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Measuring Managerial Effectiveness During The Implementation of Service Strategies

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MEASURING MANAGERIAL EFFECTIVENESS DURING THE IMPLEMENTATION OF SERVICE STRATEGIES

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In service firms performance is contingent upon the operations strategy being pursued. However, little research has been reported which empirically examines the implementation of operations strategy in service firms. We argue that implementing an operations strategy in services is primarily done through the use of human resources. We then test the proposition that in service firms the most effective operations managers are the ones that make the most effective use of their human resources. This paper develops measures of strategic implementation and tests hypotheses about the effect of strategic implementation on firm performance using published data from the National Basketball Association.

Introduction

We propose in this paper that those service firms, which emphasize employee talents that do not directly contribute to the firm's service strategy, will be low performing firms, no matter how talented the individuals employed by the firm. However service firms, which identify and use those employee talents that support their service strategy, will generate capabilities that their competitors do not possess. There has been some research about how human resources can be used to create a competitive advantage in manufacturing firms. For example, Youndt, Snell, Dean and Lepak (1996) reported that employee development significantly improved plant performance. However, we are not aware of any research that examines the implementation of service strategies through a service firm's use of its employees.

In this paper, the term service strategy is defined as a specific operating strategy for a service unit (Thompson & Strickland, 1999). A service strategy consists of a consistent pattern of decisions made by a firm's frontline organizational units (e.g., sales districts, distribution centers and customer service centers) about how to perform significant operating tasks (e.g., inventory control, shipping, advertising and customer contact tasks). In a service firm, the service strategy is the pattern of decisions about how to provide the service.

There are several barriers to studying a service strategy implementation. First, some service strategies are implemented through employee training and there may be a lag between the outcomes of this training and the training itself. Second, some service strategies are implemented by creating complex patterns of coordination between the service employees and other resources involved in the service delivery (Grant, 1991). While this coordination of available resources may provide unique capabilities and provides a competitive advantage (Cappelli and Singh, 1992), it is difficult to measure the level of coordination achieved and consequently the degree of service strategy implementation.

Third, some services have high levels of process structure complexity similar to that in manufacturing (Gupta and Loneal, 1998), which makes measurement difficult. For example, high process structure complexity can occur in a service when there is a need to use data from the process to control the process and/or there is a need for a high level of interconnection between operators providing the service. A final reason that it is difficult to study the implementation of service strategies is that the major decisions in implementing a service strategy are the decisions regarding employees. It is difficult to track decisions about employees and the reasons for these decisions. For example, a service manager typically does not record why an employee was selected for a specific project.

Most service firms do not gather detailed measurements of each employee's ability and how this information is used to assign employees to tasks. However, one set of service firms, which maintains detailed information about each employee's ability and how each employee is utilized, are the teams in the National Basketball Association (NBA). The NBA may not be generally thought of as a service firm, but it in fact is. The service the NBA provides is entertainment.

Sports data has been used by other management researchers to explore different portions of management theory. NBA data was used to examine 'tacit knowledge' (Berman, Down and Hill, 2002). NCAA basketball data has been used to study strategy (Wright, Smart and McMahan, 1995).

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The advantage of using the NBA's published data for this study is that it gives detailed information about the performance of every player in every game (Broussard & Carter, 2001). This data can be used to measure the coach's strategy implementation during a team's games. There are actually many ways to measure the performance of a NBA team, such as profit and loss and market valuation, but this paper limits its examination of the performance of NBA teams to the number of games won.

The rationale for using this approach is that this is a direct measure of the talent on a particular team and how effectively this talent is used. There are obviously some differences between NBA teams and professional service firms such as management consulting firms and law firms, but both implements their service strategy through the use of people. The performance of a professional service firm and a NBA team are both directly attributable to the talent of their respective employees. The productivity of employees of professional service firms and players in the NBA are measured in similar ways. For example, in the NBA, productivity is measured by points scored or games won. An attorney's productivity is measured by hours billed or cases won.

A final similarity between professional service firms and NBA teams is that the managers of both NBA teams and professional service firms strive to maximize their firm's performance by leveraging their human capital. To do this, both sets of managers must make decisions about when and how to use their employees. A NBA coach decides which players will start and when the player will rest during the game, with the goal of maximizing the number of wins. The manager of a professional service firms selects a lead partner or lead attorney and assigns assistants to fulfill various roles, with the goal of maximizing the firm's profits.

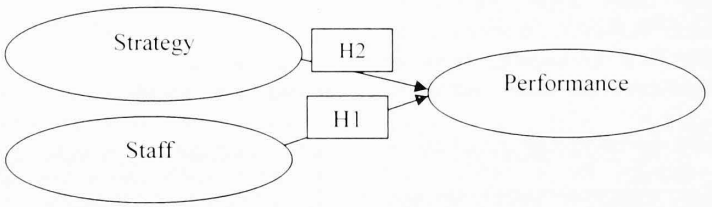
RESEARCH MODEL

In the model shown in figure 1, we propose that employee or staff talent directly affects operational performance in service firms. There is intuitive support for the first hypothesis that the talent of the staff directly affects service performance. But, hypothesis 1 is also supported by Youndt et al. (1996), who found that the effects of human resource systems on the performance of manufacturing firms is moderated by the operations strategy.

