Development of A Revenue Management Checklist

Jeff Shields
University of Southern Maine
Portland, ME 04104
Email: jshields@usm.maine.edu

Joyce Shelleman
University of Southern Maine
Portland, ME 04104
Email: jshelleman@usm.maine.edu
Biographical

Jeff Shields is an Associate Professor at the University of Southern Maine. He holds a Ph.D. in Business Administration from the University of Pittsburgh, an MBA from the University of Pittsburgh, and a B.S. in Psychology from Washington State University. His research interests are management control systems, performance measurement, revenue management, and the use of management accounting information by entrepreneurs and small businesses.

Joyce Shelleman is Adjunct Lecturer in the School of Business at the University of Southern Maine and independently counsels small business owners and professionals on leadership issues. Her Ph.D. in Business Administration is from the University of Pittsburgh. Her current research interests are in rural entrepreneurship and small business.

Abstract

This paper develops a checklist for use by small business managers to support revenue management strategy. Based on the revenue management literature and a study of small businesses, the checklist scales measuring major dimensions of revenue management are examined for evidence of construct validity. The findings suggest that the checklist scales are valid measures of small business revenue management practice, with support provided for both their internal and external validity. Results offer small business managers a simple, readily applicable and valid checklist to measure key variables essential to the planning, implementation, and evaluation of their revenue management strategy.
Development of a Revenue Management Checklist

Businesses seek to optimize revenues by practicing revenue management. Revenue management, sometimes called yield management (Boyd & Bilegan, 2003), focuses on inventory and product/service availability in tandem with dynamic pricing decisions. Its use has gradually spread from large businesses in industries such as transportation, hotels, and retailing (Talluri & Van Ryzing, 2004) to small businesses. In fact, small businesses may find that revenue management can assist them in competing with larger firms (Gold, 1964; Pineda et al., 1998; Smeltzer, Fann, & Nikolaisen, 1988; Weinrauch et al., 1991) given its positive effects on sales revenue in small businesses (Shields, 2006). Many small businesses, however, lack the sophisticated technology, staff, and other resources that might facilitate more widespread application of known revenue management strategies. A methodology such as a checklist, that tracks and manages the most critical information required for maintenance of a simple revenue management system, could enable even micro-businesses to take advantage of the potential revenue benefits to be derived from revenue management. A checklist allows for the organization of information and systematic review of progress toward a goal while requiring a minimum of resources to be devoted to its application and upkeep. Many of the large public accounting firms use decision aids such as a checklists in audits where their use has been shown to produce audit results that are more effective, efficient, and consistent (McDaniel, 1990).

Shields (2006) investigated the use of revenue management in small businesses and its effects on sales revenue, revealing practices most commonly employed and the extent to which they are used. Building on the findings from this prior research, the purpose of this paper is to present a valid revenue management checklist that can be employed in practice by small businesses to plan, implement, and evaluate a revenue management strategy. Its results will offer small business managers a simple, readily applicable and valid checklist grounded in empirical evidence to measure key variables essential to their revenue management strategy. The overriding concern of measurement is validity or the degree to which “empirical evidence and theoretical rationales support … the inferences and actions” taken as a result (Messick, 1989, p. 13). Small businesses, often facing limited resources and time, may take significant actions based on the results of checklists and similar measures; therefore, it is incumbent on small business consultants and others who develop and advocate such instruments to seek to ensure their validity.

The next section presents a review of literature on the major constructs associated with revenue management practice. This is followed by development of the checklist, including methods and results; discussion of its validity; implications; and conclusions.

Review of the Literature

Revenue management practices have been associated with increased sales and related outcomes in both large and small businesses. Some airlines have seen revenues increase by seven percent as a result of revenue management applications (Marmorstein et. al., 2003). In prominent examples of well-known companies, 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) while National Rental Car attributes a $54 million turnaround in its revenues to implementing a revenue management system (Geraghty & Johnson, 1997). Higher revenue also has been reported in small rural businesses (Shields, 2006) and revenue management practices are associated with related outcome measures that enable the
generation of higher revenues in small business restaurants (Shields and Shelleman, 2008).

Revenue management is commonly viewed as “...selling the right product to the right customer at the right time for the right price” (Smith et al., 1992). In more technical terms, it has been characterized as a process dealing with acceptance and refusal of orders by employing differential pricing strategies and stop sales tactics to: 1) reallocate capacity, 2) enhance the reliability and speed of product or service delivery, and 3) realize revenue from change order responsiveness (Harris & Pinder, 1995).

