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Human Resource Management, Service Quality, and Economic Performance in Call Centers

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Abstract

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Keywords

human resource, management, service quality, economic, performance, practice, outcome, call center, employee, quality, survey, training, discretion, reward, HR, labor, ilr, studies, CAHRS, center, efficiency

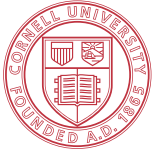
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WORKING PAPER SERIES

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Working Paper #06 – 01



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This paper has not undergone formal review or approval of the faculty of the ILR School. It is intended to make results of Center research available to others interested in preliminary form to encourage discussion and suggestions.

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Abstract

This paper examines the relationship between human resource practices, operational outcomes, and economic performance in call centers. The study draws on a sample of 64 call centers serving the mass market in a large telecommunications services company. Surveys of 1,243 employees in the 64 centers were aggregated to the call center level and matched to archival data on service process quality, as measured by customer surveys; call handling time, revenues per call, and net revenues per call. Our path analysis shows that human resource practices emphasizing employee training, discretion, and rewards lead to higher service quality, higher revenues per call, and higher net revenues per call. In addition, service quality mediates the relationship between human resource practices and these economic outcomes. There is no significant relationship between HR practices and labor efficiency, as measured by call handling time; and labor efficiency is inversely related to revenue generation.

Human Resource Practices, Service Quality, and Economic Performance in Call Centers

1. Introduction

Understanding the factors that influence economic performance in call centers is an important subject of research for management science and managerial practice. The subject is timely for management science because our empirical evidence on performance relies heavily on the experience of manufacturing operations. Interactive service settings such as call centers differ from manufacturing in important ways, including the relative tangibility of output, the level of interdependence among workers, and the role of the customer in the production process. For managers, call center performance is of strategic importance because these centers increasingly have become the central mechanism through which firms interact with their customers, and hence, shape buying behavior and sales revenues. While call centers have historically been viewed as cost centers, with savings generated through automation and economies of scale, firms increasingly position these operations as profit centers, in which service and sales activities together generate revenues.

However, many call centers continue to operate as if they are cost centers, focusing on such efficiency metrics as call handling time and customers per employee per day, even though profits may depend more on revenue generation. This cost focus translates into human resource systems that also emphasize cost minimization -- low levels of training, employee discretion, and incentives -- resulting in high absenteeism and turnover. With turnover rates of 30 to 50 percent or more, employee retention is a widely recognized problem in call centers, customer satisfaction with call centers is notoriously low (54 percent satisfaction by one survey, Purdue University 1999), and customer complaints on internet websites such as planetfeedback.com or complaints.com are high.

While the cost center model may apply to simple tasks, such as credit card activation, is it the right business model for most centers, which serve the mass market -- where demand for

service bundling, 'one-stop shopping', or 'mass customization' (Pine, 1993) is prevalent? What type of human resource system fits the characteristics in sectors such as insurance, banking, telecommunications, utilities, and after sales service for manufactured goods?

In this paper we examine two questions. First, to what extent do human resource practices explain variation in the economic outcomes of call centers? And second, what operational outcomes mediate the relationship between human resource practices and economic outcomes? More specifically, how important is the quality of service delivery for economic outcomes? Are there trade offs between service quality and labor efficiency? We contribute to the research literature by assessing whether performance models developed in the service management literature apply to call centers serving price-conscious, mass market customers. We also examine relationships among operational and economic outcomes net of labor inputs, which much of the prior literature has failed to do (Cappelli & Neumark, 2001). While labor costs in manufacturing have fallen sharply in recent years and often represent less than a quarter of costs, in interactive service activities, labor represents 50 percent of costs at a minimum. Investing in the skills and abilities of the workforce may exceed the economic benefits.

We explore these questions through a study of 64 call centers in a former Bell operating company. This market offers opportunities for mass customization: service and sales activities are moderately complex, with employees handling billing inquiries and complaints, on the one hand, and selling packages of local, long distance, and internet connections and special features, on the other. The context for the research also provides a relatively tough test for whether variation in human resource practices affects performance because the call centers are located within one business unit of a company, serve the same customer segment, use similar call center technology, and operate under the same corporate business and human resource strategies. We investigate variation in areas where call center managers have discretion: with respect to training decisions, work design, and use of incentives to motivate workers. If service

quality matters in these price-conscious markets, then the findings are likely to generalize to higher value-added settings where quality and customization are more recognized as important for competitiveness.

2. Prior Research

Research in service management draws on insights from marketing, operations management, and organizational behavior to provide a theoretical framework for the factors that shape organizational performance. That literature suggests that competing on service quality and investing in human resource systems are particularly important for interactive service activities, defined as those that are produced through the interaction of employees and customers (Leidner, 1993). The argument builds on the idea that interactive service work differs from goods production in fundamental ways. While this is not to suggest that human resource practices are unimportant in manufacturing -- a large body of industry studies shows that they are (Appelbaum, Bailey, Berg, & Kalleberg, 2000; MacDuffie, 1995) -- the service management literature draws out the specific ways that HR systems are likely to affect performance in interactive services. Typologies vary in degree of complexity and detail, but most converge on four core differences: intangibility, heterogeneity (or variability) due to customers as co-producers, perishability of output (no inventory), and simultaneity of production and consumption (Lovelock, 2005). In the following discussion, we explore implications of these arguments for human resource management and service performance.

