

STRATEGIC POSITIONING, HUMAN CAPITAL, AND PERFORMANCE IN SERVICE ORGANIZATIONS: A CUSTOMER INTERACTION APPROACH

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This study employs a customer interaction approach to examine how service organizations' strategic positioning relates to their human capital, and how the interaction between strategic positioning and human capital impacts organizational performance. Results from 234 service organizations in 96 different industries indicate very strong relationships between strategic positioning choices and human capital. We also find that certain combinations of strategic positioning and human capital result in superior performance. Copyright © 2003 John Wiley & Sons, Ltd.

There has been a great deal of discussion in the literature concerning the nature of service firms (e.g., Brush and Artz, 1999; Lovelock and Yip, 1996; Mills, 1986; Nayyar, 1993; Normann, 1984). Some scholars suggest that these organizations are unique (i.e., different than manufacturers) and, as such, require the development of new models in order to further our understanding of them (e.g., Mills *et al.*, 1983). Others believe that any differences that exist do so in degree rather than in kind, and therefore existing organizational models are robust enough to incorporate any nuances found in the service sector of the economy (e.g., Bharadwaj, Varadarajan, and Fahy, 1993). Regardless of this debate, there does appear to be general agreement that differences do exist between service and manufacturing in a few specific areas. One of the most often cited of these is customer interaction with the production process (Kotler, 1983; Normann, 1984).

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Accordingly, scholars have begun to focus on how the interaction between the customer and the firm influences elements of the production process. For example, in an examination of emergency room units, Argote (1982) found that the greater the variety of patient conditions treated, the more nonprogrammed the decisions are during service production. This finding is consistent with Jones' (1987) examination of small, mid-western service firms where he found a positive relationship to exist between the level of uncertainty surrounding the customer–firm interaction and the level of service production complexity. Furthermore, each of these authors strongly indicates that strategy acts as the driving force behind the level of customer-induced uncertainty. That is, the service firm's strategic positioning dictates the type of information required from customers during the interaction and, hence, the corresponding level of uncertainty that confronts the production process (Argote, 1982; Jones, 1987). Thus, these studies support the idea that strategic positioning choices influence the level of uncertainty that customers bring to the organization's production process. In response, service firms alter elements of

their production processes in order to effectively cope with the level of uncertainty generated by the customer interaction (Jones, 1987; Mills and Moberg, 1982; Shostack, 1987; Tansik, 1990).

Of the elements that comprise service production, human capital, or the skills, knowledge, and expertise of employees (Becker, 1964, Schultz, 1971), is believed to be one of the most important (e.g., Mills, 1986; Quinn, 1992). Unlike that in manufacturing firms, customers of service firms typically interact with the production process (Normann, 1984). And since production in services is typically dominated by labor, customers have a high degree of interaction with the production employees of the firm (Mills, 1986). Moreover, any uncertainty that customers interject into the process is being confronted in large part by these production employees (Mills and Morris, 1986). Thus, if service firms alter elements of the production process to handle varying levels of strategically induced customer uncertainty as previous studies have suggested (e.g., Jones, 1987), then this has important implications for human capital investment decisions.

Unfortunately, very little attention has been directed at exploring the interaction of strategic positioning and human capital in service organizations. Furthermore, of those studies that have examined this relationship (e.g., Boxall and Steeneweld, 1999; Delery and Doty, 1996; Hitt *et al.*, 2001), none have considered the impact of the customer interaction. While these studies are important first steps, the general dearth of research in this area is a bit surprising given the dependence of service organizations on human capital. Moreover, since employees of service organizations tend to be linked to customers during service delivery, they play a key part in carrying out the strategic initiatives of these firms. Thus, we believe that by taking into account the presence of the customer during service production, we can yield valuable insights for researchers and practitioners concerning the linkages among strategic positioning, human capital, and organizational performance in service organizations. As a result, managers of these firms may be better able to implement strategic decisions as well as make more effective investments in human resources. Likewise, researchers would be granted a better understanding of the dynamics driving human capital decisions in service firms, a sector of the U.S. economy which now represents

over 75 percent of both employment and GPD (United States Bureau of Labor Statistics, 1997).

In the following sections we begin by arguing that different strategic positioning choices impact the customer interaction with the firm. In particular, we suggest that strategic positioning choices by service firms will influence the potential variance in customer demands (i.e., the range of customer needs) that clients impose on a firm's production process, which in turn requires varying levels of human capital in order to deal with the corresponding uncertainty. Using this notion of variance in customer demands as the organizing principle, we then examine the specific relationships between strategic positioning and human capital in service firm production. Next, we explore whether the hypothesized relationships between strategic positioning and human capital yield superior organizational performance. Lastly, we discuss how managers and researchers can use our findings in their organizations and future research endeavors.

THEORY AND HYPOTHESES

Customer interaction, strategic positioning, and human capital

As customers of a service firm interact with its production process, the variance in their demands creates uncertainty for the organization (Argote, 1982; Mills and Moberg, 1982; Tansik, 1990). In response, service organizations may alter aspects of production in order to process the required levels of uncertainty. As stated above, a major element of service production is human capital. When customers introduce a high degree of variability into the service production process, service organizations may be able to address this variability (i.e., successfully satisfy customer needs) when their employees are proficient at diagnosing problems, thinking creatively, developing novel solutions, and so on; that is, when they possess high levels of skill, knowledge, and expertise (i.e., human capital). This is consistent with human capital theory, which contends that employees with high skill levels can better cope with uncertainty in the task environment (e.g., Becker, 1964; Schultz, 1971; Snell and Dean, 1992). In the present case, this uncertainty is the result of variability in customer demands (Jones, 1987).