Hypothesis 1 is supported by prior research on the importance of internal firm resources, such as staff, on a firm's competitive competencies (Barney, 1991; Wright, Dennis & McMahan, 1995).

H_1: The talent level of a service firm's employees have no a direct positive effect on firm performance.

Figure 1: Detailed Research Model



We also propose that operational performance is directly affected by the service strategy that is implemented. Hypothesis 2 that decisions about how to employ the staff's talents should influence performance is supported by prior research. Youndt, et al. (1996) reported a significant interaction between operations strategy and human resource practices in manufacturing firms. They stated that, in manufacturing firms, improving the productivity of employees improved plant performance. Olian and Rynes (1984) also found that the effectiveness of any given strategy is a function of the talents found within a firm's human capital pool.

Other researchers believe that firms must focus significant attention on hiring, training, and motivating those employees who engage in direct contact with customers and have immediate responsibility for providing the service to improve performance (Bowen & Lawler, 1992). Vickery, et al (1993) also supports the second hypothesis. They established that production competence, which is equivalent to the manager's decisions about who and where each employee will work, is linked to business performance. Hypothesis 2 is further supported by the findings of Gupta and Loneal (1998) that manufacturing strategy directly affects firm performance.

H_2: The service strategy does not directly affect firm performance.

There is a third issue about service strategies that is not illustrated in figure 1. This is whether there are

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generic service strategies similar to generic manufacturing strategies. The existence of generic service strategies in the NBA would imply that NBA coaches, over time, choose from one of a limited set of strategies. Their specific strategic choice would depend upon three key factors: the individual coach's predisposition, the productivity of key available personnel, and the rules of the game. Wright et al. (1995), in a survey of over 300 Division I college basketball teams, found that NCAA teams used one of three generic strategies. To date, this has not been investigated in professional sports.

H3: NBA teams do not use generic service strategies.

Measuring Service Strategy Implementation

The allocation of playing time to the team's starters was used as a measure of the implementation of the team's service strategy. In the NBA there is no other way to implement a service strategy, except to choose who will play and when they will play during the game. One method by which the NBA coach implements a service strategy is to allocate the playing time to the starters. There are other important behaviors that a coach must undertake to implement a service strategy. These include efforts to develop the skills of the players, efforts to motivate the players and efforts to build a spirit of team cooperation.

This paper does not examine these functions, but focuses solely on the playing time decision. The coach in isolation does not make the playing time decision. This decision typically involves other members of the organization. For example, coaches are under pressure to use the highest paid players as starters, because the general manager, who is usually involved in hiring the players, wants to justify player selection decisions to the owners.

Another pressure on the coach to play the highest paid players the largest percent of time, so that star players can use their star power to pressure the coach through the owner or general manager to obtain more playing time. So, the playing time decision captures some of the coherence between the business strategy and the service strategy as the actual service strategy.

Due to their role in hiring players, general managers can contribute to a good service strategy, or help create a weak one. A good strategic implementation is one where the players, who are hired, eliminate weaknesses in a team or add strengths that are currently missing. A bad implementation would be to hire players who do not help a team meet its strategic objectives. There are two reasons why a general manager would not hire the most appropriate players for the team's service strategy. A general manager may not be able to hire the appropriate players due to decisions made in earlier years (e.g., trading away early draft choices or reaching its salary cap). Or, a general manager, who believes that talent is more important than strategic implementation, could choose to draft a player who does not have the talent the team needs but is highly talented in other ways. The decision to obtain a valued resource that is not needed because it is a bargain, instead of obtaining the needed resource occurs in many industries. Wright, Smart and McMahan (1995) state that those managers, who believe that their firm can quickly develop the strengths to exploit an available resource, will deviate from their chosen strategy to obtain a resource that they perceive to be a bargain.

By using playing time as a measure of service strategy implementation, we are measuring the extent to which a team implements a consistent service strategy. The NBA's published data does not allow us to identify why the general manager or coach made specific decisions about player selection or playing time allocation, but it does allow measurement of whom a team hired and how that player was used. If the general manager's decisions about who to hire as a starter are consistent with the coach's decisions about playing time, the team will keep its starters in the key positions for its strategy most of the time.

RESEARCH METHODOLOGY

The NBA data from the 1978-1979 seasons and the 1997-1998 seasons was used to test the three hypotheses. The data for this period was obtained from the Sporting News 1999-2000 edition of the official NBA guide (Broussard and Carter, 2001). Currently, the NBA consists of 29 teams. The New Orleans Hornets, Dallas Mavericks, Miami Heat, Minnesota Timberwolves, Orlando Magic, Toronto Raptors, and Vancouver Grizzlies are less than 20 years old and were not used in this study to avoid the difficulties related to unbalanced data.

