



# EXECUTIVE SUMMARY

In today's dynamic and fiercely competitive business landscape, pricing decisions hold the key to success for organizations across industries. As the demand for revenue growth management (RGM) intensifies, pricing analytics has emerged as a pivotal tool in driving profitability and market advantage. This whitepaper dives deep into the concept of pricing analytics, its methodologies, and the transformative impact of artificial intelligence (AI).

In the past, companies often neglected to implement a well-thought-out pricing strategy and instead relied on traditional approaches to adapt to market dynamics and trends. However, times have now changed. With pricing analytics, a company can employ various strategies, such as the contrast principle, decoy effect, revenue boosting, and market capture, to price its product in the most accurate manner. Additionally, pricing analytics also helps optimize product offerings, identify pricing sweet spots, and achieve improved ROI.



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Al has immense potential in revolutionizing traditional statistical models and has the capability to deal with advanced methodologies like Linear Programming Problems (LPP), Thompson Sampling, and reinforcement learning. Cutting-edge Al-backed algorithms can further enhance dataset augmentation, such as Variational Autoencoders (VAEs) and Generative Adversarial Networks (GANs), including TabGAN, CTGAN, GANITE, and TGAN.

The applications of game theory to pricing analytics can yield competitive results for the business. Game theory allows businesses to consider the rational behavior of their customer base and competitors with respect to price changes. By using game theory in conjunction with other analytical methods, businesses can identify the best pricing strategy for their products or services.

As technology continues to advance at an unprecedented pace, pricing analytics assumes a pivotal role in staying ahead of the competition. By embracing the transformative power of AI and leveraging advanced algorithms, organizations can unlock new realms of pricing optimization and capitalize on untapped market opportunities.



Revenue Growth Management (RGM) is a strategic data driven approach which addresses revenue management challenges faced by companies in an increasingly competitive market landscape. These challenges encompass price pressures and reduced profit margins arising from intensified competition among retailers, limited market access due to the consolidation of power among major retailers, declining perceived value and customer satisfaction resulting from an excessive focus on price and volume, and strained company finances due to growing investments in trade promotions and discounts. By adopting an effective RGM approach, companies can achieve a "Perfect Match" - maximizing revenue and profit by strategically aligning branding, packaging, product differentiation, sales channels and game theory backed price optimization based on metrics of demand forecasting, perceived product value, price elasticity, customer segmentation, and competitor pricing analysis.

Recent trends indicate that pricing and product mix account for over 66% <sup>1</sup> of revenue growth for the top 50 FMCG companies globally, highlighting the immense potential for revenue increase through the adoption of RGM.

Furthermore, successful implementation of revenue growth management approach can lead to an increase in EBIT (earnings before interest and taxes) ranging from 2% to 5%² of sales. For a company with a U\$\$5 billion revenue, this translates to newfound profits of U\$\$100 million to U\$\$250 million annually (before interest and taxes). These statistics underscore the significant financial benefits that can be realized

financial benefits that can be realized by effectively implementing RGM strategies, with price optimization playing a pivotal role.



## Cracking the pricing enigma

The art of pricing is finding that perfect balance between profit margin and brand value, where both the business and the customer must win.

While it may seem like a straightforward task, pricing is a critical factor that can make or break a business. Even the slightest miscalculation can lead to significant losses, missed opportunities, or failed product launches.

Take, for example, the case of a leading beverage manufacturing company<sup>3</sup>. In 1985, the soft drink giant decided to launch a new formula to combat the growing popularity of competitor beverage. However, the new product failed miserably, with consumers protesting and boycotting the brand. What went wrong? One of the primary reasons was that the company failed to understand the emotional attachment that customers had to the original formula. By underestimating the customer sentiment, the company lost millions of dollars in revenue and brand equity.

