Market Orientation and Performance in the Service Industry: A Data Envelopment Analysis

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A cornerstone in the market orientation literature is the relationship between market orientation and performance. However, knowledge is still inadequate about the performance of the most market-oriented firms, because few empirical studies have applied objective performance measures. The market orientation model was tested by using a multi-method approach to measure performance. Two objective performance measures were applied; relative productivity, calculated by data envelopment analysis (DEA) and return on assets (ROA), and one subjective performance measure; perceived profitability compared to key competitors. Based on empirical data from the hotel industry, the results indicate that market orientation has only a modest effect on relative productivity and no effect on return on assets. The strongest effect of market orientation on performance was found when applying the subjective performance measure.

*Keywords:* Market orientation; Performance measurement; Data envelopment analysis; Service industry.
INTRODUCTION

The market orientation literature argues that products should reflect market demand and changes in consumer preferences (Slater and Narver, 1995). Market orientation explains how knowledge about and responses to market demands are related to business performance. Empirical studies indicate a positive link between market orientation and various outcome variables, like financial performance, innovativeness and organizational learning (e.g., Narver and Slater, 1990; Ruekert, 1992; Jaworski and Kohli, 1993; Greenley, 1995; Han, Kim and Srivastava, 1998; Baker and Sinkula, 1999). Despite these findings, other research has produced mixed results concerning the relationship between market orientation and performance (Noble, Sinha and Kumar, 2002). Especially when researchers have applied objective variables to measure performance, they did not find any significant effect of market orientation on performance (Piercy, Harris and Lane, 2002).

Market orientation research relies heavily on perceptual or subjective measures including subjective performance measures. This makes it difficult to advance rigorous analyses of how marketing costs may affect performance (Langerak, 2001). Despite its importance for marketing scholars and practitioners, the theoretical and empirical understanding of the impact and value of the costs associated with market orientation is modest (e.g., Rust, Amber, Carpenter, Kumar and Srivastava, 2004; Anderson, Fornell and Mazvancheryl, 2004). A fair criticism is therefore that there is limited knowledge about the costs of developing market-oriented firms and the corresponding benefits, and furthermore, a need to develop more reliable and valid empirical measures.

The purpose of this study is to test whether the level of market orientation can explain variations in firm performance. The aim is to identify the best performers in a sample of firms by means of data envelopment analysis (DEA). DEA is a method for measuring and
comparing the productivity of a sample of firms. DEA calculates productivity as the ratio between input resources and output results (Banker, Charnes and Cooper, 1984; Bhargava, Dubelaar and Ramaswami, 1994), and the outcome of the analysis is an identification of the most productive or efficient firms in the sample. Testing whether the most productive firms are most market-oriented was done by linking the productivity ratio to market orientation. In addition, an accounting-based performance measure (return on assets) and a subjective, psychometric performance measure (perceived profitability compared to key competitors) are included. This allows a test of the market orientation – firm performance link using a combination of subjective and objective performance measures.

MARKET ORIENTATION AND FIRM PERFORMANCE

Market orientation research has primarily been based on two frameworks (Noble, Sinha and Kumar, 2002). The Narver and Slater (1990) framework defines market orientation as consisting of the three behavioral dimensions of customer orientation, interfunctional coordination and competitor orientation, and a long-term horizon and profit emphasis in the implementation of the three behavioral dimensions. The Kohli and Jaworski (1990) framework is more concerned with market orientation as a process, and views market orientation as having three stages: intelligence generation, intelligence dissemination and responsiveness. Although the two frameworks focus on different dimensions, they have a similar view of the concept of market orientation and how organizations should address market orientation (Noble, Sinha and Kumar, 2002).

The impact of market orientation on performance has been tested in a number of empirical studies. Some have found that market orientation increases business performance (e.g., Chang and Chen, 1998; Narver and Slater, 1990; Slater and Narver, 1994; 2000), while
others have not found significant direct effects of market orientation on performance (e.g., Han, Kim and Srivastava, 1998; Siguaw, Simpson and Baker, 1998). Empirical research are usually based on a combination of single methods and subjective data, including subjective or perceptual performance indicators. Respondents evaluate business performance along dimensions such as profitability, return on assets, sales growth and new product successes. Some studies have also included objective performance measures, but these studies have not revealed any direct impact of market orientation on performance (Han, Kim and Srivastava, 1998; Jaworski and Kohli, 1993).