The practice of revenue management is employed in a broad spectrum of industries (e.g., banking, broadcasting, electric utilities, healthcare, hospitality, printing, telecommunications, and transportation) (Secomandi, Abbott, Atan, & Boyd, 2002). Because most of its history has been in large businesses, the bulk of the literature on its use is concentrated there and our review of the revenue management literature and examples of practice are, of necessity, drawn from these limited sources.

Three characteristics are associated with companies that first used revenue management:

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, (i.e., 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. Data from the reservations systems allows airlines to
segment their customers into groupings such as leisure and business travelers. With these empirically derived categories, the companies can predict the demand for specific flights and adjust fares and seat availability to maximize revenues across segments. In order to make them available for business travelers who are traveling at the last minute, seats are withheld for up to a few hours before a flight. Business travelers are willing to pay more for those seats than leisure travelers who may have reserved seats many weeks earlier, with the net result of more revenues generated for the airline.

Businesses can practice and benefit from revenue management with only some of the trademark characteristics in place. Many small 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 only a limited sum over a fixed period of time to acquire and transform resources to produce sales (Elimam & Dodin, 2001). Thus, based on capacity limits, revenue management is appropriate for adoption and practice in even very small businesses.

Revenue management practices can be broken into four main elements or categories: 1) tracking customers’ demand for products and services by accessing and recording data; 2) segmenting customers by analyzing those data; 3) targeting customers according to their differential demand and using the demand information to limit supply; 4) pricing according to each segment’s willingness to pay (Cross, 1997; Talluri & Van Ryzin, 2004; Weigand, 1999).

Tracking

The process begins with tracking customers’ demand. Customer demand for products and services is tracked with the use of reservation and data warehouse systems (Berman, 2005; Graham, 1998; Talluri & Van Ryzin, 2004). Tracking customer data with regard to demand, shopping, and buying is facilitated by technologies such as ATM machines, debit cards, point-of-sale scanners (barcodes), websites, and reservation systems. Where available, such systems offer companies an accessible source of customer data.

Analysis
After customer data are collected, a second element of revenue management practice is the analysis of the data gathered, followed by identification of customer segments (Talluri & Van Ryzin, 2004). Information on profitability and patterns of differential demand become apparent through analysis (Talluri & Van Ryzin, 2004). By segmenting customers into groups based on their preferences, businesses can discover differences in willingness to pay. These differences can then be exploited to increase revenue (Weigand, 1999). Criteria for segmentation often vary by industry. For example, in a hotel, customers may be segmented by the number of nights they stay (e.g., one night versus several nights) and by room type (e.g., number of beds) (Talluri & Van Ryzin, 2004).

**Targeting**

Targeting customers according to their differential demand and limiting supply by demand is the third major element of revenue management. Information on differential demand can be applied 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). The ability to alter supply by customer segments according to forecasts of demand is another area important to effective revenue management (Geraghty & Johnson, 1997). Limiting supply by demand involves using inventory controls. For example, hotels manage their inventory of rooms by length of stay so that typically customers wanting to stay one night during peak mid-week times have fewer rooms available for reservations than those wanting to stay multiple nights (Marriott & Cross, 1997).
**Pricing**

The fourth major element of revenue management practice is pricing according to each customer segment’s willingness to pay (i.e., demand). Applying inventory controls to limit supply according to demand across customer segments reserves supply for the customer segments who are willing to pay more (McGill & Van Ryzin, 1999). 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).

Rather than altering capital investment, pricing can be used to bring demand and supply into balance as well (Weigand, 1999). For example, rental car companies often reduce prices on weekends in locations with many business travelers on weekdays (Gearghty & Johnson, 1997). Similarly, delivery businesses balance supply and demand during peak demand times (e.g., holiday gift-giving times) by raising rates instead of pursuing more costly options such as adding capacity (Weigand, 1999). In fact, in many settings, prices tend to be 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).

These four primary elements of revenue management practice identified in the literature formed the basis for the development of the Revenue Management Checklist. Development of the checklist is discussed in the following section of the paper.

**Development of the Checklist**
The validity of an instrument such as a checklist to assess revenue management practices is a consideration to ensure that key variables are not missed or that time and effort are not wasted collecting and analyzing data that aren’t relevant to the issue at hand. When a construct like revenue management is translated into a questionnaire or checklist, implicit assumptions are made about its meaning or domain. The instrument development process tests those assumptions. This examination of construct validity eventually takes place over time with consideration of evidence relative to content (substantive component), the internal structure of the measure (structural component), and its relation to outside variables (external component) (Loevinger, 1957) as the measure is used and results recorded. The purpose of the present study was to examine and to provide preliminary evidence of validity that would facilitate its translation to practice so that small business managers might experience immediate benefit.