Similarly, the airline industry is highly competitive, with

players vying for market share by offering lower prices. However, pricing too low can also be detrimental. In 2014, a Norway-based airline launched a low-cost long-haul service, offering flights from the US to Europe for as little as US\$99<sup>4</sup>. While the pricing was attractive, the airline struggled to turn a profit and eventually ceased operations of long-haul US to Europe flights, with some experts claiming that the prices were too low to be sustainable.

On the other hand, businesses that have cracked the code of pricing analytics have seen tremendous success. For example, a market leading e-commerce giant uses a dynamic pricing model<sup>5</sup> that adjusts prices in real-time based on demand, competition, and other factors. By doing so, the e-commerce giant can maximize revenue while still offering competitive prices.

With tremendous advancements in AI today, and increasing availability and accessibility of technology, business need to harness the potential of AI quickly, and adapt in a rapidly changing world, or risk falling behind in the growth curve. In a field as complex and challenging as pricing analytics, those who can harness technology, and do it right, can achieve significant success, while those who get it wrong can suffer significant losses.

Crunching the numbers: the vital role of pricing analytics in today's business landscape

Pricing analytics has become an essential tool for businesses in today's highly competitive and rapidly changing marketplace. It can help businesses make informed pricing decisions that maximize profits and drive growth.

Pricing analytics involves using data analysis techniques and software tools to identify trends and patterns in customer behavior, competitor pricing, and market conditions. Businesses can gain insights into customer preferences, price sensitivity, and willingness to pay, allowing them to set optimal prices for their products or services.

It can help businesses to optimize pricing strategies, increase revenue and profit margins, monitor and respond to market trends and improve overall customer satisfaction. In today's data-driven business environment, pricing analytics has become an essential tool for businesses looking to stay competitive and maximize profits.

Pricing puzzles: unraveling the complexities in pricing faced by modern businesses

Pricing decisions pose a complex and challenging task for businesses. Over 30% of these decisions fail to optimize prices, resulting in significant revenue loss. It is remarkable that a mere 1% increase in price can generate a substantial 8.7% surge in operating profits<sup>6</sup>. Embracing an effective pricing strategy becomes a compelling opportunity to enhance revenue and maximize profitability. However, businesses encounter numerous and diverse challenges when it comes to setting prices. These include:

- Understanding customer behavior: One of the biggest challenges in pricing is understanding customer behavior. Customers are often unpredictable and can be influenced by a range of factors, including brand loyalty, price sensitivity, and perceived value. Businesses must conduct thorough research to understand customer preferences and tailor their pricing strategies accordingly.
- Competitor pricing: Competitor pricing can significantly impact a business' pricing strategy. Companies must carefully monitor their competitors' prices and adjust their own prices accordingly. However, blindly matching or undercutting competitor prices can lead to a price war and erode profit margins.
- Cost and profit considerations: Pricing decisions must consider the costs of production and distribution, as well as profit margins.

  Pricing too high can lead to decreased demand, while pricing too low can result in lower profits and the perception of lower quality.
- Lack of data and analysis: Many businesses lack the data and analysis required to make informed pricing decisions. When no access to accurate or updated information, pricing decisions may rely on intuition or outdated assumptions, resulting in less-than-optimal outcomes.
- Changing market dynamics: The pricing landscape is constantly evolving, with changing market conditions, consumer behavior, and competitor activity. Businesses must be agile and able to adapt their pricing strategies to changing market dynamics.

These challenges can make setting the right price a laborious task for businesses.



From human intuition to machine intelligence: a comparison of pricing approaches

Traditional pricing analytics has been around for decades, and it is a well-established method for determining the best price for a product or service. This approach relies on the expertise of pricing managers who use their intuition, experience, and market knowledge to set prices. They may also use market research and competitor analysis to gain insights into pricing strategies.

One of the primary advantages of the traditional approach is that it is intuitive and easy to implement. Pricing managers can quickly make pricing decisions based on their knowledge of the market, and they can adjust prices as needed. This approach also allows for flexibility in pricing, as managers can adjust prices based on market demand and other factors.

