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# REVENUE MANAGEMENT: A STRATEGY FOR INCREASING SALES REVENUE IN SMALL BUSINESSES

**Jeff Shields**
University of Southern Maine
jshields@usm.maine.edu

## ABSTRACT

*Revenue management is a strategy used by companies in many industries to match products and services to customers in order to increase sales revenues. Although revenue management is well suited to meet some of the challenges of small businesses, there has been no prior research on its use in a small business setting. This paper presents the results from a survey of 76 small businesses on the use and effect of revenue management. The results demonstrate that revenue management is employed by small businesses and that it has a significant and positive effect on sales revenue. The results also reveal practices most commonly engaged in and the extent to which the strategy is applied by small businesses.*

## INTRODUCTION

Revenue management refers to a process of seeking to maximize a business's revenues.[3] It is a system of inventory controls and pricing to manage capacity (Harris & Pinder, 1995) that has been shown to increase revenues (Geraghty & Johnson, 1997; Marmorstein, Rossomme, & Sarel, 2003). Initially developed in the airline industry as yield management (Boyd & Bilegan, 2003), revenue management has spread to other industries, including hospitality, media and broadcasting, retailing, and transportation (Talluri & Van Ryzin, 2004).

Although revenue management has been developed and utilized by large companies, it can be implemented in a simple form that addresses many of the constraints faced by small businesses.

These constraints include scarce resources for marketing and data gathering, a preference for relying on internal rather than external information, and a preference for informal sources of marketing information (Pineda, Lerner, & Miller, 1998; Smeltzer, Fann, & Nikolaisen, 1988). Revenue management may help small businesses to increase their sales revenue.

The empirical evidence on revenue management's characteristics and effects is derived from a mix of anecdotal reports, case studies, and mathematical models, primarily reported in the operations management literature (see Carroll & Grimes, 1995; Cross, 1997; Smith, Leimkuhler, & Darro,1992; Talluri & Van Ryzin, 2004; Weatherford & Bodily, 1992). There has been no research using large samples that offers empirical evidence on how widely revenue management is practiced. Thus, although revenue management represents a

[3]Revenue management here refers to maximizing revenue and should not be confused with the term revenue management as it is sometimes used in financial accounting to designate revenue recognition issues.

potential opportunity for small businesses, there is no empirical evidence to show the extent to which revenue management is practiced in small businesses, much less its effects on them.

In order to address this gap, the current research was guided by the following research questions. First, do small businesses use revenue management practices? Second, if they do use revenue management then to what extent and which elements of revenue management practice do small businesses use? Lastly, how does the use of revenue management affect small businesses?

The findings of this study should offer guidance for the application of revenue management in small business. Knowing the current level and nature of practice provides a benchmark. Efforts to develop a systematic program can use this as a foundation. Identification of the relative importance of the various elements of revenue management will enable a small business owner to implement a tailored program founded on empirical evidence from other small businesses. More information can help small businesses avoid the potential pitfalls that can arise from transferring management practices proven only in big businesses. Most importantly, demonstration of positive effects on revenue from a large sample of small businesses supports a decision to invest in revenue management activities.

In the next section, the practice of revenue management is defined and its elements are outlined. This is followed by presentation of the study's methodology and results of the investigation. Finally, the implications of findings are discussed.

## LITERATURE REVIEW

Revenue management is defined as "an order acceptance and refusal process that employs differential pricing strategies and stop sales tactics to reallocate capacity, enhance delivery reliability and speed, and realize revenue from changes in order responsiveness to maximize revenue from preexisting capacity" (Harris & Pinder, 1995). In simpler terms, revenue management has been defined as "selling the right product to the right customer at the right time for the right price" (Smith, Leimkuhler, & Darro, 1992). It has spread to a broad range of industries such as banking, broadcasting, electric utilities, healthcare, hospitality, printing, telecommunications, and transportation (Secomandi, Abbott, Atan, & Boyd, 2002). Because the existing studies of revenue management practice have been in industries comprised mostly of large service companies and have not focused on small business applications, the following review of the revenue management literature and the examples of practice are, of necessity, drawn from these limited sources.

