



THE IMPACT OF ACCESS ON SUPPLY CHAIN EFFICIENCY: ANALYZING
ORGANIZATIONS IN THE HEALTHCARE SECTOR IN CALI

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Resumen

Después de analizar el servicio prestado por las entidades de salud en el Valle del Cauca, podemos decir que las necesidades de dicha comunidad están siendo resueltas de una manera deficiente, por lo que es indispensable analizar que está pasando con dicho servicio y encontrar cuales son las principales variables que lo están afectando de esta manera tan negativa.

Se propuso usar el modelo AAA o 3A que por sus siglas en ingles traducen Asequibilidad Accesibilidad y Conciencia, ya que este modelo fue ya probado en Arabia Saudita por nuestro director de proyecto el Dr. Ricardo ALberto Sanrta Florez. Se prosiguió con la recaudación de datos mediante encuestas aleatorias al personal de los distintos hospitales, doctores, médicos, enfermeras, etc...

196 cuestionarios fueron recolectados para dicho análisis y procesados en los programas SPSS V21 y AMOS (Analysis of Moment Structures), los cuales arrojaron en los resultados que el Acceso influye en la flexibilidad, calidad y velocidad en la que el servicio es prestado. Además, la flexibilidad influye sobre la cadena de abastecimientos detrás de este servicio. Dejando como conclusiones que se debe tomar una pronta decisión sobre lo que se está haciendo para proveer acceso a este servicio tan indispensable en la sociedad.

Los datos cuantitativos extraídos de 196 cuestionarios se analizaron posteriormente utilizando el modelo de las 3A's con sus constructos (Asequibilidad, Accesibilidad y Conciencia). Las encuestas se dirigieron aleatoriamente al personal de varios hospitales y centros de salud en el departamento del valle del Cauca. Los hallazgos iniciales indican que en el sector salud de la región, la calidad del servicio ofrecido no es considerado importante para mejorar la eficiencia en la cadena de suministro de este sector, pero el ejercicio de las prácticas realizadas en los centros de salud y su flexibilidad para adaptarse a los cambios en la demanda de los servicios si influye directamente en la eficiencia de la cadena de suministros.

Palabras clave: Sistema de salud, calidad, velocidad, cadena de abastecimiento.

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Abstract

Health organizations in Colombia are not providing the proper coverage of services to all population. There is a lack of health care system scope to different sector in Colombia. This leads to get the Health system seen as inefficient. Hence, there is a need to study the quality of health system to determine the impact of access in the supply chain efficiency.

The methodology used was the fulfillment of 196 Questionnaires to employees of hospitals in the department of Valle del Cauca, Colombia (public and private) in order to collect quantitative data from these hospitals. These 196 surveys were divided into questions about: Business performance, Speed, Flexibility, Consistency and Quality. In each questionnaire there were questions about each construct (affordability, access and awareness) that correspond to the AAA model. These were given to managers, medical personal (doctors, nurses, and specialist), personal and directors. The data was processed in: SPSS V21 and Analysis of Moment Structures (AMOS).

Keywords: Health system, supply chain, needs, impact, quality, access, speed, flexibility.

Article classification: Research

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Introduction

This research is meant to prove that access to resources (monetary), of medical organizations, can influence the supply chain efficiency of their operations by affecting variables as flexibility, quality and speed of the SC. The research had place in Valle del Cauca, Colombia. This is part of a larger project called «Triple A Model» developed by Ricardo A. Santa. Which tries to determine an statistical relation between Affordability, Awareness and Access on supply chain efficiency in the medical sector in Valle del Cauca, Colombia.

The shocking reality of Colombia's Health Care System is that its extent is not reaching the entire population and its quality is under international standards. There are multiple agents that shape Colombia's Health Care System: The offerers, the consumers and the government. This paperwork focuses on analyze the offerer's capacity to supply all the necessary equipment to ensure consumer's access to the Health System.

The purpose of this paperwork is to analyze offer's variables in healthcare system in Colombia. There is a latent need of increase the quantity of services provided to Colombian community. This is why it's been decided to study the effect of affordability (AAA model), access and awareness over supply chain efficiency. This will make discernible the need to redesign the supply chain in the Health System.