However, traditional pricing analytics has its downsides. First, it is subjective, and the expertise of pricing managers can vary widely. This can lead to inconsistencies in pricing decisions, which can hurt the bottom line. Second, traditional pricing analytics is limited by the amount of data that can be analyzed manually. This can lead to missed opportunities for optimization and increased revenue.

On the other hand, the data-driven approach to pricing analytics is a relatively new concept that's gained popularity in recent years. This approach relies on advanced analytics tools and techniques to analyze vast amounts of data and identify patterns and trends. This can include factors such as customer behavior, market trends, and competitor pricing.

This means that pricing decisions are based on datadriven insights, which are less prone to subjectivity and bias. Data-driven pricing analytics can also be more accurate and effective than traditional methods, as it can analyze vast amounts of data quickly and identify trends and patterns that humans might miss. "The difference between a price that is too low and one that is too high can mean the difference between success and failure for a product, a company, or even an entire industry. Analytics is the key to finding that sweet spot." - Tim Laseter, author of "Dynamic Pricing: The Next Frontier in Pricing Strategy"

To illustrate the differences between these two approaches, let us look at a real-life example of success and failure. In the early 2000s, a current subscription video on-demand OTT streaming service was a struggling DVD rental company facing stiff competition from an established rival. Its CEO realized that they needed to transform their business model and focus on streaming video to survive.

The company's pricing strategy was critical to this pivot and in 2011, a major price increase was announced, which angered many of its customers, leading to a significant loss in subscribers. The company had relied on traditional pricing analytics to make this decision, which led to a failure in customer retention.<sup>7</sup>

However, the company quickly pivoted again, this time using a data-driven approach to pricing analytics. They analyzed customer behavior and pricing data and realized that their customers were willing to pay more for better content. They used this insight to launch their successful original content strategy, which has since become a major driver of growth for the company.

In another example, a global consumer goods company used a data-driven approach to optimize pricing for their products. They analyzed sales data and found that they could increase profits by reducing the price of their high-end products and increasing the price of their lower-end products. This strategy led to a significant increase in profits for the company.<sup>8 & 9</sup>



## Unlocking profitability: exploring the diverse approaches to pricing strategy

| Air conditioner (Brand A) <sup>10</sup> US\$ 490.83   | Air conditioner (Brand B) <sup>11</sup> US\$ 436.27 |  |
|---|---|--|
| IT Services 1.5 ton, 4-star, built in PM 0.1 air<br>purifier*, Wi-Fi enabled (Alexa and Hey Google<br>compatible), 39 dB, stabilizer free operation | 1.5 ton, 3-star, 45 dB, stabilizer free operation   |  |
| *Similar specification air purifier average cost: US\$ 181.77   |   |  |

Which one would you buy? Most probably the first one for the better value proposition it offers.

This pricing approach is based on contrast principle, also known as "door in the face" phenomenon- a psychological persuasive approach involving strategic placement of a product to increase its desirability by making it appear cheap or expensive in contrast to similar products.

Businesses constantly keep an eye on competitors' products and price their products based on contrast principle to increase sales.

Often, **contrast principle** is also used in pricing own product line up to increase sales of high profit generating products. A classic example is smart phone pricing. A recently launched flagship phone by a multinational electronics manufacturer<sup>12</sup>, a significant improvement over its previous generation flagship phone<sup>13</sup> is priced at US\$ 1515.28 as against US\$ 1248.59 for previous generation flagship, making it appear cheap considering the richness in experience it offers.

Let's take another example:

| Magazine Plan A<br>US\$59 | Magazine Plan B<br>US\$125<br>(Decoy) | Magazine Plan C US\$125 (Product intended to be sold) |
|---------------------------|---------------------------------------|---|
| Print only                | Web subscription only                 | Print and web access                                  |



Which one would you buy? Most likely the third one.

This is an example of **Decoy effect**<sup>14</sup> - a psychological pricing strategy which enabled a subscription based leading magazine company to register 43% increase in sales with close to 80% customers opting for Plan C (Print and web access).

