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STUDY OF QUALITY MODELS USED BY LOGISTICS OPERATORS IN ARGENTINA AND SOUTH AMERICA

This research aims to gather information on the use of Excellence models (such as the Quality Awards) by Logistics Operators in Argentina and neighboring countries. Therefore, the object of the research is the quality models used by logistics operators.

In general, these organizations, and mainly those where Logistics is their main service, have begun applying quality standards later than other types of organizations, like those in the manufacture or services industries. This is because their practice is not deemed an added-value activity by the customer.

This study found that, at the regional level, these companies are in the process of applying Quality, Environmental, Road Safety and other Management Systems from the ISO suite (ISO 9001, ISO 14001, ISO 39001, etc.), but the use of Excellence models is only present in some, mainly in Argentina-based companies. Remarkably, this behavior does not replicate in other countries of the region (Brazil, Chile, Uruguay), where the aforementioned standards are more widely applied. On the other hand, some countries have their own standards (Argentina, Brazil) for Freight activities developed by their local chambers, but these are mainly focused on the operational aspect of their activity.

In this study, information was collected regarding the methodology related to quality and excellence of 109 companies, belonging to Argentina, Brazil, Chile, Colombia and Peru. At the regional level, the ISO 9001 management model is adopted by 68 % of the organizations studied, followed by ISO 14001 adopted by 30 % of the organizations and ISO 45001 adopted by 15 % of the organizations. Based on the conclusions of this work, there is an opportunity to create specific policy around Quality Models for this industry that will support the creation of new standards and the improvement of existing ones. This paper can serve as a starting point for analyzing the scenario in other regions within a framework of similar geographical characteristics.

Keywords: *quality models, management systems, logistics operators, national quality awards.*

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1. Introduction

Logistics (i. e., product storage and distribution) is today an extremely relevant activity in the product-to-market process. Modern logistics are part of the various operations involved in transforming consumables into products and ensuring they reach their end user. A poor management could lead not only to dissatisfied customers and consumers, but also to significant losses due to the need for additional or urgent transport, perishing products, the loss of market opportunities, as well as a negative impact on the organization's reputation, among others.

Based on the definition of Logistics as a relevant and independent process, and not as a secondary activity or conclusion of other activities deemed more relevant, methods have been developed to efficiently manage delivery.

After the implementation of the European Recovery Program (also known as Marshall Plan) following WWII, a suite of resources called «Quality Tools» (where «Quality» is the set of activities aimed at ensuring processes result as expected, including detection and improvement

procedures) have emerged. Some of these tools are mainly intuitive, such as Pareto Charts, Ishikawa Diagrams, Brainstorming, while others are more complex (Statistical Process Controls, Experimental Design, and more) [1, 2].

Additionally, several methodologies or models were developed to promote the implementation of these tools within other processes (including strategy management, risk assessment, people management, among others). Some examples of these are the ISO 9000 Standards and the National Quality Awards models. This paper will assess the impact of the Argentinean National Quality Award Model, as well as their counterparts in other countries of the region, in Logistics companies [3, 4].

Although no scientific articles directly related to the topic of this research have been found, it is worth mentioning publications such as [5–10].

Thus, *this paper's goal* is to measure awareness and use of the Excellence in Quality models by organizations specialized in Logistics at a local and regional level, with a focus on the strongest markets in this area (Argentina, Chile, and Brazil). Also, as a supplement, this paper aims at assessing

the proper use of Quality Management Models and other related standards (ISO 9001 Quality Management Systems, ISO 14001 Environmental Management Systems, ISO 39001 Road Traffic Safety Management Systems, and ISO 45001 Occupational Safety and Health Management Systems). The assessment's conclusions may serve as the foundation of comprehensive policy that will ensure, through the use of Standards, a global improvement in Logistics processes.

2. Materials and Methods

2.1. Determine Target Population. Since the scope of the project in its first stage is to assess the local market, and with the understanding that Logistics involves a series of complex scenarios (for instance, some large companies have their own Logistics resources, while others resort to third-parties for this process), the target population at a local level was comprised of the most relevant local Logistics Operators, members of CEDOL (*Cámara Empresaria de Operadores Logísticos*, the local Chamber of Logistics Operators). The Chamber member companies are those considered in a better position to more easily implement the Standards (either because they have available resources, contact with other chambers and relevant stakeholders, etc.). The Chamber has 41 active members and 9 acceding members. Our reference will be active members, since they are the actual Logistics Operators [11].

