

# **Quality of Customer Service, Lean Service and Agility Tools in the Contact Center of Companies from the Telecommunications Sector: A Review of the Literature**

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## **Abstract**

In recent years, the telecommunications sector has become an important sector in the world, with globalization and the increase of technologies, people increasingly seek to be connected to the Internet and to obtain network services that meet their requirements. It is for this reason that companies are focusing their objectives to achieve a higher level of user satisfaction by implementing various tools. One of the methodologies that has helped certain companies to increase their level of user satisfaction by focusing their processes on the elimination of muda and other activities that do not generate value. That is why this research focuses on implementing the Lean methodology focused on services and combining it with Agility, in order to insert a culture of employee participation and commitment from the beginning of the project. When reviewing different articles, it was found that there are few articles that combine these two methods in telephone operators or that even use any of them. According to the results obtained by the case studies, it is expected a reduction in call waiting time, reduction in the resolution time of customer requests, increase in the performance index of the customer service process and reduction of rework that does not add value to the processes.

## **Keywords**

Lean Service, Agile, Telecom, Contact Center and Customer Support.

## **1. Introduction**

Currently, the telecommunications sector has become one of the most important sectors globally, as the number of people in all parts of the world who need to be connected to the Internet has increased. This growth is due to the increased demand for internet and mobile telephony services in the context of COVID-19. However, despite the increase in the number of users demanding these services, there is much dissatisfaction on the part of customers with the service they receive. Such is the case of the 2020 quality of service ranking prepared by OSIPTEL, the Supervisory Body of Private Investment in Telecommunications in Peru, reveals that none of the Peruvian operators managed to exceed the minimum expected target level of 75% of the service received. This shows the need for operators to focus their efforts on improving the quality of service they offer (Muento, 2020, OSIPTEL).

The problem identified according to the literature leads us to one case study of a telecommunications company in the city of Barranquilla, Colombia. It explains that the main problem is the dissatisfaction of customers as a result of the delays in response time to deal with the procedures carried out and the delay in answering calls, taking between 9 and 16 minutes to get any communication with a person in the customer service area (Camargo and Troncoso 2020).

On the other hand, in another research done for a national telecommunications corporation in Guayaquil, Ecuador, it was observed that the main problem was the desertion of customers in their fixed telephony, mobile and internet services, due to delays in solving problems, complaints in the service and inefficiency in the processing of claims (Granda and Jácome 2019). All the above mentioned shows that the telecommunications sector presents problems in

the quality of service offered, generating dissatisfaction in customers, which is why new solutions to this problem should continue to be investigated.

### **1.1 Objectives**

In this context, it is necessary for Peruvian operators to be more efficient in order to provide the adequate customer service required by their clients. Therefore, the main objective of this article is to analyze the impact of the application of Lean and Agility in the customer service process via contact center in telecommunications or service companies. Thus, the following questions were posed to be answered later:

Q1: What is the current state of the literature regarding the application of Lean tools in the customer service process?

Q2: What is the current state of the literature regarding the application of agile tools in the customer service process?

Q3: What Lean frameworks are currently immersed in the customer service process?

Q4: What is the impact of Lean and Agile models on customer service quality?

Q5: What are the main barriers to the implementation of these methodologies in customer service processes?

## **2. Literature Review**

Next, the Lean Service, Lean Six Sigma and Agile methodologies are presented. Subsequently, the review methodology used will be explained and a brief bibliometric analysis will be provided with the use of visualization software such as VosViewer. After that, the results obtained from the extensive literature review and detailed analysis of the papers selected for this article will be presented. Then, a discussion of the literature reviewed and the bibliometric analysis performed will be presented. Finally, conclusions, limitations and research opportunities for future researchers will be detailed.

### **2.1 Lean Service**

It is a discipline oriented to the management of all services provided to customers of any organization, whose main element is that employees perform their work in excellent conditions and at the same time in accordance with this philosophy. This improves the experience for consumers and workers. Similarly, the methodology allows to identify the limiting factors of the productivity of the processes considered critical (bottlenecks) of the service to achieve improvements in the performance and experience of the service.

