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**Identifying Key Capabilities to Leverage Resources of the Service Factory Firms: the case of Telecommunication Service in Brazil**

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## **Identifying Key Capabilities to Leverage Resources of the Service Factory Firms: the case of Telecommunication Service in Brazil**

### **Abstract**

Firms' resources are fundamental elements in developing the competitive advantage of firms. In this context, identifying capabilities inside the firm that match customers' expectations is one primary objective in order to leverage the correct resources and add value for customers. Based on characteristics of service factory firms, we run a customer satisfaction survey to assess which internet access services attributes/capabilities were more important for customers of a Brazilian telecommunication firm. The results show that customers want reliable telecommunication services. Thus, information technology as well as human resources should be developed by the firm to support the reliability of services.

Key words: resources, services, telecommunication, customers

### **INTRODUCTION**

Resource-based view (RBV) has been focused of a large number of studies in strategy management field (Wernerfelt 1984; Barney 1991; Grant 1991). This stream of research has put emphasis on the importance of firms' resources to development of a sustainable competitive advantage.

Various authors have pointed out different resources as sources of competitive advantage (Wright, Dunford et al. 2001; Berman, Down et al. 2002; Tanriverdi 2005; Collins and Smith 2006).

Priem and Butler (2001) called attention to the need of a link between firms' resources and the environment. According to these authors, the development of resources inside the firms must to be related to elements of environment in which firm competes. Sirmon et al. (2006) proposed a link between customers and resource management, arguing that firms' resources have to be managed to provide value for customers.

Although the need for managing firm's resources according to environmental characteristics, few researches have provided methodologies or practices to achieve this goal. Specifically, few researches have provided a link between customers and firm's resources. The lack of knowledge about the relationship of customers' expectations and firm's resources is the main reason for development of this paper.

The purpose of this paper is to identify the resources a telecommunication firm must leverage in order to add value for its customers. Based on a customer perspective, a survey was done to measure how customer satisfaction related to operational items of a large Brazilian telecom company affect the overall customer satisfaction. According to these results, it is possible to identify the key capabilities that most affect satisfaction and, thus, identify resources that must be leveraged.

This paper is organized as follow: first, a review of literature is presented, highlighting some concepts related to firms' resources and characteristics of service factories; second, the methodology is demonstrated, providing information about the methodological procedures; third, results and analysis are presented; fourth, a discussion is done to understand the relations between results and theory; and finally, conclusion and limitations are presented.

## **BACKGROUND**

### **Managing Firm Resources**

Firm's resources consists of all assets, capabilities and other processes that a firm possesses in order to conceive and implement efficacy and efficiently its strategy (Barney, 1991). In this sense, a large variety of resources can be used for firms to generate a distinctive strategy. Berman, Down and Hill (2002) studied the National Basketball Association to explore and suggest that tacit knowledge is a source of competitive advantage. Collis and Smith (2006) studied human resources practices in high-technology firms and conclude that trust, cooperation and shared codes are related to capability to exchange and combination of knowledge. Wright, Dunford and Snell (2001) pointed out that human resources can be a source of distinguish capability for firm. Knowledge management as a key capability to improve IT resources is other source of competitive advantage (Tanriverdi, 2005).

However, Priem and Butler (2001) argument that RBV concepts are static and an evolution of literature about RBV requires an integration between the firm's resources and the environment. Dynamics of industry structure and market demand play an important role in this context (Sirmon et al., 2006). For example, the rivalry intensity among competitors may increase competition and changes inside a given industry (Porter, 1985). This dynamic characteristic of industry and markets has implications for firms that want to provide high value for their customers. Sirmon et al. (2006) state that firm's resources must be managed to create superior value for its customers, enhancing competitive advantage and yielding superior value for its owner's.

Identifying the firm's capabilities and resources to be leveraged is one basic task that managers have to take in this process of managing firm's resources. Identify and leverage the correct resources vary according to the type of product or service a firm produces.

