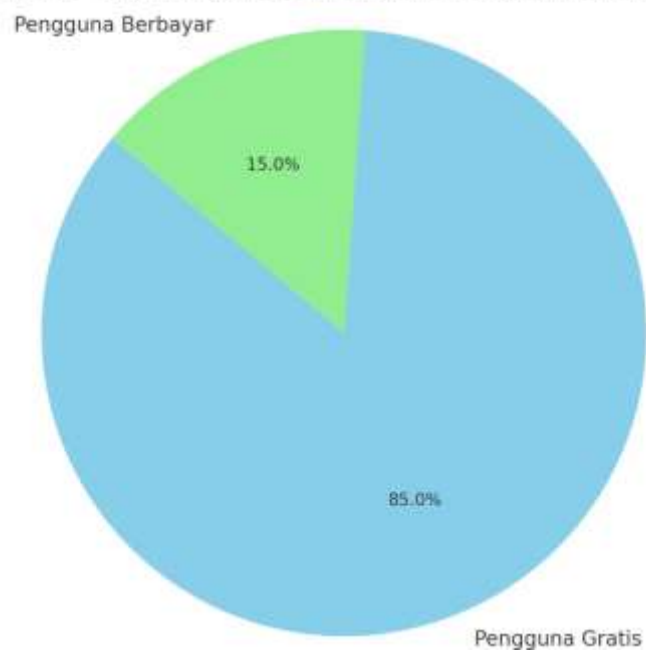
Analysis

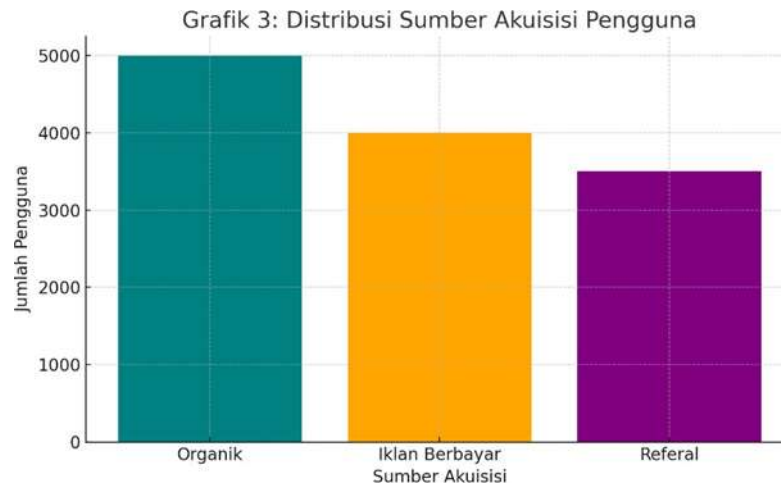
Data Overview:

- Periode: Januari – Maret 2025
- Total Unduhan Aplikasi: 12.500
- Rata-rata Unduhan Harian: 139 unduhan
- Total Pengguna Aktif Bulanan (MAU): 6.000
- Konversi ke pengguna berbayar: 15%



Grafik 2: Tingkat Konversi Pengguna Gratis ke Berbayar





Confidence Interval (CI)

- Rata-rata unduhan harian: 139
- Standar deviasi: 35
- $n = 30$ hari
- CI 95%: $CI = 139 \pm 1.96 \times (35 / \sqrt{30}) \approx 139 \pm 12.52$ CI = [126.48; 151.52]

Z-Score

Untuk mengukur pertumbuhan unduhan:

- Sebelum kampanye (Des 2024): rata-rata 98 unduhan/hari
- Setelah kampanye (Feb 2025): rata-rata 142 unduhan/hari
- $\sigma = 30$, $n = 30$ $Z = (142 - 98) / (30 / \sqrt{30}) = 44 / 5.48 = 8.03$

$Z = 8.03 \rightarrow$ Peningkatan signifikan secara statistik ($Z > 1.96$)

Probability Analysis

Target: 150 unduhan/hari $Z = (150 - 139) / 35 = 0.314$ $P(X \geq 150) = 1 - P(Z \leq 0.314)$

$= 1 - 0.6239 = 0.3761$ atau 37.61%

Central Limit Theorem

Menganalisis distribusi rata-rata unduhan mingguan ($n=7$ hari):

- Mean = 139, SD = 35

- SD sampel = $35 / \sqrt{7} = 13.23$ Distribusi rata-rata unduhan mingguan akan mengikuti distribusi normal.

Sampling Techniques

Menggunakan *stratified random sampling* berdasarkan saluran akuisisi (organik, iklan, referral) untuk memastikan representasi data akurat.

Kesimpulan

Strategi penjualan aplikasi terbukti memiliki pengaruh signifikan terhadap pertumbuhan pengguna dan pendapatan. Kampanye pemasaran yang ditargetkan berhasil meningkatkan unduhan dan konversi. Dengan menggunakan analisis statistik seperti *Z-score*, *confidence interval*, dan distribusi probabilitas, strategi ini dapat divalidasi secara kuantitatif dan ditingkatkan secara berkelanjutan.

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OPTIMIZATION OF INSTA BEAUTY CENTER MARKETING STRATEGY TOWARD RAISING SOCIAL MEDIA ENGAGEMENT AND MARKETPLACE SELLING

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ABSTRACT

This research analyzes the significant improvement of Instamoist's digital marketing performance in the period March-April 2025. Using a comprehensive statistical approach, the study showed that the strategy of quality content, KOL optimization, and targeted promotions resulted in an 18% growth in followers and a 4.78% increase in marketplace conversions. Through confidence interval, Z-score, and probability distribution analysis, the study confirmed the statistical significance of the changes. The findings provide a foundation for the development of more effective and scalable digital marketing strategies for skincare products in the Indonesian market.

Introduction

The digital age has radically transformed the marketing landscape, especially for the beauty and skincare industry. Social media and marketplaces are no longer just transaction platforms, but have become integrated ecosystems that shape consumer perceptions and purchasing decisions. In this context, digital marketing strategy optimization becomes a crucial element that can determine the success or failure of a brand Instamoist, as a skincare product released by Insta Beauty Center beauty clinic, has shown significant growth in social media engagement and marketplace sales during the period of March 10 to April 15, 2025. This growth did

not happen by chance, but was the result of the implementation of a well-planned and targeted marketing strategy.