The main advantages of the application of this methodology are reflected in the reduction of delivery time; optimization of efficiency, quality and level of services and also an improvement in the productivity of the organization (ISOTools Excellence, 2013).

### **2.2 Lean Six Sigma**

Lean Six Sigma is a business improvement methodology that aims to maximize shareholder value by improving quality, speed, customer satisfaction and costs (Alessandro et al. 2009).

A widely applied method to improve operational efficiency and effectiveness is Lean Six Sigma. Lean Six Sigma attempts to eliminate operational inefficiency on a project-by-project basis by taking each project through the define-measure-analyze-improve-control (DMAIC) phases (De Mast et al. 2012). Although the method has its origins in manufacturing, it is also used in service organizations (Zwetsloot, 2015).

DMAIC is an integral part of the Six Sigma initiative, which is a data-driven quality strategy used to improve processes. In the definition phase, the problem is defined and potential benefits are assessed. In the measurement phase, voice-of-customer (VOC) data is collected and then the results are analyzed using a cause-and-effect diagram. Brainstorming sessions are conducted in the improvement phase with a control plan developed in the control phase (Ritesh 2019).

### **2.3 Agility**

The studies collected on agile methodology applications show the benefits of applying these methodologies, one benefit mentioned in most of the studies is project control, since agile methodologies, such as Scrum, propose daily meetings under a set format of fifteen minutes. In addition, other benefits have been mentioned such as quick adaptation to customer requirements, fast response, efficiency and self-managed work teams (Christian 2020).

Lean and Agile are critical supply chain strategies because the former ensures maximization of operational efficiency through the elimination of waste, while the latter offers the advantage of rapid response and flexibility to variable and unpredictable market requirements (Raji et al.,20021 According to Rosin (2019), the interconnectivity of machines, supply chains and customers offered by Industry 4.0 technologies and the increasing decision making systems improve the agility and profitability of companies (Oluwole 2021).

### 3. Methods

This research was conducted in three stages. First, the search for and collection of information was carried out. Second, the articles found were evaluated by means of a statistical analysis. Finally, a bibliometric analysis was performed. Thus, the literature on work schemes in customer service processes in telecommunications companies and the application of Lean and Agile methodologies tools was reviewed and synthesized. Due to the fact that not enough case studies were found in companies of the sector in question, the search was extended to service companies with a call center. All of this was aimed at answering the questions initially posed, using a systematic review of the literature. Likewise, we worked under the PRISMA methodology.

#### 3.1 Eligibility criteria and sources of information

To start with the search for scientific articles, two meta-search engines were used: Scopus and Emerald. The following inclusion criteria were also considered:

- Articles not older than 7 years.
- Articles must be Original Papers
- Articles must be located in sources belonging to quartiles 1 and 2.

These criteria were established in order to evaluate the number of articles and their impact. However, articles belonging to quartile 3 were not excluded, since they have valuable information for the development of the topic of study. Similarly, 4 Conference Papers were considered for the same reason. It is worth mentioning that in the articles whose impact factor was not present in the meta-search engine used, the Scimago web page was used to verify this data.

On the other hand, in order to carry out an adequate and effective research, the following Keywords were used: Lean, Service, Scrum, Agile, Telecom, Customer Support, Contact Center and Kanban. Table 1 is a summary of the combination of strings and the number of articles found for each one.

