

System Based on Market Segmentation to Improve the Export of Peruvian Coffee

Jasson Yllescas, Hugo Vega^{*}, Percy De La Cruz, Jorge Pantoja, Ernesto Cancho-Rodriguez

Department of Computer Science, Universidad Nacional Mayor de San Marcos, Lima, Peru

Email address:

09200120@unmsm.edu.pe (J. Yllescas), hvegah@unmsm.edu.pe (H. Vega), pdelacruz@unmsm.edu.pe (P. De La Cruz),

jpantojac@unmsm.edu.pe (J. Pantoja), ernesto.cancho@unmsm.edu.pe (E. Cancho-Rodriguez)

^{*}Corresponding author

To cite this article:

Jasson Yllescas, Hugo Vega, Percy De La Cruz, Jorge Pantoja, Ernesto Cancho-Rodriguez. System Based on Market Segmentation to Improve the Export of Peruvian Coffee. *European Business & Management*. Vol. 8, No. 2, 2022, pp. 55-61. doi: 10.11648/j.ebm.20220802.14

Received: March 30, 2022; **Accepted:** April 16, 2022; **Published:** April 26, 2022

Abstract: In 2021 Peru exported 250 thousand tons of coffee, ranking seventh among the main coffee exporters in the world compared to the 4,000 thousand tons exported by Brazil, which ranks first. This research project aims to optimize coffee export processes through the development of management software for these exporting companies that allows them to have optimized processes, better control of their activities and make better decisions when exporting. Due to the great variety of types of coffee and the different destination markets, market segmentation was defined as a marketing strategy, which will allow the application of differentiated, efficient and effective commercial strategies. With the implemented software, the companies have been able to improve their export processes, the complexity of the different objectives and scenarios, the software plans quite accurately, as well as the calendar, volumes, and types of coffee to be exported. This helps coffee exporters to have adequate control of their activities and improve export processes, being more efficient and above all, making better decisions based on the information stored; With the use of a management tool, a higher percentage of organized producers is achieved, the export process is considerably improved and there is a greater participation in the international market.

Keywords: Export of Peruvian Coffee, Export Management, Information System, Market Segmentation

1. Introduction

In 2021 Peru was considered among the top 10 coffee exporting countries in the world [1]. Although the achievement is encouraging, an analysis of the context shows that in Peru there are 75 coffee exporting companies, of which 28 make up producer organizations that offer specialty coffees.

So far 20 companies concentrate 90% of exports, of which the first 10 exceed 75% of the value exported, showing a tendency to concentration in the coffee business, in similarity to the world trade monopolized by 7 large companies [2]. Table 1 list the main coffee exporting companies.

Table 1. Main coffee exporting companies [2].

ENTERPRISE	% PARTICIPATION
PAREALES HUANCARUNA S.A.C.	15%
OLAM AGRO PERÚ S.A.C	11%
PRECESADORES DEL SUR S.A.	8%
COMERCIO AMAZONIA S.A	5%
H.V.C. EXPORTACIONES S.A.C	4%
COOPERATIVA DE SERVICIOS MULTIPLE..	4%
COOPERATIVA AGRARIA NORANDINO LTD	3%
COOPERATIVA AGRARIA CAFETALERA AL...	3%
COMPAÑÍA INTERNACIONAL DEL CAFÉ S..	2%
OTHER COMPANIES (194)	35%

In Peru it is estimated that there are 81 organizations (including cooperatives and associations) that represent 30% of the grouped producers. Of these, 61% export directly, while the rest do so through an exporting company.

In Peru it is estimated that there are 81 organizations (including cooperatives and associations) that represent 30% of the grouped

producers. Of these, 61% export directly, while the rest do so through an exporting company. The recognized national coffee associations are the JNC (National Coffee Board), which represents organized producers, and the Peruvian Chamber of Coffee and Cocoa (CPC), which represents exporting companies [3]. See Figure 1.