The empirical linkage between market orientation and performance can thus be questioned. Positive effects of market orientation on performance have only been reported in research that has applied subjective performance measures. A serious obstacle with subjective performance measures is that when firms perceive themselves in relation to customers and competitors, they may in fact overstate their performance (Noble, Sinha and Kumar, 2002), and a false positive relationship is indicated. Therefore, the empirical literature is inconclusive, requiring further studies to enhance our knowledge about the empirical relationship between market orientation and business performance (Noble, Sinha and Kumar, 2002).

At least two different research strategies may be utilized to increase the knowledge in this area. First, research can investigate the mechanisms by which market orientation affects performance (Guo, 2002; Han, Kim and Srivastava, 1998; Hult, Ketchen and Slater, 2005). While most empirical studies have tested the linkage between market orientation and performance, the underlying mechanisms or processes that enable firms to utilize market orientation as a strategy to improve performance are modestly understood. Guo (2002) has introduced a gap analysis framework for service firms, in which service quality is considered as an intervening variable. In a similar vein, Han, Kim and Srivastava (1998) suggested that
organizational innovation mediates the relationship between market orientation and performance, and Hult, Ketchen and Slater (2005) proposed organizational responsiveness to mediate the market orientation – performance link. More research along these lines may further deepen the knowledge about how market orientation can be a tool to increase business performance.

Second, better methods and measures for testing the market orientation – performance link can be developed, especially by developing objective performance measures and using multiple methods of data collection. The main reason for the reliance on subjective performance measures is that objective measures are difficult to gather due to firms’ unwillingness to disclose financial information. The combination of subjective measures and single methods of data collection may affect analyses of the relationship between market orientation and performance due to spurious answers and inflated responses (Campbell, 1982). Such psychometric research may therefore lead to systematic shared method variance that affects the results (Campbell and Fiske, 1959). Examples of studies that have tried to mitigate the problems include Han, Kim and Srivastava (1998), who used both objective and subjective, self-reported performance measures, and Slater and Narver (2000), who applied a multiple respondent design.

This study falls within this second approach as a multi-method strategy is applied. Business performance is measured by the use of both subjective and objective measures as well as multiple data sources. The following three measures are applied: perceived profitability compared to key competitors, productivity, and return on assets. Perceived profitability compared to key competitors is a subjective measure based on perceptual, self-reported data, while productivity and return on assets are objective measures. The productivity measure is a calculation of efficiency based on the ratio between input resources and output results using the DEA method. DEA is particularly suitable for measuring and
comparing organizations’ performance (Afrart, 1972; Banker, Charnes and Cooper, 1984; Charnes, Cooper and Rhodes, 1978). It compares a sample of organizations with each other in a normalized, multidimensional space. The idea is to find a non-parametric best practice frontier. Units on the frontier are efficient; for other units, distance from the frontier defines inefficiency. DEA has been applied within marketing on topics such as assessment of retail productivity (Donthu and Yoo, 1998), channel efficiency in franchise versus non-franchise systems (Yoo, Donthu and Pilling, 1998), effects of allocation of marketing resources on corporate profits (Chebat, Filitrault, Katz and Tal, 1994), and assessing validity and reliability of performance measures related to marketing effectiveness (Bhargava, Dubelaar and Ramaswami, 1994). Productivity will in this way be measured as a relative concept. It does not mean much to say that productivity is high or low unless a comparison is made against some benchmark. The sampled firms will be benchmarked against the most efficient cases in the sample. This measure should be considered a truly objective measure as all sampled firms are compared against each other along identical and clearly defined dimensions, and the measure cannot be manipulated by the respondents. Return on assets (ROA) is a financial performance measure based on accounting information. Although accounting information does not provide a completely exact representation of the financial situation of a firm, such information is widely used, both for assessing firm performance and firm value. (There are three main reasons why accounting information does not provide a completely exact representation of firms’ financial situation. First, accounting numbers are often based on estimates; second, decisions to drop or postpone investments in the short run will impact accounting information; and third, different accounting principles may give different results.)