Revenue management began in service industries with companies that had three characteristics: 1) perishable products; 2) high fixed costs in the form of capacity costs; and 3) the ability to segment customers (Weatherford & Bodily, 1992). For example, airlines have a perishable product – a given flight on a given date to a given destination flies only once – high fixed costs in their investment in fleets of planes, and reservation systems that allow them to track and record data on the characteristics of their customers' shopping and buying profiles. Analysis of these data allows airlines to segment their customers into categories such as leisure and business travelers. Airlines predict the demand for specific flights and adjust fares and seat availability to maximize revenues across customer segments. Seats are withheld for up to a few hours before a flight so that seats are available for business travelers who are traveling at the last minute and who are willing to pay more for those seats than leisure travelers reserving seats several weeks earlier.

While having all three characteristics facilitates revenue management, businesses can practice and benefit from revenue management with only some of the characteristics. Most businesses have limited capacity for providing products and services (e.g., taking orders, shipping, serving customers). Capacity is perishable in the sense that a business spends a given amount of money over a fixed period of time to

provide the resources necessary to engage in activities that produce sales (Elimam & Dodin, 2001). This characteristic of capacity implies that revenue management is appropriate for adoption and practice in many businesses, even very small ones.

**Revenue Management Practice**

Increased revenues in large companies have been attributed to revenue management practices. For example, Marriott estimates that revenue management added $150 million to $200 million to sales of $10 billion in 1996 and added $400 million in 1998 (Marriott & Cross, 1997; Tomplin, 1999). Some airlines have seen revenues increase by seven percent as a result of revenue management applications (Marmorstein, Rossomme, & Sarel, 2003). In another example, National Rental Car attributes a $54 million turnaround in its revenues to implementing a revenue management system (Geraghty & Johnson, 1997).

Revenue management practice can be broken into four elements: 1) tracking customers' demand for products and services by accessing and recording data; 2) analyzing these data and segmenting customers; 3) targeting customers according to their differential demand and limiting supply by demand; and 4) pricing according to each segment's willingness to pay (Cross, 1997; Talluri & Van Ryzin, 2004; Weigand, 1999).

Revenue management practice begins by tracking customers' demand. Companies in a variety of industries track customer demand for products and services by using reservation and data warehouse systems (Berman, 2005; Graham, 1998; Talluri & Van Ryzin, 2004). The tracking of customer data concerning demand, shopping habits, and buying is facilitated by technologies such as ATM machines, debit cards, point-of-sale scanners (barcodes), websites, and reservation systems. These kinds of systems provide companies with a ready source of data to analyze their customers.

The second element of revenue management practice is the analysis of the data gathered on customers and then the identification of customer segments (Talluri & Van Ryzin, 2004). Analysis of data can reveal information such as profitability and patterns of differential demand (Talluri & Van Ryzin, 2004). Segmentation is key to discovering differences in willingness to pay among customers that can then be used to increase revenue (Weigand, 1999). Criteria for segmentation will vary by industry. Examples include segmentation of customers by the number of nights stay (one night versus several nights) and room type (number of beds, view) as practiced by hotels or segmentation of customers by reservation date (30 days versus day of flight) as practiced by airlines (Talluri & Van Ryzin, 2004). Segmentation based on customer data also can facilitate the construction of models that predict demand for products and services across different customer segments (Talluri & Van Ryzin, 2004; Weigand, 1999).

The third element of revenue management involves targeting customers according to their differential demand and limiting supply by demand. Companies use the information they have on differential demand to design new products and services to target specific customer segments' needs (Talluri & Van Ryzin, 2004). For example, banks use data mining to build models to identify customer segments and then to identify those customers who are most likely to purchase new product offerings (Hormozi & Giles, 2004).

Limiting supply by demand involves using inventory controls. The ability to alter supply by customer segments according to current forecasts of demand is important to effective revenue management (Geraghty & Johnson, 1997). For example, hotels manage the supply of rooms by length of stay; there are fewer rooms available for reservations for customers wanting to stay one night during peak mid-week times than those wanting to stay multiple nights (Marriott & Cross, 1997).