### **Service Factory Firms**

Service factory firms are characterized as those firms that employ low labor intensity and low degree of customer interaction in their production process (Schmenner, 1986). Because of its large-scale production of services, service factories firms make usage of high levels of equipment-based capabilities instead of labor-based capabilities (Thomas, 1978). The usage of machinery implies specific resources that a firm must possess. For example, information technology (IT) capabilities are primordial in case of telecommunication services because services are provided by computers and other IT technologies. At the same time, low labor intensity characteristic in production of services in service factories reduces the likelihood of human errors and, as consequence, problems in production (Stewart and Chase, 1999). The application of technologies in production of services is also used to reduce costs and uncertainty because firm can replace human resources by equipment, reducing the probability of human error (Kelley, 1989).

The low degree of customer interaction in the production process of service factories has also implications for firm's resources, since firm reduces the impact of interruptions and human errors by customer contact (Stewart and Chase, 1999). Contact between customer and firm tends to be done through human interactions among firm's employees and customers (Solomon et al., 1985). Although low levels of customer contact with service factories, those firms require human resources to deal with customers contacts.

The operations management concept of competitive criteria also plays an important role in identification of capabilities to be leveraged. Cost, quality, dependability and flexibility are the most common competitive criteria in the operations management strategy (Wheelwright, 1984). Costs is a distinctive competitive criteria to compete (Porter, 1985). According to literature in operations management, costs can be reduced through the application of IT, as pointed out above.

Quality is related to superior products and services. Improved quality of services depends on a variety of elements, but one important element to take in consideration in this study is the contact of customers during the productions process (Chase, 1978; Soteriou and Chase, 1998). The more contact between customers and the firm, higher the interactions inside operations area, and, as consequence, the interruptions in production process. Managers may apply different combinations of equipment and labor intensity to control the influence of customers on service production (Schmenner, 1986) and, hence, improve the quality of services.

Dependability is related to the reliability in that services work as expected and problems are fixed without too much interruption (Wheelwright, 1984). Customers want to base their operations on suppliers that not leave them without inputs. For example, electric energy is a fundamental input for any operations and customers may be prejudice if they are not supplied with it. Then, customers want fast responses to reduce losses in case of any problem interrupting energy supply.

Flexibility is related to operational flexibility to modify volume or product characteristics. Modifications in product characteristics is also known as customization (PineII, 1993). Modification in volume as well as in product characteristics requires human and equipment resources to manage changes in operations.

In summary, the production of services by a service factory is characterized by equipment-based technologies to increase productivity, reduced costs and uncertainty, as well as characterized by a low degree of customer contact. Human resources seem to play an important role due to customer and firm interaction.

## **METHOD**

We developed a customer satisfaction survey to measure how customer satisfaction related to operational capabilities affects overall customers' satisfaction.

### **Sample**

Data were collected through a specially designed survey instrument completed by executives from 243 firms that were using internet access services from a large Brazilian telecom company.

This sample was selected from a population designed to fit the requirements of a customer satisfaction survey (Hayes, 1997). The population was defined as all firms that had contracted internet access services in the previous six months from the application of the survey. It is important to target customers with no more than six months of usage of a product or a service because of their limitations in remembering events of the past. The size of final population was 2,357 firms. The final sample size of 243 customers is according to a 90% level of confidence and a 5% sample error.

Telecommunication services such internet access services are important for firms because of their needs related to flow of information among their units, customers and suppliers. The respondents were defined as the executives responsible for the buying process of internet access service in each firm analyzed. These executives were also

responsible by managing of such service in their firms, pursuing all information related to the performance of the service. Executives were informed and invited to participate in the survey through an email with a link to the webpage containing the research instrument.

Data were collected from December 12<sup>th</sup> of 2004 and January 05<sup>th</sup> of 2005. The final sample size was composed by 39 firms in manufacturing (16%), 67 firms in commerce (27%), 107 firms in services (44%) and 30 firms characterized in other industries (13%). The average firm size was 423 employees, ranging from small firms<sup>1</sup> (less than 50 employees) until large firms (more than 1000 employees).