The intangibility of service activities suggests that the *process* of delivery is as important, or more important, than the *output*. Customers consume a process rather than output (Gronroos, 1990). While the degree of intangibility varies across tasks and industries, the customers' experience of the process of delivery is central to their perception of quality. Because service activities are more intangible than not, quality is also difficult to measure. The most widely accepted measurement model of service quality (SERVQUAL), developed over years of empirical research in marketing, identifies five dimensions of quality: tangibles,

reliability (consistency), assurance (how confident the customer is about the service being provided), responsiveness (to the customer's demands), and empathy (for the customer) (Zeithaml, Parasuraman, & Berry, 1990). The empirical evidence shows that satisfaction with tangibles accounts for just 11 percent of total satisfaction. Technology solutions are effective for improving the quality of tangibles and reliability of information processing by eliminating human error (Chase & Stewart, 1995). However, the latter three dimensions, which account for almost 60% of customer satisfaction scores, are primarily driven by the ability of employees to respond to customers. Hence, strategies to improve the quality of the service process depend importantly on investment in human resource systems, including training in products, processes, and interaction skills; work designed to provide sufficient discretion for employees to respond to customers in a timely and effective manner; and incentives to motivate effort.

The fact that customers are co-producers in the process also has important implications. The heterogeneous preferences of customers introduce variability and uncertainty into the production process, and this has led operations management to conceptualize customers as 'partial employees' and to develop strategies to control their behaviour (Chase, 1978; Mills, Chase, & Marguiles, 1983). Management has considerable choice in the design of service operations (Chase & Tansik, 1983), and call centers represent one solution for turning high contact interactions (with high levels of variability) into low contact ones, with efficiency gains through automation and standardization. Even in these standardized environments, however, customers may reject menu-driven options or insist on their preferences, so that the quality of service delivery depends importantly on the skills and capabilities of the frontline workforce to manage customer behavior and negotiate solutions to non-routine requests.

The concept of simultaneity of production and consumption puts additional demands on human resource management – arguably adding to the importance of first time quality. Managers cannot easily intervene directly in a customer-employee interaction as it occurs. There is no functional equivalent of 'stopping the line', as is found in quality management in

manufacturing. Moreover, marketing research has shown that a negative interaction between a customer and employee has far more impact on customer behavior than a positive interaction (Gronroos, 1990). Thus, human resource practices that directly control employee behavior (through specific performance objectives and evaluations) are not particularly effective in this context. For example, call center studies have shown that job routinization and pervasive electronic monitoring for performance management are associated with emotional exhaustion and burnout (Carayon, 1993; Deery, Iverson, & Walsh, 2002; Holman, Chissick, & Totterdell, 2002; Singh, 2000). These, in turn, predict absenteeism (Deery et al., 2002) and lower self-reported service quality (Singh, 2000). Arguably, indirect methods of control, such as training and incentives, are more effective because they create behavioral norms for customer service delivery.

This line of argument is central to the service climate literature (Bowen & Schneider, 1988; Schneider & Bowen, 1985) and the service profit chain argument (Heskett, Sasser, & Schlesinger, 1997). The central insight is that management can use human resource practices to create a climate or environment for providing good customer service; what employees experience at work -- positively or negatively -- motivates them to provide good or bad service; and this shapes customers' satisfaction and willingness to purchase future services. Employee motivation is the underlying causal theory, and is typically measured by employee satisfaction.

Most evidence for these arguments comes from individual case studies, but some quantitative studies in the banking sector report a significant positive correlation between employee perceptions of service climate and customer reports of service quality (Borucki & Burke, 1999; Johnson, 1996; Peccei & Rosenthal, 2000; Schmit & Allscheid, 1995) and financial performance (Borucki et al., 1999). However, some studies show a reciprocal relationship between service climate and customer perceptions of quality (Schneider, White, & Paul, 1998). Moreover, there is little evidence of employee satisfaction as mediating the relationship between human resource practices and customer satisfaction (Korczynski, 2002). An exception is

Sargeant and Frenkel (2000), who found support for the role of employee satisfaction and commitment, although this study was based on a single-source survey.

Support for the service profit chain argument comes from Loveman's (1998) study of 479 branches of a regional bank, which demonstrated a series of correlations along links of the service profit chain. Wright, Gardner, Moynihan, and Allen (2005) also found that employee commitment and customer satisfaction mediated the relationship between HR practices and profitability, although the context was a business-to-business supply chain.

Another line of argument links human resource investments to better performance, not via employee attitudes but via their effects on worker skills, knowledge, and problem-solving capabilities. For example, Batt (1999) found that sales reps in self-directed work groups generated significantly higher revenues (net of labor costs), than did traditionally-supervised groups, and accomplished this in part through better use of technology. Another national study of 350 US call centers found that the use of high involvement practices (defined as investments in skills and training, collaborative work design to allow discretion and collaboration, and incentives based on pay and employment security) was associated with significantly lower quit rates and higher sales growth. These findings lend support to the idea that HR practices improve employee retention and build the kind of firm-specific human capital that results in higher productivity; but this study did not control for labor costs (Batt, 2002).