The talent of the players was measured by calculating each player's productivity level. The productivity is based on the ten players' performance statistics that the NBA collects and publishes annually. These ten player statistics were converted into a productivity score in the following manner:

Step 1. The player in each position on each team, who had the greatest number of minutes played, was classified as the starter for that position. Everybody else was classified as bench and his statistics were combined.

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Step 2. Data about individual player performance (or the combined performance of the bench) on each of the ten game performance statistics was converted to a 48-minute game basis. This is illustrated in table 1 using data from the Atlanta Hawks 1981 season. In the example's calculations, Steve Hawes scored 333 field goals (FG) in 2,309 minutes of playing time (Broussard & Carter, 1999). As a result, his scaled average field goals per game were 6.92 = (333 FG/2309 minutes)*(48 minutes/game), which is higher than his 4.50 (333 FG/74 games) average per game. Scaling the data to simulate the length of the NBA's 48-minute game puts all the players' productivity onto the same scale.

Personal fouls (PF), disqualifications (DSQ) and turnovers are all negative activities. They inhibit good team performance. Since they indicate negative performance, these measures were converted to negative numbers when the data was scaled as shown in table 1.

Table 1: Sample Calculation of Player Productivity: Atlanta Hawks, 1980-81 Seasons

1. Raw Statistics:	Min	FG	FT	OFF	DEF	AST	PF	DSQ	Steals	Turnovers	Blocked-shots
Hawes, Steve	2309	333	222	165	396	168	289	13	73	161	32
2. Scaled Statistics:	**Min**	**FG**	**FT**	**OFF**	**DEF**	**AST**	**PF**	**DSQ**	**Steals**	**Turnovers**	**Blocked shots**
Hawes, Steve	2309	6.922	4.615	3.43	8.232	3.492	-6.008	-0.270	1.518	-3.347	0.665

Legend: Min = minutes; FG = field goals; FT = free throws; OFF = offensive rebounds; DEF = defensive rebounds; AST = assists; PF = personal fouls; DSQ = disqualifications

Step 3. A position-by-position common factor analysis of the scaled data was conducted as shown in table 2. Four distinct factors were identified for each of the six positions analyzed. Notice that the loadings for each factor were similar for each position. The four factors are briefly discussed to demonstrate that the factors are not only statistically significant, but that they are also consistent with how the game is played.

Field goals (FG), free throws (FT) and offensive rebounds (OFF) had the largest loadings onto factor 1 for all six positions. Notice that for the center position, these loadings were field goals (0.831), free throws (0.854) and offensive rebounds (0.352). Since these are all offensive measurements, factor 1 is referred to as 'offensive mindedness'.

Offensive rebounds (OFF); defensive rebounds (DEF) and blocked shots (BS) had the largest loadings onto factor 2. These are key defensive performance measures, so factor 2 is called 'defensive mindedness'. Note that offensive rebounds loaded on both factor 1 and factor 2. This makes sense in terms of the game, because obtaining an offensive rebound creates both an opportunity to score and prevents the other team from having an opportunity to score. Notice that blocked shots loaded positively onto factor 2 for all positions except the power forward position.

The variables loading the heaviest onto factor 3 were assists (AST) and steals (STS). Since these are measures of a player's ability to anticipate the actions of others, factor 3 is called 'court awareness'.
Assists loaded onto factor 3 at about the same level for each position. However, steals loaded onto factor 3 at only 0.199 for the point guard, while steals loaded at 0.642 onto the point guard's factor 2. This suggests that steals are a more important defensive factor for the point guard than for the other positions.

The variables loading the heaviest onto factor 4 were personal fouls (PF), disqualifications (DSQ) and turnovers (TO). These are both measures of aggression, so factor 4 is referred to as 'aggressiveness'. Notice that turnovers loaded negatively onto the first three factors, but had a positive loading onto factor 4. This is appropriate, since turnovers would hurt both the offense and the defense and would not represent court awareness, but turnovers can be the result of aggressiveness by the player.

The purpose of this factor analysis was to obtain the best weighting for each piece of data. To simplify the presentation of the weights in table 2, all values between 0.00X and – 0.00X were shown as zero.

Step 4. To obtain an overall measure of productivity for each player, the scaled data from step 1 and the factor loadings from step 3 were multiplied together for each position. This was done for each team for each of the 20 years in the study period.

This is illustrated in table 3 using a sample calculation of Steve Hawes's productivity. Remember, that the scaled data for Steve Hawes is in table 1 and the factor loadings for his Center position are in table 2. For example, the product of Steve Hawes's scaled FG in exhibit 2 (6.92) was multiplied by the factor loading of 0.831 to obtain 5.753, which was recorded in table 3.