Nowadays, most of Health offerers are investing on improve aspects of AAA model in their supply chain. However, the way these variables support organizations to improve their efficiency still needs to be explored.

This paperwork is focused on understand the impact that speed, flexibility and quality have on supply chain efficiency and access, remembering that this investigation is part of a macro analysis that pretends to picture health care system in Colombia.

This paper was made with three studies in order to fin the nature, data and relation among AAA model variables with the purpose to suggest how to increasing supply chain efficiency, quality and coverage of the health system. An empirical analysis had place to determine the relations previously mentioned.

All the data that comprehend the variables in this study were collected by two work groups, Universidad ICESI students and members of aerial force in Colombia (FAC) in different health institutions in Cali, Colombia.

At last, there is going to be an analysis of the data collected in order confirm or reject the hypothesis constructed about the relations between variables and also to determine the impact of each variable on supply chain efficiency.

Theoretical framework

In health sector, specifically the medical sector, the supply chain (SC) has been object of many studies and has awake lot of interest in the recent years, having in count that this key factor is decisive in the hospital efficiency and quality of the service. The SC is transversal in all the processes that occur in the organizations making it a complicated system.

Supply Chain

In the latest studies there are examples and definitions for SC such as: “The management of information, processes, capacity and performance of the service and founding from the first supplier to the final customer.” Baltacioglu et al., 2007; Ellram, Tate y Billington, 2004). Ellram, Tate and Billington (2004) (Page 25) compare the classical models that already existed in the industry of goods to overview its applicability in the service industry.

In the Health sector, specifically in hospitals it is necessary to have a supply chain “highly efficient and integrated” (Narasimhan, 2001). This means that the supply chain have to integrate totally providers, users, stake holders and all who have operations in the sector.

This paperwork is meant to determine the impact of AAA (3A model) on offernd and demand in medical sector.

Access

The construct of access represents the physical infrastructure necessary to provide medical attention. Access is represented in equipment, supplies, infrastructure and transportation.

There are different ways to measure the capacity of the offerer to provide health care.

In order to evaluate the access of health care in Valle del Cauca, this investigation focuses on analyze the impact of the level of response understood as Speed, the capacity of modify

different operators and processes understood as Flexibility and the quality in the supply chain.

Speed

The speed is the capacity of an organization to reduce time between the request of a service and its delivery, considering the frequency of how many times a user asks for these health services (Hill 2005).

Starting with Speed, Thatte et al. (2013) explains, based on customers' needs, a fast supply chain is one with a dynamic response level to changes in needs and preferences of this service. Adding to Thatte statement, Swafford et al. (2008) said that a supply chain can be consider fast by measuring its delivery time and the certain delivery of the service.

Delivery time is a key factor which is very important in health organizations and all its agents involve in the supply chain. A delivery given after o before the granted time shall bring problems over the whole supply chain because all the operators involved in this SC have a previous preparation in the processes they are responsible about.

This is why Guiffrida & Nagi (2006) shows the additional costs that these retarded times produce: a delivery handed before the expected may bring additional costs over the care of inventories because all the assets are there for a longer period of time than the expected.

In the other hand, the delayed deliveries affect directly the production and the relations between customers and suppliers.

Considering this, the benefit of in-time delivery makes the customers feel satisfied about the service because they can have or use the services just when they expected to used, generating an increase in the returns of the business.

Flexibility

Flexibility is "the capacity of an organization to adapt (what it does and how it does it) to the customer's needs" (Slack 1991).

It cannot be forgotten that the rapidity with which an entity can achieve the products and services with the best technology is very important, because they are in a changing environment. (Tidd and Bessant, 2009).

It is clear that as the times passes by, technology advances, integration of economic sectors and the need of innovation; force the organizations to be flexible among their supply chain. Today, outsourcing plays an important role in organizations because through this they can hire specialized agents in different aspects of the supply chain in order to make it more efficient which means reduces operational costs, efficiency along the processes, reductions of non-expected issues and improving quality of the services (Cruthirds et al., 2015).