Thus, whether it is through employee motivation or capability, existing literature suggests that call centers that provide training, discretion, and rewards for good service and sales will have higher service quality and higher economic outcomes than those that do not. Thus, we hypothesize:

H1: Establishments with human resource practices that provide employees with training, discretion to meet customer needs, and rewards for using their skills and discretion effectively will have higher customer service quality and better economic outcomes

H2: Service quality will partially mediate the relationship between human resource practices and economic outcomes.

We make no hypotheses regarding the relationship between human resource practices and call handling time because we view this as an empirical question, which we explore in the analyses below. On the one hand, investments in human resource practices can allow employees to handle customer inquiries more efficiently, leading to lower call handling times. On the other hand, these practices can provide employees with the skills and motivation to probe customer demands, suggest bundles of services, and negotiate over sales packages. This would result in longer call handling time. Thus, the net effect of these two dynamics is an empirical question.

2.2 Service Quality, Efficiency, and Economic Outcomes

The second question we address is whether better economic outcomes are linked to both high service quality and labor efficiency, or whether there are trade-offs between these intermediate outcomes. This question depends in part on how quality is defined, and there are several perspectives (Garvin, 1984; Reeves & Bednar, 1994). In the manufacturing or operations management perspective, improving quality and efficiency are viewed as complementary. That is because conformance to specifications forms a major part of the definition of quality (Garvin, 1984): 'quality is free' (Crosby, 1979). By reducing variances in the production process, conformance of products to specifications increases. First time quality improves and rework and defects are reduced, leading to better quality and labor efficiency.

Zimmerman and Enell have applied this line of reasoning to service activities (1988). Call centers can improve reliability (conformance to specifications) by automating call flows and reducing the impact of human error; this reduces rework and also increases the speed of handling transactions, thereby improving labor efficiency. This approach to quality encourages call centers to focus on reducing call handling time. It assumes that the information processing needed for service and sales transactions can be standardized to such an extent that the need for human skills and interpretation is minimal. In the example of the telecommunications call centers in this study, employees would click user-friendly boxes for each added feature that a

customer wants, complete the sale, and move on to the next customer. Low call handling time would equate to higher numbers of customers served and sales made, and thus net revenues would be higher when call handling time is lower. This logic also draws on Taylorist principles of work organization, in which tasks are simplified in order to maximize volumes and minimize costs at the level of individual tasks (Taylor, 1911). Leading management theorists have advocated this approach to services to reduce labor intensity (Levitt, 1972). Using this line of argument, the focus of operations management is to continually seek ways to reduce call handling time, either by standardizing call options or shifting labor to customers through self-service venues. These strategies, however, may backfire if customers perceive that their options are too limited or that their costs of accessing the service are too great (Lovelock, 2005).

The marketing discipline, by contrast, defines quality as meeting or exceeding the expectations of customers (Zeithaml et al., 1990). More importantly, the fact that customers are part of the production process opens up new avenues for marketing, thereby decentralizing that function. The concept of interactive marketing (Gronroos, 1990) captures the idea that every service encounter becomes an opportunity to sell. Those employees who are more skilled at 'bridging to sales' will typically take longer with each customer and handle fewer customers per day, but overall will produce higher sales revenues by packaging bundles of higher value added products. It is in the interest of the marketing function, therefore, for employees to 'get close to the customer': spend as long as it takes to build an understanding of customer characteristics and buying habits, create bundled service packages, and develop a 'relationship' that yields repeated purchases and loyalty to the brand. By this definition, service quality and labor efficiency are tradeoffs – the opposite of the assumption found in operations management. Longer calls are associated with higher service quality and economic benefits.

A number of empirical studies suggest that in call centers, the marketing logic dominates. Managers view service and sales goals and call handling goals as competing

(Frenkel, Korczynski, Shire, & Tam, 1999; Korczynski, 2002). The call handling metrics derived from electronic monitoring systems put constant pressure on managers to increase calls per employee per day and reduce labor costs. However, managers are rated on customer satisfaction and sales goals as well. They believe that if they focus too much on quality, labor efficiency will go down; but if they focus too much on call volumes per employee, worker absenteeism and turnover will increase and customers will defect. Employees also experience the twin goals of limiting call handling time versus meeting service and sales goals as contradictory.