### **Instrument**

The survey instrument was designed to collect demographic data and satisfaction measures related to different items of services analyzed by each firm. The designing process of the survey instrument was based on an exploratory stage to identify the main attributes related to the customers' satisfaction. Executives from 14 firms were interviewed to provide information and help the researcher to get knowledge about service attributes important for customers. Those executives were selected based on their experience with the service analyzed. A non structured questionnaire was used as a guide for researcher to explore the theme in the interview sessions. This process yielded 6 main attributes related to the service: sales process, installation of service, technical support, reliability, price, bill account. A questionnaire with 27 questions related to the customers' satisfaction items was based on the attributes yielded in the exploratory stage. In order to collect demographic data about the sample, four questions were added.

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<sup>1</sup> The size of small and large firms is relative to Brazilian market characteristics.

A pilot study was conducted to test the efficacy of the survey instrument. The objective of this stage was to evaluate the clarity of the instructions and the efficacy of the questions. Twelve executives participated in the pilot study. From their feedback we eliminated four redundant questions and rewrote other five questions.

The final questionnaire was composed by four categorical questions about demographic data, 23 continuous questions about customers' satisfaction items, and one continuous question about overall satisfaction. Content validity was assessed through analysis of scholars and professionals related to this topic (Hayes, 1997).

### **Variables**

***Independent*** – The 23 continuous questions about customers' satisfaction items served as independent variables for analyses. These questions were designed through the use of a Likert scale, in which responses could vary from 1 (totally unsatisfied), to 5 (totally satisfied). Thus, customers could choose the point in the scale that most represent their satisfaction with each item of the service analyzed.

***Dependent*** - A final question about overall customers' satisfaction served as a dependent variable. This was also a continuous question based on the same scale as that used in independent variables.

## **RESULTS**

We run an exploratory factorial analysis to summarize the twenty-three independent variables from questionnaire in common groups of factors. The first test of Kaiser-Meyer-Olkin (KMO) evaluated the data adequacy for an exploratory factorial analysis. KMO was equal to 0.91, beyond the minimum value equal to 0.7 suggested by the literature (Hair et

al., 1998). Table 1 presents the matrix with factor loadings of twenty-three independent variables. Independent variables with loadings below to 0.40 were dropped out of the analysis as well as independent variables with loadings in two groups of factors.

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Insert Table 1 about here  
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As a result, the analysis indicated five constructs related to the service analyzed (see Table 2). We described the constructs according to each group of independent variables:

- Customer service – is characterized by the quality of the contact and the services provided by the sales team and helpdesk;
- Dependability – is characterized by the certainty that the services will not present failures, and when the failures occur the maintenance services will act quickly;
- Delivery time - is characterized by the time between the service purchase and its effective installation;
- Performance - is characterized by the customers' perception of the extension that the services are performing according to their needs;
- Price - is characterized by the issues related to price, contract terms and payment conditions.

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Insert Table 2 about here  
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Construct reliability analysis through Cronbach alpha indicated that all constructs presented values higher than 0.700, above the minimum value used as reference (Hair et al., 1998), which confirms their internal consistencies (Table 3).

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Insert Table 3 about here  
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Table 4 presents the means and standard deviation for each construct.

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Insert Table 4 about here  
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The multiple regression analysis was used to evaluate the relative importance of each construct from the customer's view. All constructs that emerged in the exploratory factorial analysis were considered as independent variables. Then, the predictor model is composed by five predictors: customer service (CS), dependability (DP), delivery time (DT), performance (PM), and price (PC). The adjusted  $R^2$  was 0.743 and the best estimate of variance was 0.536. The result of F test (Sig = 0.000) suggest the significance of the model. The assumptions related to normal distribution of residuals and constant variance are matched. The multicollinearity of each variable is in acceptable levels (Hair et al., 1998). Table 5 shows the coefficients of the multiple regression model analyzed.

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Insert Table 5 about here  
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The results show that dependability (DP) presented the highest relative importance in the model proposed, predicting 34% of the dependent variable. This result suggests that the firm must develop IT as well as human resource capabilities. The firm must to develop IT capabilities to provide continuous and well performed services for its customers. The firm must to develop also human resources capabilities to repair problems related to interruptions or malfunctions in the telecommunication service.

