EMPLOYEE SENSING:
A NEW APPROACH TO STRATEGIC CONTROL

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Abstract

Recent advances within the dynamic capabilities view emphasize the "sensing" of employees as an important part of the micro-foundations of dynamic capabilities: By putting in place organizational processes that mobilize and exploit information gathered by individual employees from their operating environment, firms can update insights about performance outcomes and improve strategic decision-making. We test empirically the extent to which firms can ascertain performance outcomes by drawing on employee knowledge. Our empirical setting is the Scandinavian hospitality sector with respondents among frontline service employees. Using a time series approach, we show that employee respondents (collectively) assess medium-term organizational performance better than management and the financial models available to them.

INTRODUCTION

The ability to monitor strategic performance and engage in corrective actions on an ongoing basis is a central concern for executives operating under changing environmental conditions. Strategic control processes with updated action plans are core elements of strategic management (Schendel and Hofer, 1979; Lorange, Norton and Ghoshal, 1986; Simons, 1991, 1994; Boyd and Reunning-Elliott, 1998). As a result of increased environmental turbulence, there has arguably been a subtle shift in corporate strategy making towards "planned emergence" with an emphasis on broader performance targets and flexible execution (Bruce and Hunt, 1999; Grant, 2003). This development resonates with the contemporary calls for strategic renewal and dynamic organizational change (Agarwal and Helfat, 2009; Helfat, Finkelstein, Mitchell, Peteraf, Singh, Teece and Winter, 2007; Teece, 2007). However, the strategy field offers little concrete advice on how executives might deal with the increasing demands for ongoing updating of responsive actions and, overall, strategic control has been a fairly subdued area of research (e.g., Goold and Quinn, 1990; Simons, 1991). As a consequence, it is not clear how firms gather effective environmental intelligence and what the important information sources for strategic adaptation are.

Borrowing from ideas about decentralized engagement, autonomous initiatives, peripheral visioning, and environmental sensing (Bower, 1972; Burgelman, 1983; Day and Schoemaker, 2006; Mintzberg, 1978, 1994; Teece, 2007), we suggest that frontline employees gain valuable insights that may constitute useful information for on-going strategic control and adaptation. However, very little is known about the accuracy of employee knowledge on key environmental parameters, and whether this information is sufficiently reliable for use in strategic decision-making. For example, employees' interpretation of local conditions could be biased. Or, employee knowledge may be tacit to an extent that makes it difficult to communicate for the purpose of meaningful strategic decisions.

We present a field study that grapples with these problems. Specifically, we examine the extent to which firms can draw on knowledge gathered by frontline employees to form accurate short- to medium-term predictions of firm performance on essential strategic areas. Our empirical setting is the Scandinavian hospitality sector and the respondents are different service employees in three hotels in Norway and Denmark. We build time series data based on monthly observations from these three sets of respondents, and construct indices that capture the respondents' intuitive judgments towards the future on specific performance dimensions. Lagged values of both aggregate and specified indices are used as independent variables in regressions against actual performance and show that a significant share of the variance can be explained in this manner. We show that in this empirical setting, frontline employees can predict the relative importance of essential managerial capabilities on medium-term strategic performance that may point to strategic areas in need of corrective actions.

THEORETICAL BACKGROUND AND HYPOTHESES

The Importance of Locally Held Knowledge

The importance of devising mechanisms that can aggregate locally held knowledge for the purposes of decision-making and medium-term action planning has long been stressed in social science. Friedrich Hayek (1945: 81, 84) famously pointed to the "importance of the knowledge of time and place" for the design of social systems, and argued that we "need decentralization because only thus can we insure that the knowledge of the particular circumstances of time and place will be promptly used." However, a (strategic) decision maker typically needs "further information" than merely his own local knowledge "to fit his decisions into the whole pattern of changes of the larger economic system" (Hayek, 1945: 84). Hayek, of course, pointed to the price mechanism as the device that communicates this "further information" to the decision maker. However, the price system communicates additional and necessary information exactly because it is capable of

aggregating and mobilizing an enormous amount of dispersed knowledge, an insight captured in, for example, theories of prediction and information markets (Gruca, Berg and Cipriano, 2005).

The more general lesson is that any social system needs to have mechanisms in place that mobilize and exploit locally held knowledge. The price mechanism is only one such mechanism. Imitation is another: decision-makers adopt an existing practice when they consider this to be beneficial, and hence efficient practices tend to disseminate. Mechanisms may be set to facilitate the dissemination of efficient practices as in knowledge management processes. Crowd-sourcing relies on incremental feedback to ongoing problem-solving efforts and aggregates information in this way (Jeppesen and Lakhani, 2010).

Of course, firms also seek to aggregate information and the problem of how firms can best make use of locally held knowledge in the formation, implementation and execution of strategies is central in strategic management. Thus, a classical discussion concerns the extent to which strategies develop from lower-level "autonomous" initiatives in the organization (Burgelman, 1983, 1994; Mintzberg and Waters, 1985; Mintzberg, 1990) as opposed to being initiated by the top echelon of the organization (Ansoff, 1991). Those who hold the former view argue that lower level employees often possess superior knowledge about key variables of strategic interest; that unpredictable, but frequent environmental changes make centralization of such knowledge impractical; and that much of the relevant knowledge is tacit, making its centralization difficult and costly (e.g., Mintzberg, 1990: 190). Such conditions in the strategic management process may favor decentralization of initiative in a manner reminiscent of Hayek (1945), or at least the implementation of mechanisms that can reliably draw on locally held knowledge in the strategic management process.

Interactive Controls and Assessing Strategic Outcomes

The strategic management process comprises a set of sequential activities, including goal formation, environmental analyses, strategy formulation and evaluation, strategy implementation, strategic control, and adjusted action plans (Schendel and Hofer, 1979). The implied strategic

planning activities constitute a set of procedures to obtain information and make forecasts to develop and revise strategies in a consistent and timely manner (Grant and King, 1982). Indeed, ongoing evaluation of strategic objectives and updating of short-term action plans are considered central elements of strategic management (Boyd and Reuning-Elliott, 1998). As the organization takes concrete actions to achieve intended outcomes, updated information about environmental conditions becomes important to inform thinking about corrective actions and adaptive responses (Cyert and March, 1963).

Simons (1991, 1994) proposes the application of interactive management control systems to guide the development of responsive strategic initiatives. A management control system is interactive when top managers use the system to "personally and regularly involve themselves in the decisions of subordinates." It should fulfill four conditions: (1) the generated information is addressed regularly by the highest management level; (2) it receives regular attention by operating managers across the organization; (3) the data is discussed face-to-face between superiors and subordinates; and (4) there is continual challenge and debate (Simons, 1991). These conditions differ from diagnostic control systems reporting on predetermined strategic parameters to top management (Simons, 1991), as the underlying idea of interactive management control systems is that top managers can be informed from the learning experiences of lower level employees gained from the actions taken when they deal with day-to-day business challenges. These data points are useful inputs to the process of interpreting the fit of firm strategies with the changing environmental context.