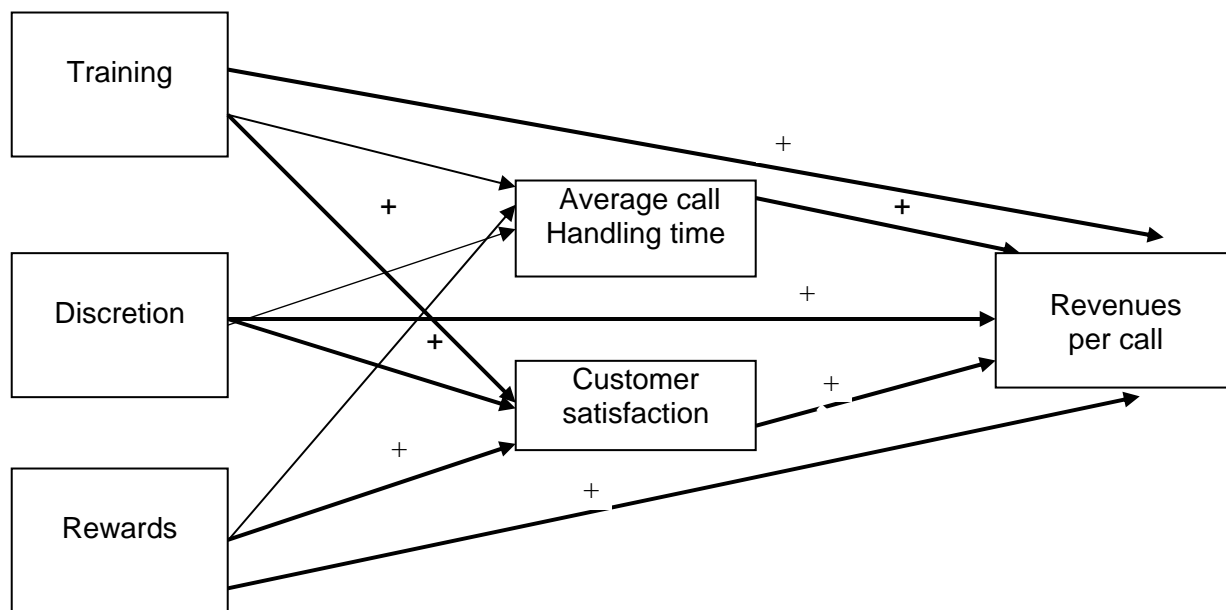
The service profit chain model, described above, takes a fairly universalistic approach to the value of relationship management, suggesting that customer satisfaction is an important driver in all markets. However, recent critics have challenged this notion, arguing that quality strategies for low-value added customers don't pay off. Since the overwhelming majority of profits come from a small minority of customers that purchase value-added products and services (the 80-20 rule), the costs of service quality should be calibrated to the value-added of particular customers (Reinartz & Kumar, 2002). Many companies, in fact, have segmented their markets by the value added of customers, and have matched labor costs – investments in human resource systems – to the value of each segment. This has allowed call centers to adopt a cost-dominated model for price-conscious mass markets and a quality-professional model for high value-added markets serving business customers (Batt, 2002). This stratification of management models by customer segment also suggests that the dominant view among service providers is that there is a necessary trade-off between labor efficiency and service quality – or as suggested by Cappelli and Neumark (2001), the costs of investing in human resource systems outweigh the benefits in price conscious markets. This may also be due to the fact that labor costs typically represent over 50 percent of costs in these types of service environments.

In sum, service management studies support the idea that labor efficiency is inversely related to service quality and revenue generation, suggesting the hypothesis that:

H3: Longer call handling time will be positively related to revenue generation.

Figure 1

Hypothesized Model of HR Practices, Operational Outcomes, and Economic Performance



3. Methods

3.1 Research Strategy and Context

This study is part of a larger research program on management practices in call centers. This sample is unique in that it consists of multiple call centers in one line of business in one large telecommunications services corporation. The call centers in the study all provide the same local and long distance telephone services to residential (mass market) customers in a multi-state area. They are the primary service and sales channel for the company, handling billing inquiries; new orders and transfers; sales of enhanced features such as call waiting and

caller ID; and high speed internet access and second lines to homes. They do not handle wireless services.

Because the call centers are organized under one line of business in one company, there are few external sources of variation – such as variation in product or customer markets, type of technology employed, corporate business strategies, and the like. In addition, the sample of call centers is under the leadership of the same business unit vice-president and thus, subject to the similar overall human resource policies. A union contract covers all customer service employees, so that there is also little variation in wages and benefits, job posting and bidding procedures, dispute resolution and grievance procedures, or due process for disciplinary cases.

In our field research, we found that call center managers did have some discretion over workforce management decisions and took different approaches. They differed in how much of their budgets went to training, who received what kind of training, how they managed supervisors, how much discretion with customers they encouraged employees to take, and what kinds of group and individual performance incentives they used.

The project involved three phases of data collection over a three-year period. In the first phase, we conducted site visits to 15 call centers across the company. Based on these visits, we developed call-center specific survey questions to capture variation in management practices. Each site visit consisted of semi-structured interviews with the general manager, manager of information technology, HR manager, supervisors, and focus groups of employees. We also sat and observed the work of several employees and listened in on their interactions with customers.

In the second phase, we administered a survey to a random sample of employees in May, 2001. We surveyed 16 percent of employees in each call center with more than 40 employees. Respondents took the survey on company time and returned it in a pre-addressed, stamped envelope directly to the researchers. The employee survey response rate was 59%,

yielding a total of 1,243 completed surveys. The third phase of the study involved the collection of archival performance data, including information from the Human Resource Information System (HRIS), the call center electronic monitoring system, archival data on sales, and customer satisfaction surveys conducted by a third party vendor. The monitoring system tracks the minute by minute performance of individual employees on a variety of dimensions, such as call handling time. We aggregated the survey data to the call center level and then matched it to the objective performance data obtained from company archives.

