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Market Orientation, Customer Satisfaction and Productivity in the Service Industry: A Data Envelopment Analysis

Sven A. Haugland
Ingunn Myrtveit
Arne Nygaard

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Abstract

A crucial cornerstone in the market orientation literature is the relationship between market orientation and performance. Products and services should be designed, developed and offered to customers based on market knowledge, and human and physical assets should be combined to satisfy customers. However, we still lack knowledge whether the most market-oriented firms are the most productive and profitable, as few empirical studies have used objective performance measures. By applying data envelopment analysis (DEA), we develop a measure of relative productivity, and test the market orientation model with productivity as performance measure. Based on data from the hotel industry, our results indicate that market orientation has only modest effect on productivity. However, DEA-productivity analyses can be used to identify best practice in an industry, and if used properly, it can be a useful instrument in the process of designing products and services and be a valuable input into the market orientation of the firm.

INTRODUCTION

The marketing orientation literature argues that products should be based on consumer preferences. The product design should reflect market demand and be adaptive to changes in consumer preferences (Slater and Narver, 1995). Market orientation explains how knowledge about consumer preferences and the capacity to adapt are related to dimensions of performance. Investigations have indicated a positive association between market orientation and financial performance (Narver and Slater, 1990; Ruekert, 1992; Jaworski and Kohli, 1993; Narver and Slater, 1990; Baker and Siukula, 1999; Greenley, 1995; Han, Namwoon and Srivastava, 1998). However, empirical research has provided mixed results concerning the relationship between market orientation and performance (Noble, Sinha and Kumar, 2002). When objective measures like, for example, market share is used as a measure of performance there is no significant association between market orientation and performance (Piercy, Harris and Lane, 2001).

While marketing costs are easy to measure, the relationship between input costs and output benefits is complex both in terms of measurement and analysis. Furthermore, the psychometric nature of most of the market orientation literature, including psychometric performance measures, makes it difficult to advance analyses of how marketing costs may affect output. In fact, many market orientation studies rest on subjective measures instead of proposed objective accounting data (Dess and Robinson, 1983). A fair criticism is therefore that we have limited knowledge about the costs of bringing products to the market and the corresponding benefits.

We argue in this paper that it is the ratio between input resources and output results that reflects the productivity of firms, and the purpose of the paper is to test whether the level of market orientation can explain variations in productivity of the service industry. We will

apply data envelopment analysis (DEA) which is a specific method developed to measure and compare the productivity of firms. The core idea in DEA 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 calculates the efficiency frontier as the tradeoff between cost factors and outcome results (Bhargava, Dubelaar and Ramaswami, 1994). DEA identifies the most productive cases in terms of the ratio between input resources and output results. These cases are efficient, and all other cases are more or less inefficient depending on the distance to the efficient frontier cases. By linking this productivity ratio to market orientation, we can test whether the fully efficient cases are the most market oriented or not. In addition, we include psychometric performance measures like customer satisfaction and perceived profitability compared to key competitors. We test whether different dimensions of market orientation are related to different performance measures. The paper contributes to the market orientation literature by testing the core assumption that market orientation affects firm performance by using an objective productivity measure.

The paper proceeds as follows: First we present some of the core assumptions and findings in the market orientation literature with special attention to the linkage between market orientation and performance. Thereafter, we present data envelopment analysis (DEA), followed by a presentation of the empirical setting and data collection procedures. Furthermore we report the results, and finally discuss implications and limitations.

MARKET ORIENTATION AND PERFORMANCE

The market orientation framework suggests that firms should know the market, share market information within the organization or marketing network (i.e. franchise system) and design a strategic marketing response (Jaworski and Kohli, 1993; Kohli and Jaworski, 1990).

Market orientation is a process that orchestrates coordination of human and physical resources in order to meet the demands in the market (Kohli and Jaworski, 1990). This strategy aims to improve technical and behavioral interdependencies (Majumdar, 1998).

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; customer orientation, interfunctional coordination and competitor orientation, and furthermore, 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 three stages; intelligence generation, intelligence dissemination and responsiveness. Even though the two frameworks focus on different dimensions, they have the similar view of the concept of market orientation, and how market orientation should be addressed in organizations (Noble, Sinha and Kumar, 2002).

