AI in Marketing
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Week 8
Lecture-40 Pricing Strategies Using AI -I

Welcome to this NPTEL online certification course on Artificial Intelligence and Marketing and now we will talk about module 40. So, as you can see here these four modules are dedicated to understanding pricing strategies using AI. So, this is module 1 and part 1 of this chapter 6 and we will talk about pricing strategies using AI. So, these are the things that we will cover in this module. We will start with an introduction to pricing strategies using AI. Then we will talk about the journey to intelligent pricing and steps to reach the goal and various ways in which AI can assist in pricing.

Now let us start with the first topic, that is pricing strategy using AI. As AI transformation can vastly improve a company's existing data flows and processes and those related to pricing are ideally starting points because they are usually well established but often lack sophistication. A pricing maturity assessment conducted by BCG and the Professional Pricing Society revealed that more than 50% of all industrial goods companies still use Microsoft Excel to build their primary pricing tools and 25% of B-to-B companies use static one-size-fits-all pricing with limited inputs and infrequent updates. These companies are ripe for the kind of steps change that AI can provide.

So large companies often have a patchwork of pricing processes and AI can enable them to raise and then scale their level of sophistication. So, these are revenue benefits from an AI transformation. So, companies with AI initiative in areas other than pricing and companies with AI initiatives that are focused on pricing. So, you see that here it is 1.7 times the change when they are using AI.

A MID BHI survey showed that large companies that undertook AI driven pricing transformation achieved more than $100 million of revenue improvement, 70% more than companies that focused on other areas. So, companies can win many pricing battles with AI. Across industries companies can tackle pricing complexities using advanced analytics approaches that take advantage of AI. Consumer packaged goods companies for example can use insights from AI based products to rethink pricing for their overall brand portfolio. Refine their pack price architecture and improve their mix management by doubling down on products and channels that have higher margins.

CPG companies can also use AI based tools to improve the efficiency of their promotions and tighten their trade terms. B2B companies can employ AI based analytics to mine rich transaction data to find quick wins in terms of incremental price differentiation and improved discounting. They can also use AI based tools to determine price metrics, set price levels and manage price implementation. Companies should identify the battles with the clearest and fastest upside relative to the investments and begin their AI pricing transformation with those. The journey to intelligent pricing.

Generalized set of pricing based on static rules to pricing tailored in real time based on demand, competition, customers' willingness to pay, all run by advanced algorithms and AI. So, this is how this looks like. On the x-axis we have tailored one by one and then here it is general one side fits one size fits all. On y-axis we have systematic and automated, that is the change can be fast. Here it is ad hoc and manual, wait and see.

Now when we when the change is fast and it is tailored then it is called as intelligent pricing. So, price is calculated in real time based on multiple variables such as demand, competition, customers' willingness to pay using advanced algorithms. Now let us look at what this personalized pricing is. So, when we are into ad hoc and manual processing and but tailored by one, so that is personalized pricing. Every single customer gets a specific price to match his or her maximum willingness to pay.

The third is rule based. Again, here it is general and one size fits all and it is ad hoc and manual processing. So that is rule based. Minimum price discrimination based on static rules that is price on weekends higher than weekdays. At this place fourth, where it is systematic and automated fast change, but it is about general and one size fits all.

So that is dynamic pricing. All the customers receive the same price, but prices vary over time. So, this is human generated, mostly transparent pricing. Here it is machine generated, mostly non-transparent pricing. Properly strategized and implemented.

Intelligent pricing can increase margins and support growth. To reach that end here are the few steps to keep in mind. The first is think big, start small and scale fast. Second is build a business case and the third is build on industry norms. Now what is this think big, start small and scale fast.

Use approaches like design thinking workshops to brainstorm an ideal end state for your intelligent pricing strategies. Then put in place a proof of concept or several proof of concept to test ideas for a small product segment or market. The third is scale successfully, scale successful proofs of concepts across the enterprise as quickly as

possible. The second step is to build a business case. Lead with the business case showing the potential revenue and margin growth from intelligent pricing.