Though variability in customer demands may influence human capital requirements, it has been

suggested that this variability is the result of strategic positioning decisions on the part of service firms (Jones, 1987; Tansik, 1990). According to the positioning view of strategy, firms undertake strategic positions in order to differentiate themselves from existing and potential competitors along dimensions that are of importance to customers (e.g., Porter, 1980, 1996). Since much of what customers purchase from a service firm is a process (Normann, 1984), and since they are interacting with that process, differences in the production process itself allow for differentiation among competing firms (Mills, 1986; Shostack, 1987). Three key differentiating mechanisms involving the production process that have been discussed in the services literature are *customer co-production*, *customer contact*, and *service customization* (e.g., Heskett, 1986; Mills, 1986). All service firms undertake each of these to varying degrees (Normann, 1984). Furthermore, since these mechanisms are difficult for service firms to change in the short term (Mills, 1986), they represent strategic elements to these organizations.

Customer co-production

As customers actively engage in the production of the service, they are expending effort. Service firms can alter this aspect of service creation, known as *customer co-production*, to differentiate themselves from competitors by offering their services in a manner that requires greater or lesser amounts of effort on the part of customers (an option which very few manufacturing firms possess) (cf. Maister and Lovelock, 1982; Mills, 1986; Upah, 1980). For example, some service firms require customers to wait for service (first come, first served), to receive service only at a specific time (3:00 check-in), or to perform various tasks (e.g., bus tables, carry your own luggage). These are instances of high customer co-production. Other service organizations may choose to position their service in a manner that reduces customer effort (e.g., free pick-up service, use of a loaner car, meals provided on a flight).

As a firm utilizes higher levels of co-production it tends to reduce the range of customer needs that it must address (e.g., Mills and Morris, 1986). For example, some tax preparation firms may have customers sort receipts into predefined categories, thereby diminishing the potential breadth of demands customers may impose on the firm. The

use of these predefined categories creates a routine input for the organization, reducing the amount of uncertainty that is encountered in the task environment during service production (e.g., Scott, 1992; Thompson, 1967). This reduction in uncertainty affords the firm a relatively predictable task environment, which allows it to codify and simplify much of its production process. As a result, we argue that the level of human capital required of a service firm's production employees would be reduced. Accordingly, we anticipate:

Hypothesis 1: Customer co-production will be negatively related to human capital.

Customer contact

Whereas customer co-production concerns the level of effort customers are expending during service production, *customer contact* refers to the degree of interaction they have with a firm's production process (Mills, 1986). As firms increase this degree of interaction, they can decrease response time in addressing customer needs. However, greater levels of interaction heighten the information flows between the customer and the organization, providing customers with a mechanism for injecting substantial amounts of uncertainty into the service production process (Mills, 1986; Mills and Morris, 1986; Tansik, 1990). Furthermore, as the level of interaction increases, more areas of the production process can become exposed to the customer, thereby increasing the number of points in which the customer may inject variability. Together, we suggest these will increase the need for effective information processing during service production. More specifically, as firms increase the level of customer contact, we suggest their production employees will need a more enhanced skill set for dealing with customers, understanding idiosyncratic situations, making quick decisions, and so on. Conversely, if the service production process is designed to minimize customer contact, less human capital will most likely be required. As such, we expect:

Hypothesis 2: Customer contact will be positively related to human capital.

Service customization

Service firms also differentiate themselves in the competitive marketplace by the extent to which they customize the service offering for individual customers (Heskett, 1986; Normann, 1984). As a firm increases the possibility of meeting each customer's specific needs, it faces greater levels of potential demand variability, which in turn increases the level of uncertainty that is encountered during service production (Tansik, 1990). Accordingly, we believe the decisions a firm makes concerning customization will in turn affect its human capital considerations. High levels of customization require production employees to ascertain varying customers' needs, decide on the particular procedures required to fulfill those needs, and choose the most appropriate production path through the organization (Shostack, 1987; Tansik, 1990; Wathen, 1995). On the other hand, low levels of customization allow for service production to be routinized, thereby reducing the need for judgment on the part of production employees. In short, as customization increases we expect service firms to cope with this strategically induced uncertainty in the production process through the use of greater levels of human capital. Therefore, we anticipate:

Hypothesis 3: Service customization will be positively related to human capital.

Strategic positioning, human capital, and performance

Service organizations are open social systems that interface with internal and external sources of uncertainty (Argote, 1982). For the production processes of service firms, a large part of this uncertainty lies in their interactions with customers (Argote, 1982; Jones, 1987; Tansik, 1990). We have hypothesized that service firms may invest in human capital so that their employees are capable of dealing with the potential variance in customer demands generated by their strategic positioning. However, investing in human capital can be a costly endeavor (e.g., Tushman and Nadler, 1978). The greater the variance in customer demands, the more sophisticated the skills needed to transform a wider variety of inputs into the service offering. This sophistication gives rise to increased costs in terms of factors such as higher levels of training, higher levels of education, and the like.