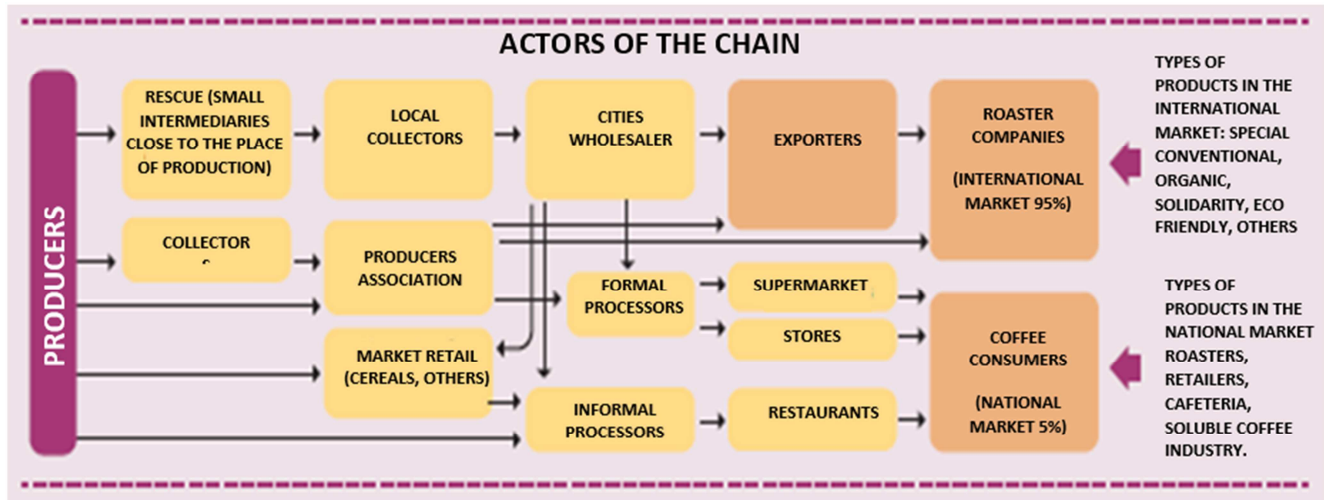


Figure 1. The Productive Chain and its main actors. [4].

2. Problem Statement

2.1. Problem Description

The business community of Peruvian exporters needs a tool that helps them in their tasks, the variety and inadequate segmentation of the international market does not allow to obtain a greater profitability in the export of their products, because many companies enter the export activity without having a clear perception of the size and characteristics of the market to which they are directed. The traditional way in which the different producers develop their activities, without having a business management in most cases, has a social impact reflected in 81 organizations that represent 30% of the total, involving 223 thousand families of which an approximate of 56 thousand belong to some organization or cooperative.

2.2. General Objective

Improve efficiency in the export management of Peruvian coffee in SMEs for this, an information system is developed that allows this process to be managed by making better decisions and making the most of opportunities.

3. Conceptual Framework

3.1. Information Systems

In a company, an information system must serve to capture information and transform it and thus make it available to those who require it mainly for decision making.

The authors believe that today's organizations cannot function effectively and efficiently without information systems that are developed using a set of information technologies. They also point out that information technologies emerge as a fundamental aspect because they facilitate business management and enable the search for competitive advantages [5].

3.2. Markets

Marketing activities can be summarized into three broad groups: product-related, consumer-related, and market-related. In other words, for a product to be sold, there must be an interested buyer and an environment in which transactions can be made [6].

The target market is made up of the set of consumers who belong to the available market, who can be part of the real and potential market, and to whom all the efforts and marketing actions of the company are directed. The goal is to turn them into true consumers of the product.

We can determine the approximate value of the market, the people who make it up and the demand it can generate, as well as profitability indicators, budget, etc. All this from the determination of the target market and the segmentation characteristics that have been made.