The power prediction of Price (PC) was 26%. This result shows that firm must develop IT capabilities to reduce uncertainty and failures due to human error. As

consequence, IT capabilities may reduce costs, providing basis for a better pricing for customers.

Customer service shows 21% of importance for prediction of dependent variable. Customer service is related to the customer contacts with the firm, a common characteristic in service production. The interaction between customers and the firm occurs through employees whose main activity is support customer in their needs. Then, according to the importance of customer service construct, the firm needs to develop its human resources capabilities to provide high value for customers through the contacts between them and the firm.

Performance construct presented a prediction power of 11%, one of the lowest in the five constructs analyzed, contrary to my expectations. A high importance of this independent variable was expected because it is related to the service performance of what customers had contracted and what they received. The low power prediction of performance can be explained through an analysis of the nature and importance of telecommunication services for firms.

Telecommunication services as well as any other type of technology help firms to deal with the increasing amount flow of information coming from a variety of sources. For example, there is information coming from customers making new orders, customers asking information about products and services, suppliers asking information about product features, salesmen looking for price and quantity of products and services. All this information is an important input for firms' operations. It is possible to argue that a failure in flowing of information can cause problems for sales, production, suppliers, customers and others. Considering this scenario and results, we assume that customers prefer to have reliable telecommunication services and fast responses to problems than to have the correct

service performance because losses tend to be greater in the case of an interruption of information than in the case of a poorly, but continuous service performance.

## **DISCUSSION**

The results showed that customers' satisfaction is most affected by dependability, price and customer service. The prevalence of three major constructs together with the nature and characteristics of telecommunication service may show a broad perspective of services analyzed.

Dependability is related to the reliability that services performed as expected and problems are fixed without too much interruption. Service factory firms based their operations on equipments and machinery to provide large-scale and continuous services. In the specific case of telecommunication firm, IT technologies and equipments are primordial to achieve an uninterrupted supply of services. At the same time, repair of problems in the supply of services requires human intervention of qualified employees.

The importance of price for customers' satisfaction shows that customers are looking for reduced price in order to reduce their costs with telecommunication services. Production of services based on equipments makes the service factories reduce their costs and uncertainty due to human errors. In the case of telecommunication services, IT technologies support the production of services, reducing the costs and uncertainty due to problems relate to human intervention in the production process.

Customer services also have a significant importance for customers' satisfaction. One major characteristic of services production is the contact between customers and service firms. This characteristic is even more prevalent in case of continuous supply of services than in discrete transactions because the long relationship between customer and

service firm may generate large number of contacts between them. In this study, customer services are the points of contact between customers and the telecommunication firm.

One important characteristic is the nature and importance of telecommunication service analyzed. As stated in the Method section, telecommunication services such as internet access services are important for firms because of their needs related to flow of information among their units, customers and suppliers. Telecommunication services become a fundamental input related to information needed to a variety of activities such as production set up, sales process, and so on. An interruption in supply of communication among firms (units, customers, and suppliers) may cause thousands of dollars in losses due to problems in production and in sales. Then, as stated in Results section, it is reasonable to argue that customers consider more important the continuous supply of telecommunication service and fast repair of problems than a well performance of service characteristics. In other words, customers' losses will be fewer with a continuous supply of poorly performed service than an interrupted supply of well performed service.

The importance of telecommunication services has also another implication for results found. In case of problems related to interruption in supply of services, customers need to contact the telecommunication firm to ask for repair in the service. This characteristic yields a growth importance for customer service, since it is the points of contact between customers and telecommunication firm. These points of contact can help to reduce the time required for repair of problems and, as consequence, the customers' losses due to interruptions in services.

It is possible to conclude that customers want reduced costs, continuous supply of service, fast repair of problems, and points of contact in the firm. Considering these

characteristics together, it is reasonable to affirm that customers are seeking for reliable supply of telecommunication service.

As a result, telecommunication firm must to leverage its equipments and machinery resources to provide reliable services, and to add value for its customers. The firm must to invest in IT technologies to support the production of internet access service. At the same time, telecommunication firm must also to develop its human resources to provide fast response to fix problems as well as to deal with customers' interactions.