To determine the target population for the second stage of the project (an assessment at a regional level), various regional associations and chambers (ABOL, the Brazilian Association of Logistics Operators; ALOG, the Chilean Association of Logistics Operators; APPROLOG, the Peruvian Association of Logistics Professionals; aforementioned CEDOL, COLFECAR, the Colombian Federation of Road Freight Transporters) were contacted, which provided information and their members' and representatives' names [12–15].

2.2. Information Acquisition Methodology. The original plan was to acquire information through a survey on 4 clearly defined content areas:

a) *Area 1: Company Characteristics:*

This content area is aimed at gathering basic and general information about the organization, for context purposes. Items to be considered in this qualitative survey include:

- *Context:* This has to do with the general characteristics of the company, including staffing, Middle Management development programs, among others.
- *Origin:* It is important to know how the company was established in order to understand its history (i. e. whether it is a family business, an affiliate of an international corporation, if its growth can be traced back to one particular customer, among others).
- *Activities:* This question requests specific information about the company's activities. The aim is to establish whether they render only distribution services or if, for instance, they provide storage services to their customers.
- *Markets served:* Since some markets (e. g., food, medicines cosmetic) require certain certifications or have special Compliance rules, this is necessary information.

b) *Area 2: Awareness of the methodologies related to Quality and Excellence:*

This topic area delves deeper on the staff awareness at an organizational level on topics related to Quality

and Excellence. The questions asked are directly related to the following models:

- ISO 9001 Quality Management Systems.
- National Quality Award [16, 17].
- ISO 14001 Environmental Management Systems.
- ISO 39001 Road Safety Management Systems.
- ISO 45001 Occupational Safety and Health Management Systems.
- Additional models (the operators' own models, those developed by Chambers, Associations, etc.) [4, 18–21].

c) *Area 3: Implementation of methodologies related to Quality and Excellence.*

The focus here is to determine whether there are models in force, as described in Area 2. The questionnaires ask what models have been applied and their scope (whether they apply to every organizational process or only to some processes, etc.).

d) *Area 4: Results, obtained or expected, of the implementation of Quality and Excellence Management methodologies as determined in Area 3.* This means the questions in this item only apply to those organizations with enforced good practices and that have reached conclusions, results and expectations.

2.3. Tools for the Analysis. Due to some limitations in the acquisition of first-hand information, it was not possible to establish relations with significant statistical value. However, some descriptive statistic tools were used for the analysis.

3. Results and Discussion

3.1. Results. As a consequence of the aforementioned, the total cases for the analysis were 109, as per Table 1.

Table 1
Distribution of Cases by Country

Country	Cases
Argentina	41
Brazil	30
Chile	16
Colombia	14
Peru	8
Total	109

Once processed, the information from the different areas was combined and the results are as follows. In keeping up with the logic throughout that compares Argentina to the Region, we are including a general analysis followed by a comparison between Argentina and the rest of the Region.

3.1.1. Excellence practice. In terms of implementation of some sort of Excellence practice (i. e. having implemented and duly certified some ISO Management System or any other model, whether own or provided by Chambers, Regional Agencies, etc.), Table 2 and Fig. 1.

Comparing Argentina with the region, results are as shown in Table 3, Fig. 2, and Fig. 3.

Table 2

Case Distribution by Number of Practices In Force

Practices In Force	Number of Companies	%
None	25	22.9
One	31	28.4
Two	24	22.0
Three	18	16.5
Four	9	8.3
Five	2	1.8
Total	109	100