Pricing according to each customer segment's willingness to pay (i.e. demand) constitutes a fourth element of revenue management practice. Given limited

capacity, using inventory controls to limit supply according to demand across customer segments reserves supply for those customer segments willing to pay more (McGill & Van Ryzin, 1999). Pricing according to customer segment demand is facilitated by inventory controls that create barriers among customer segments with respect to price (Geraghty & Johnson, 1997). Inventory controls allow the use of pricing policies, linked to demand forecasts from a data warehouse, to increase revenues. An example of this practice can be seen in Marriott's use of daily demand forecasts to adjust the rates on 160,000 hotel rooms in Marriott, Courtyard, and Residence Inns according to length of stay and length of advance purchase (Marriott & Cross, 1997).

Pricing also can be used to bring demand and supply into balance instead of changing the level of capital investment (Weigand, 1999). For example, in locations that serve mainly business travelers during the week and have lower utilization rates on weekends, rental car companies offer lower prices on weekends (Gearghty & Johnson, 1997). In another case, companies in the delivery industry balance supply and demand during peak demand times (e.g., holiday gift-giving times) by raising rates instead of adding expensive capacity (Weigand, 1999). Prices typically are increased during busy periods (e.g., a restaurant's dinner periods on Fridays and Saturdays) and decreased during slow times in order to shift price sensitive customers from periods of high demand to periods of low demand (Cross, 1997). However, the use of pricing according to demand as an element of revenue management practice may be limited by customers' perceptions of fairness. Evidence suggests that pricing according to demand appears to be more accepted in some industries (e.g., airlines, rental car, hotel) than in others (e.g., restaurant, entertainment) (Kimes & Chase, 1999; Kimes & Wirtz, 2002).

The four elements of revenue management practice that have been identified formed the basis for the development of questionnaire measures for this research. In the next section, the methodology employed by this research is presented, including the sample, questionnaire items and administration, and data analysis.

## METHODS

Data were collected by means of a semi-structured mail questionnaire sent to small businesses in a rural county in a mid-Atlantic state. Potential respondents were identified from the business membership list of the local Chamber of Commerce and a list of manufacturing companies from the local Economic Development Commission. These lists were cross-referenced with State tax records to identify current owners. One hundred and ninety surveys were mailed using components of the Tailored Design Method (Dillman, 2000). Two weeks after the initial mailing a reminder note was sent. Two weeks later, an additional survey was sent. A total of 87 surveys were returned for an overall response rate of 46%. Of these 87 responses, 76 were usable. Non-response bias was measured by comparing the early responders with the later responders. No evidence was found that there were any significant differences.

### Measures

Because no known prior research has examined the use of revenue management in small businesses, questionnaire measures were developed for this study. Measures of revenue management assessed small business owners' use of the different elements of revenue management practice identified in the literature. The characterization of these elements was adapted as necessary to reflect a small business orientation. Items were generated from the revenue management literature.

The questionnaire response scales are seven-point Likert-type scales with response categories ranging from "Strongly Agree" to "Strongly Disagree." Scales were constructed from questionnaire items by using confirmatory principal component factor analysis, using an olbimin rotation with Eigen values greater than one. Items included for a factor loaded at .50 or greater on that factor. After refinement, Cronbach's

alpha was used to assess the reliability of the final scales.

**Accessing Data**

For the revenue management practice element that addresses accessing customer data, respondents were asked, "To what extent do you use the following methods to gather information from your customers?" The items were factor analyzed and a three-factor solution that explained 64 percent of the variance emerged. Cronbach's alphas were run on each of these scales. Only the first factor had an acceptable reliability score (Nunnally, 1978) so the other two were excluded from further analysis (see Table 1). This scale, Accessing Data, includes the following items: "email from customers," "letters from customers," and "telephone calls from customers."