The final productivity score for each factor was found by summing the products for each factor. For example, Steve Hawes's productivity value of 14.146 for factor 1 was calculated as:

(6.922*0.831)+(4.615*0.854)+(3.430*0.352)+(8.232*0.168)+(3.492*0.199)+(-6.008*0.241)+(-0.270*0.000)+(1.518*0.234)+(-3.347*-0.724)+(0.665*-0.246)=14.146

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Table 2: Common Factor Analysis of NBA Performance Measures by Position

1. Common Factors – Center Position (C)										
Factor/Component	**FG**	**FT**	**OFF**	**DEF**	**AST**	**PF**	**DSQ**	**STS**	**TO**	**BS**
Factor 1	0.831	0.854	0.352	0.168	0.199	0.241	0	0.234	-0.724	-0.246
Factor 2	0	0	0.481	0.811	-0.108	0	0	0.189	-0.126	0.681
Factor 3	0.218	0	-0.499	0.113	0.862	0	0	0.665	-0.375	0
Factor 4	0	0.237	0	0.149	0	0.89	0.905	0	0.219	-0.242
2. Common Factors - Off Guard Position (OG)										
Factor/Component	**FG**	**FT**	**OFF**	**DEF**	**AST**	**PF**	**DSQ**	**STS**	**TO**	**BS**
Factor 1	0.837	0.841	0.225	0	0	0	0	-0.107	-0.712	0.178
Factor 2	0	0.143	0.755	0.802	-0.232	-0.135	-0.106	0.404	0	0.759
Factor 3	-0.177	0	0	0	0.88	-0.107	0	0.663	-0.443	0.101
Factor 4	0	0	-0.306	0	0	0.88	0.879	-0.12	0.272	0
3. Common Factors - Power Forward Position (PF)										
Factor/Component	**FG**	**FT**	**OFF**	**DEF**	**AST**	**PF**	**DSQ**	**STS**	**TO**	**BS**
Factor 1	0.827	0.832	-0.185	0.127	0.401	0.113	0	0.162	-0.696	0.24
Factor 2	-0.17	0	0.849	0.889	-0.268	0	0	-0.128	-0.148	-0.17
Factor 3	0	0	0	0	0.651	0	0	0.596	-0.357	-0.696
Factor 4	0.132	0	0	0	0.108	0.901	0.893	0	0.356	-0.118
4. Common Factors - Point Guard Position (PG)										
Factor/Component	**FG**	**FT**	**OFF**	**DEF**	**AST**	**PF**	**DSQ**	**STS**	**TO**	**BS**
Factor 1	0.87	0.871	0.137	0	-0.136	0	0	0	-0.369	0.286
Factor 2	0.138	0	0.831	0.843	0	-0.139	0	0.642	0	0.635
Factor 3	-0.153	0.198	0	0.162	0.927	0	0	0.199	-0.725	-0.179
Factor 4	0	0	0	0.171	0	0.888	0.864	-0.343	0.37	-0.3
5. Common Factors - Small Forward (SF)										
Factor/Component	**FG**	**FT**	**OFF**	**DEF**	**AST**	**PF**	**DSQ**	**STS**	**TO**	**BS**
Factor 1	0.829	0.863	0.233	0	0.112	0.171	0	-0.138	-0.626	-0.139
Factor 2	0	0	0.696	0.828	-0.1	-0.12	-0.141	0.147	0	0.75
Factor 3	0	0	-0.223	0.13	0.869	0	0	0.771	-0.522	0
Factor 4	0.16	0	-0.389	-0.111	0.151	0.897	0.89	0	0.393	0
6. Common Factors - Bench Position (B)										
Factor/Component	**FG**	**FT**	**OFF**	**DEF**	**AST**	**PF**	**DSQ**	**STS**	**TO**	**BS**
Factor 1	0.842	0.8	0.14	0	0.162	0	0	0	-0.449	0
Factor 2	0	0	0.822	0.817	-0.339	0	0	0	-0.11	0.515
Factor 3	0	0	0	0	0.742	0.102	-0.146	0.828	-0.468	-0.166
Factor 4	0	0	0	0	0	0.801	0.789	0	0.239	-0.223

Legend: Factor 1- Offensive Mindedness, Factor 2 – Defensive Mindedness, Factor 3--Court Awareness, and Factor 4– Aggressiveness
Note: All values to the negative second power or greater were treated as zeroes.

The same process was used to determine Steve Hawe's productivity measured by the other three factors. These four productivity scores were then summed to obtain Steve Hawes's total productivity score of 25.1 as shown in table 3. The total productivity was calculated for all of the starters and for the bench for the entire sample.

The factor loadings used depended on the player's position classification in the NBA's published data (Broussard and Carter, 2001).