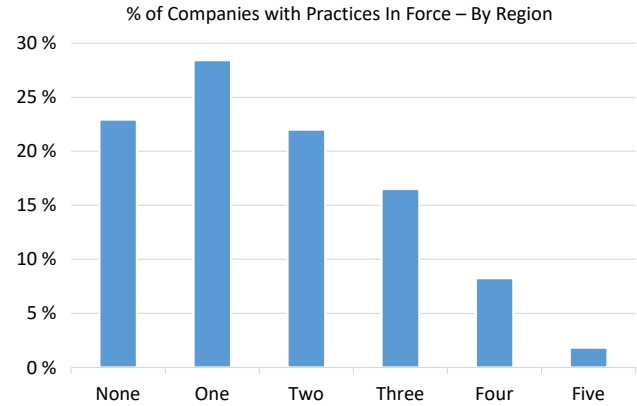


Fig. 1. Case Distribution by Number of Practices in Force

Table 3

Case Distribution by Number of Practices In force, Argentina vs. Rest of the Region

Practices in Force	Argentina	Rest of the Region
None	26.8 %	20.6 %
One	36.6 %	23.5 %
Two	19.5 %	23.5 %
Three	7.3 %	22.1 %
Four	9.8 %	7.4 %
Five	0 %	2.9 %
Total	100 %	100 %

Case Distribution – Argentina vs. Rest of the Region

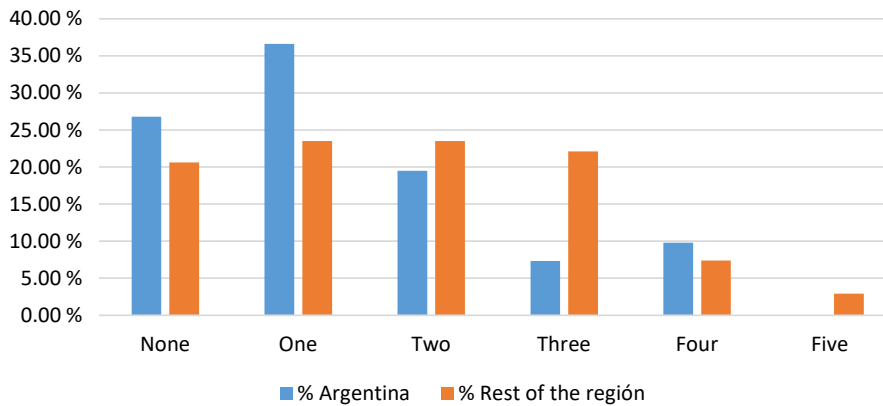


Fig. 2. Case Distribution by Number of Practices in Force, Argentina vs. Rest of the Region

Differences Argentina-Rest of the Region

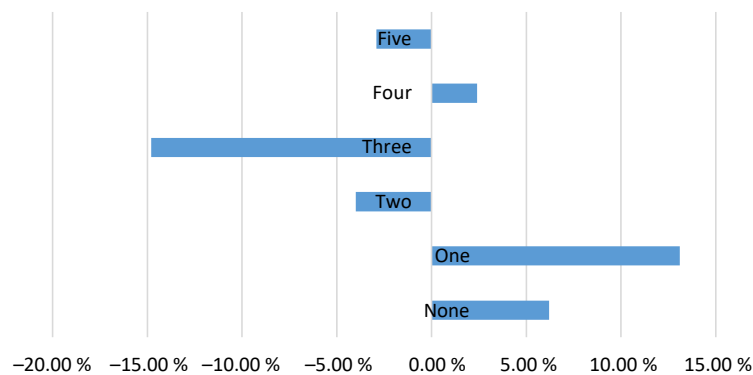


Fig. 3. Difference in Cases by Number of Practices in Force, Argentina vs. Rest of the Region

3.1.2. Types of Practices in Force. As with the previous item, practices and models in force both in Argentina and the rest of the region are analyzed in the cumulative totals (Table 4).

Distribution by Type of Practice – Argentina and Rest of the Region shown in Fig. 4.

3.1.3. Interactions Between the Various Excellence Models in Force. This section assesses whether organizations have implemented one or several practices or models. For the purposes of this study, the comparison between Argentina and the rest of the Region is not relevant (Table 5, Fig. 5).