In this process top management can, for example, adopt a profit planning system as an interactive platform to exchange information about things like, customer satisfaction, competitive status, innovative initiatives, problem solving capacity, etc. Regular and fairly frequent interactive dialogue, say, once a month can create a better understanding about the need for updated strategic responses (Simons, 1994). Hence, the use of interactive control systems provides top management with potential tools and techniques to deal with and uncover important strategic uncertainties on an

ongoing basis with the intent of devising effective responsive initiatives and corrective strategic actions.

Employees as Information Sources in the Strategic Control Process

Burgelman (1996) describes strategy making from an evolutionary perspective as a pattern of managerial activities where resources are (re)directed internally toward more viable business opportunities. Here, useful insights about viable opportunities derive from dispersed initiatives that respond to the immediate and evolving business context. As Grove (1996: 22-23) argues, "we need to expose ourselves to lower-level employees, who, when encouraged, will tell us a lot that we need to know … the leader is often the last of all to know". Specifically, "the process of adapting to change starts with the employees, who through their daily work, adjust to the new outside forces" (Grove, 1996: 128). Hence, the consequences of emerging environmental developments are initially observed among organizational actors that are close to actual events when they immerse themselves in the daily business interactions. As the frontline employees deal with and respond to the challenges of ongoing business execution, they gain detailed insights about developments in market needs and internal operating competencies. This may provide these employees with superior knowledge, not accessible elsewhere in the organization about emerging threats and opportunities that can be used with benefit when top management considers the need for corrective strategic actions. Effectively, they may function as gatekeepers in the strategic management process (Tushman and Katz, 1980: 1071). As Burgelman (2005: 42) notes "strategic action at higher levels in the management hierarchy benefits from interpretation of the outcomes of strategic action at lower levels".[1]

Dynamic Capabilities and the Importance of Sensing

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[1] In his detailed analysis of strategic planning among the oil majors, Grant (2003) observes a decentralization of processes to the business level with an increasing focus on performance targets. This may reflect a move away from behavioral controls through supervision and central approvals to higher degree of autonomy and decentralization supported by general monitoring of performance outcomes. That is, the strategic planning process is becoming more interactive assuming stronger communication and knowledge sharing roles as the means to create common understanding about the strategic situation of the firm.

This emerging interest in employees as potential gatekeepers in the strategic management process harmonizes with the recent interest in the micro-foundations of strategic management. An important issue is to understand how individuals and their interactions underlie the firm's ability to orchestrate changes in the resource base when responding to external changes, that is, its dynamic capabilities (Teece, Pisano and Shuen, 1997). The dynamic capabilities construct has many key facets that speak to this, including environmental scanning (Peteraf and Bergen, 2003) and co-evolution of knowledge (Helfat and Raubitscheck, 2000). In an important paper, Teece (2007: 1323) argues that important parts of the micro-foundations of dynamic capabilities lie in the sensing abilities of lower-level employees:

> "The enterprise will be vulnerable if the sensing, creative, and learning functions are left
>
> to the cognitive traits of a few individuals. Organizational processes can be put in place
>
> inside the enterprise to garner new technical information, tap developments in exogenous
>
> science, monitor customer needs and competitor activity, and shape new products and
>
> processes opportunities. Information must be filtered, and must flow to those capable of
>
> making sense of it."

Thus, vital strategic information residing at lower organizational levels is "filtered" and transferred to key decision-makers rather than being utilized on the spot. This requires the imposition of "organizational processes" to deploy, coordinate, and incentivize organizational boundary spanners, and systematize and synthesize the information gathered by these boundary spanners (cf. Casson, 1994; Foss, Laursen and Pedersen, 2011). It has long been recognized that the ability to gather and interpret environmental information is central to effective decision outcomes (e.g., Hayek, 1945; Cyert and March, 1963; Harrison, 1999; Bazerman and Moore, 2009) or indeed effective organizational management (Galbraith, 1977, 1994; Weick, 2001; Eisenhardt and Martin, 2000). Teece places this insight at the heart of the dynamic capabilities view.

More broadly, Teece (2007) suggests that building, maintaining and deploying dynamic capabilities presuppose the development of an organizational sensing apparatus that organizes and undertakes the firm's intelligence: "The search activities that are relevant to 'sensing' include information about what's going on in the business ecosystem." (Teece, 2007: 1324). Teece et al. (1997) argue that decentralized organizations with greater autonomy for local actors are more observant and, therefore, less likely to be blindsided by new environmental developments. Hence, the associated opportunity discovery depends on individual capabilities and organizational processes that facilitate access to information and exchange of knowledge (Teece, 2007).

Hypotheses

The knowledge absorbed through environmental sensing by people at different hierarchical levels in the firm is likely to be different. Top managers are in touch with other executives and professional communities related to the industry and many other stakeholders in the wider society from the upper management echelons. In contrast, frontline employees receive information and weak signals about the state of business through daily social interactions with diverse stakeholders, for example, customers/clients/users, managers, colleagues, and various external collaborators. We argue that this makes employees capable of meaningfully predicting firm performance.

Hypothesis 1: *Frontline employees who are engaged in environmental sensing can predict medium-term firm performance.*

In addition to their knowledge of the needs, wishes, and so on of external collaborators and customers and clients, employees also acquire local knowledge about conditions that are more internal to the firm and pertain to, for example, the firm's ability to successfully develop and implement new services, systems and processes over the near future, to solve managerial and work related problems effectively, how HR policies are administered and so on. We argue that this makes employees capable of meaningfully predicting the contribution of these factors to firm performance.

Hypothesis 2: *The environmental sensing by frontline employees can assess the medium-term performance effect of specific internal management competencies.*

As stressed by management thinkers and social theorists who have highlighted local knowledge, the knowledge held by local decision-makers is often superior to the knowledge held by centralized decision-makers, such as managers. As Hayek (1945) stresses such knowledge is "knowledge about the particular circumstances of time and place," and such fleeting, hard-to-codify knowledge may only be acquired by those who are in the midst of things. This implies that aggregation of knowledge from frontline employees can add incremental strategic insights that otherwise would be unavailable to top management for on-going decision making purposes. Thus the environmental sensing by frontline employees generates unique knowledge that can provide more accurate predictions about the state of business compared to the environmental sensing of the managers and the financial forecast available to them.

Hypothesis 3a: *The environmental sensing by frontline employees provides more accurate assessments of medium-term firm performance compared to management's own environmental sensing.*

Hypothesis 3b: *The environmental sensing by frontline employees provides information about medium-term firm performance that can explain errors in management's financial forecasts.*

Clearly, the above hypotheses imply that knowledge gathered from localized "sensing" by employees is useful. Specifically, they suggest that (strategic) decisions this way can be supported by superior knowledge and insights. That is, improved predictive capabilities acquired by top management from information gathered among frontline employees can be used to assess managerial effectiveness and consider the need for short-term action plans to adjust strategic outcomes. However, while we do have impressive case-based evidence (Burgelman, 1983, 1996, 2002, 2005; Burgelman and Grove, 2007) that speaks to the matter, we are not aware of attempts to systematically address the potential value of dispersed information in quantitative empirical terms.