Each of the performance measures has some limitations. However, by using all together, a perceptual, subjective measure of performance is combined with objective measures. Some of the problems related to performance measurement in this area should thus be overcome.
Most empirical studies that have tested the market orientation – performance link have utilized Narver and Slater’s (1990) framework in which market orientation is defined by the three components customer orientation, interfunctional coordination, and competitor orientation. In order to compare the results with other related research, this framework is also included, and possible effects of the three components of market orientation on the three performance measures are tested. Only the current level of market orientation in the studied organizations is included, featuring current customer needs; potential customer needs are not addressed.

RESEARCH METHOD

Context, sampling and data collection
The empirical context is the Norwegian hotel industry. The sampling frame was based on the Dunn and Bradstreet database, which consists of accounting information for all Norwegian limited companies. All hotels registered in the database were selected, resulting in a sampling frame of 530 hotels. Only those hotels that were represented with hotel-level accounting information in the database were selected. Hotels that were members of chains, and if the only accounting information available in the database was at the level of the chain, were thus not part of the sampling frame.

A structured questionnaire was used to collect data. The questionnaire was pre-tested on two hotel CEOs in order to check the face validity of the measures. Data was then collected by means of a telephone survey. A key informant approach was used and the most knowledgeable persons about this topic were selected at the hotels. This was either the hotel manager or the CEO of the hotel. The interviews were conducted as computer-assisted
telephone interviewing (CATI). The interviewer read all questions, and the respondent’s answers were continuously punched into a database.

110 usable questionnaires were received, giving a response rate of 21%. Furthermore, accounting information was collected for these hotels from the Dunn and Bradstreet database. Due to the time lag between selection of hotels from the database and collection of accounting information (different fiscal years), nine hotels had gone out of business, resulting in accounting information for 101 hotels.

Note that in the hotel industry the question of market orientation may not necessarily be identical for hotels of different sizes. Harris and Watkins (1998) found that the level of market orientation in small UK hotels was impeded by a number of barriers. Among other things, they found that managers in small hotels were ignorant of both the meaning and application of market orientation. Small hotels had limited resources that could be directed towards market orientation activities, and managers often perceived market orientation as inappropriate for their hotel. Furthermore, the hotel managers had an unclear view of the customer, especially on issues related to current customers versus other potential customer groups, and the hotels lacked competitive differentiation. If small hotels in this sample share some of the same characteristics as those studied by Harris and Watkins (1998), there is a possibility that the level of market orientation in this sample is skewed, and we therefore need to control for possible size effects in the empirical analyses.

**Measures**

Multi-item scales were used for measuring the constructs of customer orientation and interfunctional coordination. Two single-item scales measured competitor orientation and perceived profitability compared to key competitors was measured by one single-item scale. Calculation of productivity resulted in an index variable which compares each individual
hotel to the most efficient hotels. Return on assets was calculated on the basis of accounting information. All measures, response scales and reliability information are reported in Table 1.

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Table 1 about here
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Productivity. The DEA method was used to calculate productivity (see Appendix 1 for more details). Size (number of hotel rooms) and labor (number of employees) were used as input factors, and sales revenue and occupancy rate (utilization of room capacity) were applied as output factors (Anderson, Fok and Scott, 2000; Bucklin, 1978; Lusch and Serpkenci, 1990; Ratchford and Stoops, 1988). The input and output measures are thus based on previous performance research in marketing (Donthu and Yoo, 1998).

Return on assets (ROA). The following equation was used to calculate ROA:

\[
ROA = \frac{EBIT \ (Earnings \ before \ interests \ and \ taxes)}{Book \ value \ of \ debt + Book \ value \ of \ equity}
\]

Accounting information was used for the fiscal year in which the survey data was collected.

Perceived profitability compared to key competitors. A single-item measure of profitability was used compared to key competitors. Each respondent was asked to compare the hotel’s profitability to key competitors on a seven-point scale.

Customer orientation. The customer orientation scale measured the level of customer focus aimed at creating value for customers (Narver and Slater, 1990). Since the interaction between the company and the customer is important in both the production and evaluation of services, the different items were related to the interaction between the hotel and the customer, and focused on areas such as how employees cared for the customer and acted in the interests of the customer. Five items were used.
Interfunctional coordination. Interfunctional coordination measured the level of internal coordination in serving customers (Narver and Slater, 1990). The set of items were related to employees’ knowledge of internal communication channels, employees’ competencies in using routines and procedures, and employees’ ability to cooperate and communicate. The scale consisted of five items.