Table 4

Case Distribution by Types of Practices in Force, Argentina vs. Rest of the Region

Practice	Argentina		Rest of the Region		Region Total	
	Number*	%**	Number*	%**	Number*	%**
ISO 9001 Quality MS	28	68.29	46	67.65	74	67.9
ISO 14001 Environmental MS	10	24.39	23	33.82	33	30.3
ISO 45001 OSH MS	4	9.76	13	19.12	17	15.6
ISO 39001 Road Safety MS	1	2.44	9	13.24	10	9.2
National Quality Awards	2	4.88	0	0.00	2	1.8
Other Models	10	24.39	32	47.06	42	38.5

Notes: * – Refers to the number of companies that states having implemented the mentioned practices. Many of these organizations have more than one practice in force; ** – Refers to the percentage as relates to the universe of companies analyzed (41 in Argentina, 68 in the Rest of the Region, for a total of 109)

Distribution by Type of Practice – Argentina and Rest of the Region

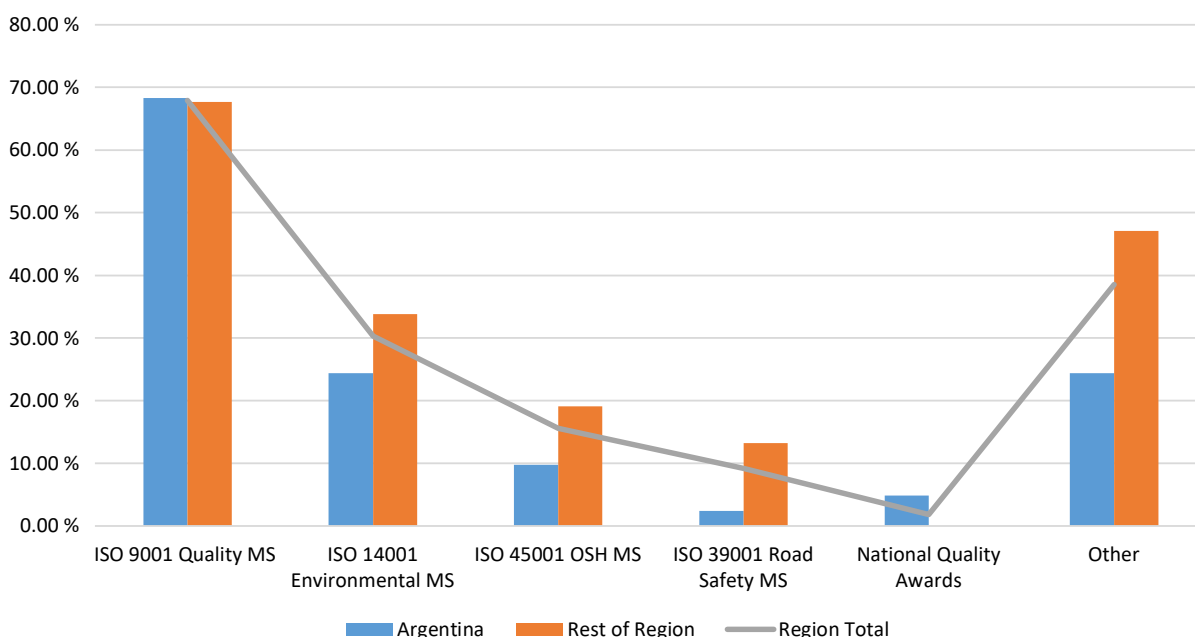


Fig. 4. Case Distribution by Types of Practices in Force, Argentina vs. Rest of the Region and Region Total

Table 5

Case Distribution by Types of Practices in Force

Practices In Force	Number	%	Cumulative (in %)
Only ISO 9001	23	43	43
ISO 9001 + Other Models	12	27	70
Other Combinations	41	23	93
Only Other Models	8	7	100
Total	84	100	100

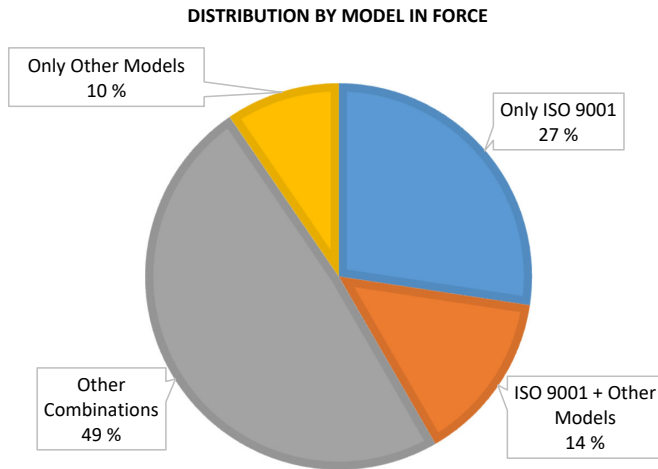


Fig. 5. Case Distribution by Models In Force Simultaneously – Region Total

3.1.4. Results of the Implementation of Practices. It should be noted that some practices (mainly National Quality Award and Road Safety Management System) were implemented by very few organizations.

