Chapter 46
Lean Services: An Approach for Supply Chains Based on the Gaps Model of Service Quality

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Abstract Supply Chains (SC) encompass interfaces where several interactions occur, notably with flows of services, products and information. Services play a major role in modern economies and its provision is widespread along the supply chain. This piece of research utilizes the Gaps Model of Service Quality, which is based on the disconfirmation paradigm, and relates it with lean principles of waste from a supply chain perspective. The Gaps Model analyses several gaps that might occur within organizations, leading to discrepancies between expected service and perceived service. A methodology is proposed for assessing the internal failures contributing to each gap of the original model. A second stage includes an approach inspired on QFD's (Quality Function Deployment) matrices, envisaging a joint analysis of gap's structure and supply chain's failures, what allows computing the importance of each failure from a service quality perspective. Furthermore, these failures can be associated to lean wastes, thus providing a framework for "leanliness" assessment. A simplified example for a generic supply chain is also presented.

Keywords Service quality · Gaps model · Lean · Supply chain

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46.1 Introduction

Organizations within supply chains are facing increasing competition, which led them to act together in search for better efficiency in their processes [1]. On the other hand, it is interesting noticing that achieving process efficiency could be harder for organizations providing a larger variety of services, which frequently increases the utilization of outsourcing [2].

Performance across the interfaces of a supply chain is vital for its success. Very often, the bottlenecks occur in these interfaces, where goods, services and information are exchanged [3].

This piece of research is focused on service provision that occurs within supply chains and utilizes the Gaps Model for service quality that was originally presented by Parasuraman et al. [4]. Some adjustments have been made since then (e.g., [5, 6]) but the model's essence has been maintained throughout time.

46.2 Gaps Model and Service Quality

The frameworks that have been developed to deal with customer's perceptions of quality can be grouped into two primary categories: performance based and standards based frameworks [7]. Under such perspective, performance based frameworks specify perceived performance without any comparative referents while standards based frameworks specify "comparative" performance conceptualization of service quality, i.e., performance is compared to a standard. SERVQUAL, which is probably the most well-known model for the assessment of service quality, was originally developed as a standard based model [4, 8], where service performance was compared against a single expectation standard, the desired expectation.

According to this perspective there are two concepts playing a major role: customer expectations and customer perceptions.

As stressed by Zeithaml and Bitner [6], in a perfect world, expectations and perceptions would be identical: customers would perceive that they receive what they would and should. However, in real world, a gap usually exists between expectations and perceptions, being important to understand what contributes for such a discrepancy. According to the gaps model of service quality, there are several gaps occurring within organizations that contribute for the aforementioned discrepancy. Fig. 46.1 presents a synthetized perspective for the gaps model of service quality.

Taking into account the presented model, four factors influence customer expectations: word-of-mouth, personal needs, past experience and external communication. On the other hand, it becomes clear that organizations must act towards closing the gaps, thus promoting a better adjustment between customer expectations and perceptions. Therefore, understanding the key factors leading to each gap is a sine qua non condition for assuring adequate service levels. This piece of research focuses

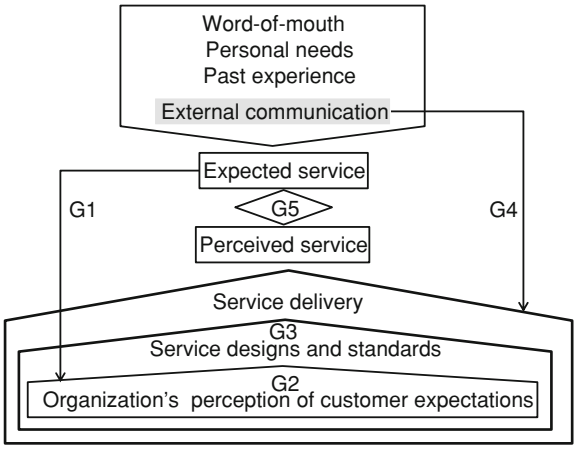

Fig. 46.1 Gaps model of service quality—simplified perspective

those factors, from a perspective of service failures within the supply chain, thus promoting a joint analysis of gap's structure and supply chain's failures.

46.3 Supply Chain's Failures from the Gaps' Model Perspective

Interactions within the supply chain constitute an opportunity for improving efficiency and efficacy among the actors, since it allows rationalization beyond their own boundaries [3].

According to Ellram et al. [9], the SSCM (Service supply chain management) is oriented towards continuous improvement of logistic operations, through the management of processes, capacities, service performance and resources along the supply chain. SSCM can be even more challenging than common SCM. In fact, since services are intangible, perishable and extremely heterogeneous, management tools become harder for implementing, what leads to an outsourcing increasing.

As mentioned above, the Gaps model establishes a gap existing between expected service and perceived service, as a consequence of other gaps occurring within organizations along the supply chain.

Although a more thoroughly analysis might be performed, adjusting those gaps to a specific supply chain, some key factors are usually associated to a generic gaps model. Those gaps are presented in Table 46.1.