In Indonesia's highly competitive skincare industry, differentiation through effective digital marketing strategies is becoming increasingly important. According to recent data, more than 96% of small businesses rely on social media in their marketing strategy, with users spending an average of 143 minutes every day on social media platforms. This creates both opportunities and challenges for brands like Instamoist to maximize visibility and conversion.

This study aims to analyze the factors that contributed to the increase in social media engagement and sales of Instamoist marketplace during the period, focusing on three main aspects: content strategy, Key Opinion Leader (KOL) optimization, and promotional program effectiveness. Using a data-driven quantitative approach, the study will provide an in-depth understanding of the relationship between digital marketing activities and measurable business outcomes.

Issues to be Addressed

In an effort to optimize the digital marketing strategy for Instamoist skincare products, several key issues need to be identified and analyzed:

Content and Engagement Strategy

The first challenge is determining the most effective type of content to increase social media engagement. Instagram as the main Instamoist platform offers various content formats of Posts, Reels, and Stories each with different characteristics and engagement potential. The key question is: which content formats generate the highest engagement and how to optimally allocate resources to maximize user interaction?

KOL Collaboration Effectiveness

Collaboration with Key Opinion Leaders (KOLs) has become a key strategy in marketing skincare products. However, measuring the effectiveness and return on

investment (ROI) of these collaborations remains a challenge. How to identify the right KOL for Instamoist? Is the number of followers or the level of engagement more important? How to measure the direct impact of KOL collaboration on awareness, traffic and sales conversion?

Promotion Strategy Optimization for Conversion

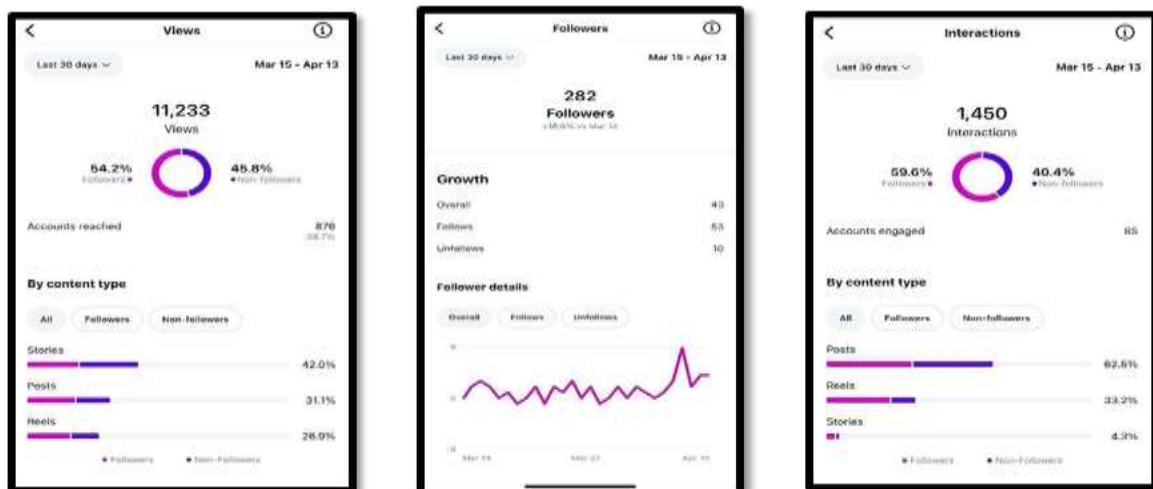
While social media engagement is important, conversion to sales on the marketplace is the primary goal. The third challenge is to identify the most effective promotional strategies to increase conversions. Do discounts, product bundling, or time-limited promotions yield the best results? How to optimize the customer journey from awareness on Instagram to purchase on Shopee?

Correlation Measurement Between Metrics

The fourth issue relates to measuring the correlation between social media metrics and marketplace sales. Does an increase in followers and engagement on Instagram always positively correlate with an increase in sales on Shopee? How to measure and optimize this relationship for better business results?

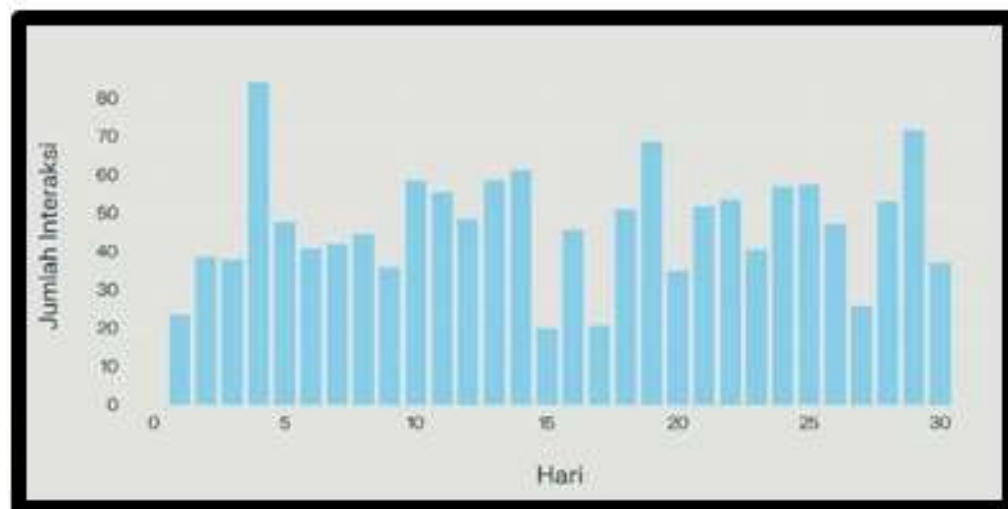
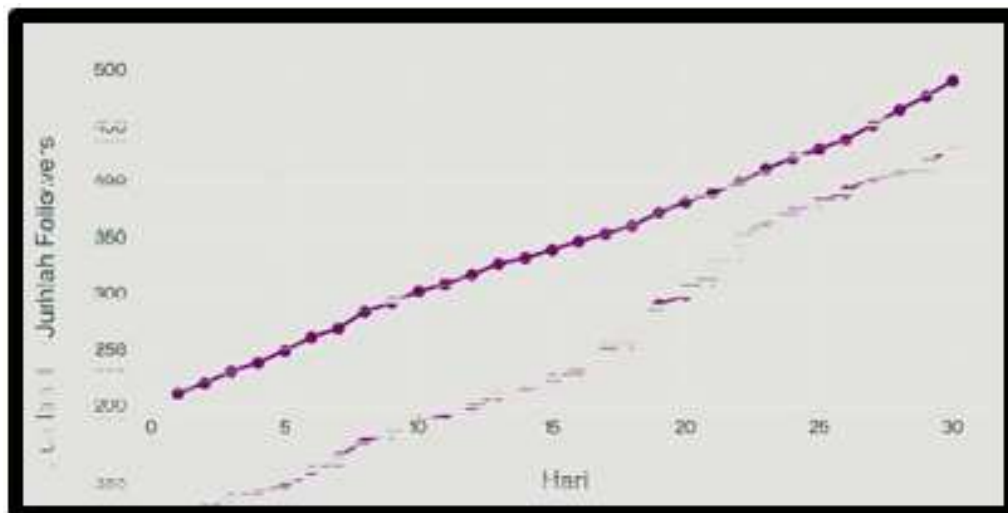
Understanding and addressing these issues is crucial to developing a comprehensive and measurable digital marketing strategy that will ultimately drive sustainable growth of the Instamoist brand.