Given the costs, it is suggested that efficient firms will make just enough of an investment in human capital to handle a given level of customer variability (cf. Williamson, 1979). This is consistent with Argote's (1982) finding that hospital emergency rooms that achieved a fit between the level of coordination and the variance in customer demand gave more effective treatment. Therefore, we suggest that service firms that possess a match between their strategic positioning and human capital will have greater performance; that is, human capital will moderate the relationship between strategic positioning and firm performance. Thus, based on the expected associations between strategic positioning and human capital detailed in Hypotheses 1, 2, and 3, we suggest the following moderation relationships:

Hypothesis 4: Human capital will negatively moderate the relationship between customer co-production and firm performance.

Hypothesis 5: Human capital will positively moderate the relationship between customer contact and firm performance.

Hypothesis 6: Human capital will positively moderate the relationship between service customization and firm performance.

METHODS

Sample

In constructing the study sample, we considered only those service firms that were publicly held in order to obtain objective performance data. We then used a size criterion of greater than \$10 million in sales and larger than 50 employees in order to increase the likelihood the organizations possessed somewhat formalized strategic and HR activities. Finally, we limited our sample to only those firms that received a majority of their sales from a single industry to reduce the possibility of multiple strategic positioning and human capital investment choices occurring within a firm. This screening process yielded 1904 service organizations. Questionnaires were mailed in late 1997 and early 1998 to the highest-ranking executive in each firm (usually the CEO, but in a few cases the President or Chief Operating Officer). Though some have voiced concern over the use of a single respondent (e.g., Simon and Burstein,

1985), our decision to use a single respondent was based on two characteristics of the present study. First, all firms predominately compete in a single industry. Thus, top managers should have a greater understanding of their firm's competitors, industry dynamics, and their own strategic positioning than would managers of diversified organizations. Second, because service firms possess relatively high concentrations of labor (i.e., labor is a primary firm resource) (Mills, 1986), it is likely that top managers of these types of organizations will have an in-depth knowledge of their human capital. Thus, we believe these characteristics help to minimize the concerns of using a single respondent.

A total of 234 organizations representing 96 four-digit SIC codes returned questionnaires (see Table 1 for a listing of the sample by industry group). An analysis of respondent–nonrespondent organizational differences based on the number of employees and performance showed the two groups were not significantly different on either of these dimensions.

Measures

A pilot study involving 23 service firms from four industries was conducted to ascertain the validity and reliability of the survey instrument. Similar to the main study, all firms had greater than \$10 million in annual sales and 50 or more employees. Alterations and clarifications were made to the questionnaire items based on responses and input from the pilot study. Questions for both the pilot and main studies were based on

seven-point Likert scales, and the pilot study organizations were not included in the sample of the main study.

Strategic positioning

These variables consisted of *customer co-production*, *customer contact*, and *service customization* and were measured relative to competitors. *Customer co-production* is the degree to which customers participate in the design and delivery of the service offering (Maister and Lovelock, 1982; Mills and Morris, 1986) and was measured using a five-item scale ($\alpha = 0.77$). *Customer contact* refers to the degree to which customers and employees interact with one another during the service production process and was measured with a two-item scale ($\alpha = 0.95$). Lastly, *service customization* refers to a firm's ability to alter service production in order to meet specific customer needs and was measured using a five-item scale ($\alpha = 0.89$). See the Appendix for a list of the specific strategic positioning variable items.

Organizational performance

Performance was measured using two variables: return on equity (ROE) and return on investment (ROI). A 2-year average of both ROE and ROI was used in order to reduce the potential for anomalous timing effects on performance. For our analysis, we combined ROE and ROI into one

Table 1. Correlations, means, and standard deviations

Variables	Mean*	s.d.	1	2	3	4	5	6	7	8
1. Size	3.13	0.78								
2. Industry performance	-0.33	1.70	0.14							
3. Industry beta	0.95	0.312	-0.16	0.16						
4. Information asymmetry	3.73	1.63	-0.09	-0.01	-0.10					
5. Customer co-production	3.40	1.33	-0.10	0.02	-0.01	0.04				
6. Customer contact	3.87	1.97	-0.02	-0.10	0.01	-0.02	-0.04			
7. Service customization	3.99	1.58	-0.08	0.02	0.06	-0.15	0.02	0.45		
8. Human capital	3.90	1.14	-0.06	-0.03	0.13	-0.20	-0.28	0.29	0.32	
9. Performance	0.01	0.88	0.02	-0.01	0.04	0.01	-0.12	0.04	-0.06	0.27

Correlations greater than 0.13 are significant at $p < 0.05$; correlations greater than 0.17 are significant at $p < 0.01$

*As recommended by Aiken and West (1991), the strategic positioning and HRM variables were centered (mean = 0) for our moderated hierarchical regression interaction tests.

Sample by industry group: Transportation (18), Communications (3), Utilities (15), Wholesale Trade (25), Retail Trade (62), Insurance and Real Estate (28), Personal and Business Services (38), Repair (2), Motion Picture and Amusement (10), Health, Education, Accounting and Related Services (33).

overall performance variable ($\alpha = 0.72$). ROE and ROI data were obtained from *Disclosure*.

Human capital

Organizations can increase their human capital levels through selection and/or training (i.e., buy and/or make). Selection refers to an organization's efforts to increase its human capital by hiring employees with high levels of education and expertise from the external labor market. Training, on the other hand, refers to an organization's effort to increase its human capital through internal developmental activities of its current employees (Snell and Dean, 1992). While human capital theory can be used to argue that selection and training are substitutes for one another and therefore redundant when used together, many studies have found them to be complementary (MacDuffie, 1995; Pfef-fer, 1994; Youndt *et al.*, 1996). It is logical to conceive, for example, that organizations can use selection to increase their generic human capital, while focusing on training to develop firm-specific human capital.

