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Innovative modeling methodologies open new doors to profit in the self-storage industry.



Expanding the frontier of pricing, revenue management

By Warren Lieberman

We love our stuff . . . especially those of us that live in the United States.

In fact, many of us pay others to take care of all the items that we don't have room for in our homes and apartments. Many businesses find it convenient to store some of their stuff in off-site facilities. Indeed, comedian George Carlin even observed that the meaning of life is "trying to find a place for *your stuff*" and that "there's a whole industry based on keeping an eye on *your stuff*" [1].

So, how much are we willing to pay others to help us store our possessions? And how much should a self-storage facility charge for the different types of units that many of us need to rent? This article highlights two innovative methodologies designed to provide self-storage operators with critical insights to answer these questions and set prices more profitably and increase revenues – perhaps by as much as 10 percent or more.

These innovations certainly affect a huge market, as there are approximately 50,000 storage facilities in the United States and more than 60,000 facilities worldwide (three times more than there are Starbucks). More than that, the pricing analytics described in this article may well prove applicable to a number of other industries – and if that is the case, it could open a new door to revenue management and dynamic pricing modeling.

The first innovation is termed **Multiple Signal Modeling (MSM)**. MSM lays the foundation for an incremental pricing update process that differs from traditional pricing systems, especially those that are designed to estimate optimal prices. The second is a dynamic pricing methodology termed **Value Pricing** (patent pending). Value Pricing implements revenue management principles in a fundamentally new way. Value Pricing leverages the desirability and value of units that are typically considered similar and sold for the same price, and differentiates how these units are valued by customers. This enables different units (which were previously sold at the same price) to be sold at different prices simultaneously, but does so without requiring differentiated purchase terms and conditions of sale. Historically, revenue management approaches have generally required different purchase terms and conditions to facilitate selling similar products (e.g., an airline seat, a standard hotel room, a certain size self-storage unit) to multiple customer segments, at different prices. Value Pricing offers an alternative way to approach this opportunity and facilitate revenue growth.



Lots of stuff: There are approximately 50,000 self-storage facilities in the United States.

Multiple Signal Modeling

Historically, revenue management systems have been designed based on transaction volumes and their rates. The forecasting and optimization analytics in such systems typically use sales (e.g., reservation) volume forecasts in combination with remaining capacity and time remaining (e.g., days to departure, days to check-in) as the primary basis for recommending pricing actions. High transaction volume, combined with the ability to use information from past events, are critically important characteristics of these industries in terms of enabling the forecasting and optimization analytics to operate with sufficient accuracy to be informative and valuable. Although not always the case, it is worth noting that frequently these analytics provide "optimal" price recommendations.

But not all industries share these characteristics. For example, a typical self-storage facility may have 750–1,000 storage units. These individual units are usually divided into 20–30 different unit types [2]. Each facility may see 30–50 transactions (i.e., new rental move-ins) each month and the number of such move-ins are likely to be highly variable week-to-week and month-to-month, especially at the unit type level. In addition, it is not uncommon for certain unit types to be in high demand, having occupancy rates of 90 percent or greater. So any particular unit size may typically have no more than three to seven move-ins in a month, with many unit types often having no more than one or two move-ins in a month. In self-storage, not only are the markets for each store relatively small, they often exhibit distinct local characteristics. Consequently, demand for a unit type often needs to be estimated by store, so data sparsity as well as data variability can reduce the accuracy of data-hungry forecasting models to less than desired levels.

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After analyzing transaction volume (especially at the unit-type level) and several other factors at individual self-storage facilities, a modeling team at Veritec Solutions adopted an alternative perspective on the goal of a price recommendation model. Rather than focusing on designing a model to estimate the optimal price, the team began by asking the question, “Is the current monthly rental price for unit type X at the right level?” This led to a variety of secondary, clarifying questions that a self-storage operator would want to ask, including:

- Do I need to lower my price to receive additional inquiries and/or move-ins?
- Is my closing rate (i.e., my ability to turn inquiries into move-ins) satisfactory?
- Am I losing too much business to my competitors? How should my price compare to the prices of my competitors?
- Is my availability sufficiently limited that I should increase my price because I will not have any vacancies in this unit type?
- Do I anticipate receiving a seasonal increase in the number of inquiries in the near future (e.g., from college students) so should I proactively increase prices now even though I have many units available?
- Has the occupancy level of this unit type been increasing or decreasing recently?
- How long has it been since the last time I changed my price? Have I given the market enough time to react? If I recently made a price change, have market or competitive conditions changed sufficiently that another rate change is appropriate?