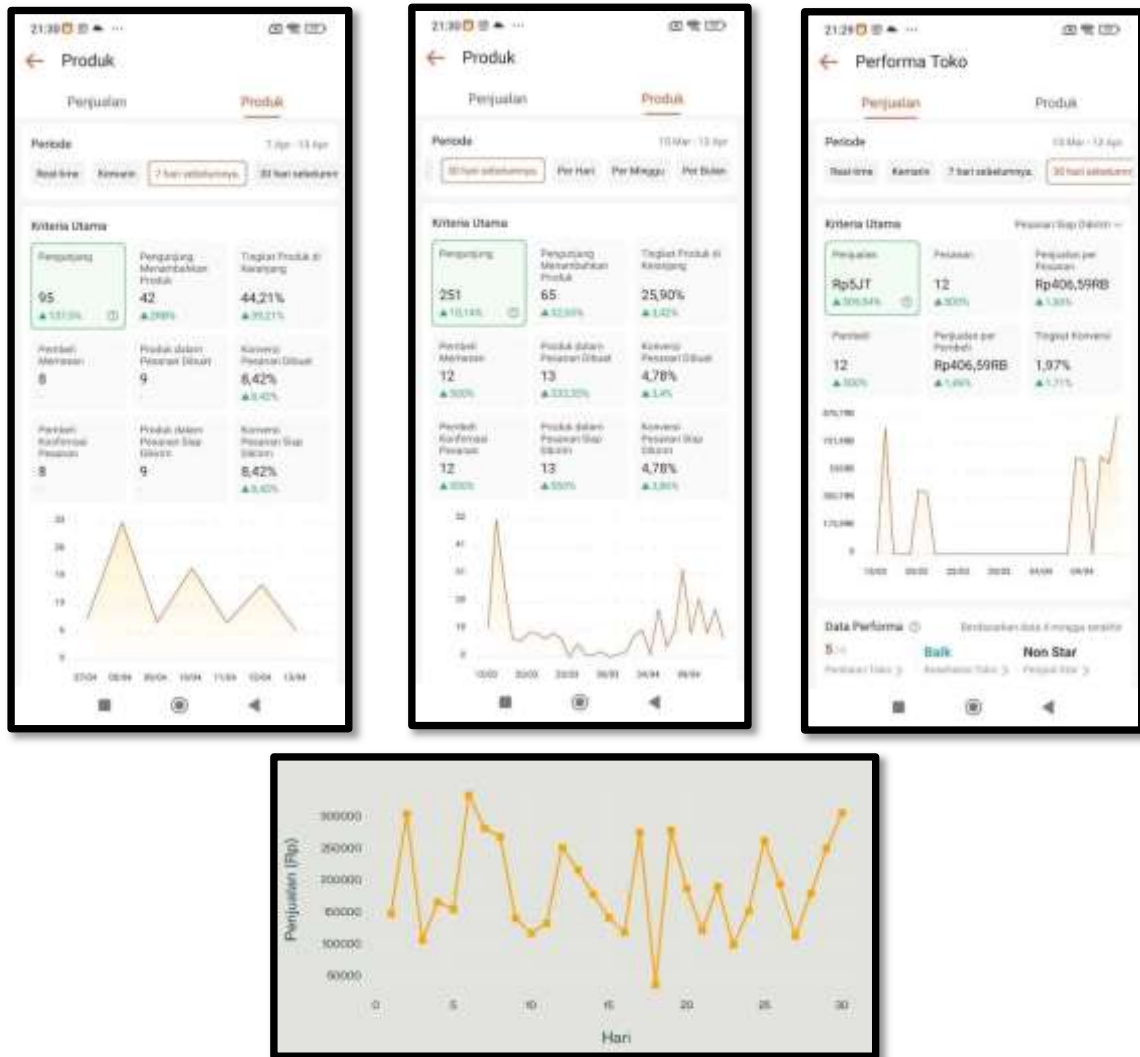
Analysis with Graphs



Based on Instagram data from March-April 2025, Instamoist achieved 11,233 views, 1,450 interactions, and an increase of 282 followers (+18.0%)². Segmentation analysis showed that 54.2% of views came from followers and 45.8% from non-followers, while for interactions, followers contributed more significantly with 59.6% compared to 40.4% from non-followers.

Posts had the highest engagement rate (62.5%), followed by Reels (33.2%), and Stories (4.3%)². This finding indicates that educational and informative content in the Posts format is more effective for skincare products that require detailed explanations of benefits and usage.





Data from Shopee shows a significant increase in store performance. Total sales reached IDR5 million with a 309.94% increase compared to the previous period. The number of orders increased by 300% to 12 orders, with an average transaction value of IDR 406,590 per buyer, a 1.66% increase from the previous period.

Conversion metrics also showed a positive trend, with the conversion rate of orders placed reaching 4.78%, an increase of 3.4% from the baseline. The conversion rate for ready-to-ship orders reached 4.78%, indicating that all orders created were successfully converted into final purchases.

Confidence Interval Analysis

To evaluate the statistical significance of increased social media engagement, a

confidence interval analysis was conducted on the average daily Instagram interactions during the study period. With data:

- Average daily interactions: 48.33 interactions
- Standard deviation: 12,5
- Sample size: 30 days
- Confidence level: 95%

Confidence intervals are calculated using the formula:

$$CI = \bar{x} \pm z_{\alpha/2} \times \frac{\sigma}{\sqrt{n}}$$

$$CI = 48,33 \pm 1,96 \times (12,5/\sqrt{30})$$

$$CI = 48,33 \pm 4,47$$

$$CI = [43,86; 52,80]$$

This means that, with a 95% confidence level, the actual average daily interaction falls between 43.86 and 52.80. This relatively narrow interval indicates good precision in estimation and high reliability of the data.