The substantive and structural elements, concerned with internal validity, occurred with the development of potential checklist items based on the literature review and the subsequent statistical analysis of the empirical data that produced internally consistent groupings of checklist items, i.e., scales. The last element, addressing external validity, was addressed by examination of correlations and regression analysis that explored the relationship between revenue management practices and sales revenue in small businesses.

The four elements of revenue management practice discussed in the literature review formed the basis for the development of the checklist. Items for the measures were generated from the literature and the wording was adapted as necessary to be applicable to small businesses. Response categories were on seven-point Likert-type scales, ranging from Strongly Agree to Strongly Disagree.

Data were collected from 87 small businesses using a semi-structured questionnaire format administered by mail. Respondents’ annual sales averaged $1,214,447, ranging from $6,000 to $9,300,000, with an average of 10 employees. Thirty-six percent of the businesses were service, 24% were manufacturing, 23% were retail, 11% were multiple business types, 5% were construction, and 1% were wholesale. Slightly over half of the respondents were female (54%).

Following the development of questionnaire items and administration of the questionnaire, item responses were subjected to principal component factor analysis, using an Oblimin rotation with Eigen values greater than one, in order to confirm groups of interrelated items comprising scales. Items included for a factor loaded at .50 or greater on that factor. After refinement, Cronbach’s alpha was used to assess the internal reliability of the final scales.

Gathering Information from Customers
For the revenue management practice element that addresses accessing data or gathering customer information, respondents were asked, “To what extent do you use the following methods to gather information from your customers?” The items were factor analyzed using Principle Components with Oblimin rotation to examine common variance. A three-factor solution that explained 64 percent of the variance emerged; however, when Cronbach’s alphas were run on each of these scales only the first factor had an acceptable reliability score (Nunnally, 1978). This scale, Gathering Information, has three items as shown in the Appendix.

**Recording Information about Customers**

To assess the revenue management element of recording information or data about customers, respondents were asked, “To what extent do you record the following information about your customers?” A three-factor solution that explained 64% of the variance emerged from the factor analysis. This resulted in three scales that addressed recording information: Record Basic Data, Record Shopping Data and Record Profitability Data (see Appendix for items). The Cronbach's alphas on all three scales were acceptable (see Table 1) (Nunnally, 1978).

**Analyzing Information**

With regard to the practice element of analyzing customer data, respondents were asked, “To what extent do you do the following with customer information?” These responses resulted in a two-factor solution that explained 72% of the variance. The factors were labeled Segment and Analyze and Take Action. The resulting scales (see Appendix for items) demonstrated acceptable Cronbach’s alphas (see Table 1) (Nunnally, 1978).

**Responding and Adapting to Customers**
With regard to the revenue management practice element that addressed targeting and pricing in order to respond and adapt to customers, 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% of the variance with scales called Target Products/Services and Price Dynamically (see Appendix for items). The scales showed acceptable Cronbach’s alphas (see Table 1) (Nunnally, 1978).
To examine relationships among the scales, Pearson correlations were run. As shown in Table 2, results demonstrated positive correlations among them, many of which were statistically significant. In addition, correlations were examined between the checklist scales and a dependent variable, sales revenue, that theory suggests is associated with these constructs. Likewise shown in Table 2, the checklist scales demonstrated correlations with average monthly
sales as predicted by theory.

Table 2

<table>
<thead>
<tr>
<th>Checklist Scales</th>
<th>1</th>
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<th>6</th>
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<th>8</th>
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</thead>
<tbody>
<tr>
<td>1. Analyze and Take Action</td>
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<td>2. Average Monthly Sales</td>
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<tr>
<td>3. Gathering Information</td>
<td>.46**</td>
<td>.14</td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>4. Price Dynamically</td>
<td>.32**</td>
<td>.06</td>
<td>.10</td>
<td></td>
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<tr>
<td>5. Record Basic Data</td>
<td>.65**</td>
<td>.15</td>
<td>.66**</td>
<td>.26</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. Record Profitability Data</td>
<td>.68**</td>
<td>.01</td>
<td>.28</td>
<td>.41*</td>
<td>.44**</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7. Record Shopping Data</td>
<td>.75**</td>
<td>.23</td>
<td>.56**</td>
<td>.27</td>
<td>.62**</td>
<td>.50**</td>
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<td>8. Segment</td>
<td>.75**</td>
<td>.51**</td>
<td>.35**</td>
<td>.23</td>
<td>.33*</td>
<td>.52**</td>
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<td>9. Target</td>
<td>.46**</td>
<td>.24</td>
<td>.10</td>
<td>.61**</td>
<td>.34*</td>
<td>.38*</td>
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Note. * p ≤ .05. ** p ≤ .01.