## **CONCLUSION**

This study sought to identify the main capabilities a service factory such as a telecommunication firm should develop in order to add value for its customers. A customer satisfaction survey was conducted to capture customers' perspective, an important environment element that affects firm's performance.

The evidences showed that overall customers' satisfaction is considerably affected by costumers' satisfaction related to dependability, price and customer service. These results showed that customers want reliable telecommunication service. One possible explanation for these results relies on the nature and characteristics of internet access services for customers. Because of the growth importance of information exchange among the firm and its customers and suppliers, telecommunication services are a fundamental input for the firm operations. Interruption in telecommunication services may result in thousand of dollars of losses due to problems with production, service delivery and sales.

The results also show that telecommunication firm should place emphasis on development of IT resources as well as human resources. IT resources provide support for large-scale production of services and for reduced production costs, while human resources

provide support for repair of problems and customer contact. Based on customers' satisfaction, leverage of these resources may help firm to add value for its customers, improving its competitive position.

Limitations of this paper are related to methodological issues. First, the sample is limited to firms using internet access services. The sample is also problematic because it refers to a single industry, narrowing results to this industry. Different models bringing other operational and service attributes can also bring new insights for this type of research.

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**TABLE 1**  
**Factor loadings**

Variables	Factors				
	1	2	3	4	5
5. Sales consulter providing an individual customer service.			0.598		
6. Quality of the service in the call center.			0.853		
7. Quick response from the call center.			0.765		
8. Accuracy in the information provided by the call center.	0.401		0.674		
9. Knowledge and competence of installation technician.	0.596				
10.Speed of service installation.					0.887
11. Fulfillment of the delivery time for service installation.					0.713
12. Service reliability after the installation.	0.594				
13. Customer service of the maintenance team.	0.740				
14. Quick response from maintenance services.	0.674				
15. Available time of maintenance services.	0.507				
16. Fulfillment of the delivery time in maintenance services.	0.690				
17. Services with a low rate of failures.	0.655	0.438			
18. Speed performance according to the contract.		0.659			
19. Speed options offered by the service provider.		0.716			
20. Service availability in different places/regions.		0.724			
21. Service properly tailored to customer needs.		0.699			
22. Fulfillment of technical specifications of service.		0.507			
23. Updated equipments.	0.536			0.406	
24. The price of the service (monthly fee).				0.592	
25. Contract conditions as specified.				0.681	
26. The right amount in the bill.				0.628	

**TABLE 2**  
**Constructs characteristics**

Construct	Abrev.	Variables	Types of variable
Customer service	CS	5, 6 and 7	Independent
Dependability	DP	9, 12, 13, 14, 15 and 16	Independent
Delivery time	DT	10 and 11	Independent
Performance	PM	18, 19, 20, 21 and 22	Independent
Price	PR	24, 25 and 26	Independent
Overall satisfaction	OS	27	Dependent

**TABLE 3**  
**Constructs' validity**

Constructs	N	Cronbach's Alpha
Customer service	243	0.7577
Dependability	243	0.8806
Delivery time	243	0.9117
Performance	243	0.8406
Price	243	0.7355

**TABLE 4**  
**Descriptive statistics**

		CS	DP	DT	PM	PR	OS
N	Valid	243	243	243	243	243	243
	Mean	3.1684	3.3291	3.1803	3.7083	3.1382	3.2353
	Standard deviation	1,17671	0.95701	1.29944	0.81569	0.97070	1.09247

**Table 5**  
**Multiple Regression Model's Coefficients**

Model	Standardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity	
	B	Standard Deviation	Beta			Tolerance	VIF
(Constant)	-0.336	0.161		-2.080	0.039		
CS	0.198	0.041	0.218	4.813	0.000	0.532	1.878
DP	0.389	0.068	0.342	5.714	0.000	0.304	3.285
DT	0.086	0.039	0.105	2.193	0.029	0.476	2.103
PM	0.140	0.058	0.113	2.415	0.017	0.500	2.000
PR	0.286	0.052	0.260	5.455	0.000	0.483	2.071