Similarly, the confidence interval for the average daily sales on Shopee was calculated:

- Average daily sales: IDR166,667
- Standard deviation: IDR 85,000
- Sample size: 30 days
- Confidence level: 95%

$$CI = Rp166,667 \pm 1.96 \times (Rp85,000/\sqrt{30})$$

$$CI = IDR166,667 \pm IDR30,389$$

$$CI = [Rp136,278; Rp197,056]$$

With a 95% confidence interval, we can conclude that the average daily sales are actually between Rp136,278 and Rp197,056. This interval provides the basis for realistic sales projections and more accurate marketing strategy planning.

Z-Score Analysis

The Z-score is used to measure how statistically significant the changes in key

metrics are compared to the previous period.

For Instagram follower growth:

- Average growth of followers/day in the previous period (μ_0): 3,2
- Average growth of followers/day in the current period (x): 9,4
- Standard deviation (σ): 2,8
- Sample size (n): 30

$$Z = (x - \mu_0) / (\sigma / \sqrt{n})$$

$$Z = (9,4 - 3,2) / (2,8 / \sqrt{30}) \quad Z = 6,2 / 0,511$$

$$Z = 12,13$$

With a Z-score value of 12.13, which far exceeds the critical value of 1.96 for a 5% significance level, it can be concluded that the increase in followers' growth is highly statistically significant and not the result of random fluctuations.

For increased conversions on the marketplace:

- Average conversion of the previous period (μ_0): 2%
- Average conversion of the current period (x): 4,78%
- Standard deviation (σ): 1,2%
- Sample size (n): 30

$$Z = (4,78\% - 2\%) / (1,2\% / \sqrt{30}) \quad Z = 2,78\% / 0,219\%$$

$$Z = 12,69$$

With a Z-score of 12.69, it can be concluded that the increase in conversion rate is highly statistically significant. This confirms that the implemented marketing strategy has a real impact on consumer buying behavior.

Probability Distribution Analysis

Probability distribution analysis helps estimate the likelihood of achieving certain business targets based on historical data. Assuming daily sales follow a normal distribution (bell-shaped curve):

- μ = IDR166,667 (average daily sales)

- $\sigma = \text{IDR } 85,000$ (standard deviation) The daily sales target is Rp200,000:

$$Z = (200.000 - 166.667) / 85.000 = 0,39$$

Based on the standard normal distribution table, the probability of achieving sales $\geq \text{Rp}200,000$ is:

$$P(X \geq 200,000) = 1 - P(Z \leq 0.39) = 1 - 0.6517 = 0.3483 \text{ or } 34.83\%$$

This indicates that with the current marketing strategy, there is a 34.83% probability of achieving or exceeding the daily sales target of Rp200,000. This understanding enables setting realistic business targets and allocating resources accordingly.

Using the Central Limit Theorem, we can also analyze the distribution of sales averages for longer periods (e.g. monthly), which will tend to approximate the normal distribution even if the daily data is not normally distributed.

Conclusion

Based on the comprehensive analysis that has been conducted, several important conclusions can be drawn about the optimization of Instamoist's marketing strategy:

Content and Engagement Strategy

Content in the Posts format proved to be the most effective in generating engagement, contributing 62.5% of total interactions. Followers generated a higher proportion of views (54.2%) and interactions (59.6%) than non-followers, indicating that building a loyal community is a worthwhile investment for sustained engagement.

KOL Collaboration Effectiveness

The 18% increase in followers over the study period with a Z-score of 12.13 shows high statistical significance². The surge in follower growth coincided with the implementation of the new KOL collaboration strategy, confirming the effectiveness

of this approach in increasing brand awareness and appeal.

Promotion Strategy Optimization

The increase in conversion from 2% to 4.78% (Z-score 12.69) demonstrates the effectiveness of the promotional strategy implemented. The sales peak coinciding with the launch of the product bundling promotion indicates consumer sensitivity to added value, not just price discounts.

Correlation Between Metrics

The analysis shows a strong positive correlation between increased engagement on Instagram and increased sales on Shopee. The narrow confidence intervals for both metrics ([43.86; 52.80] for engagement and [Rp136,278; Rp197,056] for sales) indicate high reliability in estimation and consistency in performance.

Projections and Probabilities

With the current marketing strategy, there is a 34.83% probability of achieving a daily sales target of Rp200,000 or more, indicating a significant increase in potential revenue. This probability distribution provides a foundation for more effective strategic planning and resource allocation.

Overall, the marketing strategy optimization implemented by Instamoist during the March-April 2025 period proved effective in significantly increasing social media engagement and marketplace sales. An integrated approach that aligns content strategy, KOL collaboration, and targeted promotions has resulted in measurable and statistically significant growth.

Strategic Recommendations

Based on the research findings, the following are recommendations for further optimization of Instamoist's marketing strategy:

Content Strategy Optimization

- Focus resource allocation on developing educational and informative Posts that are proven to generate the highest engagement

- Increase integration of user-generated content (UGC) to enhance authenticity and credibility
- Develop a structured content calendar with optimal distribution between educational, entertaining and promotional content.

KOL Program Development

- Prioritize collaboration with micro-influencers who have high engagement rates over macro-influencers with low engagement rates
- Implement a more sophisticated attribution system with unique codes for each KOL to measure ROI with more precision
- Develop a long-term ambassador program to build consistency and trust

Promotion Strategy Refinement

- Expansion of product bundling strategies that have proven effective with variations tailored to different consumer segments
- Implement a tier-based loyalty program to encourage repeat purchases and increase customer lifetime value.
- Develop exclusive offers for Instagram followers to strengthen the connection between the social platform and the marketplace

Utilization of Advanced Analytics

- Investment in more advanced analytics tools for more comprehensive customer journey tracking
- Systematically implement A/B testing to optimize campaign elements and landing pages.
- Develop predictive models based on historical data to forecast trends and opportunities more accurately

Marketing Channel Diversification

- Exploration of additional social media platforms such as TikTok that have high potential for skincare products
- Consider additional marketplaces besides Shopee for risk diversification

and reach expansion

- Develop a personalized and measurable email marketing strategy to build direct relationships with consumers

Implementation of these recommendations is projected to result in further improvements in social media engagement and marketplace sales, with a higher probability of achieving sales targets and more precise confidence intervals for key metrics.