Table 3: Productivity Calculation – Steve Hawes

Productivity Calculation for Steve Hawes of the Atlanta Hawks (1980-81)											
	FG	**FT**	**OFF**	**DEF**	**AST**	**PF**	**DSQ**	**STS**	**TO**	**BS**	**Total**
Factor	Game	Game	Game	Game	Game	Game	Game	Game	Game	Game	Score
Factor 1	5.753	3.941	1.207	1.383	0.695	-1.448	0	0.355	2.423	-0.164	14.146
Factor 2	0	0	1.65	6.676	-0.377	0	0	0.287	0.422	0.453	9.11
Factor 3	1.509	0	-1.712	0.93	3.01	0	0	1.009	1.255	0	6.002
Factor 4	0	1.094	0	1.227	0	-5.347	-0.245	0	-0.733	-0.161	-4.165
Total Productivity											25.094

Legend: Factor 1- Offensive Mindedness, Factor 2 – Defensive Mindedness, Factor 3--Court Awareness and Factor 4– Aggressiveness

DATA ANALYSIS

The mean, standard deviations and correlations of the dependent variable (wins) and the six independent variables are in table 4. The average number of wins for teams during the 20-year study period is 42.1455 with a standard deviation of 12.3357 wins. All the variables except for the bench are significantly correlated with the number of wins.

A hierarchical regression model is used to test hypotheses 1 and 2, because this allows the variance to be partitioned among the correlated variables (Cohen

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and Cohen, 1983). The multiple regression models are given in table 5. The starters' productivity is the only variables in the initial model as shown below:

$$\text{Wins} = \beta_0 + \beta_1\text{Center} + \beta_2\text{Off Guard} + \beta_3\text{Power Forward} + \beta_4\text{Point Guard} + \beta_5\text{Strong Forward} + \varepsilon_i$$

These variables are entered first, because the contention of hypothesis 1 is that the talent or productivity of the starting players has the major effect on the number of wins. This first regression model in table 5 supports Hypothesis 1. The model is significant and explains 0.197 of the variance, while the parameter estimates are significant except for the off guard position. For the other four starting positions, increased productivity of the starters increases the number of wins for the team.

The second regression model in table 5 investigates hypothesis 2, that the implementation of the service strategy influences firm performance. Remember, that hypothesis 2, that the service strategy affects firm performance, implies that it is the utilization of the starters and not the bench that leads to wins. The second regression model supports hypothesis 2, since there is no significant increase in the adjusted R^2 when the productivity of the bench is included in the regression model. The insignificant coefficient for the bench also supports hypothesis 2.

Table 4: Means and Correlation Matrix of Player Productivity Data

Variable	Means (Std Dev)	Wins (p)	Center (p)	Small Forward (p)	Point Guard (p)	Off Guard (p)	Power Forward (p)	Bench (b)
Wins	42.1455	1	0.12	0.1303	0.3295	-0.1316	0.13082	-0.0612
	-12.3357	-0.009	-0.006	0	-0.006	-0.001	-0.2	
Center	28.4546	0.1252	1	-0.1311	-0.1522	-0.0418	0.1308	-0.0612
	-7.1824	-0.009		-0.006	-0.001	-0.381	0	-0.568
Small Forward	24.3983	0.1303	-0.1311	1	0.0237	0.0076	-0.1432	0.1089
	-5.0861	-0.006	-0.006		-0.62	-0.874	-0.003	-0.022
Point Guard	26.5256	0.3295	-0.1522	0.0237	1	-0.1408	0.0025	0.0268
	-5.0861	0	-0.001	-0.62		-0.003	-0.958	-0.575
Off Guard	20.5256	-0.1316	-0.0418	0.0076	-0.1408	1	-0.1155	0.1396
	-4.078	-0.006	-0.381	-0.874	-0.003		-0.015	-0.003
Power Forward	22.1927	0.1308	-0.176	-0.1432	0.0025	-0.1155	1	-0.0371
	-4.695	-0.006	0	-0.003	-0.958	-0.015		-0.438
Bench	17.8695	-0.0612	0.0273	0.1089	0.0227	0.1396	-0.0371	1
	-2.0224	-0.2	-0.568	-0.022	-0.575	-0.003	-0.438	
N= 440								

The results of the third regression model in table 5 below also support hypothesis 2. As stated earlier, the amount of time the starters played measures the service strategy implementation. In the third regression model, the percent of time the starters played variable is included. This model shows that as the starters played more, the team won more games. Comparison of the adjusted R^2 of models 1 and 3 show that the time the starters play accounts for almost as much variance in the number of wins as the productivity starters. So, winning in the NBA is not only a matter of having the best talent, but of the service strategy implementation.

The insignificant coefficient for the bench also supports hypothesis 2. This indicates that the productivity of the bench does not influence the number of wins. The off guard position like the bench was insignificant. Before proceeding, it is important to check the conformance of these models to their underlying assumptions. The hypothesis that the residuals are normally distributed cannot be rejected at conventional significance levels. The Shapiro-Wilk test statistic, W = 0.9976 produces a p value of .7784. Additionally, the Breusch-Pagan chi-square test statistics for heteroscedasticity are $X^2_{BP} = 10.49$ that exceeds the 10% critical value for the chi-square distribution based on 7 degrees of freedom. This indicates that the null hypothesis of residual homoscedasticity cannot be rejected for any of the performance models. Finally, variance inflation factors range from 1.07 to 1.12 with an average variance inflation factor across all seven independent variables of 1.09. This clearly indicates that this model does not exhibit serious multicolinearity.