Although the correlations shown in Table 2 suggest relationships among the variables, multiple regression was employed to estimate how well the presumed antecedent revenue management practice factors explain variance in the consequent variable of interest, sales revenues. The checklist scales measuring the elements of revenue management practice were the independent variables and monthly sales revenue for 2000 was the dependent variable in the regression model. As shown in Table 3, the model was significant (F = 2.73, p = 01) with an Adjusted R² of 16.
Discussion

Results of the administration of the questionnaire measuring revenue management practices in small businesses suggest that the Checklist scales are valid measures. The scales map to the four elements of revenue management practice identified in the literature as follows. Gathering Information from Customers (one scale) and Recording Information about Customers...
(three scales) address the domain of the first element, tracking customers’ demand for products and services by accessing and recording data. Analyzing Information (two scales) addresses the domain of the second element, segmenting customers by analyzing those data. The third element of revenue management practice, targeting customers according to their differential demand and using the demand information to limit supply, is tapped by Target (one scale) in the category Responding and Adapting to Customers. Pricing (one scale) in the category Responding and Adapting to Customers addresses the domain of the fourth element, pricing according to each segment’s willingness to pay. These results showing that the data collected from small business managers in response to the scales were confirmed by statistical factor analysis showing distinct dimensions of items suggest that the measure demonstrates substantive validity.

Acceptable internal reliability coefficients, i.e., Cronbach’s alpha, provided preliminary evidence of the internal structure of the scales, suggesting that they are structurally valid measures of the elements of revenue management. Pearson correlations and regression analysis that examined the predictive effects of the revenue management practices on reported sales offers evidence that the measures also demonstrate the external component of validity by relating to other variables in ways predicted by theory. In sum, the questionnaire scales that form the Revenue Management Checklist appear to represent a measure of revenue management practice in small business settings that demonstrates construct validity, including its substantive, structural, and external facets (Loevinger, 1957).

**Implications**

The Revenue Management Checklist developed in this study offers a practical,
inexpensive, and readily applicable tool that can provide the basis for a systematic program to initiate or extend revenue management strategy. It can alert managers to needed changes to their existing operations as well as enable them to better understand the relationship between existing practices and revenue management potential. Identified revenue-advantageous modifications to operations can then be incorporated into the overall revenue management strategy.

For ease of administration, the Checklist can be used as a pencil and paper inventory as shown in the Appendix or it can be automated. An automated version is under development by the authors to offer small business managers the ability to administer the Checklist to multiple employees (e.g., leaders of different product/service lines, locations, etc.) and tabulate their responses quickly at minimal cost.

The first four categories in the Checklist address gathering and recording information about customers. How complete is the existing information that the business routinely gathers about its customers? This can be assessed by filling out the Checklist items for these initial four groups of items. For example, under Part II, Record Profitability Data, a manager should ask, “Are there gaps, such as “Annual dollar purchases?” In this case, the gap can be filled by recording transactions properly. Software such as Quicken/QuickBooks has features that include categories, memos, and tags that can be used to generate a report on annual purchases. The Checklist should stimulate the manager to develop a procedure when he or she uses the software that makes the information available for report generation. Customer Relationship Management software, QuickBooks, or Quicken can be employed to systematically record and expand the information base a business has on its customers. Together Part I, Gathering Information from Customers, and Part II, Recording Information about Customers, identify the
necessary information set that a business should build as part of a revenue management program.

Once a business has Parts I and II of the Checklist in place, i.e., is systematically recording relevant customer information, the business then is in a position to address Parts III and IV. In Part III of the Checklist, the Segment items signal the need to establish categories of customers. These categories should be based on common differentiators among customers that are relevant to that business such as demographics (e.g., age, gender, income) or behavioral-based characteristics (e.g., product use, purchase frequency, convenience, shopping behaviors). Once categories have been created, then the small business manager needs to decide on the importance of the groupings based on factors such as the number of customers in or sales revenues generated by each category. Once this is accomplished, then the information associated with more revenue-critical segments can be analyzed. Relevant information might include items such as these customers’ frequency of purchase, SKUs purchased, products desired but not available (i.e., stock outs, products not stocked), services desired but not available, and complaints.