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REVIEWING THE EFFECTIVITY OF TRAVEL POLICY FOR DOMESTIC'S FLIGHT

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Introduction

Airline has implemented a dynamic pricing strategy since 1980, to maximize revenue and at the same time also to stay competitive, because dynamic pricing allows airlines to adjust their pricing point based on the customer's demand. In many cases, airline has multiple classes such as, first class, business class, premium economy class and economy class, on those classes they keep multiple sub-classes with the different benefits and restrictions*, how is it affecting corporation's or individual's budget? Almost many corporations or individuals are glued to the ideas that "to get the cheapest fare you need to purchase far ahead in advance" and that last minute purchase is for sure will be more expensive compared to the purchase the ticket in advance, the fact is that dynamic pricing is not as simple as purchasing first, some times airlines also give last minute deals to maximize their airline capacity* which at the end will reduce the airline's operation's cost.

We thought after covid-19 hits, it will change the consumer behavior especially on the air travel part, because of the new normal, the new consumer's behavior such as implementing online video conference and online meeting rather than offline meeting is impacting on the demand of traveling, which will lower or even eliminate the necessity / need for traveling, but according to the ACI Airport Council International, after their investigation from more than 2700 airports in 180 countries, the data by 2024 November shown that the traffic has increased by 8% year on year and the data indicate that if we compared the same month or year to the pre-covid time, the current volume is already surpassing the pre-covid travel needs, which means that even though some corporations or personnel have been trying to reduce their travel needs, still there are more passenger who are travelling. And that is also why it is important

for us to be able to strategize our travel spend to be able to save more money instead of spending more for something which we don't need such as airline's higher sub-classes due to the lower class is already runs out.

The old belief is that the more advance you purchase the opportunity to capture the cheaper class is bigger, but that is not always the case nowadays, in order to maximize airline fleet's capacity sometimes airline runs a last minute deals for the customers, and due to the business planning which often times not being well planned in advance, consumers more often buying on the last minute or same day or one day in advance compared to 10 or 14 days in advance. So what is actually happening? Is it true that the earlier we buy the ticket, the cheaper we get the price?.

In this study we will investigate based on the one company group spending XYZ Group which has 12 corporates under one group, and their spending on average is 5 Billion IDR per month only for travel needs, we will analyze based on their top 10 routes, and their windows of advance purchase, with the same route and the same airline which advance category window shows the best average price. The data which we will analyze is the Air Domestic purchase, due to it is the highest spending of the company which will make our population is high ergo it will support the research result, Exhibit A informs the pie chart of all transaction of the company based on the product type.

The sampling technique used in this study is purposive sampling, which involves selecting the highest volume of transactions—namely, domestic air travel—and choosing the top 10 most frequently purchased routes during the period from January 2022 to December 2024. From the many available advance purchase windows, we categorized this continuous data into several distinct groups to evaluate the effectiveness of the current 7-day advance purchase policy for domestic flights. The classification is as follows:

1. Advance Purchase yang dilakukan dari 0 hari (beli di hari pax terbang) hingga 6 hari termasuk Within 6 Days yang mana masuk kategori Non-Compliant
2. Advance Purchase yang dilakukan dari 7 hari hingga 14 hari termasuk 7-14 Days yang mana masuk kategori Compliant Week 2.
3. Advance Purchase yang dilakukan dari 15 hari hingga 21 hari termasuk 15-21 Days yang mana masuk kategori Compliant Week 3.

4. Advance Purchase yang dilakukan dari 22 hari hingga 28 hari termasuk 22-28 Days yang mana masuk kategori Compliant Week 4.
5. Advance Purchase yang dilakukan dari 29 hari hingga 35 hari termasuk 29-35 Days yang mana masuk kategori Compliant Week 5.
6. Advance Purchase yang dilakukan di atas 36 hari termasuk 36 Above yang mana masuk kategori Compliant Above Week 5.

Non-Compliant means that the traveler or booker are not comply with the travel policy, which is to purchase domestic airline ticket by the latest 7 days in advance, meanwhile Compliant means that the traveler or booker comply with the company travel policy. Exhibit B will show the total of transaction and the advance purchase windows, which shown that most of the travel is purchased non-compliant with the existing travel policy which is to purchase flight above 6 days.

The top 10 routes which we will analyze is:

- a. Balikpapan – Jakarta with 4,459 flights
- b. Jakarta – Balikpapan with 4,407 flights
- c. Jakarta – Pekanbaru with 2,672 flights
- d. Pekanbaru – Jakarta with 2,525 flights
- e. Jakarta – Palembang with 1,097 flights
- f. Jakarta – Surabaya with 1086 flights
- g. Jakarta – Balikpapan – Jakarta with 1078 flights
- h. Palembang – Jakarta with 1031 flights
- i. Surabaya – Balikpapan with 1006 flights
- j. Balikpapan – Surabaya with 983 flights

The top 10 routes along with total transaction number is listed on the EXHIBIT C. If we checked on all those routes, it is shown that 9 of them is having lower on the average price when it is purchased within 0 – 6 days compared to when it is purchased above 6 days, The comparison will be shown on EXHIBIT D, so although the policy suggested to book more than 6 days in advance, the average (mean) price of ticket purchased in advance suggested that it is actually cheaper when we purchase within the 0 – 6 days which is non-compliant.

So which windows of advance purchase is the most ideal to purchase a flight ticket based on those routes? If we compared it to all the flight purchased above 7 days which is categorized as compliant, after further investigation by regrouping the mean, median and mode prices based on the advance purchase windows which is divided into six category which is shown in Exhibit B, we can not really say that the 0-6 Days is showing the cheapest fare, and there is no certain pattern on whether one of the advance purchase window is showing the consistent result of being the cheapest, instead each routes behave differently, for example the routes BPN-CGK, CGK-SUB & BPN-SUB data suggesting that either we buy more than 36 days in advance or the second cheapest is the 0-6 days purchase window, while the routes CGK-BPN & SUB-BPN shown that the mean price is cheapest if its purchased on the window 15-21 Days and then the second cheapest is if it is purchased on the 0-6 days window, while the route CGK-PLM showing that either we should buy it on the 22-28 days in advance, or the second cheapest is 0-6 days. The rest of the routes does not really show a consistent pattern, below in Exhibit H is the comparison of the mean price between the top 10 routes.