To investigate hypothesis 3, that generic strategies exist among NBA Teams, the Time-In-Game statistics are analyzed using a common factor analysis. This is shown in table 6 below. Table 6 provides the component matrix of Promax rotated factors. The loadings listed under the "factor" headings represent a correlation between that item and the overall factor. The rotated matrix provides loadings that are indeed highly

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interpretable and distributed between factors 1, 2, and 3, which represents over 73.6 percent of the data. The results of the factor loadings are supportive of hypothesis 3.

Table 5: Hierarchical Regression of Independent Variables on Number of Wins

	Source	DF	Sum of Squares	Mean Square	Coef Var	R^2	Adj R^2	F Value	Sig. F		
1	Model	5	13421	2684.28	26.31	2009	1917	21.82	0001		
	Error	434	53381	122.99							
	Total	439	66803								
	Variables		Parameter	Standard Error	t value	Sig T					
	Intercept	1	-10.329	6.968	-1.48	1390					
	Center	1	0.402	0.077	5.22	0001					
	Off Guard	1	-0.155	0.132	-1.17	2413					
	Power Forward	1	0.502	0.117	4.28	001					
	Point Guard	1	0.845	0.105	8.04	001					
	Small Forward	1	0.437	0.106	4.11	001					
	Source	**DF**	**Sum of Squares**	**Mean Square**	**Coef Var**	**R^2**	**Adj R^2**	**F Value**	**Sig.F**	**$\triangle$ adj R^2**	**Sig. $\triangle R^2$**
2	Model	6	13892	2315.28	26.23	2080	1970	18.95	0001	- 005	- 124
	Error	433	52911	122.19							
	Variables		Parameter	Standard Error	t value	Sig T					
	Intercept	1	-2.958	7.897	-0.37	7082					
	Center	1	0.410	0.077	5.34	0001					
	Off Guard	1	-0.117	0.134	-0.87	3821					
	Power Forward	1	0.503	0.117	4.31	0010					
	Point Guard	1	0.856	0.105	8.04	0010					
	Small Forward	1	0.461	0.106	4.11	0010					
	Bench	1	- 521	0.266	-1.96	0500					
	Source	**DF**	**Sum of Squares**	**Mean Square**	**Coef Var**	**R^2**	**Adj R^2**	**F Value**	**Sig. F**	**$\triangle$ adj R^2**	**Sig. $\triangle R^2$**
3	Model	7	20839	2976.99	24.47	3119	3008	27.98	0001	1091	< 05
	Error	432	45964	106.40							
	Variables		Parameter	Standard Error	t value	Sig T					
	Intercept	1	-52.658	9.599	-5.49	0001					
	Center	1	0.323	0.073	4.45	0001					
	Off Guard	1	-0.116	0.125	-0.93	3537					
	Power Forward	1	0.413	0.110	3.77	0002					
	Point Guard	1	0.723	0.099	7.28	0001					
	Small Forward	1	0.398	0.100	3.98	0001					
	Bench	1	- 130	0.253	-0.51	6083					
	Start Play Time	1	85.43	10.573	8.08	0001					

Table 6: Promax Rotated Factor Matrix of Time-in-Game Variables

Time-in-Game Variable	1	2	3	Communality
Off Guard	0.7930	0.0000	0.0000	0.6770
Power Forward	0.1180	0.7160	-0.2060	0.6520
Point Guard	0.7610	0.0000	0.1630	0.6110
Small Forward	0.0000	0.0000	0.9320	0.9250

Legend: Factor1 - Mixed Strategy, Factor 2 - Power Strategy, and Factor 3 - Speed Strategy

If no generic strategies exist among the NBA teams the expectation would be that the five position variables would all load on one factor. The results depicted in Table 6 suggest the existence of three distinct factors. Factor 1 loads positively on the off guard (0.793), point guard (0.761), and power forward (0.118). We call factor 1 a 'mixed strategy,' because it combines the power forward, who is known for power, and the point guard, who is known for speed. The center (0.734) and power forward (0.716) positions load positively onto factor 2. Since both of these positions are known for their power, they are referred to as a 'power strategy'. Finally, the center (0.179), point guard (0.163) and small forward (0.932) loaded positively onto factor 3. This is referred to here as the 'Speed Strategy,' since two of these positions are known for speed. Note that the bench loaded negatively onto all three factors.

To test the predictive capability of the model further, the model was used to predict the number of wins for the 6 teams not used in the original sample. First, the productivity level of the starting players and the bench was calculated as described earlier. The productivity level for each player was multiplied by the parameter estimates given in table 5. The percent of playing time of the starters was also multiplied by its parameter estimate from table 5. These products were

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summed to obtain the predicted number of wins for each of the teams. This prediction is shown in table 7, where the actual wins for each team are shown in column (1).