Competitor orientation. Competitor orientation captured the company’s position in relation to key competitors. Two single-item measures were used. The respondents were asked to evaluate the hotel’s prices (lower to higher) and technology (worse to better) in relation to prices offered and technology used by key competitors. These two items reflect knowledge of competitors’ capabilities and strategies (e.g., Narver and Slater, 1990).

RESULTS

First the DEA efficiency score for each hotel (Appendix 1) was calculated. The overall DEA efficiency was on average 70%, and eleven hotels were found to be on the frontier. These hotels are thus fully efficient, and on average hotels should be able to save 30% of input resources if they copied the most efficient units. This score represents the level of productivity in each hotel. Descriptive statistics for all variables and the correlation matrix are reported in Table 2.

DEA identifies best practice rather than the best 10% or an average estimation. This makes the technique very sensitive to extreme observations, and it is necessary to conduct a sensitivity analysis of outliers. Whether the frontier is robust and can be trusted or not must be
settled. The super-efficiency technique (Andersen and Petersen, 1993) was applied for this purpose, which estimates how far a frontier unit is from an artificial frontier created without the unit itself in the dataset. The frontier was first estimated without the unit in the dataset. Then, the distance from the unit to the “new” frontier was estimated. No real outliers were found as none of the units were “far” from the frontier. One unit was the only exception. However, pie-chart analyses indicated that few other units had this hotel as a reference unit, and being a non-reference hotel it is not important as a frontier unit. The average efficiency for each “new” dataset, including a super-efficient unit, was hardly influenced. Thus, the frontier seems to be robust and without influential outliers.

Then the market orientation model was tested by regression analyses. Three models were estimated, with the three performance measures as dependent variables. Models 1 and 3 were tested with perceived profitability compared to key competitors and return on assets as dependent variables by OLS-regression analysis. Model 2, with productivity as the dependent variable, was tested by Tobit-regression analysis. The reason for using a Tobit-regression is that productivity is truncated at the value 1. Remember that all hotels at the frontier are considered to be fully efficient and have a score of 1, and all other hotels have a lower score. We therefore right-censored observations at the value 1 and left-censored observations at the lowest productivity value of .26, in order to have a productivity scale representing the actual range.

The results are reported in Table 3. Prices compared to key competitors have positive effects on perceived profitability compared to key competitors (Model 1) and productivity (Model 2). Furthermore, customer orientation has a positive effect on perceived profitability compared to key competitors, while interfunctional coordination has a negative effect on productivity. Surprisingly, none of the market orientation variables have any effect on return on assets.
As pointed out in the methods section, whether the empirical relationship between market orientation and performance is the same for hotels of different sizes must be checked. Therefore the sample was split into three groups, using the number of rooms in each hotel as an indication of size. The three groups were: small hotels (up to forty rooms), medium-sized hotels (between forty-one and seventy-nine rooms), and large hotels (eighty or more rooms). Regression analyses were performed for each of these groups with perceived profitability compared to key competitors and return on assets as dependent variables. Since the number of rooms was one of the input factors in the calculation of productivity, no regression analyses were conducted for the three groups with productivity as the dependent variable. The analyses revealed no major differences between the groups. Also, regression analyses with number of rooms as a control variable were conducted, but no significant effect of size was found. These results indicate that there is no size effect in the sample.

The results suggest that the general effect of market orientation on performance varies depending on which performance measure we have applied. Market orientation seems to be related to perceived profitability compared to key competitors and productivity, but not at all to return on assets.

DISCUSSION AND IMPLICATIONS

The results show that the relationship between market orientation and performance is not straightforward. Some effect of market orientation on performance was confirmed when using the subjective performance measure, while the effect was rather marginal when objective
performance measures were applied. This replicates other market orientation studies that suggest a positive effect of market orientation on performance when using subjective performance measures, but only a limited or no effect when applying objective performance measures. None of the market orientation variables had any impact on the accounting-based performance measure, and although the validity of accounting-based measures as indicators of performance may be questioned, such measures are widely used for assessing and comparing company performance. Furthermore, only one of the competitor orientation variables affected productivity. As most previous studies of market orientation have primarily relied upon subjective performance measures, this study questions any direct effect of market orientation on business performance. Any direct effect may be caused by the fact that company informants may overstate both their performance (Noble, Sinha and Kumar, 2002) and their evaluation of how they manage the company.