Flexibility includes the capacity to offer a wider portfolio of services that adapts to the customer's requirements and be able to respond fast to changes in the market conditions (Hill 2005).

It is expected that in the future the supply chain will be integrated by means of a virtual network where the timely implementation of biotechnologies will prevail, thus providing a constant flow of data and an increase in utility, due to the reduction of costs, in every place. (Reza Baradaran kazemzadeh, 2018).

An important insight of the supply chain efficiency is that information and products must flow through it without any problems and as fast as possible. There is a name for this kind of systems that focuses on the information-products flow, is called "Third-party logistics" (3pl), which looks for the coordination of different organizations to enrich the supply chain in order to be more precise, efficient and fast; creating a value proposition to the market itself (Sha y Chen, 2008).

We can also define the concept of "flexibility" as the ability of a procedure to evolve as changes in its environment arise, without neglecting the expected productivity of it. (Singh and Sharma, 2014). Only those corporations that manage to understand the needs of their clients are the ones that achieve to organize, build and direct the relationships with the different partners, making them closer, facilitating the implementation of different processes. . (Christopher, 2000).

Flexibility could be understood, as far as the supply chain is concerned, such as the restructuring and constant adaptation of this chain in terms of its components, such as partners, processes, supplies and services. (Lee and Whang, 2005).

It is necessary to provide access to health services; this is why the channels where these services are offered must be in a constant change in its infrastructure, technology usage and creation of new ways to distribute these services.

Quality

Quality is seen as the capacity to provide services that satisfy customer's expectations; it is in a constant improvement and always focused on the market conditions (Russell and Taylor 2008).

As in any service, the quality of this is an issue that can not be neglected in any way, since it is this that certifies that the processes performed meet the expected requirements. Being a key construct in the services, it is necessary to have quality standards for the different services. (Desai, 2008).

The quality in a supply chain refers to the focus on customer's requirements and also on decreasing imperfections in the service. So quality can be understood as the service provided focusing in satisfying as much as possible the customers.

On the way to want to define "quality" are different approaches, such as to reach to meet the established standards (Elshennawy, 2004), or could be seen as the quality of the good, service provided, the way in which the information is provided, the way in which the process is carried out, the human capital, the system, the company, goals and many more parts that make up this supply chain in the provision of the service. (Ishikawa, 1986)

(Hill 2005) proposes that as the quality of the services increase, the gap between what organizations can offer and what customers really need; reduces.

But at the time of measuring the "quality", you can get to find 2 problems, their ends. The first is not to use enough indicators to understand what factors influence the quality of my service, either due to lack of knowledge, or even the measurement of incorrect variables. And the second is the over-measurement of the variables, thus generating that this process is very complex and losing control in the processes due to the excess of bureaucracy present. (Prajogo and Goh, 2007)

Understanding quality as following a set of guidelines, these should be constructed in the right way, since it is these who will qualify the service and if these are poorly designed the indicators will say that the service has an optimal quality when in practice it's like that So you should not allow ambiguities in any way. These standards must also be measured with an optimal record to ensure that everything is working as expected. (Crosby, 1988).

Hence, the quality of the services is an indicator of how much does the offerer know about customer's need and its capacity to supply these needs.

Hypothesized Model Access

Hypothesis 1: There is a predictive influence of Access on Supply Chain Efficiency (SCE);

Hypothesis 2: There is a predictive influence of Access on Flexibility;

Hypothesis 3: There is a predictive influence of Access on Quality;