Also highlight the benefits and risk related to the hallow effects on customers relationships. Sales teams, partners and customers will all significantly benefit from intelligent pricing in the short and the long term. The third step is to build on industry norms. The trend towards real-time data-driven and more tailored pricing is inescapable. The test for companies will lie in their ability to both masters as extracting value in the B2C space and also scale it to transactions with their B2B and B2C ecosystem partners.

The future of intelligent pricing is one that reaches end to end across the value chain. When this happens, companies will realize the full spectrum of benefits well beyond steering sales and improving margins and revenues. It will increasingly also be leveraged as a powerhouse to foster enduring customer relationships, ecosystem partnerships and ultimately fuel innovation, competitiveness and growth. Now let us understand ways in which AI can assist in pricing. Identify then eliminate the most unproductive customer discounts and segments, freeing up more financial resources and time for those that contribute to profits.

Stopping the leakage of revenues due to sub-optimal expensive customer investment has value at any time. Companies' first priority remains ensuring strong safety protocols for employees and customers. They can then bring order to the discount chaos. To shore up profitable revenues during a downturn, companies will need to avoid unnecessary spending on uncontrolled and unproductive discounts. They should focus instead on high return high return investments in their most valuable customers and identify the growth opportunities with the level or shrinking customer base.

Companies often overlook it due to the long legacy of discounts, rebates and other investments that have not been subject to the kind of scrutiny that management gives to more explicit costs. Plugging the leaks entails such rigorous scrutiny. Determining which investments to make, at what levels and what time and for which customer is a complex task. Which investments, where what time and for whom. So many companies create models of their transaction waterfalls even going as far as analyzing past actions to learn where they might be unintentionally leaking profits.

However, the traditional methods does not answer important questions like are we making investments in the right form? Two, how can we optimize or eliminate unproductive discounts? Three, where should we free up investment to allocate to certain types of customers? An effective approach using segmented statistical analysis to look at the effect of a discount or other customer investment across all variables like product,

geography, customer segments and so on. This analysis can become the baseline for an artificial intelligence supported engine to continuously analyze results and inform trade-offs for different types of investments. It shows that transactions levers contribute most to the profit, which one destroys value and what the pricing waterfall should look like in order to maximize profitable growth. A recent BNN company research brief provides an excellent example of how AI can be used to determine the effectiveness of discounts by customer segments and the type of discount. The brief mentions how focused analysis of discounts can help stop revenue leakage due to suboptimal expensive customer investment.

One building product distributor has benefited from this analysis. For years the company used a wide array of discounts across a diverse product and customer portfolio. Because there was so much overlap and noise in the data, standard business analysis could not confidently flag which investments had a positive return and which were wasted. The company applied segmented statistical analysis to isolate which investments and at what levels and with which customers drove the most incremental profit. For many products and customer segments different types of discounts produced a negative return on investment.

In other cases, different discounts produced a surprisingly high return on investment. By optimizing investments this distributor could get 50% more profit out of the investments using the following tactics. First, immediately eliminate investment in low return customers, namely those that did not respond to incentives in a profitable fashion. Next is to end ineffective discount programs. Of the five major discount programs the company ran only two had a statistically significant effect on profits and the rest of the three were not worthful.

Eliminate discounts on products that resulted in low profit growth or outright loss. Rebalance the spending across the remaining viable discount programs. Using the money saved from these steps increase spending on the highest ROI investments. So, the two graphics summarize the key the briefs key findings. So, this is figure 1 on the left-hand side.