Table 1. String combinations used in total search

Ítem	Search Terms	Query Applied	Number of search results
1	Lean Service in customer support	TITLE-ABS-KEY(LEAN) AND TITLE-ABS-KEY(SERVICE) AND TITLE-ABS-KEY(CUSTOMER AND SUPPORT) AND PUBYEAR > 2014 AND ( LIMIT-TO ( DOCTYPE,"ar" ) OR LIMIT-TO ( DOCTYPE,"cp" ) )	71
2	Agile or Scrum in customer support by contact center	TITLE-ABS-KEY (AGILE OR SCRUM) AND TITLE-ABS-KEY(SERVICE) AND TITLE-ABS-KEY(CONTACT AND CENTER) AND TITLE-ABS-KEY (CUSTOMER AND SUPPORT) AND PUBYEAR > 2014 AND (LIMIT-TO (DOCTYPE,"ar") OR LIMIT-TO (DOCTYPE,"cp"))	69
3	Lean and Agile in customer support by contact center	TITLE-ABS-KEY(LEAN) AND TITLE-ABS-KEY(AGILE OR SCRUM) AND TITLE-ABS-KEY(SERVICE) AND TITLE-ABS-KEY(CONTACT AND CENTER) AND TITLE-ABS-KEY( CUSTOMER AND SUPPORT) AND PUBYEAR > 2014 AND ( LIMIT-TO ( DOCTYPE,"ar" ) OR LIMIT-TO ( DOCTYPE,"cp" ) )	11
4	Model of service in customer support by contact center	TITLE-ABS-KEY( CUSTOMER AND SUPPORT) AND TITLE-ABS-KEY(CONTACT AND CENTER) AND PUBYEAR > 2014 AND ( LIMIT-TO ( DOCTYPE,"ar" ) OR LIMIT-TO ( DOCTYPE,"cp" ) )	46
5	Lean Service and Agile	TITLE-ABS-KEY( LEAN AND SERVICE) AND TITLE-ABS-KEY(AGILE) AND PUBYEAR < 2022 AND ( LIMIT-TO ( DOCTYPE,"cp" ) OR LIMIT-TO ( DOCTYPE,"ar" ) )	276

Combinations (1), (2), (3) and (4) were carried out to answer the research questions posed in the previous chapter. On the other hand, combination (5) was carried out for the subsequent statistical and bibliometric analysis, so it was decided to review all the existing literature to date. In this way, it will be possible to know the research topic in greater depth. Figure 1 shows the flow chart that explains the process for the elaboration of the state of the art and classification of articles by typology.

#### 4. Data Collection

After defining the restrictions and search criteria, we proceeded with the collection of sources. The general flow of the work performed is shown below in Figure 1.

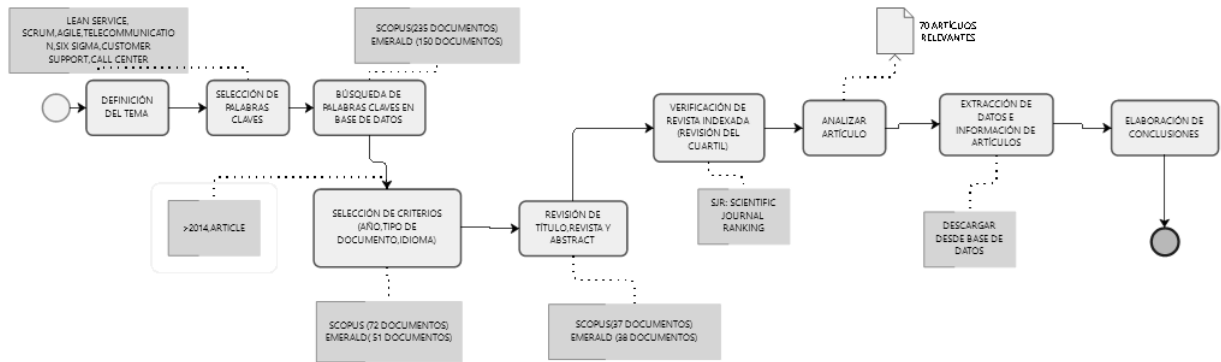


Figure 1. Flow of the source gathering process

#### 4.1 Statistical analysis

After having carried out the segmentation and selection of the papers, following the aforementioned criteria, a statistical analysis of all the results obtained with the combination (5) described in the string table was performed. The purpose of this section is to identify the distribution of the existing publications and the trend patterns over time with respect to the frequency of publications to date. Thus, the Figure 2 shows the distribution of the results according to the type of document.

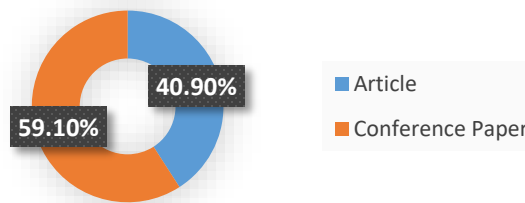


Figure 2. Source distribution

As can be seen in the Figure 3, the knowledge about Lean Service and Agility started to be known since the beginning of the 90's, since the first research was carried out in 1994. However, there was not much continuity until 2004. It is worth mentioning that it is from 2012 that 80% of the publications made were obtained, being 2018 the year with the highest rate of articles. Therefore, it can be said that the trend for the application of Lean and Agile oriented to service companies is still growing.