While not knowing the real cost-outcome relationship, a strategic response can be a dangerous adventure whenever the marginal costs exceed the benefits. Also, the empirical evidence produced by market orientation scholars is often based on a combination of single methods and subjective data (Jaworski and Kohli, 1993; Narver and Slater, 1990; Slater and Narver, 1994). The reason is that objective information about costs and benefits are seldom available at low costs (Matsuno, Mentzer and Özsomer, 2002). Common measures of performance in marketing research include the traditional satisfaction with performance index, relative return on investments and relative performance to key competitors (Slater and Narver, 1994).

Objective measures may be hard to gather due to firms' unwillingness to disclose financial information. However, objective information on performance is clearly defined and certified, and has content validity. Whenever objective data are available, research should

utilize this source of information (Dess and Robinson, 1983). Furthermore, the criticism of marketing research to apply single methods for data collection may affect the relationship between market orientation and performance due to spurious answers and inflated responses (Campbell, 1982). Psychometric research may therefore lead to systematic shared method variance that affects the results (Campbell and Fiske, 1959). The single method variance should be regarded as a serious threat in most market orientation research. Slater and Narver (2000) have applied a multiple respondent design within the organization (Kumar, Stern and Anderson, 1993) to mitigate the assumed key informant problem (John and Reve, 1982). Still there is a demand for multi-method designs and objective data to control the single method variance.

Other critics have emphasized that performance is often too much related to salesperson productivity because service, retailing and marketing functions are labor intensive activities (Stern and El-Ansary, 1992) even when investment in capital is of great importance in marketing (Donthu and Yoo, 1998). On the other hand Bush, Bush, Ortinau and Hair (1990) emphasize that performance is more focused on micro level units than the strategic allocation of resources on a company-level. In addition, performance studies in marketing have been biased towards absolute measures of performance instead of a relative to best measure that reveal far better strategic information (Donthu and Yoo, 1998). A relative and comparative approach makes it possible to learn from best practices.

Marketing scholars have suggested many different approaches to evaluate performance; cost approaches, market share ratios, communication and coordination measures, risk evaluations, innovation levels and adaptation criterions (Anderson and Weitz, 1986). Some studies establish a strategic managerial perspective and relate the current situation to potential profits (Dubinsky and Hansen, 1982). Other studies of productivity in marketing present a guideline approach to marketing productivity (Wind, 1987). With regard

to specific variables influencing marketing productivity, capital investment and labor costs have been considered important (Alderson, 1993). Size reflecting the level of capital investments, and the number of employees reflecting labor costs have been portrayed as important determinants of performance in several marketing studies (Bucklin, 1978; Ingene, 1982, Lusch and Moon, 1984; Pilling, Henson and Yoo, 1995; Ratchford and Stoops, 1988; Yoo, Donthu and Pilling, 1998).

As pointed out above, research on market orientation has not been able to establish a clear link between market orientation and business performance. Empirical studies have provided mixed results as some studies have found that market orientation increase performance, while other studies have not found any effect of market orientation (Noble, Sinha and Kumar, 2002). The reasons for these mixed results may be several. The importance of market orientation may vary across industrial and international contexts, different dimensions of market orientation may be related to different performance measures, and as discussed above, inadequate or poor measures of performance (Noble, Sinha and Kumar, 2002).

In response to the need for more research into the relationship between market orientation and performance, we will focus on measuring business performance by relying on both subjective and objective measures. We will pay attention to three different measures. These are: customer satisfaction, perceived profitability compared to key competitors and productivity. Customer satisfaction and profitability compared to key competitors are subjective measures based on perceptual data, while productivity is an objective measure based on a calculation of relative efficiency. It has been argued that when firms perceive themselves in relation to customers and competitors, they may in fact overstate their performance (Noble, Sinha and Kumar, 2002). This may explain the fact that a positive effect of market orientation on performance has been found when using subjective performance

measures, but not when applying objective performance measures (Jaworski and Kohli, 1993). By combing perceptual, subjective measures of performance with an objective measure, we can overcome some of the problems related to performance measurement. With regard to market orientation variables, we will primarily draw on Narver and Slater's (1990) framework by applying the three constructs customer orientation, interfunctional coordination and competitor orientation.