In considering these and other questions relevant to evaluating whether the current price is appropriately set, the team brainstormed quantitative ways to answer them. In doing so, we analyzed conventional

industry practices, seeking to identify those that seemed strong and insightful as well as legacy practices that could yield acceptable pricing decisions likely to be leaving money on the table. Doing so enabled methods and measures to be formulated that were highly credible to industry executives. The team was able to explain the rationale behind the modeling decisions in ways that could be intuitively grasped. Ultimately this allowed for valuable debates and a systematic process to compare and evaluate model-generated price recommendations versus the prices that would otherwise have been implemented.

Staff Skeptical

Self-storage staff, while open to new pricing approaches and excited by the prospect of obtaining data-driven decision support tools, were highly skeptical that an optimal price could be estimated with sufficient precision given all the modeling assumptions that needed to be made. Would a model-based recommendation to raise the price of a storage unit from \$119/month to \$124/month actually be better than raising the price to \$122/month or \$129/month? How would they know for certain? Additionally, staff was concerned about how the knowledge and expertise that they possessed would be incorporated into the pricing process. Unlike many other revenue management systems, whereby analysts primarily influence the forecasts and then rely on the optimization model to identify the best actions, having analysts influence the forecasts was not a particularly good option in self-storage.

Ultimately, these considerations led the modeling team to broadly review current conditions and embrace an incremental pricing strategy, whereby prices are gradually adjusted. These adjustments, either up or down, are made in response to observed, as well as anticipated, changes in demand as well as the business environment.

After considering a variety of modeling options, the team settled on a “multiple signal” approach. Rather than seeking analytics that are driven primarily by transaction volume and provide an optimal price recommendation, the team identified a variety of measures, or signals, that provided insight into whether the current price is (with apologies to fairy tale enthusiasts) too high, too low or just about right. Such measures included competitive pricing position, ability to turn inquiries into sales, supply availability, recent trends in how demand has responded to pricing changes, volume of inquiries and anticipated changes in availability (e.g., due to current customers moving out). In short, we focused on identifying a pathway to the optimal price rather than the price itself.

Using a diverse set of measures, the MSM methodology provided pricing analysts with greater transparency into key metrics. Rather than providing



For many products, a significant number of customers are more “service sensitive” than “price sensitive.” Self-storage is no different.

them with pricing recommendations that were generated from a comprehensive (but often “black-box”) price-demand elasticity model, which can be difficult to interpret under changing business and competitive conditions, the MSM approach enabled the pricing analysts to gain insight into how well they were generating interest in their product and then converting that interest into sales. To the extent that analysts sought to stimulate sales, the individual measures facilitated analyses to evaluate whether, and by how much, price changes would achieve their objective.

For example, when inquiries are converted into sales at very high rates, decreasing price is only effective when the price reduction stimulates additional inquiries. But if this “closing rate” is low, a price reduction might be much more likely to achieve the desired financial impact. Traditional price-demand models have a difficult time capturing and communicating this level of granularity. When supply is limited and demand will necessarily be turned away due to lack of availability, the individual measures support greater understanding into how aggressive analysts might want to be with respect to raising prices.

Veritec designed scoring algorithms for each of the signals and then combined the individual signal measures into a single overall “price pressure” score to use as

the basis for recommending whether a price change is needed, its severity, and ultimately a new price. Recognizing that the reliability and importance of each signal could vary according to different business conditions, the influence of each measure on the price pressure score varies accordingly. For example, under conditions of very high occupancy, the influence of the closing rate signal may be disproportionately reduced as limited availability makes it more likely that a potential customer will not find a satisfactory unit or that the number of recorded inquiries will be systematically biased. The user interface developed for the front-end of the MSM decision support system utilizes color-coding to provide visual cues where price changes are expected to be profitable, to help further focus analyst attention to the right unit types.

Across a range of industries, taking a systematic, data-driven approach to pricing appears to be yielding profit improvements of as much as 10 percent – even more for some companies. Although a low-frequency transaction environment provided the basis for the self-storage modeling decisions, the Multiple Signal Modeling approach could be just as valuable for providing pricing insights in industries that have higher transaction volumes, either as an alternative approach or as a way to supplement existing optimization models.