For a building product distributor certain customer segment had similar average discounts but the ROI obtained from each type of discount varied widely. So, you see that on this x-axis we have this quality quantity discount the various types of discounts, quantity discounts, customer tier discount, customer group discount, special discount and discretionary discount. And then there are segments, and this is segment 1. So, the quality discount total weightage was 4.7; customer tier discount minus 0.4 and for customer group discount 1.0; special discount minus 0.3 discretionary discount minus 0.2. So, the

total weighted was -0.2; -0.2; 0.1; 0.4; 0.1; and 0.2. And on the right-hand side of the figure 2 the building product distributors identified a large lift in profit due to optimizing discount.

So, that is per customer annual profit. So, profit with no discount, net impact of traditional discounting, profit with traditional discounts, eliminate discounts to low ROI segments, eliminate low ROI discount types. Then there are eliminating discounts to low ROI product categories, profits after eliminating non-productive investments, optimize across discount types, optimize overall discount level and optimize after profits after optimizing overall discounting. So, these are high confidence and then you have medium confidence. Automating pricing rules with AI in revenue management system to increase the total revenue.

Boston Consulting Group, the BCG found that 95% of successful digital transformation initiatives utilized one or more revenue growth levers. 77% of the given digital transformation's financial impact was achieved through the combined use of 6 revenue growth levers. Improving pricing optimization with advanced techniques including AI has the potential to deliver a 5% increase in total revenues and the 6 levers are as follows. The first lever is targeted selling programs. The second lever is sales channel optimization.

The third lever is sales force activation. The fourth lever is contract improvement. The fifth is price optimization and the sixth lever is revenue assurance. So, what is this first lever that is targeted selling program? Sales of strategic products or services or sales to specific customer segments can be increased by for example, bundling components of existing offerings to meet the needs of target customers. Converting one-time sales to subscriptions or improving the effectiveness of targeted promotions and loyalty programs.

Sales channel optimization. The efficiency of the sales coverage models can be increased by, for example, expanding the size and capabilities of the inside sales function. To better target underserved customer segments, clarify direct sales role such as hunters versus farmers or partnering with third parties to increase penetration in markets with limited sales presence. Sales force activation. The effectiveness of the sales force can be improved by for example, increasing inbound marketing, improving account planning and sales funnel governance and optimizing incentive structures for exceeding sales targets.

Contract improvement. So, contractual agreements can be standardized, and profitability improved by for example, in introducing big data tools and process. Improvements to

simplify and accelerate decision making in contract reviews and negotiations or aligning service agreements with delivery capabilities. Pricing optimization. The sales process can be accelerated, and more value captured through standardized pricing and rigorous pricing discipline. For example, by automatic pricing rules in revenue management systems or enforcing contractual pricing changes.

Revenue assurance. Revenue leakage that is the failure to collect revenue earned from contracted services or products sold can be identified and stopped by for example, applying machine learning and automation tools to quickly find leaked revenues and fix systemic billing issues. So, these are the six revenue levers and their impact. So, as you can see from the left-hand side there are these are the six revenue levers targeted sales program increasing sales of strategic product or services. The second is sales channel optimization that is increasing the efficiency of sales coverage model. The third is sales force activation that is enhancing the effectiveness of the sales force.

The fourth is pricing optimization that is standardizing pricing and improving pricing discipline. The fifth is contract improvement that is improving the profitability of contractual agreements and the sixth is revenue assurance that is identifying and stopping revenue leakages. So, this shows the typical financial impact, and this is the average time of impact. So, in the first the impact was 3 to 5 percent and that happened within 6 to 12 months. In the second, that is the sales channel optimization, the total financial impact was 2 to 3 percent and that happened within 3 to 12 months.

For sales force activation the total financial impact was 2 to 5 percent and the total average time to impact in months was 3 to 12. For the fourth one, that is pricing optimization, the total financial impact was 2 to 5 percent again and the average time to impact was 3 to 9 months. For contract improvement it was 1 to 2 percent and that was between 6 to 18 months. While for revenue assurance the total financial impact was 3 to 5 percent and that happened in 3 to 6 months. So, this light green is low range, and this dark green is high range.