Following the complementary approach commonly employed by strategic human resource management researchers studying high-performance work systems (e.g., Arthur, 1994; Huselid, 1995; MacDuffie, 1995; Youndt *et al.*, 1996), we used a composite selection and training scale consisting of five items to assess the level of *human capital* possessed by the organization's employees directly involved in the service production and delivery process ($\alpha = 0.85$). More specifically, the items focused on whether or not firms select production employees with high levels of prior education, training, and experience, and how much time and money they spend on internal training activities. Similar to the strategic positioning measures, these items were assessed relative to competitors. See the Appendix for the specific human capital items.

Control variables

Previous studies have indicated that firm size and industry environment can influence firm performance (e.g., Keats and Hitt, 1988). To control for the effects of *size*, we gathered data on the number of individuals employed by each firm. Number of employees was used rather than total revenue, as researchers believe it to be a more accurate

proxy of size in the service sector (cf. Normann, 1984). We then calculated the log of this number and entered it in the first step in our regression analyses.

In order to control for industry effects, we first collected data using *Research Insight* on average ROE and ROI for each of the 96 four-digit SIC codes represented in the study. We combined these into an overall measure of *industry performance* to be consistent with the composite nature of our firm performance variable. Next, to control for the effects of industry risk, we obtained the *industry beta* for each of the 96 industries from *Research Insight*. Finally, we incorporated *information asymmetry* into the analysis for two reasons. First, past data suggest the level of information asymmetry in the environment may impact industry-level profitability (e.g., Nayyar, 1990) as well as firm strategy (Nayyar, 1993; Nay-yar and Templeton, 1994). Second, the inclusion of information asymmetry helps account for any effects industry complexity/knowledge intensiveness might have on human capital investments. To assess information asymmetry, we used a four-item scale that measured customers' abilities to ascertain the underlying quality of the service offering as well as their ability to differentiate among the output of competing firms ($\alpha = 0.90$). See the Appendix for a list of the specific information asymmetry items.

Confirmatory factor analysis of all the self-reported constructs suggested that the model provided a good fit to the data. The CFA resulted in a chi-square statistic of 150 with 51 degrees of freedom. Since the chi-square was less than three times the degrees of freedom, a good fit was implied (Carmines and McIver, 1981). Furthermore, other measures of the fit indexes all exceeded the critical levels suggested by Bentler and Bonett (1980) (comparative fit index = 0.983; goodness-of-fit index = 0.912; incremental fit index = 0.983). Construct reliability was assessed by calculating Cronbach's alpha for each of the constructs. All of the scales reached the 0.70α suggested by Nunnally (1978). Moreover, the standardized loadings of all measurement items to their respective constructs were significant at the $p < 0.05$ level, suggesting that the scales for the constructs had convergent validity (Montoya-Weiss, Massey, and Song, 2001). In addition, none of the confidence intervals of the phi values contained a value of one ($p < 0.01$),

again suggesting that the constructs possessed discriminant validity (Bagozzi and Phillips, 1982).

RESULTS

Strategic positioning and human capital

Correlations, means, and standard deviations of all variables are shown in Table 1. To test our strategic positioning–human capital hypotheses (1 through 3), we used ordinary least squares regression analysis. In doing so, we regressed the variable *human capital* on the three main effects (*customer co-production*, *customer contact*, and *service customization*) as well as on the two control variables (*firm size* and *information asymmetry*). Results of this analysis are shown in Table 2.

Hypothesis 1 suggested a negative relationship between customer co-production and human capital. The results support this hypothesis ($b = -0.300$, $p < 0.01$). This finding upholds our assertion that higher levels of customer co-production act to standardize customer inputs into the production process, thereby reducing the need for higher levels of human capital among a firm's production employees. This finding is also consistent with those who make the corollary argument that increased co-production may allow firms to shift production activities to customers.

Hypothesis 2 suggested a positive relationship between customer contact and human capital. The results also confirm this contention ($b = 0.194$, $p < 0.01$). This finding supports the argument that service organizations with high levels of customer contact in the production and delivery process require greater levels of human capital in order to handle the increased uncertainty brought about

by this interaction. As such, increased investments in human capital are needed.

In Hypothesis 3, we argued there would exist a positive relationship between service customization and human capital. Again, the results support this contention ($b = 0.212$, $p < 0.01$). Thus, there is strong evidence to suggest that service organizations with adaptable production and delivery processes are investing heavily in human capital so that employees can process the corresponding variance in customer demands.

Strategic positioning, human capital, and performance

In order to test our hypotheses examining how the 'fit' between strategic positioning and human capital influences organizational performance (Hypotheses 4, 5, and 6), we used moderated hierarchical regression analysis. In step 1 of this analysis, we entered the control variables (*size*, *industry performance*, *industry beta*, and *information asymmetry*) and the main effects variables (*customer co-production*, *customer contact*, *service customization*, and *human capital*). Significant effects here indicate direct relationships between these variables and organizational performance. This procedure eliminates any main effects on performance prior to examining potential strategic positioning–human capital interaction, or fit, effects (Stone and Hollenbeck, 1989). In step 2, the cross-products of each of the strategic positioning variables and human capital (e.g., *customer co-production* \times *human capital*) were entered as a set. Entering the interaction terms simultaneously aids in controlling for possible multicollinearity among the variables. Evidence of moderation exists when the set of interaction terms accounts for significant residual variance in the dependent variable. A significant R^2 change here indicates that strategic positioning and human capital interact to influence performance. To understand the specific relationships between the strategic positioning–human capital interactions and performance, we then examined the individual interaction terms in the regression equations. Table 3 shows the results of our moderated hierarchical regression analysis.