MEASURING PRODUCTIVITY BY DATA ENVELOPMENT ANALYSIS

At a first glance, the problem of measuring productivity, P, may seem trivial using a simple measure defined as the ratio of output, y, over input, x, P=y/x. In general, the more output per unit input, the more productive the unit. The usual inputs are labor and capital, and the output is the amount of product delivered. Such models assume constant returns to scale, CRS.

A simple productivity measure like P faces two problems; returns to scale and multiple inputs and/or outputs. If we assume variable returns to scale (VRS), one pragmatic approach is to define a non-parametric best practice frontier in a two-dimensional space. This idea is illustrated in Figure 1, where the dotted line represents the constant returns to scale (CRS) best practice frontier, and the solid line represents the variable returns to scale (VRS) best practice frontier. According to the CRS-scheme unit 21 is the only fully efficient unit. All other units will be inefficient compared against this one. In the VRS scheme, unit 21 is no longer the only fully efficient unit. Rather, units 22 and D are also on the front (P=1), instead of being highly unproductive as for unit D's case in the CRS scheme. Similarly, for example, unit C is benchmarked against the line segment between units 21 and 22 instead of against the dotted CRS line where unit 21 is the only reference unit.

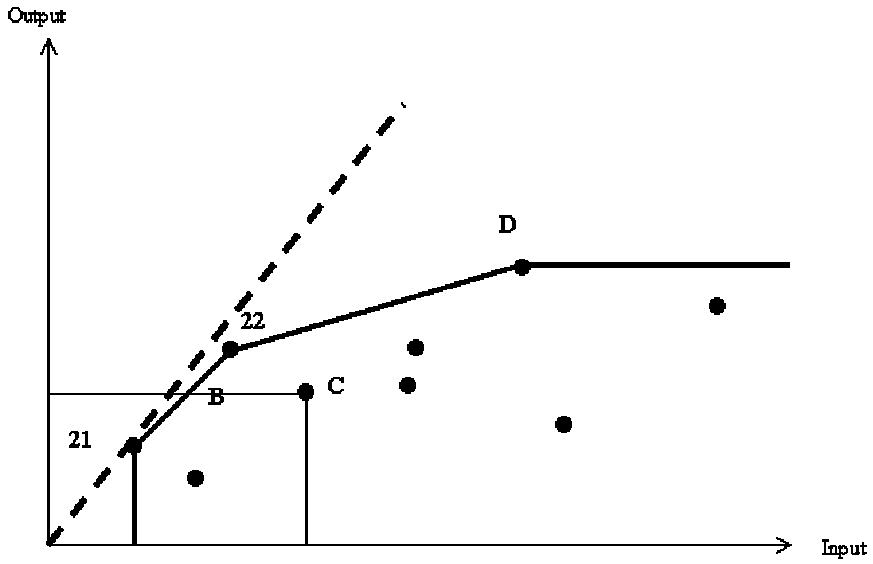

FIGURE 1
Illustration of the DEA-model

A second problem arises with the simple ratio measure when there are multiple inputs and outputs. In this case, it seems reasonable to construct a productivity measure similar to Equation 1:

$$P = \frac{\sum_{j=1}^{n} a_j Y_j}{\sum_{k=1}^{m} b_k X_k}$$

Equation 1: A multidimensional productivity measure

In Equation 1, a_j and b_k are weights reflecting the relative importance of the different outputs and inputs, respectively. We observe that although this multidimensional measure handles multi-dimensionality, it still does not handle VRS, only CRS. In this paper, we therefore propose to use DEA to benchmark units because DEA addresses the problem of comparing

similar units with each other (i.e., applying a VRS model) in a normalized, multidimensional space.