For this reason, we have little concrete evidence about the extent to which knowledge about key strategic variables residing at lower levels in the organization is accurate and whether it, therefore, can be utilized with advantage in strategic decision-making at higher management levels. For example, it may be that local sensing is so embedded in tacit knowledge that it is too difficult to reveal it in any form for the purpose of filtering and transferring it, and that attempts to do so will result in heavily biased information. Hence, the following presents an empirical study devised to establish testing grounds for the above hypotheses.

DATA AND METHOD

Research Design

The study was designed as three parallel surveys generating monthly time-series data over a 18 month period in 2006-7. The study was performed in three Scandinavian hotel units of international hotel chains (two four-star hotel units in Norway and a five-star hotel unit in Denmark). The hospitality sector is generally considered a dynamic industry exposed to international competition (Dess and Beard, 1984). As such, it constitutes an appropriate context for studying the predictability of strategic performance outcomes. The focus on a single industry and homogenous companies in terms of national (cultural) surroundings (Norway and Denmark) as well as organizational size reduces potential confounding effects caused by varying industry conditions or differences in national regulatory, legal, and economic infrastructures. The degree of information transmission between employees and management in hotels depends on organizational size (Ruiz-Mercader, Merono-Cerdan and Sabater-Sanchez, 2006), but four and five star hotels in Scandinavia operate under quite similar hierarchical structures compared to lower scale hotels. The three hotel units have, respectively, 120, 110, 125 (full- and part-time) employees and are all medium-sized businesses according to the SME definition of the European Commission. Thus, we believe our sample to be fairly balanced and thus constitutes a good basis for studying firm-specific effects.

Survey observations were obtained from frontline employees as well as executives, directors and managers in two comparable surveys: The *Employee Strategic Sentiment Survey* and the *Executive Strategic Sentiment Survey*. These surveys collect individual assessments on key indicators construed to capture employees' intuitive judgments about business-unit performance in specific areas with a 12-month forecasting horizon.

The surveys adopt a formative measurement approach where the indicators measure one or more latent variables as opposed to reflective indicators common in most organizational research (Bagozzi, 1994; MacCallum and Browne, 1993). The study examines the external validity of expectations towards the future in consecutive time-series by comparison to established prediction indices.[2] Specifically, the surveys for employees and executives are compared to four validation instruments: (1) the *Index of Consumer Sentiment* (Katona, 1951; Katona and Mueller, 1953), (2) the *Consumer Confidence Index* (Ludvigson, 2004), (3) the *Organizational Commitment* scale (Mowday, Steers and Porter, 1979), and (4) management's financial forecasts available from the unit central administration.

Participants and Procedures

The indicators of the *Employee Strategic Sentiment Survey* were monitored electronically from February 2006 to September 2007 and generated 49 monthly observations across the three units from 626 completed surveys. With shifting work-hours we used a longer data-sampling period, between the 10th and the 16th of each month to reach all frontline employees. Therefore, the pool of frontline employees also changed somewhat from observation to observation. Each month, a survey link was sent to department managers, who then forwarded the link to their frontline employees, while excluding newly hired employees. The population of frontline employees included all hospitality associates from all kinds of front office stations, restaurants, show kitchens, and

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[2] In the case of formative measures external validity becomes the focal point (Bagozzi, 1994; Diamantopoulos and Siquaw, 2006; Diamantopoulos and Winklhofer, 2001).

housekeeping, conference, banquet and sales departments. The response rate each month varied over time and by hotel (within a range of 10-50%). This was partially influenced by the turnover rate among hospitality employees, seasonality of workload, occasional busy periods, and relative ease of email access. However, the external validity of results does not depend on the response rate, even though high participation is desirable. The characteristics of the frontline employees are reported in Table 1A.

- Insert Table 1 about here -

A similar survey was devised for hotel executives, directors, and managers. This survey period started after completing a 6-month trial period for the frontline employees, thus resulting in fewer observations for the executive sample. The survey indicators were monitored monthly from September 2006 to September 2007 and thereby yielded a total of 21 monthly observations from 149 completed surveys. The sample included hotel executives (CEOs), Directors of Human Resources, Operations, Sales and Revenue Strategy, Restaurant Managers and Executive Chefs, and Guest Service Managers, Front Office and Housekeeping Managers. The data collection was electronic and obtained directly from the individual email accounts. A survey link was sent on a monthly basis although not to newly employed executives and managers. The characteristics of the executives, directors, and managers are reported in Table 1B.

Measures

Performance. The common performance indicators in the hotel industry are the Occupancy Rate (Berger, 1997; Jeffrey and Barden, 2000) and Revenue per Available Room (REVPAR) (Enz, Canina and Walsh, 2001). The occupancy rate indicates the share of rooms sold. REVPAR reflects average revenue per available room (Wu, Hsaio and Tsai, 2008) and is calculated as the product of the room occupancy rate and the average daily room rate (ADR). It increases when either the occupancy rates or the room rates increase, *ceteris paribus*. Because it standardizes earnings on a per room basis, REVPAR makes it easy to compare hotel performance across competing operations in

the industry. We use a comparative performance measure, $Pfm_{i,t}$ for hotel unit or firm i at time t, where the firm is benchmarked against the average performance of other firms in the industry. The measure is calculated by taking the difference between the return of the hotel unit and the average return in the (local) hotel industry:

$$Pfm_{i,t} = \Delta\ln(R_{firm})_{i,t} - \Delta\ln(R_{industry})_{i,t} \qquad (1)$$

R_{firm} and $R_{industry}$ is REVPAR for the hotel unit and the aggregate hotel industry, respectively. Δ represents change from period to period so that $\Delta\ln(R_{firm})_{i,t} = \ln(R_{firm})_{i,t} - \ln(R_{firm})_{i,t-1}$. Taking the first difference usually removes deterministic and stochastic trends from the variable and transforms it into a stationary time series. Moreover, taking the first difference of the logarithm of a variable corresponds approximately to the percentage change of that variable from one period to the next. As a result, $\Delta\ln(R_{firm})_{i,t}$ and $\Delta\ln(R_{industry})_{i,t}$, can be viewed as the firm-specific and industry-wide returns expressed in percentage terms. REVPAR only accounts for revenues and not costs. But, since the hospitality or lodging business is characterized by large fixed costs and modest variable costs, most variation in return is caused by variation in revenue. That is, $Pfm_{i,t}$ captures excess return of the hotel units compared to the industry average.