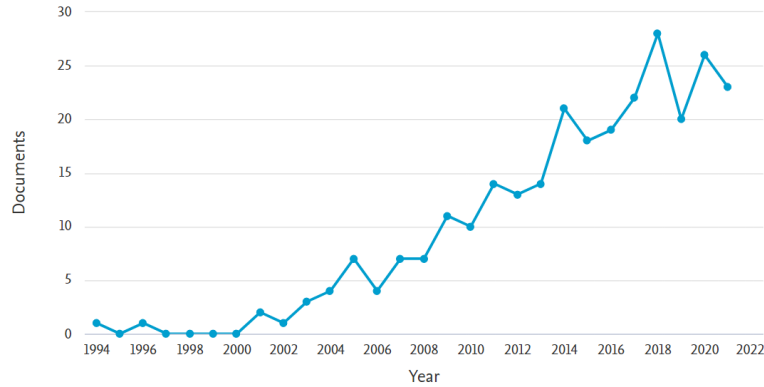


Figure 3. Annual production of published papers

Figure 4 shows the hierarchy of the journals in which the articles found in the Scopus database were published. The distribution of articles published in the five main journals during the period evaluated can also be observed. Thus, it can be highlighted that publication in the main journals began in 2010. In addition, Communications In Computer And Information Science is currently the journal with the most publications (7), followed by Production Planning And Control (6), Lecture Notes In Computer Science Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics (5), Advances In Intelligent Systems And Computing (4) and IFIP Advances In Information And Communication Technology (4).

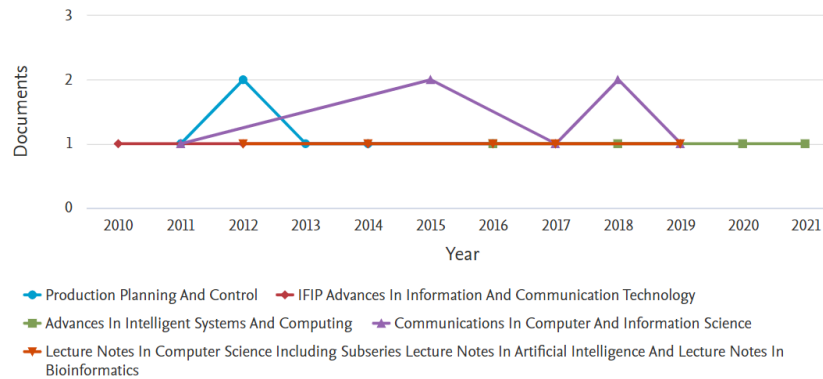


Figure 4. Articles published by year and journal

#### 4.2 Bibliometric Analysis

The analysis was performed with the combination (5) described in Table 1 of strings used, with a total of 276 articles evaluated, consisting of a total of 378 authors and 2138 keywords. Figure 5 shows the number of publications by country. Thus, it can be seen that the United States is in first place, with 16.7% of the total number of articles. This is followed by the United Kingdom, which accounts for 12.3%, and India, with 7.2%. Brazil is also the country that stands out in Latin America, with 5.1%.

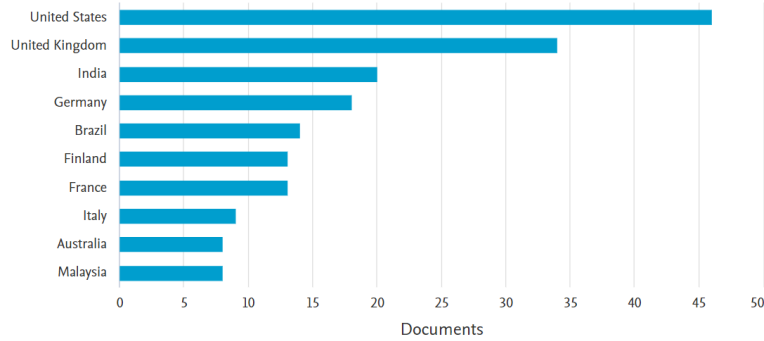


Figure 5. Number of publications by country

This is related to a research conducted by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2020, in which it mentions that the United States is the country with the highest number of Science, Technology, Engineering and Mathematics (STEM) graduates in America. Likewise, the United Kingdom would be the country with the highest number of graduates in Europe and India leads the ranking of qualified graduates in Asia and worldwide.