The initial publication on data envelopment analysis (DEA) is credited to Charnes, Cooper and Rhodes (1978) handling only CRS (constant returns to scale). Afriat (1972) laid the foundations for VRS (variable returns to scale), which have later been enhanced by several authors including Banker, Charnes and Cooper (1984), and Førsund and Hjalmarson (1979). DEA is a method to measure and compare organizations' performance. 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.

The DEA model calculates efficiency in basically two ways, input reducing or output increasing efficiency respectively. Both are reasonable measures. We can either measure how much less input that could have been used to produce the same amount of output, or alternatively, we can measure how much more output that could have been produced with the same amount of input. In this paper we apply the input reducing model.

When performing DEA, the first step is to decide whether to use a CRS or a VRS model. As we in this study focus on hotels, it makes sense to assume VRS as high initial investments typically are required. Figure 1 illustrates the idea in a simple two-dimensional diagram. Using unit C as an example, we attempt to find the *minimal* input required to produce the same amount of output as C produces. That is, we ask how much input it would take for a best practice unit to produce just as much output as C. This minimal input is the input at the point B, which is a linear combination of the two frontier units 21 and 22. These latter are termed *reference units.* Thus, the idea is to move horizontally from C and towards the left until we hit the line segment at B. This is a minimization problem, which can be solved using linear programming. This is the same procedure as described above in the two dimensional case, however it can be generalized to several dimensions.

The formal problem thus becomes 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

θ_i – is the efficiency score variable to be determined for observation i

λ_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 units. The score will range from 0 to 1 where 1 is on the frontier. This means that each unit will obtain an efficiency score, and the distance from 1 indicates level of inefficiency. The technicalities for solving the DEA problem in a computationally efficient manner is beyond the scope of this article and is thus not discussed here.

RESEARCH METHOD

Context, sampling and data collection

The Norwegian hotel industry was used as empirical context. The sampling frame was based on the Dunn and Bradstreet database. This database consists of accounting information of all Norwegian limited companies. We selected all hotels in the database, and checked if all hotels still were in business. This resulted in a sampling frame of 530 hotels. We used a structured questionnaire, and collected data by a telephone survey. The interviews were conducted as computer assisted telephone interviewing (CATI). The interviewer read all questions, and the answers were continuously punched into a database. We used a key informant approach, and in most cases the hotel manger or the CEO answered the questionnaire. We received 110 usable questionnaires, resulting in a response rate of 21 %.

Measures

We used multi-item scales for measuring the constructs of customer satisfaction, customer orientation and interfunctional coordination. Profitability compared to key competitors was measured by one single-item scale, and two single-item scales measured competitor orientation. Productivity can be viewed as an index-variable where each individual hotel is compared to the most efficient hotels. All measures, response scales and reliability information are reported in Table 1.

TABLE 1

Measures, scales reliability analysis

	Cronbach Alpha	Corrected Item-Total Correlation
	.86	
Customer orientation (Five-item, seven-point scale anchored by "strongly disagree" and "strongly agree")		
Our employees always care for our customers		.57
Our customers always feel that they are welcome to our hotel		.77
We always do our best for our customers		.71
Our customers always believe that that our hotel acts in the customers' best interests		.60
Our customers trust our hotel		.70
Interfunctional coordination (Five-item, seven-point scale anchored by "strongly disagree" and "strongly agree")	.77	
The employees have very good knowledge about the internal communication channels in the hotel		.37
Our employees are highly competent regarding routines that are specific for this hotel.		.70
Our employees are highly competent regarding procedures that are specific for our hotel		.54
The employees have very good cooperating skills		.52
Our employees communicate very good with each other		.56
Competitor orientation		
Price compared to key competitors (Single item, seven-point scale anchored by "much lower price" and "much higher price")		
Technology compared to key competitors (Single item, seven-point scale anchored by "much worse technology" and "much better technology")		
Business performance		
Productivity (Dea-score)		
Profitability compared to key competitors (Single item, seven-point scale anchored by "much lower profitability" and "much higher profitability")		
Customer satisfaction (Three-item, seven-point scale anchored by "strongly disagree" and "strongly agree")	.77	
Our customers are very satisfied with our hotel		.68
Customer expectations are at large exceeded at this hotel		.55
Compared to our customers view of a perfect hotel, they are very satisfied with this hotel		.60