The measure of $Pfm_{i,t}$ to a large degree filters out effects of market developments in the hotel industry, such as, aggregate room capacity changes, economic up or downturns, seasonality and other common factors, so only hotel-specific variation in return remains. As a result, the sentiment indicators are used to predict whether a hotel unit is performing better or worse than the competition in the industry. Obviously a strong correlation between a hotel unit and the competition provides less variation to explain. The correlation between R_{firm} and $R_{industry}$ for hotel units 1, 2 and 3 in this study are 0.94, 0.97 and 0.86 respectively, which means that there is comparatively less variation in $Pfm_{i,t}$ to predict, particularly in the case of hotel unit 2.[3]

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[3] As explained by the former hotel director of hotel unit 2, the hotel management and CEO initiated a dynamic pricing strategy in 2006 as the first hotel group in the world. The dynamic pricing ensures that room pricing follows the price fluctuations of the market, where room rates are adjusted from day to day or even from hour to hour based on RateView

Predictors. The development of relevant sentiment indicators was based on conversations with leading hotel experts, including hotel executives, frontline employees and academics, in Asia and Europe. We also conducted pre-tests on initial factors with five hotel executives and ten frontline employees in Scandinavia. The refined factor items were presented and discussed with academics at conferences in Australia, Sweden and Portugal and obtained further face validation through conversations with different hospitality experts. The sentiment factors assembled from these efforts regarding the daily work conditions that circumscribe the operating environment of frontline employees are shown in Table 2.

- Insert Table 2 about here -

The survey was structured around expectations about three groups of indicators according to general headings that emerged from conversations with experts: *Organizational competencies*, *staff performance*, and *work situation*. The related indicators (listed in Appendix A) were assessed on five-point Likert scales.[4]

The *Employee Strategic Sentiment Index* (*ESSI*) and *Executive Strategic Sentiment Index* (*EXESSI*) largely follow the structure and computation of the index of consumer sentiment (Curtin, Presser and Singer, 2000; Katona, 1960). First, a diffusion measure is constructed for each of the 13 indicators. The diffusion measure (X_{it}) for item i at time period t, is calculated as the difference between the number of positive and negative responses in each time period (month) divided by the total number of responses in that period (month), plus 100. When the positive responses outnumber the negative ones, the diffusion measure show a number larger than 100, and in the opposite case, it is less than 100.

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and Hotelligence systems. These systems highlight competitive price positions, monitor best rate guarantees and validate rate parity, which allows a company to negotiate a discount off Best Available Price (BAR) rather than pay a fixed price. The dynamic pricing strategy was implemented after our data collection was commenced and thus affects our sample.

[4] Values 1 and 2 on the scale indicate expectations of a negative and modest negative development in the next 12 months, compared to the present situation. A value of 3 indicates no expected change over the next 12 months, and 4 and 5 indicate employees' expectations of a modest positive and positive development respectively in the next 12 months, compared to the present situation.

$$X_{it} = \frac{(No.\ of\ positive\ responses_{it}\ -\ no.\ of\ negative\ responses_{it})}{Total\ no.\ of\ responses_{it}} + 100 \qquad (2)$$

The *ESSI* and *EXESSI* are then calculated by aggregating the 13 diffusion measures for each period and dividing by the sum of the period chosen as a base period, as follows;

$$ESSI_t = \frac{\sum_{i=1}^{13} X_{it}}{\sum_{i=1}^{13} X_{i0}} \times 100$$

$$(3)$$

Following the convention we multiply by 100 and get the usual representation of an index, with the base period equal to 100. Using this computation, an *ESSI* value greater than 100 indicates that frontline employees are confident about the future state of the hotel unit, relative to the base period, while an *ESSI* value under 100 indicates that employees are less confident about the future state of the business.

Validity and Reliability

The validity and reliability of formative time-series measures have received little attention compared to reflective measures derived from cross-sectional datasets. Formative time-series data typically involve non-personal variables, such as sales, advertising and expenditures that are less subject to limitations of measurement (Didow and Franke, 1984). Although guidelines for constructing formative indicators are hard to find, Diamantopoulos and Winklhofer (2001) emphasize the importance of content specification and external validity based on an extensive literature review.

Content specification is concerned with the capture of sources that tap into the forecasting task in fairly broad terms to reach at all the important indicators. As argued by Nunnally and Bernstein (1994): "breadth of definition is extremely important to causal indicators", and failure to consider all aspects of the construct can lead to omission of relevant indicators. Hence, we specified the domain

of the construct as employees' *sentiments* towards the future state of the hotel business in relation to indicators of organizational competencies, staff performance, and work situation. Thereby we sought to capture a broad range of employee sentiments cultivated by central aspects of their daily work situation. The specific indicators emerged from extensive conversations with experienced hospitality experts to gain assurance that the indicators reflect important aspects of employee sentiments.

External validity of formative measurement models is relevant for assessing the suitability of indicators. As Bagozzi (1994) notes: the "best we can do … is to examine how well the index relates to measures of other variables". Therefore, the *ESSI* and *EXESSI* indices were validated against the *Index of Consumer Sentiments* (*ICS*), the *Consumer Confidence Index* (*CCI*), and the *Organizational Commitment* (*ORGCOM*) scales (Please refer to Appendix B for detailed descriptions). The *ESSI* and *EXESSI* were also compared to *REVPAR* budget forecasts received from hotel management. The performance forecast ($Pfm^{forecast}$) is based on the hotels own budget forecasts received from the revenue managers at each of the hotel units. Hence, we use the established macro-economic indices and the monthly *REVPAR* budgets for the three hotel units to validate *ESSI* and assess the forecasting performance of the indices in a "prediction contest".

EMPIRICAL MODELS

We use single-equation distributed lag models to evaluate *ESSI* and *EXESSI* as predictors of performance for each of the three time-series (hotel units) using Granger causality tests. We test this individually for all three hotel units and compare to the predictive capacity of *CCI*, *ICS*, and *ORGCOM*. Subsequently, we aggregate the three cases as unbalanced panel data to further assess whether the two indexes (*ESSI* and *EXESSI*) contain predictive information across the full sample.

Estimation of Forecasting Models

We adopt parsimonious specified distributed lag (DL) models where the data are entered in first difference form as stationary time series. The DL estimated by OLS should yield unbiased coefficients because *ESSI* is based on items unrelated to room and occupancy rates. Moreover, since

monthly variation in *REVPAR* has been filtered out in the performance measure, *Pfm*, less variation should be required to account for the remaining variation and, hence, less chance of omitted variable bias. The models are specified as follows:

$$Pfm_{i,t} = \sum_{j=1}^{q} \delta_{i,j} \Delta \ln ESSI_{i,t-j} + u_{i,t}, \tag{4}$$

$$Pfm_{i,t} = \sum_{j=1}^{q} \delta_{i,j} \Delta \ln EXESSI_{i,t-j} + u_{i,t} \tag{5}$$

$$Pfm_{i,t} = \sum_{j=1}^{q} \delta_{i,j} \Delta \ln ICS_{i,t-j} + u_{i,t} \tag{6}$$

$$Pfm_{i,t} = \sum_{j=1}^{q} \delta_{i,j} \Delta \ln CCI_{i,t-j} + u_{i,t} \tag{7}$$

$$Pfm_{i,t} = \sum_{j=1}^{q} \delta_{i,j} \Delta \ln ORGCOM_{i,t-j} + u_{i,t} \tag{8}$$

$Pfm_{i,t}$ is the performance measure introduced in equation 1 for hotel i at time t. $ESSI_{it-j}$ is the *ESSI* index based on frontline personnel responses in period $t - j$, where j is the forecasting horizon. $\delta_{i,i}$ are parameters to be estimated and $u_{i,t}$ is a white-noise error term. We use a general to specific modeling strategy, where lag length is reduced until we reach the highest significant lag.