3.2 Sample

The sample includes 64 call centers. The mean number of survey respondents per call center was 21, with a range of 6 to 55 (the range reflects the variation in the size of call centers). Of the subjects who responded, 78% were female and 52% were married. The average age of the participants was 36 years, with a range of 27 to 49. Average organizational tenure was 5.9 years (ranging from 9 months to 16 years). The average salary was \$42,514, ranging from \$33,042 to \$48,940, with this variation reflecting a seniority-based union pay scale and overtime pay. The typical employee has a high school degree plus one or two years of college education (16 percent have a high school degree; 45 percent have some college education; 14 percent have a 2-year college degree; and 21 percent have a 4-year college degree). Representatives typically spent 85% of their day on the phone handling incoming calls. They served an average of 50 customers per day and had an average interaction time with customers of 8 minutes.

3.3 Measurement of Variables

For the outcome variables in this study, the company provided archival data on the following performance metrics: call handling time, revenues per call, costs per call, and customer satisfaction data for the period of January through May, 2001. The satisfaction data comes from an outside vendor, who randomly contacts a sample of customers of each center each month and surveys them on their satisfaction with service. Of an initial 73 call centers in

the survey, we could obtain complete satisfaction data for 65. The 65 sites that had customer satisfaction data did not significantly differ from the 8 that did not in terms of rewards and work design HR practices. There were significant differences between centers with and without satisfaction data in the amount of initial training and training in the last six months. Centers with satisfaction data provided on average 5 weeks of initial training and 50 hours of training in the prior 6 months. Centers without satisfaction data provided, on average, 4 weeks of initial training and 8 hours of training in the last six months. Though these differences may indicate a response bias affecting the mean levels, it is not clear that this would bias results regarding correlations.

Service quality. To measure the quality of the service process, we developed an index based on six questions from the customer satisfaction survey administered for the company by a third party vendor. The telephone interview used a Likert scale (1=strongly disagree, 5=strongly agree) to rate customer satisfaction. Of 9 items in the survey, we used the six which capture dimensions of the *service process* over which the employees have some influence. Items included satisfaction with the service providers': "understanding your needs", "ability to handle your request", "willingness to handle your request", "handling call efficiently", "courtesy of the representative", and "overall rating of the rep". We created a mean composite of the survey items and aggregated it across five months of service quality data.

Labor efficiency. Labor efficiency is the average of 5 months of data on the call handling time per employee per call center.

Economic outcomes. Economic outcomes are measured by revenues per call and net revenues per call over a 5 month period. An alternative measure of economic performance is revenues per employee; however, that does not take into consideration variation in hours of work across work sites. Thus, revenues per call provides a more accurate measure. Total sales revenues are used in the equations in which we estimate the relationship between customer satisfaction and call handling time. Net revenues per call was calculated as total

revenues per call minus operational costs per call. Note that this measure is viewed by company managers as call center 'profits'. However, in reality, the measure does not take into account the costs associated with the actual installation of telecommunications services done by field technicians. Hence, when these costs are taken into account, actual profitability is lower.

The independent variables in the study are organizational-level measures of human resource practices, created by averaging the individual survey responses at each call center.

Training. Training is an additive index of training reported by employees at three points in time. The three questions asked about: the amount of initial training received, the amount of on the job training following initial training, and the amount of training in the last six months ($\alpha = .50$, $ICC(1) = .20$, $ICC(2) = .76$). Because initial and on-going training can be complements or substitutes, we do not expect the correlation between the two to be high; rather we use the additive index to capture the total amount of training provided. Training focused on skill development in three areas: product knowledge, social interaction and sales skills, and technical skills for computer use and information processing. Initial training covers all of these aspects of the job and is provided at the center level. In addition, managers offer on-going training as needed. In some instances, this may be mandated by the company if a new product, marketing strategy, or IT system update is introduced, hence the importance of controlling for region. However, we interviewed managers who also made decisions to spend money for on-going training based on their assessment of training needs, and this training could include any of the three skill domains.

Discretion. Our measure of discretion was developed from our fieldwork and is contextually specific. It is an additive index based on four questions that capture different dimensions of serving customers and meeting their needs. Respondents were asked "how much discretion you have in making customer-related decisions" (1 = no discretion...5 = complete discretion) for the following activities: adjusting prices over and above fixed rates or

tariffs, waiving late penalties or other similar fees, switching a customer to a more suitable product, extending a deadline ($\alpha=.56$, $ICC(1)=.18$, $ICC(2)=.81$).

Rewards. We measured rewards by an additive index of two items, also developed from our fieldwork and tailored to the specific setting. As noted above, wages and reward structures in this environment were largely set by the union contract, but managers had discretion to use non-cash and small cash rewards as incentives to improve service and sales. Survey respondents were asked “When you do your job well, how often are you rewarded with” (1 = never...5 = always) the following: non-cash rewards, (e.g., free lunch or dinner, public recognition, or small gifts), and cash rewards, (e.g., gift certificates, cash bonus) ($\alpha = .75$, $ICC(1)= .13$, $ICC(2)= .76$).