Productivity. As discussed above, we used the DEA-method to calculate productivity. We used *size* (number of hotel rooms) and *labor* (number of employees) as input variables, and applied *sales revenue* and *occupancy rate* (the utilization of room capacity) as output measures (Anderson, Fok and Scott, 2000; Bucklin, 1978; Lusch and Serpkenci, 1990; Ratchford and Stoops, 1988). Thus, our input and output measures are based on previous performance research in marketing (Donthu and Yoo, 1998). We applied list wise deletion due to missing data for the size variable (number of hotel rooms), resulting in 90 observations. However, we do not suspect that this has created a bias. We assumed variable returns to scale and minimizing input.

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

Customer satisfaction. The customer satisfaction scale reflected how satisfied the customers were with the hotel, whether expectations had been met, and satisfaction compared to a "perfect" hotel. Customer satisfaction was measured at the respondents' perception of the level of customer satisfaction, and not based on responses from individual customers. The scale consisted of three items.

Customer orientation. The customer orientation scale measured the level of customer focus aiming at creating value for customers. Since the interaction between the company and the customer is important both in the production and evaluation of services, the different items were related to the interaction between the hotel and the customers, and focused on areas such as how the employees cared for the customers and acted in the interests of the customers. Five items were used.

Interfunctional coordination. Interfunctional coordination measured the level of internal coordination of resources in serving the customers. 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. We asked the respondents 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.

RESULTS

We first calculated the DEA-efficiency for each hotel. The overall DEA-efficiency was on average 70 %, and 11 hotels were found to be on the frontier. These hotels are thus fully efficient, and on average hotels should be able to save 30 % if they copied the most efficient units. The DEA-efficiency score represents the level of productivity in each hotel. Descriptive statistics for all variables and the correlation matrix are reported in Table 2.

TABLE 2
Correlation matrix

	Mean	SD	1	2	3	4	5	6
1 Customer orientation	5.99	.66						
2 Interfunctional coordination	5.49	.80	.57***					
3 Prices compared to key competitors	4.32	1.35	.06	.13				
4 Technology compared to key competitors	4.14	1.49	-.03	-.06	.23*			
5 Customer satisfaction	5.53	.94	.60***	.53***	.05	.09		
6 Profitability compared to key competitors	4.85	1.48	.21*	.09	.30**	.19*	.32***	
7 Productivity	.71	.18	-.05	-.19	.30**	.18	.17	.34***

* $p < .05$
** $p < .01$
*** $p < .001$

DEA identifies best practice rather than average or the best 10 %, which makes the technique very sensitive to extreme observations. It is, therefore, necessary to do a sensitivity analysis of outliers. Several techniques can be used, i.e., super-efficiency (Andersen and Petersen, 1993) and analysis of reference units (Torgersen, Førsund and Kittelsen, 1996), each with strengths and limitations depending on the purpose of the DEA analysis. The primary purpose of our DEA analysis is to assess individual hotels, identify best practice units and reference units for individual hotels. We need to know whether the frontier is robust and can be trusted or not. The super-efficiency technique (Andersen and Petersen, 1993) estimates how far a front-unit is from an artificial front created without the unit itself in the dataset. We first estimated the front without the unit in the dataset. Second, we estimated how far from the front the unit is. We found no real outliers as none of the units were "far" from the frontier. One unit was the only exception. However, by pie-chart analyses we observed that few other units had this hotel as a reference hotel, and being a non-reference hotel it is not important as a frontier unit. Average efficiency for each "new" dataset, including a super-efficient unit, is hardly influenced. We conclude that the front is robust without influential outliers.

We then tested the market orientation model by regression analyses. Three models were estimated with the three performance measures as dependent variables. We tested Models 1 and 2 with customer satisfaction and profitability compared to key competitors as dependent variables by OLS-regression analysis. Model 3 with productivity as 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 units at the frontier are considered to be fully efficient and have a score of 1, and all other units have a lower score. We therefore right-censored observations at value 1 and left-censored observations at the lowest productivity value equal to .26 in order to have a productivity scale representing the actual range.