So, this is the high range. Again, these are the high ranges while these greens they are low range. So, it means that in the initial 3 months the impact was less and then it started increasing. Now, implementing the revenue levers. Phase 1 is rapid assessment. Identifying, valuing and prioritizing revenue levers according to which ones will lead the most value and can be implemented quickly.

Phase 2 is quick wins. Designing and executing pilots to test the effectiveness of revenue levers by demonstrating tangible impact. Evaluating lessons learned from pilots and iterating solutions to maximize value capture. Phase 3 is scaling applying the most

effective revenue levers to new geographies, segments or products. Then capitalizing on the many insights transactional data can provide by using AI and machine learning to look for patterns in pricing, volume and mix analysis. The patterns and trending insights in transaction data include new insights every business can use to become more competitive.

Unlocking those insights take an AI based approach to interpreting the price, volume and mix fluctuations often locked within the constraints of transactional data. Combining transactional data analysis and price, volume and mix fluctuations have proven difficult and a challenge to combine in a unified intuitive application. One of the companies having success combining transactional and product mix data using AI is Vindabo. Their approach is noteworthy in how it solved the usability challenges. So, many other price optimization vendors have struggled with.

They have been able to deliver real-time price optimization driven by local market conditions, competitive intelligence and cross-border parameters. AI and machine learning to capture more revenues and profits by finding how, what are given customers willing to pay or optimize price across their customers and product mix. Identify blind spots in pricing, discounts and deal size decisions which are difficult to identify for customers and products using spreadsheets alone. So, the problem lies in the spreadsheets.

So, this is where the problem is. AI and machine learning helps pricing managers analyze whether the existing discounts make sense by correlating deal size to discount made. Identifying outliers where discounts have been granted due to the negotiating insight of the customers. Lack of pricing discipline often results from inertia, poor leadership and affection for the status quo. Especially in the B2B space where everything is negotiated, and customer relationships are hard baked.

That is difficult to change. The change in ownership creates a golden opportunity to shake things up. The process of harvesting quick wins allows the buyers to assess talent and capabilities verifying words with leads. Early opportunities most often show up in three areas. One is understanding customer willingness to pay.

Two is testing if discounts are rational. And the third is probing the price leakage. When value is given away through unintended discounts such as relaxed payment terms or expedited shipping. Many companies leave money on the table because they do not appreciate what a given customer is willing to pay. So, they are not able to understand what a customer is willing to pay.

Or how to optimize price across customers and product mix. So, it is about customer and product mix. And that requires optimization. These blind spots make salespeople timid about demanding price increases over the life of a contract. To define the scope of this problem right away, firms can analyze whether existing discounts are rational by correlating.

By correlating deal sizes to the discount made. This will identify outliers where discounts have been granted due to negotiating with a human of the customer and not the deal size. So, in this figure you can see that the this shows correlating discount and deal size can help determine if a company's discounting behavior is rational. So, here we have small deal sizes and here we have large deal sizes. Here we have high discounts and here we have low discounts. Now you see that in this area where the deal size is low the discounts are also low.

Now this is large. Similar size deals getting highly variable discounts. Similar size deals but getting different kind of discounts. So, the deal size is high, but the discount is varying from low to high. Similarly, these the dots represent customer transactions. These are the various transactions and many small deals with unjustifiable large discount.

So, although the deal size was small, here in this the deal size is small but they are getting high discount. So, these are the areas of concern. Here the deal size is big and the discount is less.

So, again that is a problem. So, these two are the problem areas. So, AI is making it possible to create propensity models by persona and they are invaluable for predicting which customers will act on a bundling or pricing offer. By definition, propensity models rely on predictive analytics including machine learning. To predict the profitability, a given customer will act on a bundling or pricing offer, email campaigns or other call to action leading to a purchase, upsell and cross-sell. Profensity models have proven to be very effective at increasing customer retentions and reducing churn. Every business excelling at omni-channel today relying on propensity models to better predict how customers preferences and past behaviour will lead to future purchases.