Control variables. We controlled for regional location in all models because union contracts and ownership patterns of the former Bell companies vary by these geographic areas.

4. Results

Table 1 contains the means, standard deviations, and correlations of the study variables. Several regional control variables are significant. This helps explain why correlations among the variables of interest are not significant, because the variation across regions is large and must be taken into account in order to examine the relationships of interest.

In our analyses below, we first examine revenue generation as the dependent variable in relation to HR practices, service quality, and call handling time. We then analyze net revenue generation using the same model, but with the exclusion of call handling time because net revenues takes into consideration all costs per call, including variation associated with call handling time.

Table 1:
Means, Standard Deviations, and Inter-correlations

	1	2	3	4	5	6	7	8	9	10
1. Revenues per call	1.00									
2. Call handling time	-0.02	1.00								
3. Service quality	-0.23	0.11	1.00							
4. Training hours	0.06	-0.02	0.22 †	1.00						
5. Discretion	0.24 †	-0.11	0.26 *	-0.03	1.00					
6. Rewards	-0.10	0.09	0.24 †	0.13	0.17	1.00				
7. Region 1	-0.08	-0.27 *	0.46 **	0.13	0.20 †	0.06	1.00			
8. Region 2	0.14	-0.25	-0.21	-0.03	-0.13	0.21 †	-0.17	1.00		
9. Region 3	0.42 **	-0.12	-0.55 **	-0.03	0.13	-0.07	-0.30 **	-0.25 *	1.00	
10. Region 4	-0.32 *	0.65 **	0.27 *	-0.07	0.00	0.03	-0.22 †	-0.18	-0.33 **	1.00
Means	77.12	416.93	4.16	1.81	3.5	-3.13	0.16	0.12	0.32	0.19
Standard Deviations	12.47	32.48	0.13	0.85	0.41	0.49	0.37	0.33	0.47	0.40

NOTE: ** $p < .01$, * $p < .05$, † $p < .10$

In hypothesis 1, we stated that the call center human resource practices of training, customer discretion, and rewards should be positively related to service quality and economic outcomes. Hypothesis 2 stated that service quality should partially mediate the relationship between HR practices and economic outcomes, which we tested using path analysis.

Hypothesis 3 states that call handling time will be positively related to revenue generation.

Our findings provide partial support for hypothesis 1. Discretion with customers is significantly positively related to service quality (0.32, $p < .01$) and revenues per call (0.25, $p < .01$). Rewards are significantly related to service quality (0.22, $p < .05$). In addition, the amount of training is positively related to service quality (0.16) and approaches statistical significance ($p < .06$). None of the human resource practices are significantly related to call handling time.

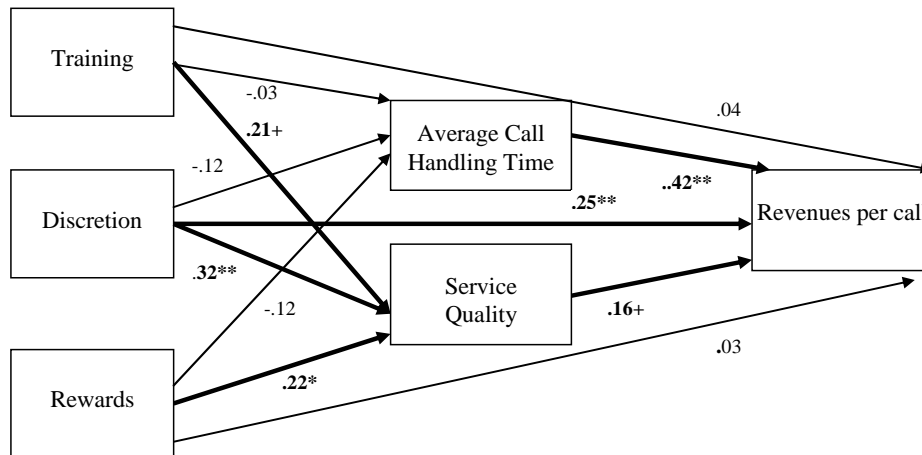
With respect to hypothesis 2, service quality is positively related to revenues per call (0.16), and approaches statistical significance ($p < .06$), suggesting that it partially mediates the relationship between human resource practices and revenue generation. Figure 2 shows the standardized coefficients and significant paths for our hypothesized partial mediation model.

With respect to hypothesis 3, average call handling time is significantly positively related to revenues per call (0.43, $p < .01$), as expected. That is, longer call handling, or lower labor efficiency, is associated with higher net revenues. We suspect that this positive relationship is explained by the fact that processing fairly complex sales transactions takes time but yields higher value. However, we considered an alternative hypothesis that the relationship might be curvilinear, such that longer call handling time produces diminishing returns. However, the estimates for a curvilinear relationship were not significant.