The results are reported in Table 3. By comparing the three regression analyses, we observe that different market orientation variables are related to different performance measures. Both customer orientation and interfunctional coordination have strong positive effects on customer satisfaction, and the market orientation variables explain 41 % of the variance in customer satisfaction (Model 1). When it comes to profitability compared to key competitors (Model 2) and productivity (Model 3), prices compared to key competitors seems to be the most important variable. Customer orientation has also a positive effect on profitability to key competitors, while interfunctional coordination has a negative effect on productivity. We also note that adjusted R^2 is much lower for Model 2 compared to Model 1[1].

TABLE 3
Regression analysis
(Standardized coefficients with t-values in parentheses)

	Model 1 (OLS) Customer satisfaction	Model 2 (OLS) Profitability compared to key competitors	Model 3 (Tobit) Productivity
Customer orientation	.45 (5.00***)	.23 (2.16*)	.02 (.56)
Interfunctional coordination	.29 (3.24**)	-.07 (-.63)	-.06 (-2.06*)
Competitor orientation			
Prices compared to key competitors	-.05 (-.61)	.26 (2.81**)	.05 (2.86**)
Technology compared to key competitors	.13 (1.71)	.14 (1.46)	.01 (.60)
Adjusted R^2	.41	.12	
F-value	20.14***	4.54**	
LR chi^2 (4)			13.30**
Pseudo R^2			18.55
N	110	110	90

* $p < .05$
** $p < .01$
*** $p < .001$

[1] Note that pseudo R^2 cannot be interpreted in the same way as adjusted R^2.

These results suggest that different dimensions of market orientation are related to different performance measures, and that the general effect of market orientation on performance varies considerable depending on which performance measure that is used. It seems like market orientation is strongly related to customer satisfaction, but less to profitability and productivity. When comparing the three dimensions of market orientation, customer orientation is strongly related to customer satisfaction, while it is the hotels' ability to charge premium prices that effects profitability and productivity.

DISCUSSION AND IMPLICATIONS

Discussion of the results

The results show that the relationship between market orientation and performance is not straightforward. The total effect of market orientation on performance is quite strong when using subjective performance measures, while the effect is rather marginal when using an objective performance measure. Furthermore, while dimensions internal to companies (customer orientation and interfunctional coordination) are primarily related to subjective performance measures, a dimension external to companies (competitor orientation) is primarily related to the objective performance measure. These findings may indicate that company informants may overstate both their performance (Noble, Sinha and Kumar, 200), and their evaluation of how they manage the company.

Based on our findings we may question the importance of market orientation for company performance. The only factor that affects productivity in our study is one of the competitor orientation variables. Those hotels that are able to charge higher process than their key competitors seem to have the highest productivity. Since productivity measures the

relative efficiency of our sampled hotels, it is not influenced by any subjective opinion. It is somewhat surprising that the key market orientation constructs such, as customer orientation and interfunctional coordination are not related to productivity. Most previous studies of market orientation have primarily relied on subjective performance measures. Therefore we should interpret empirical findings that suggest a relationship between market orientation and performance with great cautiousness.

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-analysis calculates the relative efficiency in a sample of companies, and companies are thus compared and benchmarked based on the same input and output factors. This technique solves many of the common biases by using psychometric performance measures. The benchmarking technique also opens up for a broader perspective on how companies can become market oriented, and can be a useful tool for companies in assessing their degree of market orientation.

Our finding suggesting that different dimensions of market orientation are related to different performance measures, may suggest that pursuing one strategy or a strategic orientation may increase some outcomes and prevent companies form achieving other outcomes. Companies striving to become more market oriented should know what kind of performance outcomes that are most likely to be realized, and which performance outcomes that cannot be realized. As most companies cannot focus on only one target outcome, they also need to balance their strategy in order to achieve different outcomes that may be in conflict with each other. A valid benchmarking technique can be of great importance for developing and implementing company strategies aiming at realizing a set of target outcomes.