The inclusion of productivity as a performance measure based on the DEA approach seems to be a fruitful step in developing more valid performance measures. DEA calculates the relative efficiency in a sample of companies, and companies are thus compared and benchmarked on the basis of the same input and output factors. The best companies are identified, and the level of inefficiency for specific companies is measured relative to best practice. This technique solves many of the common biases entailed in using psychometric performance measures and accounting data.

This benchmarking technique also paves the way for a broader perspective on how companies can become market oriented. Furthermore, DEA can be a useful tool for companies in assessing an optimal degree of market orientation. By identifying best practice cases, a benchmark level of performance throughout an industry, within a larger network of organizations, or within a service or retail chain is defined and managers can learn and imitate methods of obtaining the best possible utilization and combination of input factors in order to
adapt to market demand and output levels. DEA may also indicate why some firms perform inefficiently (Majumdar, 1998). The technique can in this way provide important information and guidelines, and broaden the understanding of market orientation as a process (Kohli and Jaworski, 1990). For example, by using the DEA approach within a hotel chain, the identification of the best cases may provide excellent opportunities for educating and training the management of less efficient hotels. The best cases might have discovered new customer needs before other hotels, or how to serve customer needs with fewer resources. DEA can contribute to a better understanding of the mechanisms by which market orientation may actually lead to better performance (Guo, 2002; Han, Kim and Srivastava, 1998) and DEA can be a useful approach in the market orientation process.

This study used a convenience sample of hotels based on the Dunn and Bradstreet database. As the market orientation – performance link from a theoretical perspective was tested, data were collected from a homogeneous sample of organizations (one industry), thus reducing the number of uncontrollable factors that often creates noise in cross-industry studies. However, since less attention was paid to the question of the representativity of the sample, caution must be exercised in interpreting the results, and the study’s results cannot necessarily be generalized to the hotel industry in general or to other industrial contexts.

The service research literature has argued that service quality is directly related to performance and profitability (e.g., Lovelock and Wirtz, 2004; Zeithaml, Bitner, and Gremler, 2006). The exclusion of service quality in this study may therefore be considered a limitation. Aaker and Jacobson (1994) found a positive relationship between stock return and changes in quality perceptions, and Rust, Subramanian, and Wells (1992) found that service complaint management impacted customer retention. Other studies have suggested that service quality is linked to performance by moderating the relationship between market orientation and performance (Caruana, Pitt and Ewing, 2003; Raju and Lonial, 2001; Webb, Webster and
One explanation for the limited effect of market orientation on performance in this study may be that service quality has a stronger impact on performance than market orientation in the service industries. Future studies elaborating the role of market orientation in the service industries should include service quality and compare the relative impact of service quality and market orientation on performance and investigate how they are related to each other.

This study has provided a framework for a multi-method approach to cultivate market orientation in firms. In particular, the investigation showed how DEA and a best case benchmarking perspective may add value to further research and be a helpful device for management.
REFERENCES