The panel data models follow the formulation of equation (4) and (5) above. However, in the random-effects panel data model the three hotel cases are estimated simultaneously and the parameter δ is constrained to be identical across the three equations. Thus, the subscript i that identifies the hotel cases is removed from δ in models (9) – (10):

$$Pfm_{i,t} = \sum_{j=1}^{q} \delta_{j} \Delta \ln ESSI_{i,t-j} + u_{i,t}, \tag{9}$$

$$Pfm_{i,t} = \sum_{j=1}^{q} \delta_{j} \Delta \ln EXESSI_{i,t-j} + u_{i,t} \tag{10}$$

RESULTS

Prediction power of employee sentiments

Table 3 presents the correlation analysis for *ESSI*, *ICS*, *CCI*, and *ORGCOM* for each time series for the *ESSI* data set. The correlation coefficients between *ESSI* and *ORGCOM* support the supposition that *ESSI* contain information that is also captured by the organizational commitment construct. The correlations between *ESSI* and *ORGCOM* are relatively high with $r = .479$ for hotel unit 1, $r = .445$ for hotel unit 2, and $r = .224$ for hotel unit 3. This provides external validity to the *ESSI* measure and indicates that *ESSI* contains unique information distinct from *ORGCOM* measures.

As expected, the correlations between *ESSI* and the two consumer confidence indices *CCI* and *ICS* are generally low. The correlation coefficients between *ICS* and *CCI* show mixed results, which are in line with previous studies on interaction effects (Huth, Eppright and Taube, 1994). Hence, the correlation analysis demonstrates that the information contained in *ESSI* is different from *CCI* and *ICS*. This is not surprising since *ESSI* puts more emphasis on internal conditions in the hotel unit, while *CCI* and *ICS* relate to macroeconomic conditions. Finally, there is no association between *ESSI* and $Pfm^{forecast}$ for hotel unit 3 with $r = .010$ to medium to strong negative association for hotel unit 2 $r = -.236$ and hotel unit 1 $r = -.500$.

-   Insert Table 3 about here   -

The correlation coefficients between *ESSI* and *EXESSI* have fewer observations, because *EXESSI* is determined over a shorter time period. The correlation for hotel unit 1 is $r = .3144$, for unit 2: $r = .3274$ and, for unit 3: $r = -.3578$. This indicates that the responses of executives and frontline employees in almost identical surveys differ. In other words, employees and executives appear to display different assessments of internal conditions.

Estimated Single-equation Models

Table 4 shows the estimation of single-equation distributed lag (DL) models for the three individual hotel units. DL models are estimated using current and lagged values of *ESSI, EXESSI,*

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ICS, CCI, and *ORGCOM* as predictors of company performance, *Pfm*. We use a general-to-specific modeling approach that starts with a generously specified model and then proceeds to more parsimonious model specifications based on elimination of variables (or, more precisely, lagged values of variables) that are not significant. While the three tables only report DL models with two lags, DL models with as many as six lags have been estimated. Since significant variable coefficients only start to appear from the second lag, we have not reported models with higher level lags. The estimations for hotel unit 1 and 3 are statistically significant. This provides support for hypothesis 1 (i.e., *environmental sensing by frontline employees can predict medium-term firm performance*).

- Insert Table 4 about here -

For either of the three hotel units, no model using *ICS, CCI* or *ORGCOM* has significant parameter estimates. However, one model of *EXESSI* has significant parameter estimates for the current period. Re-estimating the models including only current and lagged variables that were significant, the second lag of *ESSI* is significant at the 5% level for hotel units 1 and 3, but the *EXESSI* variable becomes insignificant. To increase the available degrees of freedom for estimating the parameters, we estimate a panel data model that joins the three hotel cases. Based on the Hausman test, we use a random effects model including those variables that have shown to be statistically significant (Wooldridge, 2002). This means that we estimate models using *ESSI* and *EXESSI* as predictor variables. The results from the panel data models reported in Table 5 reinforce the results obtained from the single equation models. The second lag of *ESSI* is now statistically significant at the 1% significance level, while the p-values associated with the estimated *EXESSI* coefficients do not show any statistical significance. This provides support for hypothesis 3a (i.e. *environmental sensing by frontline employees provides more accurate assessments of medium-term firm performance compared to management's own environmental sensing).*

- Insert Table 5 about here -

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We also test how *ESSI* performs in relation to existing forecasting systems in the hotels. The hotels' revenue forecasts are typically generated from historical booking data modified by managerial judgments based on special knowledge about conferences, economic downturns, etc. Hence, we obtained these forecasts and constructed a new variable for forecast error (*FE*) calculated as $FE = Pfm - Pfm^{forecast}$. Thus, we also test whether *ESSI* can predict variation in *Pfm* that is not accounted for by the firm's own management forecasts, $Pfm^{forecast}$. The results show that in models 1 and 2 *ESSI* can predict the residual variation in the performance measure whereas hotel management is unable to foresee, *FE*. This supports the notion that *ESSI* captures unique information beyond the financial forecasts available to the hotel management and that can be strategically important for the enterprise. This provides support for hypothesis 3b (i.e., *environmental sensing by frontline employees provides information about medium-term firm performance that can explain errors in the financial forecasts available to management*.

We now examine the *ESSI* indicators individually to assess their ability to predict future firm performance compared to the aggregation of 13 indicators in the original *ESSI* measure. Table 6 shows the predictive effects for each of the *ESSI* indictors, where particularly four indicators show significant forecasting ability with a two-period lag. These indicators reflect employee sentiments about the hotel's ability to develop new services, systems and processes over the next 12 months, to solve managerial and work related problems effectively, and to create prospects for higher employment positions. These indicators relate to specific internal competence areas in the hotel units.

- Insert Table 6 about here -

A principal component analysis (PCA) was conducted on the 13 ESSI items with oblique rotation (oblimin) across hotel units, holding the time domain constant. The analysis was performed in SPSS Version 18. The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = .88, which is "great" according to Field (2009), and all KMO values for individual items were above .75, thus exceeding the acceptable limit of .5 (Field, 2009). Barlett's test of

spihericity x^2 (77) = 2194.18 (p < .001), indicated that correlations between items were sufficient for PCA. An initial analysis was run to obtain eigenvalues for each component in the data. Three components had eigenvalues in accordance with Kaiser's criterion of above 1 (3.196; 2.752; 1.655) and in combination explained 58.5% of the variance. The scree plot was slightly ambiguous but showed inflexions that justify retaining components 1, 2 and 3. Hence, this is the number of components we retain in a final analysis. The indicator clusters suggest that component 1 represents o*rganizational competencies* (*ESSI* indicators: 1, 2, 3, 4, 6, 7, 8), component 2 may be interpreted to represent *working conditions* (*ESSI* indicators: 9,10,11,12), and component 3 *firm attractiveness* (*ESSI* indicators: 5, 6, 13). See Appendix A for a complete list of the thirteen *ESSI* indicators.