With the help of AI, the model can automatically identify the customers which are prone to buying multiple product, single products and those who would not buy at all. And so, based on the profitability, sellers can target and offer different customers with different bundle pricing and also at the same time different discounts. So, these are customer profensities. The following is a dashboard that show how propensity model works.

So, this is the customer profensities and it is shown here on this dashboard. Price

optimization and price elasticity are going beyond industries with limited inventories including airlines and hotels proliferating into manufacturing and services. All marketers are increasingly relying on machine learning to define more competitive, contextually relevant pricing. Machine learning apps are scaling price optimization beyond airlines, hotels and events to encompass product and service pricing scenarios. Machine learning is being used today to determine pricing elasticity by each product, factoring in channel segment, customer segment, sales period and the product's position in the overall product line pricing strategy. We will take the example of Microsoft's Azure Interactive Pricing Analytics per configured solution.

So, PCS is an Azure cloud application providing a set of tools to recommend prices for wholesale and retail products based on elasticity estimates from transaction records of the past sales. It is targeted at mid-size companies with small pricing teams who lack extensive data science support for bespoke pricing analytics models. The Pricing Analytics PCS is an economical, full-featured application driven by the sales transaction history of your business. It discovers products whose prices deviate from optimum and suggests pricing promotion for sets of related products. A pricing manager can examine sales predictions as forecasts, demand curves and cross-product effects as a function of recommended price change then track the effect of the price changes over time on a dashboard.

Given the abundance of historical data, pricing seems ripe for the application of machine learning. However, there are many confounding effects like holidays and promotions. Machine learning tradition prioritizes prediction performance over causal consistency. But pricing decisions need high quality inference about causation.

Causation is most reliably established using randomized control experiments. But experimentation, also known as A-B testing is extremely difficult to set up on existing operations systems. Observational approaches do not require infrastructural changes but tools that guard against the many statistical pitfalls are essential. The core concept is that of price elasticity of demand. A measure of how sensitive the aggregate demand is to price. Self-price elasticity is the percentage lift in sales of a product if you discount it by 1%.

Most consumer product have elasticities in the range of 1.5 to 5. Products with more competitors are easier to substitute away from and will have higher elasticity. Discretionary products are more elastic than staples. Elasticity, that is consumer responses to price varies by current price points, time, sales channel, location, customer segments from product to product and by other considerations. The PCS includes a model

that computes an elasticity for each combination of item, location, channel, segment and week.

Optimal price is any price that optimizes some business objective. The most natural business objective is the gross margin. The difference that is price minus marginal cost. Suppose you sell products with negligible marginal cost that is electronic media then you should lower or raise price until you reach elasticity of minus 1. The elasticity minus 1 you are in equilibrium. You use the dollar worth of sales quantity every time you raise price enough to make a dollar from the higher prices and your gross margin stays the same.

More frequently you have substantial marginal cost. Cost to make one more piece or acquire it from the supplier. Then the constant minus 1 in the calculation is replaced by price upon gross margins also known as inverse learner index. For example, suppose your marginal cost of orange is dollar 4 and you are selling them for dollar 5 making the gross margin of dollar 1. Your inverse learner index is minus 5 as you should increase prices at lower elasticities.

So, where A is more than minus 5 and decrease them otherwise. These are the following example is from Microsoft Azure's interactive pricing analytics pre-configured solutions. So, this is how this Microsoft Azure's interactive pricing analytics pre-configured solution works. So, there are site names and channel names and customer segments. So, there you can tick and and then find out and compare. So to conclude in this module we have first given a brief introduction of how AI is transforming the pricing strategies in the industry.

Then we have studied about the price journey towards intelligent pricing and some steps to achieve the goal. Finally we have gone through the various applications of AI that can assist in pricing and the same thing will be continued in the next module. These are the nine references from which the material for this module was taken. Thank you.