As mentioned before, the degree of response to the surveys was low, so conclusions and results below have a significant limitation in terms of casuistry.

Regarding the primary goal (measuring use of the Excellence Model National Quality Award), it appears it has been implemented only in Argentina, where an organization refers not only to having enforced it, but also having been the recipient of the award in one of its editions. The organizations refer that having implemented this practice contributed to an improvement in terms of process organization and consolidated a vertical and horizontal approach towards its management, highlighting the information flow used for the improvement process applies all senses, thus creating feedback for the management system in force [11].

On the other hand, as it will become apparent from the Discussion and Conclusions sections, models created by chambers (ABIQUIM, CEDOL) are characterized by a direct relation with the organization's management process and, when integrating this to the ISO 9001 system, it renders, in many aspects, a model comparable to that of the National Quality Awards [2, 16, 17].

3.2. Discussion. This research aimed to analyze the use of excellence models (National Quality Awards) in the surveyed organizations (Table 1), both at the local level (Argentina) and at the regional level (South America). It is interesting to note the number of models implemented per organization, as shown in Table 2 and Fig. 1.

Per this assessment, according to what is observed in Table 4 and Fig. 4, ISO 9001 is highly considered in Argentina (and the trend replicates at a regional level). However, except for the National Quality Awards, all other types or practices are well below the regional average, as can be seen in Table 3, Fig. 2 and Fig. 3.

As can be observed in Table 5 and Fig. 5, it is worth noting that, except for the case of «Only Other Models», the other practices not detailed (ISO 14001, ISO 39001, ISO 45001, and National Quality Awards) were mostly accompanied at least by the implementation of an ISO 9001 Quality Management System; only two cases informed the implementation of the ISO 39001 Road Safety System.

This is expected, since implementing the ISO suite of Management Systems (mainly ISO 9001 – Quality Management System) enables entry to certain markets that expressly require their providers to follow this Standard. They also enable a certain degree of trust from their customers and other stakeholders, since external audits by an impartial agency ensures there are no interested parties involved in the reviews.

At the internal level, implementing Management Systems aids with task organization and standardization, which in turn improves processes. It also promotes a better understanding of the behaviors and requirements of consumers and regulatory bodies by the staff, since language and concepts are uniform at the local and international levels [22].

Also, in several cases, the ISO 14001 – Environmental Management System is a required standard by parent companies and even certain specific customers. In the cases where ISO 45001 and ISO 39001 are in force, it is usually linked to an organizational interest, a trend that is slowly but steadily growing. Organizations in Peru are a clear case of this trend.

3.3. Limitations during research. The main limitation was that the surveyed casuistry (positive responses) regarding Area 4 (importance, advantages, benefits, and other conclusions) was too low to consider it statistically relevant, so the analysis of this area was qualitative.

3.4. Prospects for further research. Both ISO Management System models and models of excellence or quality awards have as their primary objective the continuous improvement of operations and support processes.

In this globalized and competitive world, where standards are consistently being surpassed, it is essential to establish minimum acceptance requirements for each of the processes.

This paper can serve as a starting point for analyzing the scenario in other regions where different issues may arise (e. g., Ukraine, the Middle East, etc.), but within a framework of similar geographical characteristics.

Understanding the commonalities and differences in the implementation of these models in different regions can be of great interest, as it can help establish a set of minimum agreements for quality development in logistics operators.

4. Conclusions

1. Conclusions at the local level (Argentina):

- There are few Logistics Operators who are aware of or have implemented the Excellence model known as National Quality Award: one has openly and publicly implemented it (and won the Award in 2017), while two other companies have partially implemented the practice.
- The most widely used Quality Management System is ISO 9001, with similar rates across the region. However, the rest of the standards are less enforced.
- 10 of these organizations are certified by CEDOL, CEDOL developed a guide of Good Management Practices that includes some aspects of Quality Management and others related to corporate Excellence and Social Responsibility.