Table 7: Out of Sample Prediction of Wins Using Model

NBA Franchise Name	Wins	Wins	Difference	Error
New Orleans Hornets	46	44	-2	-4.3%
Dallas Mavericks	53	43	-10	-18.9%
Orlando Magic	43	39	-4	-9.3%
Minnesota Timberwolves	47	46	-1	-2.1%
Toronto Raptors	47	36	-11	-23.4%
Vancouver Grizzlies	23	33	10	43.5%

The predicted wins using the model coefficients are given in column (2). The difference between the actual and predicted wins is given in column (3). The model predicted 18 fewer wins than these teams did actually win. A t-test of the mean differences between the predicted wins and the actual wins yielded t = 0.88 with a p value of 0.4213. This is an indicator of the validity of the model and some support for hypothesis 2 that the coach's decisions about playing time do influence the number of wins.

DISCUSSION

While all three hypotheses are supported, it is not clear why the off guard's contribution is not significant. To explore this further, we conducted the ANOVA and the SNK means test shown in table 8.

Table 8: ANOVA of Position Productivity

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F	R^2
Model	5	33699.52	6739.90	275.48	.0001	0.3434
Error	2634	64442.94	24.47			
SNK Grouping	N	Mean	Position			
A	440	28.455	Center			
B	440	26.526	Point Guard			
C	440	24.398	Small Forward			
D	440	22.193	Power Forward			
E	440	20.526	Off Guard			
F	440	17.869	Bench			

The ANOVA and the SNK means test demonstrate that the productivity of each position varies significantly. The least productive positions are the bench and the off guard. Hypothesis 2 predicted that the bench would not be productive. But, there was no prediction about the performance of the off guard.

To investigate why the off guard was not as productive as the other starters, we did a similar ANOVA and SNK means test on all 10 of the performance measures that were used to calculate the productivity of the players. In table 9, the off guard position is never the best in any performance category which has a positive impact, but is first in two of the categories that create a negative impact.

This suggests that either less talented players are used as off guards, or that the position requires a generalist – someone who is fairly good at several things. This finding is consistent with the basic tenets of the resource-based theory of the firm, which suggests that four criteria determine whether a resource is a potential source of sustainable competitive advantage (Barney, 1991). The resource is:

1. valuable;
2. rare among a firm's current and potential competition;
3. imperfectly imitable; and
4. cannot be a strategically equivalent substitute.

In the NBA, the off guard is primarily an offensive position. The off guard does not run the offense or the defense and is substituted more than the other positions as shown in table 9. This implies that the off guard position does not meet criteria 3 and 4, so that the off guard position is not a source of sustainable competitive advantage.

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Table 9: SNK Ranking of Performance by Position

Productivity Variable	SNK Grouping						
Positive Impact		1st	2nd	3rd	4th	5th	6th
Field Goals Made	FGM	SF	OG	PF,C	PG	B	
Free Throws Made	FTM	SF, PF	OG, C, PG	B			
Offensive Rebounds	OFF	PF, C	B, SF	OG	PG		
Defensive Rebounds	DEF	C	PF	SF, B	PG, OG		
Assists	AST	PG	OG	B, SF	PF		
Steals	STL	PG	OG	B, SF	PF	C	
Blocked Shots	BS	C	PF	B	SF	OG	PG
Negative Impact							
Personal Fouls	PF	PG	OG	SF	PF	C	B
Disqualifications	DSQ	PG, OG	SF, B	PF, C			
Turnovers	TO	OG, PF	SF, C	B	PG		

Summary

The regression models in this paper support hypothesis 1, that staff talent has a positive, direct effect on operating performance. Second, this study also supports hypothesis 2, that the performance of the teams is influenced by the implementation of the service strategy. Finally, the factor analysis supports hypothesis 3 that the NBA does use generic service strategies. It is not surprising that hypothesis 1 is supported. The NBA invests a lot of time and money in obtaining the best talent available. This has clear implications for all service companies. It provides empirical support for common sense efforts by firms to recruit, train and develop key employees in their firm (see table 10).

While the player's talent does account for a large percent of wins, the power of the explanatory model was increased from an adjusted R^2 of 0.1917 to an adjusted R^2 of 0.3008 by including the playing time of the starters. This supports hypothesis 2 that implementing a coherent service strategy matters. So, talent is not enough to have talent, the coach's use of that talent influences the number of wins.

Table 10: Summary Results and Managerial Implications

Hypothesis	Results	Managerial Implications
H1: Staff has a positive, direct effect on operating performance.	Hypothesis supported	Recruiting, training, and development of key employees is critical to achieving high levels of firm performance.
H2: Operating strategy has a positive, direct effect on operating performance.	Hypothesis supported	Strategy implementation does matter. It is important that all decisions about the service strategy be consistent.
H3: Service firms use generic operating strategies.	Hypothesis supported	Service managers' do have more than one strategic path to choose from. As a result, managers' must carefully consider which strategy is best given their resources.