When examining the relationships among the strategic positioning characteristics, human capital, and performance, our regression model indicates that adding the strategic positioning and human

Table 2. Results of regression analysis of strategic positioning on human capital

Strategic positioning	Human capital
Size	-0.086
Information asymmetry	-0.123*
Customer co-production	-0.300**
Customer contact	0.194**
Service customization	0.212**
$R^2 = 0.24$	
$F = 12.401^{***}$	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 3. Results of hierarchical regression analysis of strategic positioning, human capital, and performance

Variables:	Step 1	Step 2
Control and main effects		
Size	0.028	0.017
Industry performance	0.007	-0.011
Industry beta	0.012	0.027
Information asymmetry	0.033	0.027
Customer co-production	-0.023	-0.067
Customer contact	0.032	0.053
Service customization	-0.176*	-0.178*
Human capital	0.325***	0.360***
Interaction effects		
Customer co-production × Human capital		-0.145*
Customer contact × Human capital		-0.170*
Service customization × Human capital		0.383***
Information asymmetry × Human capital		-0.160*
ΔR^2		0.137
R^2	0.107	0.244
ΔF		7.718***
F	2.59**	4.57**

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

capital interactions into our hierarchical regression analysis in step 2 explains significant incremental variance in performance ($\Delta R^2 = 0.137$, $\Delta F = 7.72$, $p < 0.001$). Thus, there is strong support for the general proposition that strategic positioning characteristics interact with human capital to influence organizational performance. Furthermore, each of the individual hypothesized interaction terms (*customer co-production × human capital*, *customer contact × human capital*, and *service customization × human capital*) was significant.

As predicted in Hypothesis 4, customer co-production interacted with human capital to have a statistically significant, negative relationship with organizational performance ($b = -0.145$, $p < 0.05$). A plot of this interaction in Figure 1(a) confirms our belief that higher performance will be associated with service organizations that couple higher levels of customer co-production with decreased human capital. On the other hand, as these firms assume a larger portion of service production (i.e., as customer co-production decreases), increasing levels of human capital will be linked to higher organizational performance.

The interaction between customer contact and human capital was also significantly related to performance ($b = -0.170$, $p < 0.05$). However, the direction of this relationship was contrary to our

expectations stated in Hypothesis 5. The graphical depiction of this relationship in Figure 1(b) reveals that as customer contact increases, high levels of human capital are associated with decreasing performance, while low levels of human capital are linked to performance increases.

The results for our final hypothesis, Hypothesis 6, confirmed our prediction that service customization and human capital interact to affect performance ($b = 0.383$, $p < 0.001$). As expected, Figure 1(c) illustrates that the combination of high levels of customization and human capital are related to increased performance. Conversely, performance suffers substantially when increased service customization is coupled with low levels of human capital.

DISCUSSION

Findings surrounding hypothesized relationships

Service organizations constitute almost 80 percent of employment in the United States and over 75 percent of gross domestic product (United States Bureau of Labor Statistics, 1997). Yet, there have been few studies that examine the effects of customer participation in the service production and delivery process. Our study begins to