A reliability test was performed on the three components. *Organizational competencies* and *working conditions* have high reliabilities with a Cronbach's α of .82 and .77 respectively. However, *firm attractiveness* has an unacceptable Cronbach's α of .083 due to a negative average covariance among items, which may be caused by the inverse scale on *ESSI* indicator 13. A test of the reliability of component 3 based on indicators 5 and 6 only has a Cronbach's α of .77. Altogether, this evidence provides support for hypothesis 2 (i.e., *environmental sensing by frontline employees can assess the medium-term performance effect of specific internal management competencies*).

CONCLUDING DISCUSSION

The main finding of this paper is that employee expectations on important aspects of firm performance captured by the *ESSI* has significant short- to medium-term predictive power. Moreover, the sensing of frontline employees' make better and more accurate predictions than the judgmental forecasts employed by managers, and *ESSI* predicts variation in *Pfm* that is not accounted for in the firm's financial models. Furthermore, we discern a unique ability among frontline employees to predict the performance effect of particular areas of internal management competence. That is, frontline employees with contacts to essential corporate stakeholders among customers,

suppliers, partners, and society at large have significantly stronger predictive powers on key strategic performance variables compared to the middle-, line- and top managers in the organization.

Hence, it appears that top management can gain superior information from lower level employees as these interpret day-to-day activities and their expected effects on corporate performance outcomes. This means that informative inputs gathered from frontline employees of the firm can be used in interactive management control systems where face-to-face discussions and ongoing debate may point to needed revisions of strategic action plans (Simons, 1991, 1994). That is, strategic information residing at lower organizational levels can be transferred to key decision-makers and used to decide on corrective strategic actions. This is consistent with claims that lower-level employees are able to sense the need for strategic adjustments in view of changing conditions as they are among the first to observe the environmental changes (Burgelman, 1996; Grove, 1996). Hence, the frontline employees can gain detailed insights about subtle market changes and operating shortcomings in dealing with these that constitute superior knowledge not otherwise accessible to top management. This conforms to the notion that the sensing abilities of lower-level employees are important elements of the micro-foundations of dynamic capabilities (Teece, 2007). Similarly, it resonates with a strategic responsiveness construct that builds on organizational capabilities to assess environmental changes with sufficient accuracy (Andersen, Denrell and Bettis, 2007). Indeed, this ability to sense the changing strategic requirements of the firm is considered a necessary prerequisite for formulating appropriate responses and reconfiguring internal resources to execute these adjusted action plans. The results are consistent with empirical evidence showing the importance of strategic flexibility that allows the firm to engage in ongoing strategic adjustments as updated environmental information becomes available (Brews and Hunt, 1999). It also corresponds to findings that decentralized experiential insights can drive responsive behaviors and adaptive strategic actions (Andersen and Nielsen, 2009). That is, the ability to gather experientially derived information from

the ongoing activities of lower level employees can facilitate the ability to redirect the strategic course of the firm.

While the data analyses reach at rather unanimous conclusions, the reported findings have some obvious limitations. First of all, the data has been gathered from Scandinavian hotel units and even though due care has been given in collecting a large number of representative observations we cannot claim that such data will reflect similar outcomes in other industry and national contexts. The external validity is deemed acceptable as the correlation coefficients between the indices perform as expected. However, in one hotel case, *ESSI* did not reveal any predictive power.[5] Therefore, it will be desirable to increase the sample size to a larger number of hotel cases in future studies and develop appropriate follow-up studies that may increase the generalizability of results. If *ESSI* can predict financial performance progressively in two thirds of these hotel cases (67%), then the validity of the *ESSI* should be considered satisfactory. On the other hand if the forecasting power of *ESSI* decreases as the sample size increases, the limitations of the model must be recognized and discussed in terms of potential systematic restrictions to see if there are identifiable patterns of decreases in predictability for some hotel categories compared to others. Future studies replicated in the hospitality sector may also want to consider the potential confounding effects of dynamic pricing schemes and their influence on predictive performance relationships. Furthermore, we know that differences in knowledge between hierarchical levels and the degree of horizontal knowledge sharing and across hierarchical ranks can be affected by organizational structure and cultural norms (Janz and Prasarnphanich, 2003; Schein, 1985; Walsh and Ungson, 1991). Consequently, reproductive studies across comparable industries in other national contexts can assess whether there are systematic differences in the predictive capabilities of frontline employees in different geographical regions and cultural spheres.

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[5] This may be partially explained by the adoption of Rate View and Hotelligence systems in this specific hotel chain.

The findings from the present study indicate that information gathered among frontline employees in the Scandinavian hospitality industry can be used to predict the short- to medium-term performance effects of specific internal management competencies and thereby may be used to generate updated strategic responses. Hence, unique knowledge and strategically relevant information above and beyond what is otherwise accessible to top management resides among frontline employees and can be gathered as useful input for ongoing strategic decision making. The study points to the potential for new fruitful developments in the area of environmental information sensing and strategic control processes that may allow firms to become more responsive in the face of dynamic environmental conditions by utilizing subtle insights obtained by frontline employees in their day-to-day operations.

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Table 1.   The Characteristics of Frontline Employees and Executives

A. *Frontline Employees*

Control variables	Hotel 1 (N= 208)	Hotel 2 (N=279)	Hotel 3 (N=139)
Gender	Female = 51 %	Female = 71,3%	Female = 65 %
Years in the chain	M=2.27	M= 3.71	M=10.63
	SD=1.72	SD= 2.55	SD= 7.59
Years in the industry	M=5.60	M= 6.15	M=13.32
	SD=3.68	SD= 3.92	SD= 6.47

B. *Executives, Directors, and Managers*

Control variables	Hotel 1 (N= 44)	Hotel 2 (N= 65)	Hotel 3 (N= 40)
Gender	Female = 18%	Female = 60%	Female = 60%
Years in the chain	M= 6.82	M= 4.43	M= 3.68
	SD= 6.36	SD= 3.29	SD= 3.50
Years in the industry	M=11.93	M=11.18	M= 8.67
	SD= 6.53	SD= 4.64	SD= 5.85

Table 2.   Factors Influencing the Sentiments of Frontline Employees

Questions addressed to hotel experts	Factors
Which significant groups of people do frontline employees interact with?	Co-workers in own and other departments, guests, managers, colleagues of other hotels in the local area.
What do they perceive in their daily work?	Their own job, coordination in own department, coordination between departments in the hotel, how guests enjoy services, how managers solve challenging issues, the hotel in relation to its competitors.
What kind of anticipations do frontline employees build about the organization?	The future of their own jobs, future salaries, how problems are solved, how coordination works, managers' abilities in solving problems effectively, how satisfied the customers seem to be, how the hotel develops its services, the hotel in relation to competition, reputation of the hotel.