Though this dataset doesn't explicitly label seasonality, fare fluctuations around common peak periods (e.g., school holidays or festive seasons) are noticeable. Prior studies—such as the analysis of Brazilian airline fares during seasonal events—support the claim that external factors heavily influence pricing. Similarly, airline type (full-service vs. low-cost) likely affects pricing but wasn't distinguished in our dataset. A simple linear regression was used to determine whether booking earlier leads to lower prices. In several routes, a negative correlation was observed—meaning earlier booking tends to offer better prices. However, the correlation is not strong enough to generalize across all routes. Interestingly, the best prices are not always the earliest. For some routes, the 15–21 day window offered the most consistent balance between price and availability. This suggests that customers who book too early may miss out on periodic promotional fares, some sample of the last minute promo from the airlines shown in Exhibit G

Our findings confirm that ticket pricing is highly dynamic and influenced by booking behavior. While earlier booking often helps, it is not always the most cost-effective strategy, therefore we suggested that the company should review it more flexibly when

it comes to the advance purchase policy, and maybe adjust the policy according to the routes, and the company also can start the trial on the top 3 or top 5 routes.

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Appendix:

Exhibit A:

Row Labels	Count of Product
Tour	99
Hotel International	523
Visa	856
Misc.	1,536
Reschedule	1,873
Air International	3,664
Train	4,597
Hotel Domestic	29,372
Air Domestic	47,126
Grand Total	89,646

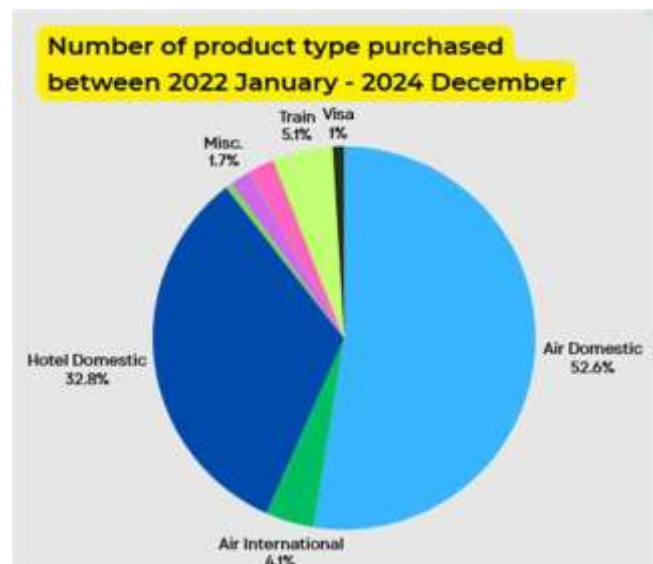


Exhibit B:

Advance Purchase Windows	Category	No. of Trans
Within 6 Days	Non Compliance	38,815
7-14 Days	Compliance Week 2	5,808
15-21 Days	Compliance Week 3	1,176
22- 28 Days	Compliance Week 4	536
29-35 Days	Compliance Week 5	309
36 Above	Compliance Above Week 5	482

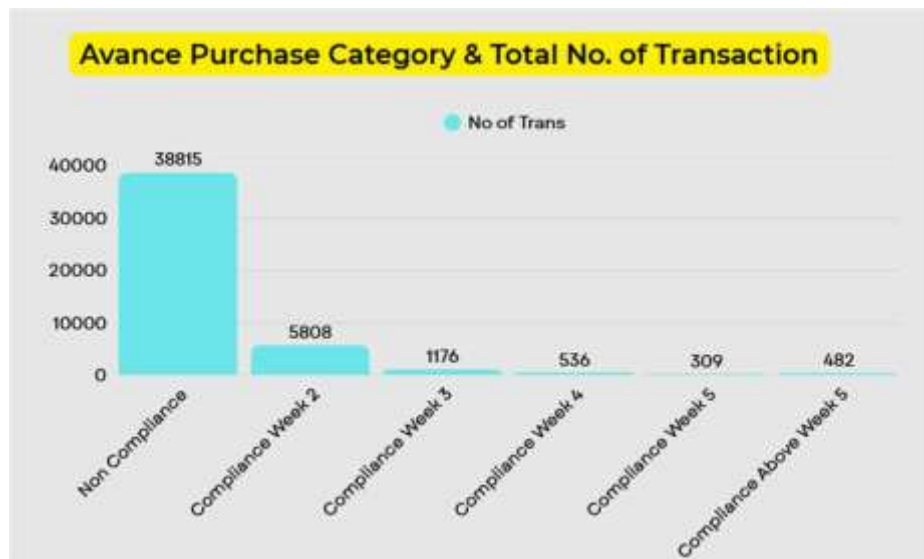
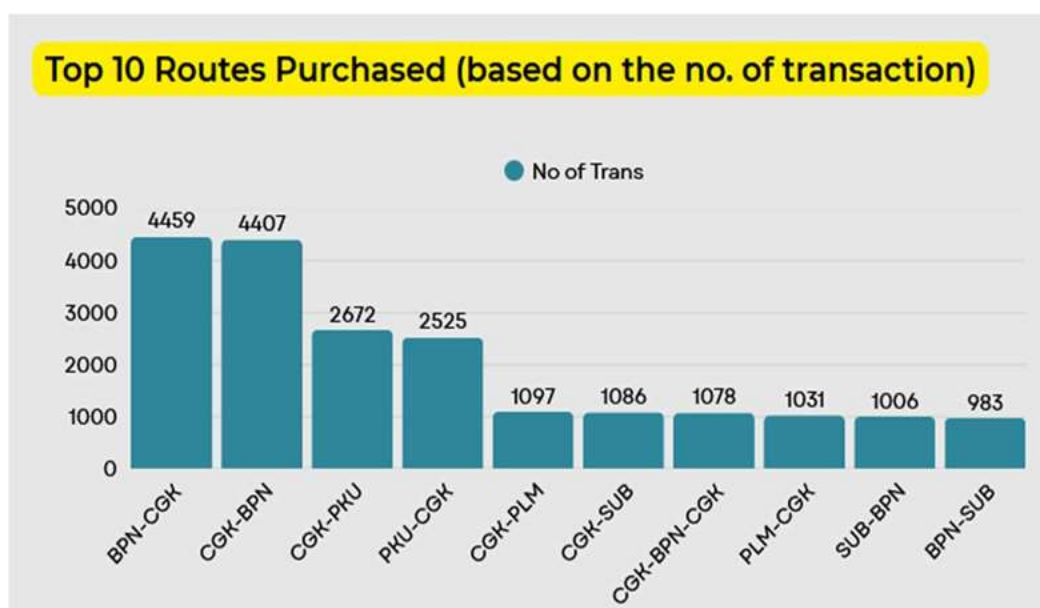