Moreover, a total of 378 authors were found, although those corresponding to the specified study period were a total of 177. Figure 6 shows the distribution of authors with a minimum of 2 articles published in the period from 2014 onwards. In addition, for the literature review, the contributions made by Münch, J., Fagerholm, F., Aaltola, M., Munezero, M., Palmu, C. Tan, W.G., Yaman, S. and Yang, T; were used as references because they introduced more knowledge about the application of these methodologies to service companies with a contact center for customer service.

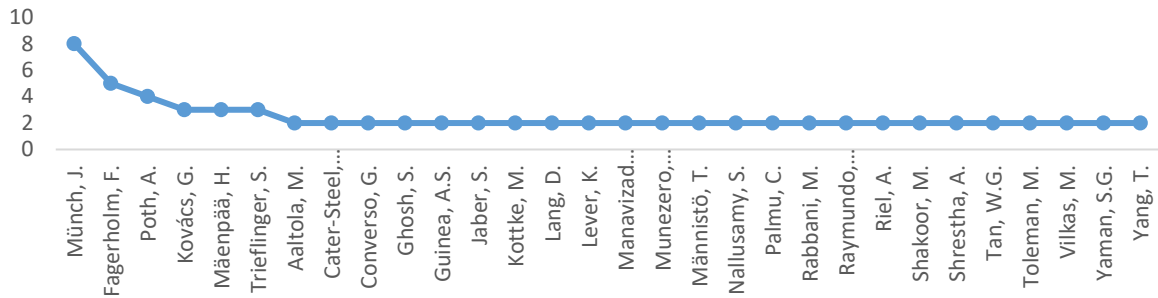


Figure 6. Distribution of articles by author

The keyword match analysis shown in Figure 7 was developed using the VosViewer software, which shows the relationship between the keywords present in the existing publications. The present match analysis shows a total of 2138 keywords, but only those with a minimum of 3 occurrences were filtered out. Thus, the ones that stand out are Agile Manufacturing Systems, with a number of 118 occurrences; followed by lean production, lean manufacturing and lean, with an occurrence of 77, 62 and 34 respectively. Likewise, the close relationship with customer satisfaction and service orientation can be observed.



main complaints of customers, which are eliminated with new problem solving processes. (Xiaoxi et al., 2018, Smith et al., 2018) On the other hand, other authors also apply Machine Learning and Big Data solutions among their models to improve the level of attention.

Khan et al. (2021) conducted a study to identify the real-time customer experience in communication services offered by companies in the Telecommunications sector. Thus, specific surveys were conducted and call records were reviewed. Subsequently, the data obtained was processed using Big Data tools. In this way, a CEMI (Customer Experience Management Index) model was proposed. Thus, by applying it, CEMI could be calculated with a better accuracy of 84.55%.

Espadinha-Cruz et al. (2021) focused on lead conversion by telephone calls. To do this, they analyzed the information corresponding to the company's historical data and were able to predict the probability of lead conversion and correctly distribute the company's resources in the proposed model. This consisted of adapting the activities to the most appropriate channel, a continuous update of the data and automating this update by means of Data Mining tools. Likewise, the processing was defined following a waste elimination model.

#### **5.4 What is the impact of Lean and Agile models on customer service quality?**

The customer service process evaluated is via call center, so the quality of service improved considerably in the case studies in which a Lean Service, Lean Six Sigma or Agility model was applied. This improvement was seen mainly at the time level, as in the waiting time of the customer in queue until an operator is assigned. Also, response times were reduced, which is made up from the time the user expresses his query until the call is concluded. This is due to the elimination of waste in the processes, such as activities that do not generate value and reprocesses. On the other hand, although the aforementioned improvements were achieved at the operational level, greater customer satisfaction was also achieved. This is due to a better understanding of the client's needs, in order to be able to prioritize certain requests and also to speed up the attention and timeliness of the response. With all this, it was possible to reduce costs at the operational level and increase revenues, because by obtaining greater customer satisfaction, this also influences the level of recommendation or NPS.