**Table 1 – Descriptive Statistics ($N = 76$)**

| Variable | Theoretical Range | Actual Range | Mean | Standard Deviation | Cronbach Alpha |
|---|---|---|---|---|---|
| Accessing Data | 1-7 | 1.00-7.00 | 4.00 | 1.64 | 0.76 |
| Analysis & Action | 1-7 | 1.00-7.00 | 3.94 | 1.99 | 0.88 |
| Average Monthly Sales 2000 (x1,000) | $ 0-N.A. | $.583-775 | $90.172 | $166.517 | N.A. |
| Average Monthly Sales 2001(x1,000) | $0-N.A. | $.583-1,000 | $101.203 | $192.170 | N.A. |
| Pricing | 1-7 | 1.00-5.33 | 2.52 | 1.28 | 0.65 |
| Recording Basic Data | 1-7 | 1.00-7.00 | 5.59 | 1.67 | 0.89 |
| Recording Profitability Data | 1-7 | 1.00-6.50 | 3.31 | 1.68 | 0.84 |
| Recording Shopping Data | 1-7 | 1.00-7.00 | 3.95 | 1.94 | 0.92 |
| Revenue Management Practice | 1-8 | 1.15-5.76 | 3.61 | 1.22 | N.A. |
| Segmenting | 1-7 | 1.00-7.00 | 2.57 | 1.87 | 0.92 |
| Targeting | 1-7 | 1.00-6.67 | 2.76 | 1.44 | 0.63 |

**Recording Data**

For the revenue management practice element of recording data about customers, respondents were asked, "To what extent do you record the following information about your customers?" From the factor analysis, a three-factor solution emerged that explained 64 percent of the variance. This resulted in three scales that addressed recording information: Recording Basic Data, Recording Shopping Data, and Recording Profitability Data. The scale Recording Basic Data consisted of the following items: "customer name," "email address," "mailing address," and "telephone number." The scale Recording Shopping Data included: "complaints," "compliments," "frequency of purchases," "number of purchases," "product/services wanted but not available at the time," "products/services wanted but not provided," and "returns." The scale Recording Profitability Data included these items: "annual dollar purchases," "customer specific costs," "demographics," "least preferred product/service features," "most preferred product/service features," and "profitability." The Cronbach's alphas on all three scales were acceptable (see Table 1) (Nunnally, 1978).

**Analyzing and Segmenting**

For the revenue management practice element of analyzing customer data, respondents were asked, "To what extent do

you do the following with customer information?" These responses were factor analyzed, resulting in a two-factor solution that explained 72 percent of the variance. These factors addressed segmentation and analysis and action. The scale Segmenting included these items: "analyze information by category," "count the number of customers in each category," "group customers into categories," and "weigh the importance of categories." The scale Analysis and Action has these items: "review the information," "set goals," "take actions based on analysis," and "track trends." These scales had acceptable Cronbach's alphas (see Table 1) (Nunnally, 1978).

**Targeting and Pricing**

For the revenue management practice element of targeting and pricing, respondents were asked, "To what extent do you do the following to adapt to your customers?" Factor analysis resulted in a two-factor solution that explained 60 percent of the variance. The Targeting scale had the following items: "provide better services to more profitable customers," "set aside products/services for last minute customers for a premium price," and "target specific products/services to certain customers/ segments of customers." The Pricing scale had the following items: "discount prices during slow periods," "mark up prices during busy periods," and "price products/services differently for different customer segments." These scales had acceptable Cronbach's alphas (see Table 1) (Nunnally, 1978).

**Sales Revenue**

The dependent variable of sales revenue was measured to assess the effect of revenue management on small businesses. It was measured by two questions asking respondents for their average monthly sales revenue during 2000 and 2001. Monthly figures rather than annual figures were used in order to increase respondents' propensity to disclose what might be perceived as sensitive financial information on sales revenue.

## ANALYSIS AND RESULTS

The sample consisted of the following types of businesses: service (36%), manufacturing (24%), retail (23%), multiple businesses types listed (11%), and wholesale (1%). Fifty-four percent of the respondents were female and 46 percent were male. Mean sales were $1,214,447 with a range from $6,000 to $9,300,000. The mean number of full-time employees was 10.22.

The first research question asked, do small businesses use revenue management practices? As shown on Table 1, the mean scores for the use of revenue management practices ranged from a low of 2.52 (Pricing) to a high of 5.59 (Recording Basic Data), indicating an affirmative response to the first research question. The mean scores also answer research question 2: to what extent and which elements of revenue management practice do small businesses use? In rank order from most used to least used, revenue management practices included: Recording Basic Data, Accessing Data, Recording Shopping Data, Analysis and Action, Recording Profitability Data, Targeting, Segmenting, and Pricing. A one sample t-test was used to further investigate if small businesses' use of revenue management would be greater than might be expected by chance, using the scale value of 1 (Never) as the test value. As shown on Table 2, the t-test revealed that the means of all of the scales measuring elements of revenue management practice were significantly greater than one.