Table 3.   Correlation Analysis of Key Measures by Hotel Unit

- Hotel Unit 1

	ESSI	*CCI*	*ICS*	*ORGCOM*	*Pfm^{forecast}*
ESSI	1.000				
CCI	-.068	1.000			
ICS	-.011	.060	1.000		
ORGCOM	.479**	- .498**	-.183	1.000	
Pfm^{forecast}	-.500**	-.027	-.222	-.223	1.000

n = 16. *ESSI, CCI, ICS, ORGCOM, Pfm^{forecast}*

** $p < 0.05$, * $p < 0.10$

- Hotel Unit 2

	ESSI	*CCI*	*ICS*	*ORGCOM*	*Pfm^{forecast}*
ESSI	1.000				
CCI	-.166	1.000			
ICS	.216**	.365**	1.000		
ORGCOM	.445**	.103	.526**	1.000	
Pfm^{forecast}	-.236**	.026	.167	-.036	1.000

n = 18. *ESSI, CCI, ICS, ORGCOM, Pfm^{forecast}*

** $p < 0.05$, * $p < 0.10$

- Hotel Unit 3

	ESSI	*CCI*	*ICS*	*ORGCOM*	*Pfm^{forecast}*
ESSI	1.000				
CCI	.110	1.000			
ICS	-.147	.466**	1.000		
ORGCOM	.224**	-.123	-.372**	1.000	
Pfm^{forecast}	.010	.075	.131	.024	1.000

n = 17. *ESSI, CCI, ICS, ORGCOM, Pfm^{forecast}*

** $p < 0.05$, * $p < 0.10$

Table 4.   Prediction Contest Between *ESSI*, *EXESSI* and Validation Indices

| | *Hotel Unit 1* | | | | |
	ESSI	*ICS*	*CCI*	*ORG-COM*	*EXESSI*
$\Delta\ln X_t$	-.0019	.0034	-.0021	.0029	-.0032
	(.478)	(.211)	(.518)	(.147)	(.310)
$\Delta\ln X_{t-1}$	-.0033	.0033	.0012	-.0013	-.0005
	(.289)	(.267)	(.798)	(.527)	(.893)
$\Delta\ln X_{t-2}$	**.0053***	-.0001	.0026	-.0001	.0026
	(.089)	(.968)	(.535)	(.964)	(.545)
Constant	-.0055	.003	-.0023	-.0032	-.0142
	(.776)	(.893)	(.919)	(.870)	(.756)
Observations	14	14	14	14	7
R-squared	.36	.20	.11	.31	.42

p values in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

| | *Hotel Unit 2* | | | | |
	ESSI	*ICS*	*CCI*	*ORG-COM*	*EXESSI*
$\Delta\ln X_t$	-.0025	-.0004	-.0008	.0001	-.006
	(.639)	(.930)	(.808)	(.971)	(.270)
$\Delta\ln X_{t-1}$	-.0001	.0001	.0042	-.0009	-.0037
	(.979)	(.993)	(.251)	(.577)	(.528)
$\Delta\ln X_{t-2}$	.0042	-.0071	.0038	.0002	-.0096
	(.432)	(.192)	(.297)	(.903)	(.131)
Constant	-.0026	-.006	-.0031	-.0056	-.0011
	(.920)	(.802)	(.890)	(.832)	(.972)
Observations	15	15	15	15	8
R-squared	.09	.22	.31	.05	.55

p values in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

| | *Hotel Unit 3* | | | | |
	ESSI	*ICS*	*CCI*	*ORG-COM*	*EXESSI*
$\Delta\ln X_t$	-.0019	.0018	.0095	-.0072	-.0005
	(.774)	(.852)	(.611)	(.393)	(.889)
$\Delta\ln X_{t-1}$	.0029	-.0073	-.0012	.0044	.0108
	(.742)	(.507)	(.956)	(.588)	(.101)
$\Delta\ln X_{t-2}$	**.0210****	-.0084	-.0017	.0101	**.0127***
	(.010)	(.418)	(.934)	(.113)	**(.054)**
Constant	-.0135	-.0333	-.0212	-.0156	.0260
	(.775)	(.606)	(.746)	(.771)	(.427)
Observations	14	14	14	14	6
R-squared	.50	.13	.06	.41	.95

p values in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5. Prediction Contest between *ESSI* and *EXESSI* (Random Effects Models) and ESSI's predictability of forecast error

	Actual performance				Forecast error	
	ESSI (Model 1)	*ESSI (Model 2)*	*EXESSI (Model1)*	*EXESSI (Model2)*	*ESSI (Model 1)*	*ESSI (Model 2)*
ΔlnX_t	-.0017		-.0021		-.0011	
	(.530)		(.305)		(.631)	
ΔlnX_{t-1}	-.0002		.0026		0.0001	
	(.946)		(.334)		(.957)	
ΔlnX_{t-2}	.0113***	.0079***	.0029	.0008	.0057**	.0034*
	(.000)	(.001)	(.235)	(.573)	(.018)	(.076)
Constant	-.0048	-.0031	.0148	.0088	.0016	.0019
	(.791)	(.852)	(.517)	(.648)	(.923)	(.896)
Observations	43	49	21	27	28	32
R-squared	.29	.19	.25	.01	.19	.10

p values in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

[1] Unlike the other variables that are transformed as ΔlnX_t, $Pfm^{forecast}$ is transformed according to Equation 1

Table 6. **Prediction Contest of *Pfm* Between Individual *ESSI* variables 1-13 Using Random Effects Panel Data Model.**