It works by influencing customers' purchasing preferences, often leading them to buy the product exhibiting highest perceived value.

Here, web subscription only plan was used as a decoy which induced customers to compare US\$125 print only plan and US\$125 print and web access plan. Without a decoy, customers inclination would have been US\$59 print only plan.

Thus, using a simple decoy, the company nudged customers to buy a plan which was more profitable to business.

Companies can choose from a variety of pricing strategies to sell the intended product. Four main pricing strategies are: profit producing, market shaking, revenue boosting, and trailblazing.

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**Profit producing:** The focus is on increasing profit margins by optimizing pricing strategies that drive sales and revenue. This approach involves analyzing pricing data and market trends to identify pricing opportunities and adjust prices accordingly. Profit producers may use dynamic pricing algorithms, cost-plus pricing, and other tactics to maximize profit margins.

Market shaking: It involves using pricing as a strategic tool to disrupt the market and gain a competitive advantage. This approach involves setting prices that are significantly lower or higher than competitors' prices to attract customers or shift market share. Market shakers may use penetration pricing, skimming pricing, or other tactics to disrupt the market and gain a foothold.

Revenue boosting: Revenue boosters focus on driving revenue growth by implementing pricing strategies that maximize sales volume and revenue per customer. This approach involves analyzing customer behavior and market trends to identify pricing opportunities that drive customer loyalty, repeat purchases, and revenue growth. Revenue boosters may use value-based pricing, bundling, and other tactics to optimize revenue growth.

Trailblazing: This approach uses pricing as a tool to pioneer new markets, products, and business models. It involves taking calculated risks and experimenting with new pricing strategies to differentiate from competitors and establish market leadership. Trailblazers may use pay-what-you-want pricing, subscription models, and other innovative tactics to pioneer new pricing models.

Choosing the right pricing strategy depends on factors such as the industry, competition, customer demand, and the company's goals and objectives.





### Revolutionizing pricing strategies: the impact of AI on pricing analytics

Imagine you are the CEO of a company that produces and sells high-end sports equipment. Your team has been working hard to develop a new line of products, and you are excited to bring them to the market. However, you are facing a challenge – how do you determine the optimal price for these products?

This is where technology comes in. Pricing analytics, the process of using data analysis to set prices, has become increasingly sophisticated, thanks to advances in technology. With the right tools and expertise, companies can optimize their pricing strategies and maximize profitability.

Traditional statistical models, such as regression analysis and cluster analysis, also play an important role in pricing analytics. These models enable companies to identify key factors that influence pricing and develop models that predict future pricing trends. For example, regression analysis can be used to identify the relationship between price and demand, while cluster analysis can be used to segment customers based on their purchasing behavior.

While the traditional analytical approaches have been prevalent in determining pricing strategies, the introduction of Generative AI backed by a precise set of algorithms has created an impact among businesses in determining a fine-tuned pricing strategy based on merit of efficient optimization and accuracy.

By employing Generative Al-based data augmentation techniques, the accuracy and reliability of data preprocessing and demand forecasting are enhanced.

Generative AI techniques, including Variational Autoencoders (VAEs) and Generative Adversarial Networks (GANs) such as TabGAN, CTGAN, GANITE, and TGAN, facilitate the expansion of dataset diversity and size through the generation of additional synthetic data points.

This leads to enhanced data pre-processing and improved demand forecasting precision. Consequently, more effective pricing strategies can be developed and implemented, resulting in improved business outcomes and a competitive edge in the market.



For maximizing profit/revenue through optimized pricing, the most effective price optimization approaches are found in Linear Programming Problem (LPP), Thompson's Sampling, and Reinforcement Learning (RL).

Linear Programming Problem (LPP), being a deterministic approach, finds the optimal solution to a linear objective function with linear constraints. It offers a rigorous framework and can be fine-tuned, but clear constraints are crucial for its performance.