Mostly, the objectives of the application of this integration of methodologies are oriented towards the reduction of lead time, reduction of project delivery time, increased interaction between employees, increased customer participation and proper compliance with the schedule (Narayanamurthy et al. 2019; Ibérico et al. 2020). Similarly, this approach would favor the elimination of the root cause of origin of the waste and not the subsequent waste arising (Al-Baik, and Miller 2014). Another reason for applying these two methodologies in conjunction is the need to obtain greater user understanding and rapid feedback (Yaman et al. 2017).

#### **5.5 What are the main barriers to the implementation of these methodologies in customer service processes?**

The constraints present in the reviewed articles can be classified into human resources and organizational level dimensions.

Firstly, at the human resources level, this refers to the resistance to change present in the personnel. (Tsironis and Psychogios 2016) identified a number of crucial factors to take into consideration in the process of implementing Lean Six Sigma in service industries and making it successful. of which, they agree with the factors identified by (Psychogios et al. 2012), in that the involvement and support of top management, and implementing a quality-related organizational culture are crucial in the adoption process and maximizing its benefits. This is because there have been cases in which the implementation of Lean has not been successful, because it did not fit the business and there was not much participation or commitment to quality improvement. Such is the case of the study by (Amitanand et al. 2020), who mention that with greater knowledge of the Lean Six Sigma tool, a positive impact is achieved by improving performance measures such as quality of service and reduction of waiting time.

Secondly, the organizational level involves the investment of time invested in training by third parties to staff on agile and lean issues. Indeed, this is highlighted in the study by (Sinha et al. 2020), who mention that with greater knowledge of the Lean Six Sigma tool, a positive impact is achieved by improving performance measures such as quality of service In addition to this, an evaluation and redesign of operational processes should be performed. Such is the case of the article by AlHasan and Hossain M, in which unnecessary documentation that prevented customer service processes from causing customer discomfort was eliminated, thus offering a more agile service.



## 5.6 Results discussion

In this literature review, several papers were analyzed that focus on improving the processes carried out in telecommunications companies, finding the main causes that originate various problems such as delays in service times, customer complaints about poor service, poor organization of the work team and failures in the implementation of technologies, resulting in dissatisfaction of users who are customers of these organizations that are telephone operators, call centers or software development companies.

As a result, several benefits were obtained at the operational, financial and customer experience levels. On the one hand, implementing an agile framework such as scrum improves process productivity. On the other hand, Lean favors the prevention and elimination of waste, thus reducing waiting time for customer service and activities that do not generate value. Finally, a synergy between both approaches implies a powerful work scheme that positively impacts the quality of service provided. On the other hand, during this research in which a total of 70 articles were reviewed, some barriers were identified:

- Insufficient number of publications regarding Lean Service, so there is little information on the application of the Lean philosophy oriented to services.
- Most of the studies initially found were focused on software development and design or on the implementation of such projects, but not on the service provided.
- Lack of publications regarding improvements in customer service via contact center since most of them focused on reducing queues in face-to-face customer service.

## 6. Conclusion

A systematic review was conducted in order to discover the state of the literature on lean methodology and agility applied to customer service processes in telecommunications or service companies. Also, the impact of the adoption of the mentioned approaches and the challenges present in their application were detailed. The findings agree that many benefits are obtained at the operational level, specifically through the reduction of time and reprocesses; at the user level, since customer satisfaction is increased; and finally, at the financial level, since the level of recommendation increases with user satisfaction, so the number of leads is also benefited.

This study has also shown that there is little literature on the application of these methodologies in the contact center service process in telecommunications companies. That is why it was necessary to diversify to review articles that corresponded to contact center services of companies in other service areas. Therefore, it could be said that there is an urgent need for the adoption of tools of these approaches to achieve a better quality of customer service.

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