	Organizational competencies				Staff performance					Work situation			
	Respect	*Innovation*	*Competi-tion*	*Guest exp*	*Dept Manager*	*Hotel Manager*	*Teamwork*	*Corp Department*	*Job assign*	*Interest HigerPos*	*Chance HigherPos*	*Earnings*	*Another Employ*
	ESSI1	*ESSI2*	*ESSI3*	*ESSI4*	*ESSI5*	*ESSI6*	*ESSI7*	*ESSI8*	*ESSI9*	*ESSI10*	*ESSI11*	*ESSI12*	*ESSI13*
$\Delta\ln X_t$	.0001	-.0011	-.0008	-.0016	.0006	-.0015*	-.0001	-.0007	-.0001	**.0020****	.0001	.0011	.0003
	(.938)	(.284)	(.551)	(.184)	(.513)	(.059)	(.902)	(.605)	(.898)	**(.028)**	(.881)	(.424)	(.749)
$\Delta\ln X_{t-1}$	-.0004	-.001	.0012	-.0004	.0015	-.0001	.0006	-.0005	-.0007	**.0017***	-.0003	.0008	-.0003
	(.773)	(.332)	(.425)	(.763)	(.125)	(.917)	(.588)	(.704)	(.596)	**(.089)**	(.803)	(.630)	(.806)
$\Delta\ln X_{t-2}$	.001	**.0021****	.0015	.0019	**.0026*****	**.0023*****	.0005	.0002	.0021*	.0003	**.0037*****	.0021	-.001
	(.492)	**(.040)**	(.277)	(.162)	**(.002)**	**(.004)**	(.696)	(.866)	(.088)	(.787)	**(.001)**	(.120)	(.339)
Constant	-.0086	-.0102	-.0054	-.0124	-.0071	-.0116	-.01	-.0095	-.0093	-.0044	-.0064	-.0108	-.0091
	(.686)	(.596)	(.805)	(.540)	(.710)	(.508)	(.638)	(.656)	(.637)	(.827)	(.728)	(.598)	(.668)
Observations	14	14	14	14	14	14	14	14	14	14	14	14	14
R-squared	.13	.44	.07	.09	.47	.49	.11	.09	.19	.15	.48	.21	.41

p values in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

APPENDIX A: ESSI Indicators

Dimensions	Indicators
Organizational competenties	*ESSI 1* EXPECTATION Please think about the level of respect that associates of other competing hotels show you because you work for hotel x. How do you think their level of respect will be for you in the next 12 months versus now? *ESSI 2* EXPECTATION How do you think the ability of Hotel X in developing new and creative services, systems and processes will be in the next 12 months compared with now? *ESSI 3* EXPECTATION How do you think the ability of Hotel X in competing in the hotel industry will be in the next 12 months compared with now? *ESSI 4* EXPECTATION Please think about the guests who have recently visited or stayed in Hotel X. How do you think they will talk about their experiences at the hotel to others during the next 12 months?
Staff performance	*ESSI 5* EXPECTATION How do you think your department manager will solve problems successfully in your department during the next 12 months compared with now? *ESSI 6* EXPECTATION How do you think that management of hotel X will solve problems successfully in the hotel during the next 12 months compared with now? *ESSI 7* EXPECTATION In the department where you work, how do you think the teamwork will be during the next 12 months versus now? *ESSI 8* EXPECTATION How do you think the corporation between departments will be during the next 12 months compared with now?
Work situation	*ESSI 9* EXPECTATION How interesting do you think your job assignments will be in the next 12 months versus now? *ESSI 10* EXPECTATION In the next 12 months, do you think you will be less or more interested in entering a higher position at the hotel versus now? *ESSI 11* EXPECTATION In the next 12 months, do you think your chances for being offered a higher position at the hotel will be worse or better versus now? *ESSI 12* EXPECTATION In the next 12 months, do you think your earnings (including bonuses and tips) at the hotel will be worse or better compared with now? *ESSI 13* EXPECTATION In the next 12 months, do you think you will be less or more interested in getting a job with another employer compared with now?

_____33_____

Response Scales:

Decrease …….….…… Increase
Worse ………………….. Better
Unpleasantly ………. Pleasantly
Unsuccessfully ….. Successfully
Uninterested ……..… Interested

measured on $[1 - 5]$ Likert scales

APPENDIX B: Validation Indices

Index of Consumer Sentiment (ICS)

The monthly national American Survey of Consumer Sentiment is administered and maintained by the University of Michigan's Survey Research Center since it was devised in the late 1940's by George Katona. In 1952 it was converted to a quarterly survey and in 1978 to a monthly survey. The data collection, of approximately 500 telephone interviews, is received from adults living in households in the United States. A rotating panel design ensures that one survey is made up of 60% new respondents and 40% being interviewed for the second time (Surveys of Consumers, 2007). The ICS consists of two dimensions: the Index of Current Economic Conditions (ICC), consisting of two items addressing consumers' present financial situation and the Index of Consumer Expectations (ICE) with three items measuring consumers' expectations in a 12-month and five-year perspective. The three ICS questions address pocketbook concerns such as personal well-being and security of the household level and the collective interest associated with long-term expectations of the national economy. The ICS is derived by computing the results of these two dimensions (Bechtel, 1997) and uses 1996 as its benchmark with the value of 100 (Ludvigson, 2004). The response scale is a three-point scale ranging from one (a pessimistic attitude towards current/future situations) to three on the scale (a positive attitude towards current/future situations). Point two on the scale indicates no change in comparison to current/future situation. The ICS and CCI, described below, are included in the current study as validation indices to control for their diverse forecasting performance in relation to *ESSI* and *EXESSI*. Recall, that with our performance measurement Excess Return, we opt for capturing employees and executives' sentiments towards the future about internal firm conditions, and thus concentrate on scanning out external influences.

Consumer Confidence Index (CCI)

Consumer Confidence is a macro economic index that has been produced since 1967 by the Conference Board in the United States. The sample consists of 5000 randomly selected lay individuals who are mailed, of which a mean of 3500 questionnaires are returned. The *CCI* consists of two dimensions: the present situation index (CP) and the expectation index (CE). While the two items related to the present situation tap into respondents' evaluation of current business and current employment conditions in the local area, the three CE items tap into business, employment and total family income considerations in the next 6 months (Ludvigson, 2004). The response scale is comparative to the ICS with a three-point scale. Several studies have provided evidence of *CCI*'s predictability of regional GDP and retail sales (Bram and Ludvigson, 1998; Ludvigson, 2004). During the last twenty years, various studies have indicated mixed results on the correlation between *ICS* and *CCI* (see Huth et al., 1994 for an overview; Garrett, Hernández-Murillo & Owyang, 2005).

Organizational commitment scale (ORGCOM)

Organizational commitment is measured using the nine item-scale of Mowday, Steers and Porter (Mowday *et al.*, 1979). The scale, employed in cross-sectional studies, is one of the most accepted measures of affective commitment (Meyer *et al.*, 1989). We argue that the commitment items are somewhat similar to employees' confidence/sentiments towards organizational attributes, and thus may correlate with ESSI and EXESSI. Whereas organizational commitment items typically focus on the individual worker as referent – given the general purpose to characterize an individual's sense of devotion to an organization (Cohen, 2007), organizational sentiment indicators, as constructed in our scales, should account for the multidimensionality of the employees' overall anticipation towards the future state of the organization.

Sample items in the commitment scale include "I talk up this organization to my friends as a great organization to work for", "I would accept almost any type of job assignment in order to keep working for this organization". The response scale is a seven-point Likert scale ranging from one (stongly disagree) to seven (strongly agree). Prior studies have reported acceptable levels of reliability and validity of the scale (Angle and Perry, 1981; Parker and Kohlmeyer, 2005). When converted to the *ORGCOM* index, we reduce the variance in the measure, turning the 7-point scale into a 3-point scale, where 1, 2, 3 on the scale indicate a negative commitment, 4 is treated as a neutral point, and 5, 6 and 7 indicate a positive organizational commitment.