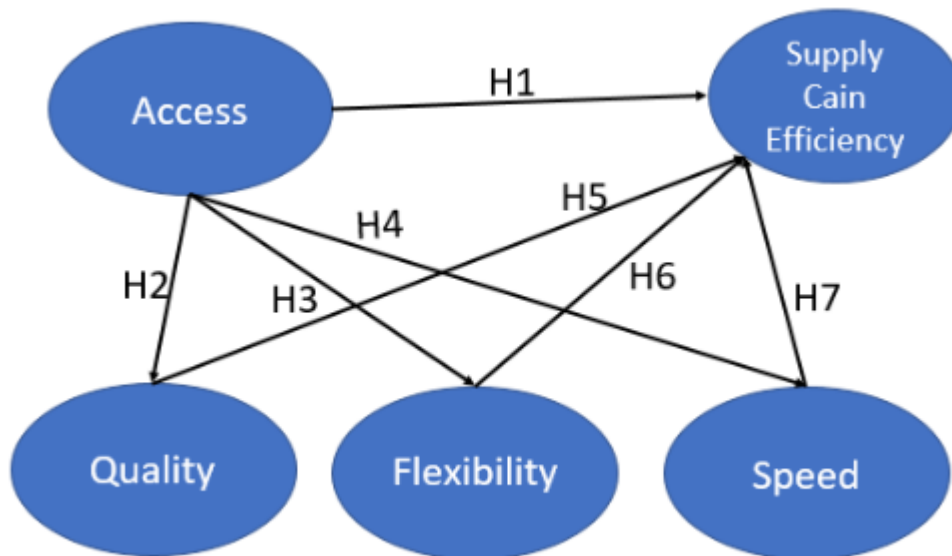
Hypothesis 4: There is a predictive influence of Access on Speed;

Hypothesis 5: There is a predictive influence of Flexibility on Supply Chain Efficiency.

Hypothesis 6: There is a predictive influence of Quality on Supply Chain Efficiency.

Hypothesis 6: There is a predictive influence of Speed on Supply Chain Efficiency.

Image #1: Theoretical Framework and Hypothesis



Methodology

This is an exploratory research that is based on a scientific study that investigates the influence of the construct chosen on the SCE in the health system in Valle del Cauca, Colombia. In Colombia there is an already existing problem to provide good access of this service to the population. This research also shows the impact of access on the constructs Quality, flexibility and speed in the supply chain.

For this objective, quantitative data was reunited through a physical questionnaire handed out in health organizations, also the questionnaire was sent out online to be fulfilled for the highest positions in these organizations. Public and private organizations were selected as the population for this research. In total 196 questionnaires were handed out in hospital, these were given to managers, medical personal (doctors, nurses and specialists) administrative personal and directors. According to the following distribution:

Imagen #1: Distribution of hospitals

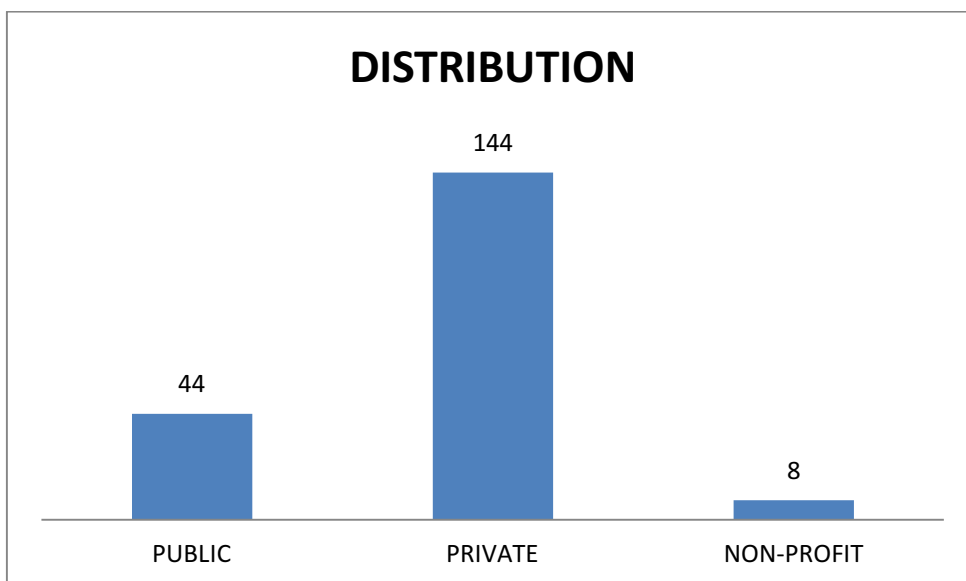


Table #1: Percentage distribution.