## TABLE 1
Measures, scales, and reliability analysis

<table>
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<th>Cronbach Alpha</th>
<th>Corrected Item-Total Correlation</th>
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<td>.86</td>
<td></td>
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<tr>
<td>(Five-item, seven-point scale anchored by “strongly disagree” and “strongly agree”)</td>
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<tr>
<td>Our employees always care for our customers</td>
<td>.57</td>
<td></td>
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<tr>
<td>Our customers always feel that they are welcome at our hotel</td>
<td>.77</td>
<td></td>
</tr>
<tr>
<td>We always do our best for our customers</td>
<td>.71</td>
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<td>Our customers always believe that our hotel acts in the customers’ best interests</td>
<td>.60</td>
<td></td>
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<tr>
<td>Our customers trust our hotel</td>
<td>.70</td>
<td></td>
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<tr>
<td><strong>Interfunctional coordination</strong></td>
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<td></td>
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<tr>
<td>(Five-item, seven-point scale anchored by “strongly disagree” and “strongly agree”)</td>
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<tr>
<td>The employees have very good knowledge of internal communication channels in the hotel</td>
<td>.37</td>
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<tr>
<td>Our employees are highly competent regarding routines that are specific to this hotel</td>
<td>.70</td>
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<tr>
<td>Our employees are highly competent regarding procedures that are specific to our hotel</td>
<td>.54</td>
<td></td>
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<tr>
<td>The employees have very good cooperation skills</td>
<td>.52</td>
<td></td>
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<tr>
<td>Our employees communicate very well with each other</td>
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<td></td>
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<td><strong>Competitor orientation</strong></td>
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<tr>
<td>Price compared to key competitors</td>
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<td>(Single item, seven-point scale anchored by “much lower price” and “much higher price”)</td>
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<tr>
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<td>(DEA score)</td>
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<td>(Accounting information)</td>
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<td>(Single item, seven-point scale anchored by “much lower profitability” and “much higher profitability”)</td>
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* p < .05  
** p < .01  
*** p < .001
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<td>compared to key competitors</td>
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<td></td>
<td>(2.16*)</td>
<td>(.56)</td>
<td>(.85)</td>
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<td>(-.63)</td>
<td>(-2.06*)</td>
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<td>Competitor orientation:</td>
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<td>.05</td>
<td>.06</td>
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<td>key competitors</td>
<td>(2.81**)</td>
<td>(2.86**)</td>
<td>(.55)</td>
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<tr>
<td>Technology compared</td>
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<td>.01</td>
<td>.06</td>
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<tr>
<td>to key competitors</td>
<td>(1.46)</td>
<td>(.60)</td>
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<td>Adjusted R²</td>
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<td>LR chi² (4)</td>
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<td>Pseudo R²</td>
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* p < .05
** p < .01
*** p < .001
FIGURE 1

Illustration of the DEA model
APPENDIX 1

MEASURING PRODUCTIVITY BY DATA ENVELOPMENT ANALYSIS

The problem of measuring productivity, $P$, may seem trivial using a simple measure defined as the ratio of output, $y$, over input, $x$, i.e., $P=y/x$. However, a productivity measure like $P$ faces two general problems: returns to scale and multiple inputs and/or outputs. The first step in a DEA analysis is to decide whether to use constant or variable returns to scale. As this empirical context is the hotel industry, variable returns to scale are assumed, as high initial investments are required in this industry. Second, choosing between input-reducing or output-increasing models is required. The option is either to measure how much less input could have been used to produce the same amount of output, or alternatively, how much more output could have been produced for the same amount of input. This study applied the input-reducing model. Figure 1 illustrates the DEA method in a simple two-dimensional diagram.

Using C as an example, DEA attempts to find the minimal input required to produce the same amount of output as C produces. That is, how much input would it take for a best practice organization to produce just as much output as C. This minimal input is the input at point B, which is a linear combination of the two frontier organizations 21 and 22. These organizations are termed reference units. The idea is to move horizontally from C towards the left until hitting the line segment at B. The dashed line in Figure 1 is the constant returns to scale frontier and the solid line is the variable returns to scale frontier. This is a minimization
problem that can be solved by linear programming. The formal problem is to minimize the
objective function:

\[ E_i = \min \theta_i \]

Subject to the constraints:

\[ \sum_j \lambda_{ij} y_{kj} \geq y_{ki}, \forall k \]

\[ \theta_i x_{mi} \geq \sum_j \lambda_{ij} x_{mj}, \forall m \]

\[ \sum_j \lambda_{ij} = 1 \]

\[ \lambda_{ij} \geq 0, \forall j \]

Where:

\( E_i \) - is the efficiency score for observation i

\( \theta_i \) – is the efficiency score variable to be determined for observation i

\( \lambda_i \) – are the weights to be determined for observation i

\( X_{mi}, Y_{ki} \) – are inputs and outputs of observation i

i - is the current observation

j - is all the other observations with which observation i is compared

m - is the number of inputs

k - is the number of outputs

The calculation results in an efficiency score, E, for all organizations ranging from 0 to
1, where 1 is on the frontier. Each unit obtains an efficiency score, and the distance from 1
indicates the level of inefficiency.

This productivity measure is different from profitability, although productivity is usually
one of the main determinants of profitability. If a firm produces more and/or better goods
from the same amount of resources, profitability should also increase, but profitability can
also be influenced by other factors, for example, input price variations, capital cost variations and monopoly power.