Exhibit C



Routes	Description	No. of Trans.
BPN-CGK	Balikpapan - Jakarta	4.459
CGK-BPN	Jakarta - Balikpapan	4.407
CGK-PKU	Jakarta - Pekanbaru	2.672
PKU-CGK	Pekanbaru - Jakarta	2.525
CGK-PLM	Jakarta - Palembang	1.097
CGK-SUB	Jakarta - Surabaya	1.086
CGK-BPN-CGK	Jakarta - Balikpapan - Jakarta	1.078
PLM-CGK	Palembang - Jakarta	1.031
SUB-BPN	Surabaya - Balikpapan	1.006
BPN-SUB	Balikpapan - Surabaya	983

EXHIBIT D

All Routes

Description	(All)
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Row Labels	Average of TOTAL SALE AMOUNT
------------	------------------------------

Compliant	2,233,167
Non Compliant	1,856,873

Balikpapan – Jakarta (BPN) – (CGK)

Description	BPN-CGK
-------------	---------

Row Labels	Average of TOTAL SALE AMOUNT
------------	------------------------------

Compliant	1,646,329
Non Compliant	1,594,653

Jakarta – Balikpapan (CGK) – BPN

Description	CGK-BPN
-------------	---------

Row Labels	Average of TOTAL SALE AMOUNT
------------	------------------------------

Compliant	1,728,305
Non Compliant	1,703,542

Jakarta - Pekanbaru

Description	CGK-PKU
-------------	---------

Row Labels	Average of TOTAL SALE AMOUNT
------------	------------------------------

Compliant	1,449,813
Non Compliant	1,443,630

Pekanbaru - Jakarta

Description	PKU-CGK
-------------	---------

Row Labels	Average of TOTAL SALE AMOUNT
------------	------------------------------

Compliant	1,491,598
Non Compliant	1,457,712

Jakarta - Palembang

Description	CGK-PLM
-------------	---------

Row Labels	Average of TOTAL SALE AMOUNT
------------	------------------------------

Compliant	1,068,160
Non Compliant	999,223

Jakarta - Surabaya

Description	CGK-SUB
-------------	---------

Row Labels	Average of TOTAL SALE AMOUNT
------------	------------------------------

Compliant	1,322,752
Non Compliant	1,263,395

Jakarta – Balikpapan - Jakarta

Description	CGK-BPN-CGK
-------------	-------------

Row Labels	Average of TOTAL SALE AMOUNT
------------	------------------------------

Compliant	3,703,212
Non Compliant	3,549,320

Palembang – Jakarta

Description	PLM-CGK
-------------	---------

Row Labels	Average of TOTAL SALE AMOUNT
------------	------------------------------

Compliant	980,522
Non Compliant	983,389

Surabaya – Balikpapan

Description	SUB-BPN
-------------	---------

Row Labels	Average of TOTAL SALE AMOUNT
------------	------------------------------

Compliant	1,284,964
Non Compliant	1,213,376

Balikpapan - Surabaya

Description	BPN-SUB
-------------	---------

Row Labels	Average of TOTAL SALE AMOUNT
------------	------------------------------

Compliant	1,338,532
Non Compliant	1,176,475

Exhibit E

Top 10 routes with the detail mean, median and mode price

Routes : BPN CGK			
Windows of Advance Purchase	MEAN Price	MEDIAN Price	MODE Price
Within 6 Days	1,594,653	1,524,580	2,150,580
7-14 Days	1,646,266	1,613,380	2,150,580
15-21 Days	1,640,504	1,530,330	2,150,580
22- 28 Days	1,621,075	1,781,551	2,150,580
29-35 Days	1,922,833	1,473,716	2,150,580
36 Above	1,541,638	1,524,580	1,093,580

Routes : CGK - BPN			
Windows of Advance Purchase	MEAN Price	MEDIAN Price	MODE Price
Within 6 Days	1,703,542	1,674,440	2,199,420
7-14 Days	1,722,139	1,613,380	2,199,420
15-21 Days	1,630,288	1,523,686	2,199,420
22- 28 Days	1,807,689	1,864,971	2,199,420
29-35 Days	1,877,209	1,706,056	1,701,880
36 Above	1,838,221	1,841,839	2,199,420

Routes : CGK - PKU			
Windows of Advance Purchase	MEAN Price	MEDIAN Price	MODE Price
Within 6 Days	1,443,630	1,363,280	1,363,280
7-14 Days	1,442,934	1,363,280	1,963,820
15-21 Days	1,429,913	1,300,647	1,963,820
22- 28 Days	1,486,371	1,442,080	1,963,820
29-35 Days	1,483,505	1,520,880	1,963,820
36 Above	1,528,482	1,612,500	1,678,580

Routes : PKU - CGK			
Windows of Advance Purchase	MEAN Price	MEDIAN Price	MODE Price
Within 6 Days	1,464,382	1,403,300	1,895,000
7-14 Days	1,460,996	1,343,300	1,895,000
15-21 Days	1,510,715	1,343,310	1,895,000
22- 28 Days	1,538,793	1,500,900	1,895,000
29-35 Days	1,832,390	1,737,400	1,895,000
36 Above	1,445,891	1,366,1	1,895,000

37

Routes : CGK - PLM			
Windows of Advance Purchase	MEAN Price	MEDIAN Price	MODE Price
Within 6 Days	999,223	984,797	1,259,320
7-14 Days	1,047,571	1,025,367	976,480
15-21 Days	1,393,183	1,259,320	1,786,100
22- 28 Days	867,415	736,780	736,780

29-35 Days	1,259,320	1,259,320	1,259,320
36 Above	1,175,231	1,259,320	1,259,320

Routes : CGK - SUB			
Windows of Advance Purchase	MEAN Price	MEDIAN Price	MODE Price
Within 6 Days	1,263,395	1,220,061	1,653,720
7-14 Days	1,302,851	1,334,781	1,653,720
15-21 Days	1,449,565	1,452,216	NA
22- 28 Days	1,281,780	1,281,780	NA
29-35 Days	1,653,720	1,653,720	1,653,720
36 Above	1,182,001	1,164,561	1,164,561