		Frecuency	Percentage	Porcent	Acumulated
Valid	Public	44	22,4	22,4	22,4
	Private	144	73,5	73,5	95,9
	Others	8	4,1	4,1	100,0
	Total	196	100,0	100,0	

To process all the data, both SPSS V21 (SSPS Inc and IBM Company, Chicago, Ill, USA) and Analysis of Moment Structures (AMOS version 21.0.0, AMOS Development Corporation, Spring House, Penn., USA) were used. This is a multivariable analysis research of the gathered data. With these statistical software is possible to determine the influence of the constructs chosen on the supply chain efficiency. Internal consistency was assessed using Cronbach's alpha coefficient and the items-to-total correlation. Table 1 summarizes the constructs' coefficient values. All constructs have values greater than 0.7 of the cut-off level set for basic research (Nunnally, 1978). Additionally, confirmatory factor analysis (CFA) was conducted to test the construct validity used.

Table #2: Cronbach's alpha

<i>Variable</i>	Number of Items	Alpha (α)
<i>Access</i>	12	.919
<i>Quality</i>	4	.873
<i>Flexibility</i>	3	.782
<i>Speed</i>	3	.844
<i>Supply Chain Efficiency</i>	3	.803

baseline comparisons fit indices, which are all greater than the base range of 0.7, suggest that the hypothesized model fits the observed variance-covariance matrix well relative to the null or independence model (see Table 3).

Table #3: Baseline Comparisons

Model	NFI	RFI	IFI	TLI	CFI
	Delta1	Rho1	Delta2	Rho2	
Default model	.886	.827	.906	.901	.925
Saturated model	1.000		1.000		
Independence model	.000	.000	.000	.000	

Results

The results of the study show that there is not an impact of Access on supply chain efficiency, which suggests that organizations with a greater perception of Access in the services delivered by healthcare organizations will not have higher levels of supply chain efficiency. Also, there is a predictive influence of Access on flexibility, Quality and Speed; this finding suggests the importance of the Access initiatives services delivered by health organizations because it does not influence directly on SCE but as it impacts the three constructs it means that somehow access put the right environment for organizations to improve their efficiency on the supply chain. The significant impact of Access on the flexibility reveals the importance of this construct and in the processes to satisfy the needs of the customers or patients in the healthcare sector. At least, flexibility in health organizations is impacting in a strong and positive way the efficiency of the supply chain.

Table #4: Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
Quality	<---	Accesss	.916	.094	9.734	***	
Flexibility	<---	Accesss	1.216	.141	8.651	***	
Speed	<---	Accesss	.671	.112	5.991	***	
SCE	<---	Accesss	.302	.171	1.771	.077	
SCE	<---	Quality	.224	.100	2.243	.025	
SCE	<---	Flexibility	.439	.080	5.489	***	
SCE	<---	Speed	.066	.073	.903	.366	

The correlations between the variables can be summed up in the following table:}

Table # 5: Hypothesized model summed up

Proposition	Result
P1. There is a predictive influence of Access on Supply Chain Efficiency (SCE).	Rejected.
P2. There is a predictive influence of Access on Flexibility.	Confirmed.
P3. There is a predictive influence of Access on Quality.	Confirmed.
P4. There is a predictive influence of Access on Speed.	Confirmed.
P5. There is a predictive influence of Flexibility on SCE.	Confirmed.
P6. There is a predictive influence of Quality on SCE.	Rejected.
P7. There is a predictive influence of Speed on SCE.	Rejected.

Conclusions

The construct Access is important as it has a direct impact on Quality, Speed and Flexibility.

It has been demonstrated by this research that, from the operational factors (Quality, Flexibility and Speed), only flexibility has a direct impact on the Supply Chain Efficiency.

This result is very concerning as it demonstrates the lack of focus on operational effectiveness in the health system in Colombia. Managers have to work on create innovation on processes to guarantee that operational factors have a direct and positive impact on the Supply Chain Efficiency in health care System.

These factors are crucial in order to provide appropriate health care services to patients in the country, compared to the world.

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