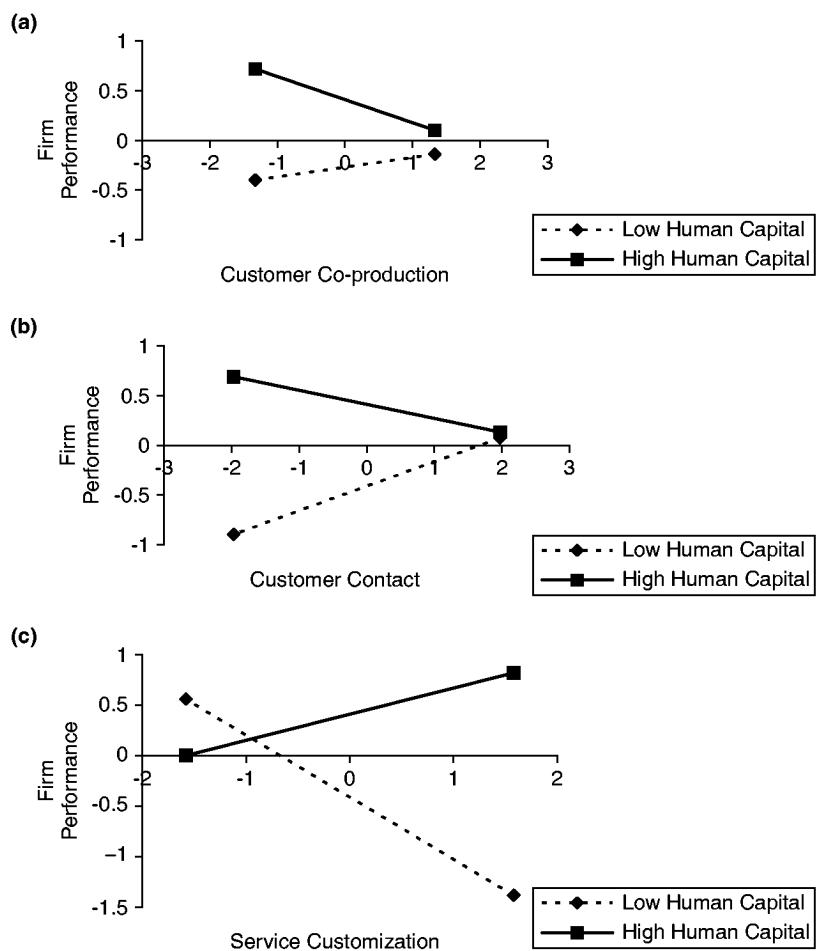


Figure 1. Strategic positioning and human capital interactions

address this area by taking a customer interaction approach to examining how certain strategic positioning choices are related to human capital, and how the interaction among strategic positioning and human capital influences organizational performance. We found strong empirical support to indicate that strategic positioning (i.e., customer co-production, customer contact, and service customization) is in fact related to human capital and that the proper 'fit' among these variables is associated with changes in firm performance.

To begin, we found that when organizations choose to utilize more customer co-production they are less likely to make investments in human capital in their service production processes. As hypothesized, this most likely results from organizations simplifying and standardizing their production processes as co-production increases. Such well-defined environments reduce

the cognitive demands placed upon employees involved in the production process, which in turn reduces the organization's need to invest heavily in developing and selecting human capital.

Our performance analysis with regard to the customer co-production and human capital interaction provides some interesting insights. As expected, as co-production increases the performance benefit of high levels of human capital diminishes substantially. Thus, on the surface it appears that firms are behaving rationally by coupling higher co-production with lower human capital (our result from Hypothesis 1). However, a detailed interaction plot (Figure 1a) shows that even though there is a diminishing benefit to having high human capital when co-production increases, firms with high human capital always outperform those with low human capital regardless of the level of co-production. As such, under most co-production

circumstances organizations would be wise to employ high levels of human capital even though the benefits of doing so are substantially reduced under conditions of moderate to high co-production.

With regard to customer contact, we found a very strong, positive link with human capital. This finding implies that as customer–employee contact increases (i.e., as more of the production process is exposed to customers), organizations employ higher levels of human capital in order to deal with the heightened information flows and variability resulting from this increased interaction. While such organizational decisions appear logical and were consistent with our predictions, our interaction analysis (Figure 1b) illustrates that such a coupling can have detrimental performance consequences. For example, combining low customer contact with low human capital results in extremely low performance, whereas coupling high human capital with the same low contact leads to very high performance. With regard to high customer contact, organizations exhibited very similar performance whether they utilized high or low levels of human capital when adopting this type of strategic position.

One explanation for our unexpected findings can be found in an offshoot of agency theory, coined control theory (Snell, 1992). At its basic level, control theory outlines mechanisms organizations can use to affect the behavior of employees in a manner that serves the best interests of the firm. Assuming that managers of service firms are interested in meeting the needs of customers, then investments in human capital through selection and training can be used as a mechanism to help ensure that employees have the proper skills to meet these needs. This approach to employee control is referred to as *input control*. Alternatively, firms can use *behavioral control* by directly monitoring their employees to ensure that they are acting in a manner consistent with meeting customer demands. We suggest that when customer contact is high, it is possible that customers can serve as extra-organizational monitoring agents for service firms. Rather than requiring management to monitor employee behavior, it is the customers themselves that ensure their needs are met through direct communication with production employees. Due to this monitoring role by customers brought about by a high degree of contact with the production process, service organizations may be able to economize on their level of investments in

human capital. Thus, firms employing high levels of customer contact may be able to meet customer needs with either input control (i.e., higher human capital) or behavioral control (i.e., lower human capital). This would explain why we found little performance differences among firms pursuing high levels of customer contact. When customer contact is low, however, behavioral control through customer monitoring may not be possible as customers' interactions with production employees are reduced. In this case, service firms using input control (i.e., higher human capital) would most likely achieve higher performance. Though this explanation is consistent with our results, it is but one possible reason for our findings. For example, it is also possible that employees were not given enough decision-making discretion to deal with the added uncertainty brought about by high customer contact, thereby reducing customer satisfaction and hence firm performance. Thus, much more research is needed to fully understand the effects of customer contact on human capital.

We also found a strong, positive relationship between service customization and human capital. Not surprisingly, service organizations employ higher levels of human capital in their production processes when confronted by this potential for substantial variance in customer demands. Under such a condition, employees need to ascertain a customer's specific needs and determine how to provide customized services that meet those idiosyncratic needs. Our interaction results (Figure 1c) are consistent with this rationale and highlight the importance of human capital to service customization. Organizations matching high human capital with highly adaptable service production exhibited extremely high levels of performance, while companies using low human capital with the same strategic position experienced severe performance problems. On the other hand, when service customization was low, organizations performed significantly better with low as opposed to high levels of human capital. As one might expect, it appears that service organizations with low customization may not be able to derive a requisite amount of benefits to compensate for the additional costs associated with high levels of human capital.

Supplemental analyses

Although we did not hypothesize any direct relationships between the strategic positioning characteristics and performance, or between human

capital and performance, our results provide some interesting observations. The only strategic positioning variable with a direct effect on performance was service customization ($b = -0.176$, $p < 0.05$). This negative performance effect seems to suggest that service customization, unless packaged and implemented correctly, may be very costly and/or not valued by consumers. That is, service customization may have high production and delivery costs without commensurate pricing power and therefore erodes profit margins unless coupled with the proper level of human capital.