– The main benefits of applying quality models are an improvement in customer satisfaction, in the company's reputation and in internal processes.

– An ISO 9001 Quality Management System Certification enables operators to render services to customers that specifically require this. Customers have begun to require Road Safety Management System (ISO 39001) certifications. No cases have been observed of mandatory requirement of the National Quality Award.

– Although there are virtually no companies with the ISO 39001 Standard (Road Safety) certification, there is a trend towards its implementation, since this System was specifically designed for organizations as those objects of this study.

2. Conclusions at the regional level:

– The National Quality Award model (which has specific rules in each country) is less widely used among Logistics Operators: Based on all interviews conducted and Online research, the most important takeaway is that even those countries with the highest number of Logistics Operators (Chile and Brazil) have not openly implemented the model. It's worth noting that the National Quality Awards are specific to each country, but do have many things in common (this includes the Argentinean model).

– Regionally, the ISO 9001 Quality Management System remains the most widely used, and it has been successfully implemented (i.e. certified) by 68 % of the surveyed organizations. All other models remain far from this scope, and only other management models appear to have been implemented.

– In Brazil, Quality Management Systems and other models are much more prevalent than in Argentina: 80 % of the surveyed operators have implemented and obtained ISO 9001 Quality Management System certifications, while 33 % have obtained ISO 14001 Environmental Management System certification. Also, there is an interesting level of introduction of other models, like the ISO 45001 Occupational Safety and Health Management System and the ISO 39001 Road Safety Management System. Also, as part of a corporate mandate, companies operating in the chemical industry are usually certified through a specific model known as Comprehensive Management System (SASSMAQ) that based on our survey, is the road to certification with the other aforementioned Management Systems.

– In the case of Chile, the other country with comparable development among Logistics Operators, 50 % are ISO 9001-certified. In some very specific cases, some international corporations have completed Environmental Management System (ISO 14001) and Occupational Safety and Health System (ISO 45001) certifications.

– Regarding the rest of the region, although fewer operators were surveyed, the trend is similar to the Argentinean case. They work with local standards and are very slowly moving towards the implementation of different types of Management Systems. As is the usual case, they expect to first implement ISO 9001 Quality Management System and move on to the rest after that. In the case of Peru, the trend also points to the Road Safety Management System (ISO 39001) at a higher rate than the rest of the region. When asked about this trend, the Logistic Operators' representatives agree that

sooner, rather than later, this will become a mandatory requirement both nationally and internationally.

As mentioned in previous passages, it can be concluded that Excellence models (National Quality Awards) are not a goal among companies of the sector. In the case of Argentina, the model is more widely recognized in the industry, but at a regional level there were no relevant references to it.

Evidence shows these organizations find standard models (ISO Management Systems) more attractive, since they have global recognition and are usually required by their parent companies. It is worth mentioning that in those cases where the National Quality Award System was implemented in Argentina, they were national companies.

Also, all the surveyed countries have their own specific standards, either defined by their chambers (for instance, CEDOL in Argentina) or by operators associations (like the SASSMAQ model designed by the Brazilian Association of Chemical Industries). Both models were mentioned and are not binding or mandatory, but are widely implemented, and show high growth rates.

There is an opportunity of development, probably at a small scale, of a model that includes the requirements of the National Quality Awards, with a focus on the industry's particular characteristics and difficulties. To ensure its implementation, this model should incorporate some concepts of the National Quality Awards to the models developed by the chambers. Also, there is an additional opportunity in engaging support and collaboration from local authorities across the region to establish some common requirements that will enable a standardized regional model, more generic in nature, and that considers each country's distinctive features (cultural, legal, market development and other aspects).

Conflict of interest

The authors declare that they have no conflict of interest in relation to this study, including financial, personal, authorship, or any other, that could affect the study and its results presented in this article.

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Data availability

The manuscript has no associated data.

Use of artificial intelligence

The authors confirm that they did not use artificial intelligence technologies when creating the current work.

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