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Without
data-driven
pricing
methods,
it would not
have been
possible
for a centralized
pricing
group
to take
responsibility
for a
large
portfolio
of stores.

Organizationally, the introduction of data-driven pricing analytics in the self-storage industry has also led self-storage companies to discover that they can obtain better results when assigning pricing responsibility to a single individual or centralized group that focuses on pricing, rather than distributing responsibility to regional staff (e.g., regional vice presidents and district managers) who have a multiplicity of responsibilities – so long as the centralized group has the appropriate reports and decision support tools to manage a portfolio of stores and prices. Across industries, the most effective “pricers” tend to possess strong quantitative and analytical capabilities. Assigning pricing responsibilities to staff that have a wide variety of customer service and operational responsibilities often results in less profitable pricing decisions. Of course, it’s critical to have effective communication channels from field staff to the pricing group regarding local, relevant information when centralizing pricing.

Without data-driven pricing methods, it would simply not have been possible for a centralized pricing group to take responsibility for a large portfolio of stores. Using pricing decision support software based on the MSM approach, self-storage pricing analysts are handling up to five times as many stores as they were previously able to manage. In addition, they are making better pricing decisions.

Senior management is keenly aware of the financial returns made possible by data-driven decision support for pricing. For example, Sovran Self Storage CFO Andrew Gregoire, in reporting the company’s 2014 third quarter earnings, said, “We are pleased with another quarter of solid earnings. Our revenue management system has been driving exceptional top line growth. The system made pricing adjustments during the third quarter in anticipation of the off-peak season, and we are well positioned for strong year-end performance” [3].

Value Pricing

For many products, there are a significant number of customers that are more “service sensitive” than “price sensitive.” Self-storage is no different. Providing customers with a range of options, in which the more desirable units that are currently available are priced higher than other available units, is a very effective way of increasing revenues. The commonly implemented approach in self-storage relies on static unit assignments – that is, specific units are associated with premium

prices. Practices in other industries are often similar. For example, some airlines charge a premium for a set of aisle seats toward the front of economy class. While the premium for such an aisle seat may change, within the set of seats for which a premium is charged, the premium for a specific seat will not vary based on which of the other aisle seats in the same unit group are still available (although the price may vary based on the total number of such seats that are available). A revenue opportunity exists, but it is not capitalized on.

Considering this situation, Veritec designed a methodology, Value Pricing, for dynamically pricing units based on the desirability of the specific units that are available. Rather than simply consider the total number of units available, Value Pricing identifies the specific units that are available within a grouping of units that are typically considered similar and for which the price is the same, analyzes the relative desirability of those units, and prices them in a manner whereby the most desirable units are priced higher than the available units that are less desirable. This enables the company to be price competitive, as the least desirable units within a unit grouping can be priced at the level that is necessary to attract the most price sensitive customers, while simultaneously being able to obtain higher prices for the units within the grouping that appeal to the more service-sensitive customers. Furthermore, this approach empowers customers as it enables them to determine for themselves the extent to which they are price-sensitive vs. service-sensitive and choose the alternative they prefer.

Successfully implementing this program required changes in both store-level business processes as well as in IT systems. The initial implementation of Value Pricing by a self-storage company client resulted in revenue increases of approximately 6 percent from new sales.

Summary

In many ways, pricing analytics are still in their infancy. The two approaches highlighted here could have widespread applicability. For many companies, thinking about all the things that can be done to price units on a more systematic, data-driven basis can be overwhelming, and that can easily lead to taking no action at all. But relying primarily on intuition and experience comes at a great cost in terms of lost revenue opportunity. If systematic pricing does seem like too much to pursue, try taking small steps. Consider one specific aspect of pricing and work on improving your capabilities in that area.

Taking small incremental steps adds up. And so will the increased revenues and profits. **ORMS**

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NOTES & REFERENCES

1. <https://www.youtube.com/watch?v=MvgN5gCuLac>
2. A unit type is a category of similar units, frequently based on a variety of physical attributes such as square footage, length, width, general location in the storage facility, and whether or not the unit is climate controlled.
3. Yahoo Finance, <http://finance.yahoo.com/news/sovrans-self-storage-reports-third-200400250.html>, Oct. 29, 2014.