In Part III, the category Analyze and Take Action guides the process that the manager should take after segmenting customers and the process to follow in taking action by both targeting products/services and pricing for revenue management. Continuing a sequential flow through the Checklist, the outcome of completing Part III of the Checklist, Analyzing Information, will suggest actions addressed in Part IV of the Checklist, Responding and Adapting to Customers.

The section, Target Products and Services, suggests to the manager to take actions to
target products and services for a specific customer segment. For example, in response to feedback from a revenue-critical customer segment about products that are not stocked or available, the manager may wish to expand his or her product line.

Additional actions in a revenue management strategy might be prompted under Part IV, Price Dynamically. Analysis of busy and slow periods might suggest pricing policies such as discounting during slow periods (e.g., hour of day, day of week, quarter of the year). Further, this section prompts a manager to price differently for different customer segments, such as, for example, structuring and offering tiered services. Tiered services allow the customer to choose the level of service for which they are willing to pay. For example, a florist might offer flowers on a cash and carry basis; bouquets with ribbons; bouquets with ribbons and a card; bouquets with ribbons, card, and delivered; or bouquets with ribbons, card, and delivery at a specific date and time.

The Checklist can be applied for three phases of a revenue management strategy and program in small businesses: 1) to plan a program and set goals, 2) to guide implementation, and 3) to evaluate an existing program. The use of the Checklist in a cycle of goal setting, guiding, and evaluating provides a systematic implementation of a revenue management strategy for small businesses that is both efficient and effective.

Conclusion

In conclusion, this paper presents empirical evidence that supports the internal and external validity of the Revenue Management Checklist. The validated Checklist offers small business managers a simple, inexpensive tool that they can employ with confidence to initiate and manage their revenue management strategy.
References


Footnote

1 The data and statistics employed for this study are drawn from Shields, 2006.
Appendix

The Revenue Management Checklist

Introduction

The Revenue Management Checklist inventories and tracks your revenue management strategy. Revenue management is the process of matching your products and services to your specific customers to both better serve them and at the same time to maximize your sales revenue.

By using this checklist, you will identify gaps in your current practices. This information will allow you to take timely corrective actions and expand your procedures to more directly affect revenue. The checklist also will help you to identify appropriate goals for your operations. Frequent monitoring will enable you to adjust goals and implementation strategies as you become more adept at revenue management, your competitive environment changes, and your business grows.

Directions

On the following pages are items describing actions that small businesses often take to implement a revenue management strategy. For each item, simply use the checkbox to indicate with a check (✓) if you currently are engaged in that activity on a regular basis.
The Revenue Management Checklist

**Part I. Gathering Information from Customers**

Indicate whether you use the following methods regularly to gather information from your customers.

**Gather Information**

- [ ] Email from customers
- [ ] Letters from customers
- [ ] Telephone calls from customers

**Part II. Recording Information about Customers**

Indicate whether you regularly record the following information.

**Record Basic Customer Data**

- [ ] Customer name
- [ ] Email address
- [ ] Mailing address
- [ ] Telephone number

**Record Shopping Data**

- [ ] Complaints
- [ ] Compliments
- [ ] Frequency of purchases
- [ ] Number of purchases
- [ ] Product/services wanted but not available at the time
- [ ] Products/services wanted but not provided
- [ ] Returns

**Record Profitability Data**

- [ ] Annual dollar purchases
- [ ] Customer specific costs
- [ ] Demographics
- [ ] Least preferred product/service features
- [ ] Most preferred product/service features
- [ ] Profitability
Part III. Analyzing Information

Indicate whether you regularly do the following with customer information.

Segment

- [ ] Group customers into categories
- [ ] Count the number of customers in each category
- [ ] Analyze information by category
- [ ] Weigh the importance of categories

Analyze and Take Action

- [ ] Review the information
- [ ] Set goals
- [ ] Take actions based on analysis
- [ ] Track trends
The Revenue Management Checklist

Part IV. Responding and Adapting to Customers

Indicate whether you regularly do the following to adapt to your customers.

Target Products and Services
- [ ] Provide better services to more profitable customers
- [ ] Set aside products/services for last minute customers for a premium price
- [ ] Target specific products/services to certain customers and/or segments of customers

Price Dynamically
- [ ] Discount prices during slow periods
- [ ] Mark up prices during busy periods
- [ ] Price products/services differently for different customer segments