Table 46.1 Key factors for the gaps

Gaps contributing for discrepancy between expected service and perceived service		
Not knowing what customer expects	Gap 1	Inadequate market research
		Weak relationship with customers
		Too many levels within organization
		Insufficient vertical communication and lack of information sharing
Not selecting the right service designs and standards	Gap 2	Service standards not oriented towards customers
		Inadequate technical specifications
		Inadequate service design
		Lack of commitment
Not delivering to service standards	Gap 3	Role's ambiguity
		Lack of adjustment between tasks and technology
		Lack of adjustment between tasks and employees
		Customers are nor aware of service characteristics
Not matching performance to standards	Gap 4	Too many promises
		Wrong management of customer expectations
		Inadequate communication among departments
		Inadequate customer support

46.4 Joint Analysis of Gap's Structure and Supply Chain's Failures

For promoting a joint analysis of gap's characteristics and supply chain failures, an approach inspired on QFD's (Quality Function Deployment) matrices was adopted [10]. The key factors were included as "rows" in the first matrix. Therefore, a systematic procedure was required for assigning importance levels to each key factor. Although other procedures could have been adopted, it was decided assigning the importance through the assessment by a panel of experts. The panel was composed by a PhD student who develops research within the supply-chain framework, as well as two researchers whose scientific activity is focused on Logistics, notably as regards supply chains. Furthermore, one of the authors started developing professional activity in a logistics operator. The approach was developed for a generic supply chain, being clear that adjustments have to be made for specific situations. Table 46.2 shows key factors along with their corresponding importance, after experts' assessment.

As regards the failures within the supply chain, a generic approach was also adopted, having the failures been assigned to six physical or organizational areas: inbound, outbound, transport, delivery, customer service and information technology.

Table 46.2 Importance of key factors

Key factors	Importance
Customers are nor aware of service characteristics	5
Wrong management of customer expectations	4.7
Inadequate technical specifications	4.7
Service standards not oriented towards customers	4.7
Too many promises	4.3
Inadequate customer support	4
Lack of commitment	4
Inadequate service design	4
Inadequate market research	4
Inadequate communication among departments	3.7
Lack of adjustment between tasks and technology	3.7
Insufficient vertical communication and lack of information sharing	3.7
Role's ambiguity	3.3
Weak relationship with customers	3.3
Lack of adjustment between tasks and employees	3
Too many levels within organization	2.7

				SCF1	SCF2	SCF3	SCF4
				Direction of improvement			
				↑	○	↓	○
KF1	Importance	3	I1	R11 (●)			
KF2		4	I2			R23(△)	
KF3		2	I3	R31(○)			
KF4		3	I4				
KF5		1	I5				
KF6		5	I6				
				IMP-SCF1	IMP-SCF2	IMP-SCF3	IMP-SCF4

Fig. 46.2 Generic matrix relating key factors and supply chain failures

A brainstorming process, along with the analysis of daily activities in a logistic operator, led to the identification of a large set of failures: inadequate package identification, wrong storage, errors in invoices, delay in expedition, etc.

At this point, a matrix can be developed, relating each failure with one or more key factors from the gaps model. As in QFD, relations can be strong (●), medium (○) or weak (△). Usually, a strong relation is weighted with 9 points, a medium relation with 3 points and a weak relation with 1 point. To illustrate the concept, a generic matrix is presented in Fig. 46.2.

In the previous matrix it is also identified which direction for improvement is associated to each failure, according to Taguchi perspective: lower the better, higher

the better and nominal the best. The presented matrix supports the calculation of failure's importance from service quality perspective. The importance of supply chain failure j, would be computed as follows: $(IMP - SCF)_j = \sum_{i=1} R_{ij} \times I_i$, for instance, $(IMP - SCF)_1 = 9 \times 3 + 3 \times 2 = 32$.

This approach can be deployed to further matrices, through an approach similar to QFD. Generically, the columns from one matrix are transported as rows to the following matrix. Their importance can then be computed using an approach similar to the previously presented.

As regards the lean principles, there is some consensus as regards wastes' classification, which comprises the following categories [11]: Transport, Inventory, Motion, Waiting, Over Production, Over Processing and Defects.

These wastes can be included as new columns in a deployed matrix, where the rows are constituted by the aforementioned supply-chain failures with their corresponding importance. Hence, following the approach presented above, a relationship can be established between the wastes and the supply-chain failures. Furthermore, the importance of each waste from a supply-chain failure's perspective can easily be computed, thus providing a framework for "leanliness" assessment.

46.5 Conclusions

Looking into a supply-chain from a service perspective is a challenging approach. The gaps model of service quality is usually applied to frameworks exclusively associated to service provision. Therefore, its utilization within the framework of a supply-chain is not straightforward. Nevertheless, the authors believe that supply-chains' performance can benefit from such insights. Other approaches, such as FMEA (Failure Modes and Effects Analysis), can be very useful for analyzing failures and their consequences in supply-chains. However, the joint approach provided by the gaps model of service quality along with the matrices based in those from QFD, encompasses the potential of further deployments, thus enhancing the ability for the adoption of several perspectives, notably as regards other paradigms.

46.6 Limitations and Suggestions for Future Research

The proposed approach was developed having in mind a generic supply-chain. Further refinements and adjustments would have to be put in place for utilizing that approach in a specific supply-chain. For such a framework, beyond the participation of scientific experts, the contribution of professionals working on the chain would be vital for a successful implementation.

The deployment that was discussed, addressing the lean paradigm, can be expanded to other paradigms, such as the agile, resilient or green paradigms. These new approaches might constitute encouraging challenges for new developments. Fur-

thermore, a better understanding of customer expectations, which were not addressed in this piece of research, can provide new perspectives into supply chains' design.

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