Thompson's Sampling balances exploration and exploitation, operating within a Bayesian framework. It handles structured and unstructured, labeled, or unlabeled data, providing probabilistic guarantees. However, it can be computationally expensive and sensitive to prior selection.

Reinforcement Learning (RL) learns optimal behavior through interactions with an environment, adapting to complex and dynamic situations. It explores novel solutions and requires various types of data. RL algorithms need a significant number of interactions for effective learning.

Adoption of Generative AI has revolutionized pricing analytics, providing companies with powerful tools to analyse data and optimize their pricing strategies. Machine learning algorithms, simulation modeling, and Generative AI-based models are all important components of pricing analytics. With the right combination of technology and expertise, companies can achieve maximum profitability and gain a competitive edge in the marketplace.



Mastering the pricing chessboard: the strategic role of game theory in pricing analytics

Game theory is a tool that helps businesses model the behavior of their competitors and make decisions based on that model. It allows businesses to consider the rational behavior of their customer base and competitors with respect to price changes. This strategic approach is like a game of chess, where each move is contemplated with the anticipation of the next.

By using game theory, businesses can identify the best pricing strategy for their products or services. For example, if your competitor lowers their prices, you could either match their price or lower yours even further. Alternatively, you could maintain your current price and focus on marketing your unique value proposition to differentiate yourself from your competitor.

However, it should be used in conjunction with other analytical methods to make informed pricing decisions

Navigating the uncertainty: challenges in using AI/ML in pricing analytics

One of the limitations of statistical models is their assumption that data attributes are mutually independent and normally distributed, which may not always be the case in real-world pricing data. This can result in inaccurate predictions and suboptimal pricing decisions. Another limitation is that statistical models rely on fixed assumptions about the relationship between variables, which may not hold true over time. As a result, these models may not be able to adapt to changes in the market or customer behavior, leading to suboptimal pricing decisions.

In contrast, AI can leverage machine learning and deep learning algorithms to analyze large amounts of data and identify patterns and insights that traditional statistical models may miss. Additionally, AI can adapt to changes in the market and customer behavior, leading to more effective and flexible pricing strategies.

However, the road to pricing optimization through AI/ ML can be a bumpy one, with challenges along the way. From the quality of data to the complexity of models, implementing AI/ML in pricing analytics requires careful navigation of potential pain points.

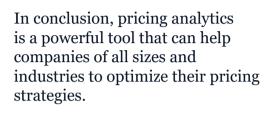


Some of the challenges faced are:

- Data quality: The accuracy and reliability of pricing analytics depend heavily on the quality of data used. If the data is incomplete, inconsistent, or outdated, the accuracy of the pricing analytics can be compromised.
- Model complexity: AI/ML models can be highly complex and require significant computational resources to train and deploy. This can be a significant barrier for smaller companies or those with limited resources.
- Interpretability: One of the key challenges of using Al/ML in pricing analytics is interpretability. It can be difficult to understand why a model arrived at a particular pricing decision, which can make it challenging for businesses to explain pricing decisions to customers or stakeholders.
- Implementation and integration: Implementing AI/ML models for pricing analytics can be a complex and time-consuming process, requiring specialized skills and resources. Integrating these models with existing pricing systems and processes can also be a challenge.
- Cost: Implementing AI/ML models for pricing analytics can be expensive, especially for smaller companies with limited budgets. The cost of data storage, computational resources, and specialized personnel can be significant.

Despite these challenges, the benefits of using AI/ML in pricing analytics can outweigh the pain points. As the technology continues to evolve, the pain points of AI/ML in pricing analytics are likely to diminish, making it an even more powerful tool for businesses of all sizes and industries. By leveraging advanced algorithms and data analysis, businesses can optimize their pricing strategies, increase profitability, and stay ahead of the competition.

# Crafting the future: concluding thoughts on pricing analytics



By leveraging data and advanced algorithms, businesses can determine the optimal price for their products or services, stay ahead of the competition, and increase profitability.