Pearson correlations were run to examine relationships among the revenue management practices employed by small businesses. Results are shown on Table 3. The correlation results demonstrate that there were positive and significant correlations among the elements of revenue management practice.

The last research question asked, how does the use of revenue management affect small businesses? Regression analysis was used to investigate the effects of revenue management on sales revenue. The eight scales of revenue management (Accessing

Data, Analysis and Action, Pricing, Recording Basic Data, Recording Profit Data, Recording Shopping Data, Segmenting, and Targeting) were the independent variables and monthly sales revenue for 2000 was the dependent variable. As shown on Table 4, the model was significant ($F = 2.73$, $p = 01$) with an Adjusted $R^2$ of .16. Segmenting was significant and positive ($b = 0.44$, $t = 2.92$, $p = .01$).

**Table 2 – Use of Revenue Management**

Panel A: t-test*

| Variable | Mean | Standard Deviation | t | p |
|---|---|---|---|---|
| Accessing Data | 4.00 | 1.64 | 20.62 | .00 |
| Analysis and Action | 3.94 | 1.99 | 11.89 | .00 |
| Pricing | 2.52 | 1.28 | 10.27 | .00 |
| Recording Basic Data | 5.59 | 1.67 | 23.78 | .00 |
| Recording Profitability Data | 3.31 | 1.68 | 11.08 | .00 |
| Recording Shopping Data | 3.95 | 1.94 | 12.05 | .00 |
| Segmenting | 2.57 | 1.87 | 6.85 | .00 |
| Revenue Management Practice | 3.61 | 1.22 | 15.40 | .00 |
| Targeting | 2.76 | 1.44 | 10.24 | .00 |
| * test value = 1 | | | | |

Panel B: Rank Order of Means

| Variable | Mean |
|---|---|
| Recording Basic Data | 5.59 |
| Accessing Data | 4.00 |
| Recording Shopping Data | 3.95 |
| Analysis and Action | 3.94 |
| Recording Profitability Data | 3.31 |
| Targeting | 2.76 |
| Segmenting | 2.57 |
| Pricing | 2.52 |

## DISCUSSION

Large businesses have developed expensive information systems for accessing, recording, and analyzing data on their customers, for segmenting and targeting their customers, and for applying pricing based on differential demand. These companies use data mining to replace the intimate relationships with customers that are a characteristic of many small businesses (Chye & Gerry, 2002). However, revenue management does not have to be implemented at the level of complexity and sophistication of the big businesses in the airline, hotel, and other industries (Lieberman, 1993). The results of this research provide the first large sample evidence that small businesses do practice revenue management. Further, the set of revenue management practices had a significant positive effect on sales revenue. These results provide evidence that small businesses should be practicing revenue management to increase their sales revenue.

The results show that small businesses routinely employ the first element of revenue management. They gather data on their customers, ranging from their addresses to the frequency of their purchases. Small businesses have the capability to access, record, and analyze customer data in order to develop information about their customers, such as their buying and shopping behaviors. This information can be developed by simple activities such as direct or indirect observations of their customers including

**Table 3 – Pearson Correlations (N =76)**

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Accessing Data | | | | | | | | | | | |
| 2. Analysis and Action | .46** | | | | | | | | | | |
| 3. Average Monthly Sales 2000 | 0.14 | .40* | | | | | | | | | |
| 4. Average Monthly Sales 2001 | 0.11 | .42** | .98** | | | | | | | | |
| 5. Number of Customers | -0.21 | -.45** | 0.13 | 0.07 | | | | | | | |
| 6. Number of Full Time Employees | 0.2 | .43* | .85** | .83* | 0.07 | | | | | | |
| 7. Pricing | 0.1 | .32* | 0.06 | 0.05 | -.53** | 0.03 | | | | | |
| 8. Recording Basic Data | .66** | .65** | 0.15 | 0.19 | -.48** | 0.21 | 0.26 | | | | |
| 9. Recording Profitability Data | 0.28 | .68** | -0.01 | 0.02 | -.52** | -0.10 | .41** | .44** | | | |
| 10. Recording Shopping Data | .56** | .75** | 0.23 | 0.25 | -.49** | 0.27 | 0.27 | .62** | .50** | | |
| 11. Segmenting | .35** | .75** | .51** | .50** | -0.15 | .40* | 0.23 | .33* | .52** | .52** | |
| 12. Targeting | 0.1 | .46** | 0.24 | 0.22 | -.35* | 0.18 | .61** | .34* | .38* | 0.29 | .33* |