The support for hypothesis 3 indicates that there are three generic service strategies in the NBA. Each strategy emphasizes using the human resources differently. The positions do not load totally onto one factor or service strategy. But, they do load heavily onto only one factor, so there are distinct differences between the service strategies. Further, each strategy has at the most two positions loading onto it heavily. This suggests that coaches can shift strategies as their players' age or change. For example, a team could start with a speed strategy and if their center matures, they could switch to a power strategy by obtaining a good power forward. The issue of which service strategy is appropriate requires additional research.

Implications for Service Managers

This research used data from the NBA. But it is likely that other professional service firms, whose performance is highly dependent on the performance of their star personnel (e.g., law firms, medical practice firms etc.), have a set of critical tasks that the professional must perform well for the firm to be competitive. If so, then those professional service firms which identify the critical tasks that employees must perform extremely well and measure the amount of time spent by the key personnel on these tasks and reward those who perform these tasks the best should be successful. For example, in today's high technology environment it is likely that high performing firms would identify the activities performed by a systems analyst which are critical activities for the firm's success. Once the manager identifies the key tasks, which a systems analyst needs to perform, the manager is then in a position to measure performance of the tasks and to reward those systems analysts who perform the pivotal tasks the best. Managers can also manage the

limited time available of these key personnel so that these personnel focus on performing the critical tasks.

It is expected that future research will demonstrate that the most successful service firms have analyzed their service processes thoroughly enough to measure the time spent on the critical tasks. It is further expected that future research in other service industries will demonstrate that time spent on critical tasks is a valid measure of service operations competence.

This research about NBA teams also suggests that individuals can be trained to be better managers. Managers who analyze the service activities conducted by their firm while providing its services will be able to identify the critical activities. Once they have identified these critical activities they can then assign responsibility for implementing these activities to their best resources. They are also in a position where they can recruit the most capable individuals available for those positions they identified as critical.

Limitations

One important issue not examined here is the question of why the bench is not more productive. The lack of productivity of the bench may be a function of the NBA salary cap. For example, a team may spend its entire allowed budget on its stars, so that it can only have weaker players on the bench. If so, this would constrain the choices that a coach has available for utilization. However, the data set we used for this research did not contain information about the salary levels of the players.

A second limitation of this study is that it evaluated service strategy only in terms of the playing time allocated to the starters. It is possible that successful coaches do much more to implement their strategies. However, examination of other coaching techniques will require different types of data.

Suggestions for Future Research

Further research is needed to investigate other possible factors influencing the number of wins in the NBA. A possible item for future research based on this study is to investigate whether there are strategic time periods, which have to be managed with particular care. These strategic time periods should obviously be staffed with the most talented individuals.

In the NBA, the concept of a strategic time period is that there is a period in the game during which a team has a larger opportunity to gain a competitive advantage over its opponents. During this strategic time period it would be important for those who can perform critical tasks the best, i.e. the "starters," to be in the game. It would be the responsibility of the coach to identify when critical time periods are likely to occur during the game and prepare for them in advance.

It is possible that if we incorporated the concept of critical time periods, that we would find that the off guard does make significant contributions during these critical time periods even if their overall contribution to the number of wins is not significant.

This concept of critical time periods could be applied in other services such as a law firm since there may be crucial points during a trial or negotiation when the firm's best lawyers must be present and actively involved. Another example of critical time periods exists in the retail grocery business, where managers may find it crucial to staff the store with their most productive employees during the time periods most customers shop. Or a surgical care unit that may want the best medical technicians and charge nurses to participate in the most difficult surgeries.

Future research is needed to determine whether there is a particular point during a service encounter where it is critically important that the best employees be present to serve the best customers. This study of service strategy implementation could be conducted in other industries by examining how managers and their key subordinates spend their time. This analysis would require that the firm identify the critical tasks that employees must perform extremely well for their firm to have a competitive advantage. When these activities are identified the amount of time spent by the key personnel can then be measured and used to predict a firm's success. Future research is also needed to determine if these results for the NBA remain valid on teams where a bench player at the beginning of the year becomes a starter later in the year because they matured and emerged as the best player at that position.

CONCLUSION

The premise of this research is that service operations strategies are largely implemented via human resource practices. This study of the NBA supports the concept that service strategy implementation is important to performance. Performance is not simply the result of hiring the best personnel, but also depends on how they are used.

While the player selection process did account for a large percent of wins in the NBA, the ability to explain the relative differences in the won/loss performance of NBA teams was significantly improved by including the level of implementation of the service strategy. This supports the theory that high performing firms in the service industries manage their personnel better than

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lower performing firms.

One implication of this research is that individuals can be trained to be better managers. Those managers who analyze the service activities conducted by their firm while providing its services will be able to identify the critical activities. Once they have identified these critical activities they can then assign responsibility for implementing these activities to their best resources. They can then measure and reward those individuals who perform these key tasks the best

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