Routes : CGK - BPN - CGK			
Windows of Advance Purchase	MEAN Price	MEDIAN Price	MODE Price
Within 6 Days	3,549,320	3,820,900	4,295,000
7-14 Days	3,682,299	3,775,600	4,259,500
15-21 Days	4,099,262	3,530,260	4,259,500
22- 28 Days	3,701,080	3,980,541	4,259,500
29-35 Days	3,499,300	3,499,300	0
36 Above	3,261,238	3,135,860	2,410,652

Routes : PLM - CGK			
Windows of Advance Purchase	MEAN Price	MEDIAN Price	MODE Price
Within 6 Days	983,389	993,200	1,199,470
7-14 Days	961,891	994,800	1,199,470
15-21 Days	1,043,429	1,171,200	1,199,470
22- 28 Days	823,992	823,992	0
29-35 Days	0	0	0
36 Above	0	0	0

Routes : SUB - BPN			
Windows of Advance Purchase	MEAN Price	MEDIAN Price	MODE Price
Within 6 Days	1,213,376	1,208,780	1,595,080
7-14 Days	1,227,139	1,192,756	1,595,019
15-21 Days	1,160,043	1,144,355	822,430
22- 28 Days	1,595,019	1,595,019	1,595,019
29-35 Days	1,469,028	1,455,594	1,444,929
36 Above	1,504,972	1,479,228	1,427,776

Routes: BPN - SUB			
Windows of Advance Purchase	MEAN Price	MEDIAN Price	MODE Price
Within 6 Days	1,176,475	1,145,469	1,595,080
7-14 Days	1,326,468	1,273,180	1,595,080
15-21 Days	1,512,775	1,466,270	1,268,517
22- 28 Days	1,495,957	1,595,080	1,595,080

Kang Bana Bana

29-35 Days	1,232,997	1,232,997	NA
36 Above	1,000,163	759,189	759,189

Exhibit F:

Line chart on the mean price of all the top 10 routes against the advance purchase windows

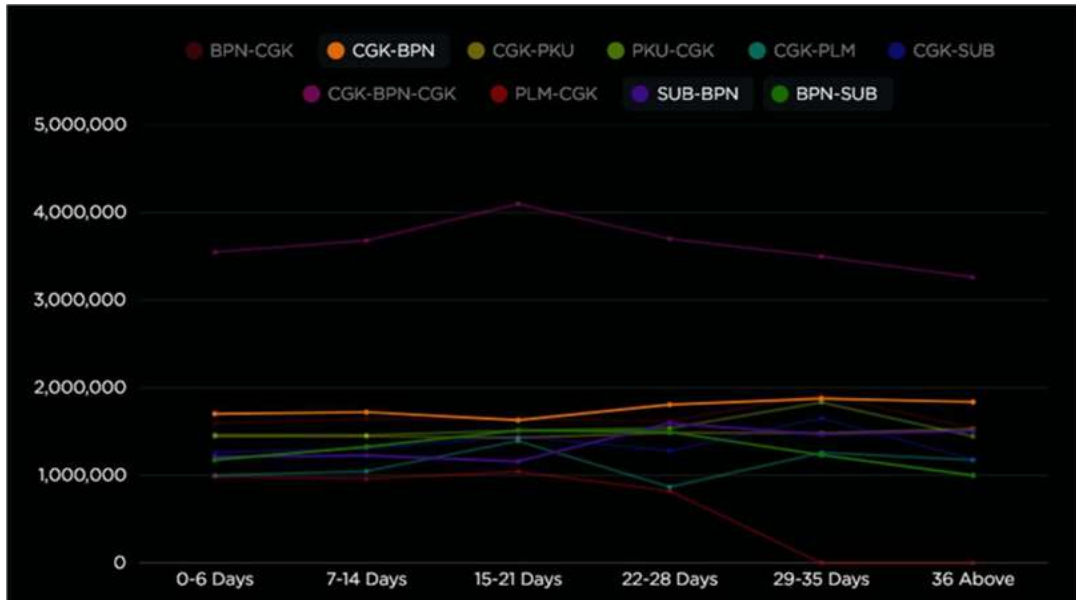


Exhibit G:

Sample of airline's last minute deals

GA INFO
RAMADAN DEALS 2025
Date: 05 February 2023

Dear Partners,

We would like to inform you about Ramadan Deals 2025 with detail as follows:

Program Name	Ramadan Deals
Date of Issue (DOO)	05 February - 10 February 2023
Date of Travel (DOT)	Periods Ramadan: 05 Mar - 15 Apr 2023; Periods Empty Leg Before & After: 01-04 Mar 2023; Empty Leg After: 16-18 Apr 2023
Point of Sale (POS)	All Channels
Account code	Tamara Account Code: 0000000000000000
Product Code (P-Code)	-
Basic Period (B-Code)	-
Remarks	NO OTHERS
Special Benefits	Best Deal and Discount Scheme: 100% Discount
Black Out Date	Refer to latest GA info regarding Black Out Date and Empty Leg Period (ELP) and PBT Routes

GA INFO
SPECIAL PROMO FARE JAKARTA-AMBON VIA PERIODE 10-12 APRIL 2023
Date: 05 April 2023

Dear Partners,

We would like to inform you about Special Promo Fare (SPF-AMQ) via Periode 10-12 April 2023 with detail as follows:

Route	Flight Number	Schedule	Departure	Arrival	Start Price
Jakarta - Ambon	GA 888	Daily	05:00	11:00	IDR 1,854,320
Ambon - Jakarta	GA 887	Daily	18:00	07:00	IDR 1,715,000

Schedule is subject to change at any time.

Please be informed accordingly.
Thank you for your best attention and cooperation.

This book covers the daily lives of us in Business Statistics, and it is also part of the curriculum for the BBA Professional program at IPMI Institute.

It introduces students to the fundamental concepts of business statistics, emphasizing its practical applications in decision -making and problem -solving within the business environment. This introduction serves as a foundation for students to build their knowledge and skills in business statistics, preparing them for challenges in the professional world

This book is covered the importance of business statistics for the daily lives, explains how statistical methods are used to analyze data, identify trends, and make informed decisions, highlights the relevance of statistics in various business functions, such as marketing, finance, and operations. It also covers the real-world applications by demonstrates how business statistics are applied in real -world scenarios, such as market research, financial forecasting, and quality control and to encourages students to think critically about data and its implications for business strategy.

*Kary Guna
Gernang*