The human capital variable itself had a very strong, positive main effect on organizational performance ($b = 0.325$, $p < 0.001$). This result lends considerable support to the basic argument that human capital is vital to the production and delivery processes of service organizations (e.g., Mills, 1986). Thus, all else being equal (e.g., strategic positioning, industry environment), more human capital appears to be better than less human capital. This result is also consistent with the visual plots of the performance effects of the strategic positioning–human capital interactions. While these interactions revealed that certain strategic positions required more or less human capital to maximize performance, the graphs illustrated that high levels of human capital were better than low levels in most service production contexts.

In controlling for the potential effects of information asymmetry, we noticed that it too was significantly related to human capital.¹ Interestingly, the relationship was negative ($b = -0.123$, $p < 0.05$). This is in direct contrast to what most scholars have suggested, which is that industries

with high levels of information asymmetry are typically characterized by complex, knowledge-intensive tasks and hence require high levels of human capital (Heskett, 1986; Normann, 1984). Because of the contrary nature of this finding, we decided to investigate the effect of the interaction of information asymmetry and human capital on performance. Our results indicated that the interaction was significant ($b = -0.160$, $p < 0.05$); however, the graphical depiction of the relationship was again contrary to what one would expect based on the literature. As highlighted in Figure 2, service firms utilizing high levels of human capital in environments characterized by low information asymmetry had correspondingly high performance, while firms employing low levels of human capital in the same environments possessed low performance. At the other end of the spectrum, the performance differences among firms taking either a low or high human capital approach narrowed substantially when the environment was characterized by high information asymmetry.

One explanation for these results is the potential effect of information asymmetry on the need for organizational slack. Slack is typically conceptualized as excess resources that give firms a greater ability to respond to unforeseen demands (e.g., Thompson, 1967). In a service firm, investments in human capital add to the level of organizational slack, for they create a resource that allows the firm to better cope with the potential uncertainty customers bring to the service environment (Quinn, 1992). However, as information asymmetry increases, customers are less able to ascertain the underlying quality of the service offering and therefore have a reduced understanding as to whether or not their demands are actually being met (Normann, 1984). Such limited

¹ We would like to thank an anonymous reviewer for calling attention to this relationship and encouraging us to investigate it further.

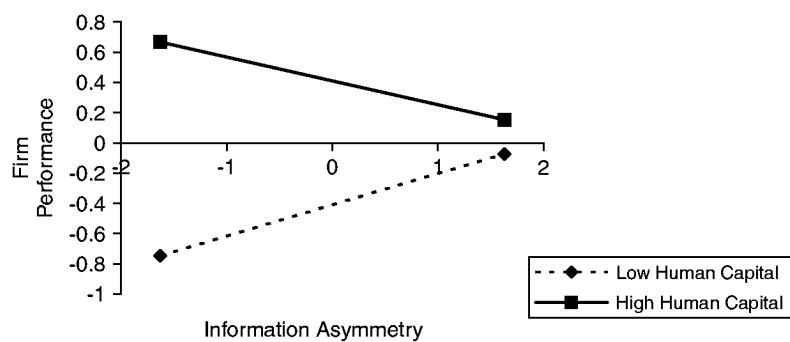


Figure 2. Information asymmetry and human capital interaction

knowledge may therefore significantly decrease the impact of a customer's demands upon the service production process. In effect, information asymmetry may act as a buffer between the firm and its customers, allowing the firm to reduce its investment in slack resources, which in this case is human capital. In low information asymmetry environments, however, there is not much of an information buffer between the firm and its customers, thereby necessitating the use of high levels of human capital. Much more research is needed to fully understand the impact of information asymmetry on service organizations.

Limitations and additional future directions

One limitation of this study involves the timing of the effects between strategic positioning characteristics, investments in human capital, and performance. Though we developed our customer interaction arguments in terms of the impact of strategic positioning on human capital and their subsequent affect on organizational performance, other directional influences are possible. For example, it is reasonable to contend that successful organizations—regardless of the strategic positioning characteristics they implement—have the resources necessary to invest in human capital. Likewise, it can also be argued that high levels of human capital afford organizations the ability to pursue various strategic alternatives. On the other hand, firms currently exhibiting low performance may invest in human capital and certain strategic positions in order to improve their performance. The cross-sectional nature of our study prohibits us from excluding any of these possibilities. Future research might look at strategic positioning characteristics, human capital, and performance over time to examine the sequential and reciprocal relationships among these aspects of service organizations.

A second limitation involves the object of the study. Consistent with our customer interaction approach, our study focused on the service production and delivery process. This focus allowed us to target a relatively homogeneous subpopulation of an organization's employees, thereby increasing the accuracy of our human capital measurements. However, doing so limits the generalizability of our results to the production process. Future studies are needed to explore the linkages between strategic positioning, human capital, and performance in other subpopulations of employees

within service organizations. In a related matter, scholars may also consider examining these interrelationships in diversified firms, as we limited our study to nondiversified organizations primarily competing in a single industry.