As the legendary chess grandmaster Garry Kasparov once said, "In business, as in chess, it is crucial to anticipate your opponent's moves and think several steps ahead." With pricing analytics, businesses can do just that. By anticipating market trends and customer behavior, and using data to inform their decisions, companies can stay one step ahead of their competitors and achieve long-term success.

In today's rapidly evolving marketplace, it is more important than ever for businesses to take a scientific and data-driven approach to pricing. As technology continues to advance, so too will the capabilities of pricing analytics. By embracing this powerful tool, businesses can unlock new opportunities, optimize their pricing strategies, and achieve their goals. As the famous management consultant Peter Drucker once said, "The aim of marketing is to know and understand the customer so well the product or service fits him and sells itself." With pricing analytics, businesses can do just that.





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<sup>14.</sup> https://matt-rickard.com/decoy-effect



#### **Ahmedabad**

22nd Floor, B Wing, Privilon Ambli BRT Road, Behind Iskcon Temple, Off SG Highway Ahmedabad - 380 059 Tel: + 91 79 6608 3800

#### Bengaluru

12th & 13th floor "UB City", Canberra Block No. 24, Vittal Mallya Road Bengaluru - 560 001 Tel: + 91 80 6727 5000

Ground Floor, 'A' wing Divyasree Chambers # 11, Langford Gardens Bengaluru - 560 025 Tel: + 91 80 6727 5000

Tel: + 91 172 6717800

#### Chandigarh

Elante offices, Unit No. B-613 & 614 6th Floor, Plot No- 178-178A Industrial & Business Park, Phase-I Chandigarh - 160 002

#### Chennai

Tidel Park, 6th & 7th Floor A Block, No.4, Rajiv Gandhi Salai Taramani, Chennai - 600 113 Tel: + 91 44 6654 8100

#### Delhi NCR

67, Institutional Area Sector 44, Gurugram Haryana - 122 002, India Tel: +91 124 443 4000

3rd & 6th Floor, Worldmark-1 IGI Airport Hospitality District Aerocity, New Delhi - 110 037 Tel: + 91 11 4731 8000

4th & 5th Floor, Plot No 2B Tower 2, Sector 126 Gautam Budh Nagar, U.P. Noida - 201 304 Tel: + 91 120 671 7000



#### Hyderabad

THE SKYVIEW 10 18th Floor, "SOUTH LOBBY" Survey No 83/1, Raidurgam Hyderabad - 500 032 Tel: + 91 40 6736 2000

#### **Jamshedpur**

1st Floor, Shantiniketan Building Holding No. 1, SB Shop Area Bistupur, Jamshedpur - 831 001 Tel: + 91 657 663 1000

#### Kochi

9th Floor, ABAD Nucleus NH-49, Maradu PO Kochi - 682 304 Tel: + 91 484 433 4000

#### Kolkata

22 Camac Street 3rd Floor, Block 'C' Kolkata - 700 016 Tel: + 91 33 6615 3400

#### Mumbai

14th Floor, The Ruby 29 Senapati Bapat Marg Dadar (W), Mumbai - 400 028 Tel: + 91 22 6192 0000

5th Floor, Block B-2 Nirlon Knowledge Park Off. Western Express Highway Goregaon (E) Mumbai - 400 063 Tel: + 91 22 6192 0000

#### Pune

C-401, 4th floor Panchshil Tech Park, Yerwada (Near Don Bosco School) Pune - 411 006 Tel: + 91 20 4912 6000

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# CONTACT



N Balaii Partner, Data & Analytics +91 44 6654 8635 +91 9840356452 n.balaji@in.ey.com



Dhivva J Senior Manager, Data Science +91 44 66548170 +91 9790816810 dhivya.j@in.ey.com



**Anirban Datta** Manager, Data Science and Al +91 44 6654 8100 +91 9007774874 anirban.datta1@in.ey.com



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