Implications

Despite the fact that marketing costs have increased, the effect of marketing expenditure on productivity has been rather modestly treated in the literature (Bush, Smart and Nichols, 2001). Also the dangerous ignorance of the required input costs to adapt to consumer needs is rooted in traditional marketing practice and research. In marketing, productivity is based on ratio of sales to marketing costs. Therefore, we have proposed a new operational tool, DEA that can be used to increase both market orientation and efficiency. Our analytical approach illustrates how we can identify the best practice cases.

We have exemplified how input costs (size and labor) are related to sales and utilized service capacity as output measures (Bonoma and Clark, 1988). By identifying best practice cases, it is possible to define a benchmark level of performance throughout an industry, or a chain-organization, make comparisons and implement corrective actions. The DEA-approach also makes it possible to detect problems in advance and be pro-active in order to adapt to the market. By applying a DEA-model, chain managers may learn and imitate how to obtain the best possible utilization and combination of input factors (size and labor) in order to adapt to market demand (sales) and output levels (capacity utilization). DEA may also indicate why some firms perform inefficient (Majumdar, 1998). The technique can in this way provide important information and guidelines, and broaden our understanding of market orientation as a process (Kohli and Jaworski 1990).

Because DEA is a tool to identify best practice adopted in the market, it is also a tool for organizational learning. DEA makes it possible to utilize information based on direct market experience. This source of information facilitates transfer of cumulative business experience back into new marketing strategies. However, adaptive learning like this may proceed within a market and occur as a sequential and incremental procedure within organizations (Hamel and Prahalad, 1991). The generative learning perspective, though,

confronts the framework of existing organizational paradigms (Argyris, 1977). The DEA approach makes it possible to escape from traditional organizational procedures and to test new frame-breaking concepts. A better tool to measure productivity may stimulate both adaptive learning and an experimental approach into the context of discovery of new concepts in the market (Garvin, 1993). March (1991) argues that organizations should balance knowledge exploitation within the existing framework and exploitation of new ideas. Thus, benchmarking by using the DEA comparative productivity method can harmonize the innovative approach and adaptive learning (Slater and Narver, 1995).

For example, our analyses revealed that 11 hotels can be defined as efficiency frontier hotels. Further experimental learning must analyze these cases to build benchmark strategies that can be adopted all cases across a hotel network. For example, by using the DEA approach within a hotel chain, the identification of the best cases may provide an excellent source to educate and train the management in less efficient chain hotels. The best cases might have discovered customer needs before the rest of the hotels, or they have discovered how to serve customer needs with fewer amounts of resources. Organizational learning includes dissemination of these insights into the rest of the chain. Thus, it is a crucial part of the process to ensure communication and shared information based on productivity analyses.

From a marketing practice point of view, new product development must be evaluated based on customer impact and sales in return for investments in human and physical capital. We therefore believe that the DEA approach can be a useful tool as well as an approach in the marketing orientation process. DEA should be part of the generation of information; the organization learning process and market responses through establishing and imitating best practice strategies (Piercy, Harris and Lane, 2002). The superior companies tend to have superior strategies for resource allocation (Majumdar, 1998). A market orientation perspective provides a framework for utilizing DEA into organizational learning. The application of DEA

as a market orientation tool may also benefit the consumers. Reduced input costs given output service levels in the market may reduce prices and further improve the competitive position of a company (Anderson and Fok, 1998).

Conclusion

We have in this study measured both market orientation and performance at one point in time. It is likely that the implementation of a market orientation as a strategy will not necessarily produce immediate positive outcomes. It may take some time to realize outcomes, especially in terms of productivity. We do not know how long our sampled hotels have been market orientated, and if a strategy has started to pay-off. Measuring market orientation at one point of time and performance at a later point of time would enable us to test whether market orientation increases future performance or not. Therefore, further research should utilize time asymmetry, preferably quasi-experimental data to analyze causal structures in the presented model.

In addition, research should analyze how combinations of different input and output variables define best practice, and more focus in marketing should address how we can better learn from these benchmark cases. Further research addressing the market orientation - performance link may utilize the DEA approach, especially by applying it to a range of different marketing contexts. DEA can be an avenue to mitigate criticism because of validity reasons in this area (Piercy, Harris and Lane, 2002).

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