A third limitation concerns the relationship between organizations' decision-making structures and the level of human capital in their production processes. We have argued that as variability in customer demands increases, service organizations will increase the level of human capital involved in the production process to address this uncertainty. However, it is likely that these same production employees will also require higher degrees of autonomy so that they may address this uncertainty. In the present study, we assumed that managers would give the requisite amount of decision-making power to production employees depending on the level of variability they encountered. If, however, managers did not grant such authority to production employees, then any potential returns from investments in human capital may not materialize. For example, as mentioned previously, our contrary performance findings surrounding the customer contact–human capital interaction may result from organizations not providing the requisite amount of decision-making authority to their production employees. This suggests there may exist both direct and interaction effects among strategic positioning, human capital, and the decision-making structure that ultimately impact performance—effects that were not accounted for in the present study. Due to the potential impact of decentralization on a service firm's ability to handle uncertainty, we encourage future research in this area.

Besides these areas for future research, two others are of note. The first concerns the role of technology in service organizations. As stated above, our study focused on the human capital requirements surrounding the service production process. Past research on production processes has mostly examined the throughput aspect of production, in particular the use of technology in efficiency gains (e.g., Thompson, 1967; Woodward, 1965). However, in the present study we did not measure technology. Instead, we assumed it to be a multifaceted resource that is applied to achieve efficiency gains in a manner consistent with the organization's strategic positioning. Though this approach was theoretically consistent,

it was nonetheless an oversimplification. Continuing advances in technology allow it to be used in more difficult and complex tasks. Although our results show strong support for our argument that service firms use human capital to address variability in customer demands, it is possible that technology is playing an ever-increasing role in allowing firms to contend with this uncertainty. That said, the reality is we know very little about the role of technology in services. For instance, why is it that new technologies have brought forth vast productivity gains in the manufacturing sector, while very few gains have occurred in the services (United States Bureau of Labor Statistics, 1997)? Another question involves the creation of new technology by service firms. Much of what a service firm sells is a process. When such a firm develops a new process for delivering the service, this is by definition a new technology. However, processes are very difficult to patent. As such, new technologies in services may be easily copied by competitors, which in turn may reduce these organizations' desire to invest in innovation. These questions have only scratched the surface of potential topics involving technology in the services. A great deal more research is needed in this area.

The second area involves the skill level of customers. In the present study we assumed that all customers possessed a similar level of skill. However, it is likely that differences do exist among customers based on their skill and/or knowledge surrounding the service. For example, Nayyar and Templeton (1994) suggest that expert buyers may have a better familiarity with the service than would novice clients. As such, expert customers may be able to perform more complex tasks during service production, thereby reducing the need for higher levels of human capital. In addition, customer skill level could also impact the strategic options available to service firms. When customer skill level is very low, firms may encounter difficulty in adopting a production process high in customer co-production (i.e., one that requires much effort on the part of customers). Finally, the level of customer skill may also impact a buyer's susceptibility to the effects of information asymmetry (Nayyar and Templeton, 1994). For example, highly skilled customers may have a better understanding of what constitutes quality in the service offering. As such, this could have implications for the level of slack resources in the form of human capital that service firms require.

These are just a few examples of how customer skill level can affect service organizations. Again, much more research is needed.

CONCLUSION

Previous research on production and human capital has typically focused on the nature of the task. However, this body of research implicitly assumes a separation between production and the environment. Recent works have suggested that in service environments a client–firm interaction occurs that can create higher levels of uncertainty for the firm. As a result of this interaction, service organizations must adapt elements of their production processes to address this uncertainty. The current study extends this idea by suggesting that the strategic positioning of service production determines the level of uncertainty arising from the client–firm interaction, and hence the human capital required to handle this uncertainty. In addition, we found partial support for performance differences among service firms as a result of their fit between strategic positioning and human capital.

Thus, the findings in this study add to the growing belief among researchers that a different set of dynamics may be at work in service organizations. With this sector of the economy accounting for the vast majority of both employment and gross domestic product in the United States, we believe that more research in this area is warranted. We hope that the findings presented here will encourage researchers to continue investigating the dynamics driving these organizations.

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APPENDIX: QUESTIONNAIRE ITEMS

Customer co-production

Relative to competitors, our firm:

1. requires customers to perform functions similar to that of an employee.
2. requires customers to become heavily involved in producing the service.
3. *minimizes the amount of time customers spend in the service production process.
4. *performs many tasks for customers (e.g., rental car company offering free pick-up and drop-off service).
5. *is conveniently located near customers.

Customer contact

Relative to competitors, most of our firm's service production:

1. *occurs out of customers' view (i.e., in the 'back office').
2. occurs in full view of customers (i.e., in the 'front office').

Service customization

Relative to competitors, our firm:

1. changes how our service is offered for each customer.
2. *offers a service which is similar from customer to customer.
3. allows our customers to dictate how the service is offered.
4. *performs the same procedures for each customer.
5. requires a great deal of information from each customer before producing the service.

Human capital

Relative to competitors, our firm:

1. spends more money per employee on training.
2. spends more hours per year training employees.
3. hires employees with high levels of prior experience.
4. hires employees with high levels of prior training.
5. hires employees with high levels of education.

Information asymmetry

Relative to other industries, how accurately do the following describe the service offered in your industry?

1. It is difficult for customers to understand how services are actually produced.
2. Customers cannot determine firms' level of effort in service production.
3. It is difficult for customers to make comparisons of the service offering across competing firms.
4. It is difficult for customers to determine the quality of the service offering prior to purchase.

All items were on a scale of 1 (not accurate) to 7 (very accurate).

*Indicates item was reverse coded.