In general, the goodness of fit indices show that the partial model fits the data relatively well, although the RMSEA statistic does not ($\chi^2 = .149.86$, $df=30$; IFI=.94; CFI=.94; NFI=.92) (Bentler and Bonett 1980). These findings provide partial support for hypothesis 2. They suggest that human resource practices have a significant positive effect on revenue generation,

both directly, and indirectly through their effect on service quality. The fit statistics for the path analysis are shown in Table 2.

Figure 2
Partial Mediation Path Analysis: HR Practices, Operational Outcomes, and Revenues per Call



+ p < .06
 *p < .05
 **p < .01

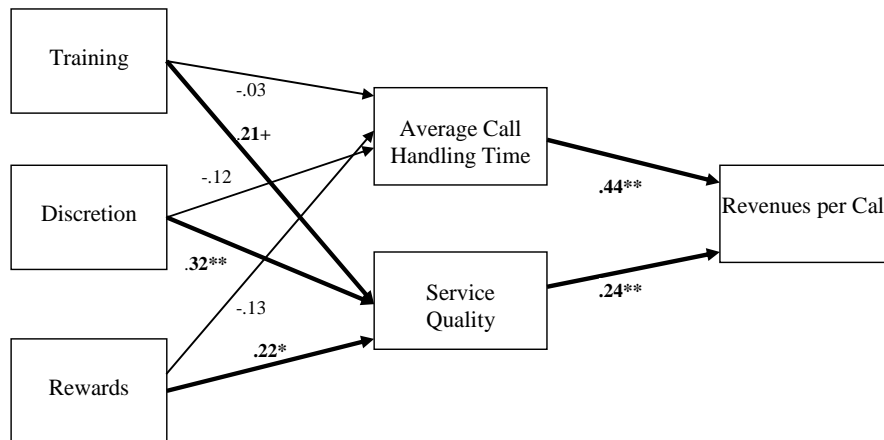
Note: standardized coefficients are shown.
 Significant paths are in bold.
 Regional control variables not shown.

Table 2
Alternative Path Model Comparison (N=64)

Model	CFI	IFI	NFI	RMSEA	AIC	BCC	χ^2 , df	Difference from Model 1
Model 1: (Figure 2) Partial mediation model	.94	.94	.92	.20	219.86	230.48	149.65, 30	--
Model 2: (Figure 3) Full mediation model	.94	.94	.92	.23	218.47	230.02	154.47, 33	4.82, 3
Model 3: Direct Effect Model	.93	.93	.91	.23	232.47	242.21	169.31, 38	19.66, 8*
Model 4: Trimmed full mediation model (final model)	.94	.94	.92	.22	213.99	224.46	155.99, 36	Difference from Model 2: 1.52, 3

We examined alternative path models by using chi-square difference tests and several goodness-of-fit indices, including CFI, NFI, and RMSEA (Hu & Bentler, 1995), as shown in Table 2. Model 2 is a full mediation model (removing the paths between human resource practices and revenues). Model 3 is a direct effect model (removing paths between HR practices and call time and HR practices and service quality). Compared to Model 1 (the partial mediation model), the full mediation model is not significantly different in fit nor in the path relationships, although the path between service quality and revenues is more significant. The direct effect model has a significantly worse fit (Model 3 diff $\chi^2 = 19.66$, $df=8$, $p < .01$; See Table 2). These results indicate that the overall fit of the partial and full mediation models is comparable.

Figure 3
Full Mediation Path Analysis: HR Practices, Service Quality, and Revenues per Call



+p<.06
 *p<.05
 **p<.01

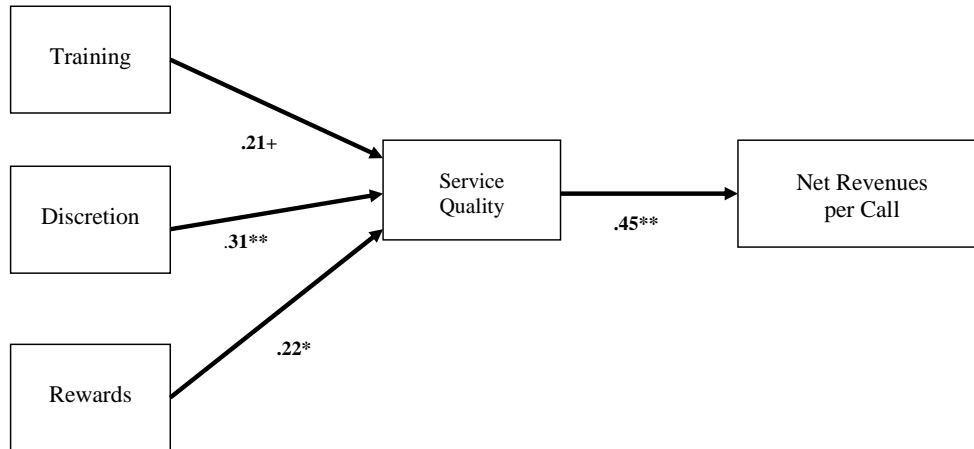
Note: standardized coefficients are shown.
 Significant paths are in bold.
 Regional control variables not shown.