Level of significance ** = < .01 & * = < .05

**Table 4 – Regression Analysis**

| Independent Variables | Regression Coefficient | t for Variable | F for Equation | Total Adj $R^2$ | VIF |
|---|---|---|---|---|---|
| Accessing Data | -.12 | -0.90 | 2.73*** | .16 | 1.46 |
| Recording Basic Data | -.00 | -0.01 | | | 1.74 |
| Recording Shopping Data | .18 | 1.22 | | | 1.97 |
| Recording Profitability Data | -.21 | -1.45 | | | 1.81 |
| Segmenting | .44 | 2.93*** | | | 2.04 |
| Analysis and Action | .03 | 0.17 | | | 2.89 |
| Pricing | .03 | 0.18 | | | 1.81 |
| Targeting | .10 | 0.69 | | | 1.75 |
| Level of significance *** = ≤ .01; ** = ≤ .05; and * = ≤ .10 | | | | | |

interacting with them in person, over the phone, by letters, or by email. Accessing the data from customers and recording data on their buying and shopping behaviors can be done by keeping a log or using a spreadsheet, without the need for capabilities such as a data warehouse or data mining.

The results of this study show that information is analyzed and reviewed. Small businesses are tracking trends and setting goals, demonstrating the second element of revenue management. However, the results show that customer segmentation was not extensively employed. When customers exhibit different shopping and buying behaviors (e.g., willingness to pay, lead time) then they can be segmented based on these differences (Talluri & Van Ryzin, 2004). The regression results indicate that segmenting is an important revenue management practice. Findings here suggest that some small businesses may not have the capability to take full advantage of segmenting in this fashion or may not yet be fully aware of the benefits of doing so.

The results show that the third element of revenue management, targeting, was not extensively employed. Infrequent use of segmenting would make targeting more difficult because of the lack of distinct groups of customers for targeting efforts. Targeting customers according to their differential demand can be accomplished in small businesses through means such as developing new products and services for different customer segments (e.g., offering expedited service or delivery) or providing better services for more profitable customers (e.g., extra services such as free shipping to customers purchasing high margin products).

The results show that the fourth and last element of revenue management, pricing, was the least extensively employed. Similar to targeting, pricing by segment is dependent on segmenting customers into identifiable groups. The infrequent use of pricing is consistent with prior evidence that pricing according to demand is viewed as unfair in certain industries (Kimes & Wirtz, 2002). The infrequent use of pricing may also represent a reluctance of owners to use this practice. This reluctance is consistent with a written comment from a respondent that, "I treat all customers that same whether they spend $1,000 or $10,000." Despite its infrequent use, pricing can be simple to implement such as raising prices during busy times (e.g., Saturdays) and discounting prices during slow periods (e.g., Wednesdays) to shift differential customer demand (e.g., price sensitivity). Shifting demand in this way increases the sales revenue generated from capacity. Capacity can be set aside in some small businesses in order to service customers willing to pay more to better meet their needs. A small business also can provide profitable customers with better services to extend sales and in an effort to retain these customers.

This study employed a cross section of different types of small businesses, providing a heterogeneous sample that enhances the generalizability of the findings. However, the sample was limited in its overall size and it was drawn from a single location. Future

research should be conducted by replicating the study with a large sample drawn from a different location. Future research can also extend the results of this study. For example, research can investigate the types of information and methods used by small businesses to segment customers, such as what customer attributes or characteristics are employed to delineate segments.

In summary, this research presents evidence that small businesses practice revenue management. Results demonstrate that these practices positively affect sales. This evidence supports the conclusion that "Selling the right product to the right customer at the right time for the right price" (Smith et al., 1992) can be an effective strategy for small businesses.

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**Jeff Shields** is an Assistant Professor of Accounting at the University of Southern Maine. His research interests include management accounting, small business, and entrepreneurship.