The partial and full mediation models also tell a similar story in which human resource practices that emphasize training, discretion, and rewards lead to higher service quality, which in turn predicts higher revenues. Given the similar findings for the partial and full mediation

models, we would conclude that the full mediation model represents the most appropriate model because it is the most parsimonious.

In Figure 4, we turn to the question of whether the size and significance of our findings hold when net revenues are the dependent variable. The results are very similar to those found in models 1 and 2. The relationship between the human resource practices and service quality are similar in magnitude and significance to the first models; and service quality mediates the relationship between HR practices and net revenues.

Figure 4
Full Mediation Model: HR Practices, Service Quality, and Net Revenues per Call



+p<.06
*p<.05
**p<.01

Note: standardized coefficients are shown.
Significant paths are in bold.
Regional control variables not shown.

Chi-square = 110.499
Degrees of freedom = 25
CFI: .94
IFI: .95
NFI: .93
RMSEA: .22

In terms of the magnitude of the significant relationships, Figure 4 shows the standardized estimates for the full mediation model with net revenues as the dependent variable. Standardized path coefficients are interpreted the same way as beta weights. For example, the standardized path coefficient of .21 for the direct effect of training on service quality means that service quality is expected to improve by .21 SD, given a change in training of 1 SD, when controlling for discretion and rewards.

Indirect effects are calculated as the product of the direct effects (between HR practices and service quality and between service quality and economic outcomes). Thus, the indirect effect of training on net revenues is 0.09 ($.21 \times .45 = .09$). The indirect effect of customer discretion via service quality is 0.14 ($.31 \times .45 = .14$). The indirect effect of rewards via service quality is 0.10 ($.22 \times .45 = .10$). Thus the total effect of human resource practices on net revenues is 0.35. These are not significantly different from the results found in model 2.

To translate these values into real dollar terms, we use the unstandardized path coefficients. For net revenue calculations, the unstandardized path coefficient for service quality to net revenues per call is 58. The unstandardized coefficients of training, customer discretion, and rewards on service quality are .032, .096, and .058 respectively. Thus, the indirect effect of training on net revenues is \$1.86 ($.032 \times \58.29), of discretion is \$5.60 ($.096 \times \58.29), and of rewards is \$3.38 ($.058 \times \58.29). Thus the total effect of HR practices on average net revenues per call via service quality is \$10.84. On average, call centers in this study handled 58,620 calls per month. The median call center handled 53,700 calls. The average net revenues per call is \$68.91. Variation in HR practices accounts for \$10.84 in net revenues per call, or about 15.7 percent of net revenues. Given these call volumes, \$10.84 in additional net revenues per call is a non-trivial amount.

5. Discussion

In this paper we have explored the relationship between human resource practices, operational performance metrics of labor efficiency and service quality, and economic performance in call centers. The findings suggest that call centers that provide employees with training, with discretion to use their judgment with customers, and with rewards to do so, have significantly higher service quality and higher net revenues. In addition, these human resource practices lead to higher net revenues through their effect on service quality. By contrast, human resource practices are unrelated to labor efficiency, and lower labor efficiency is associated with higher revenues per call.

These findings contribute to our understanding of human resource practices and service management strategies in a number of ways. First, they show that even in price-conscious markets, competing on the basis of service quality pays off. This finding is consistent with the idea that mass customization (Pine, 1993) is a viable strategy for consumer markets that offer opportunities for bundling products and services. Despite the fact that companies do need to worry about cost pressures, they can compete effectively by focusing on revenue generation – and by taking advantage of opportunities to customize offerings to mass market consumers. The current study involves call centers in telecommunications services. The service offerings in these centers do not involve high levels of complexity or customization; however, there are enough opportunities for packaging services to fit different consumer demand profiles that investment in the skills and abilities of the workforce appears to pay off. If we consider comparable environments and levels of task complexity, then we expect that our findings would generalize to call centers serving mass market consumers in industries such as financial services, health care, manufacturing industries, public sector services, and print and media services. We expect that they would generalize less favorably to call centers involving very simple transactions, such as outbound telemarketing or perhaps retail commodities.

Second, the findings show that a narrow focus on labor efficiency as a driver of performance is misguided. We believe this finding is particularly important in the context of call centers because our field research has shown us that companies routinely place a high value on minimizing call handling time and maximizing the number of customers per employee per day. Our results suggest that such a focus is probably the wrong business model. It is not the volume of output per labor input that is important, but rather the *value* generated in service interactions that is a meaningful measure of productivity. Human resource practices that provided greater skills, discretion, and incentives to employees allowed them to maximize customer service quality and net revenue generation. Third, by taking the costs of production into account in the context of price-conscious markets, we provide some evidence to counter the argument that investing in human resource practices is too costly in these environments.

Finally, our results show that even in a tightly constrained production system – in this case call centers with highly standardized technology and the same overall corporate strategy – variation in managerial choice matters. If the relationships between human resource practices, service quality, and economic outcomes hold in this environment, we believe they are likely to generalize to other environments in which there are more opportunities for managerial discretion and more opportunities to compete on service quality.

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