3.3. Market Segmentation

It is to subdivide the universe of buyers into groups whose members of each group have similar characteristics, considering specific factors such as identifying their current and potential needs, but that the groups have different characteristics or behaviors from each other, in order to apply

differentiated marketing strategies on each group, considering geographical, psychographic and behavioral aspects to optimize sales results and thus be able to achieve the objectives set and above all achieve a clear, strong and positive positioning within the market of interest [7, 8].

3.4. Background

Prieto and Martínez explain the importance of information systems in companies for decision making, increased productivity and the use of resources to achieve greater growth and comments that in the implementation of an information system three important aspects must be considered, minimizing the risks of information by establishing realistic objectives for the organization's information system and identifying the tasks and important activities, the effectiveness of users and IT people in the company, establishing training policies and data security procedures, and developing a strategy to facilitate the evolution of the company's information system, identifying future needs, and in relation to global strategies [9].

In communication in the management of organizational culture two especially modalities must be considered. Internal communication, which comes to be a tool to motivate employees and to transmit all the information about the activities of the company, both its achievements and its failures with the aim of getting the members of the company to direct their activities and efforts towards the goals and objectives of the organization. External communication, which seeks to show the image of the organization and

promote the relationship with the public [10].

Albarrán Peralta, explains the importance of the application of the Uppsala theory that refers to the international expansion of a company under a traditional approach raised in terms of variance under an incremental learning knowledge is obtained and resources are dedicated to expand internationally gradually [11]. See figure 2.

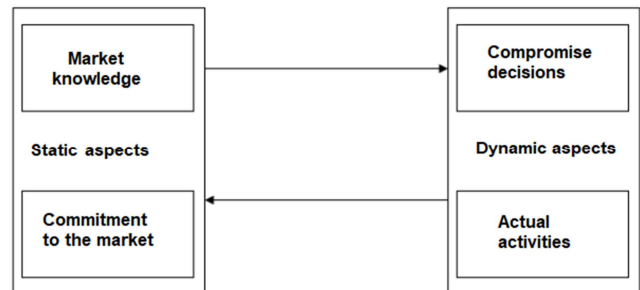


Figure 2. Uppsala's gradualist model. [11].

C. Regalado uses the data collection instrument that is the survey conducted with coffee farmers in the province of Rodríguez de Mendoza [12]. Likewise, information and statistics extracted from public and private organizations in Peru such as INEI, SUNAT and MINAGRI, INFOCAFÉ and different trade instruments such as TRADEMAP are used. Regarding the reliability in the surveys carried out, they show us a level of reliability of 95.5% and the margin of error of 4.5%. See table 2.

Table 2. Current condition and its management.

Actual Condition	Yes	%	Not	%
Belongs to the cooperative	7	9%	71	9%
Use promotion for coffee sale	0	0%	78	100%
Keep track of your production costs	4	3%	74	95%
They hire labor to produce coffee	61	78%	17	22%
They have several buyers at the end of their campaign	6	8%	72	92%
Access to financing for coffee production	11	14%	67	86%
State support with training	0	0%	78	100%
Participate in fairs for the promotion of coffee	5	6%	73	94%

Information and communication technologies (ICT) and computer systems enable the integration of data and facilitate decision-making [13]. Digital signatures are of great support for the exchange of information [14].

The lack of technological tools and information systems generate impotence in the members of the organization and becomes a key factor of demotivation [15], but it is not enough to have a good support of ICTs and information systems, but also to ensure that we have important strategies of approach to the client [16].

The trust and perceived risk are factors that must be considered for the adoption and integration of technologies [17].

It should also be considered that to generate important improvements in management, it is important to implement

collaborative motivation strategies both within the organization and in the relationship with customers [18]. It is also important to collect, through surveys, the opinions of customers about our services [19].

4. Business Modeling

4.1. Business Use Cases

The Business use cases are shown in Figure 3, where we appreciate as users of the business the producer who has access to register his information and consult in the system the exporters' information, the export manager who registers the exporters and the exporting companies and finally the general manager who can also register the exporting companies.

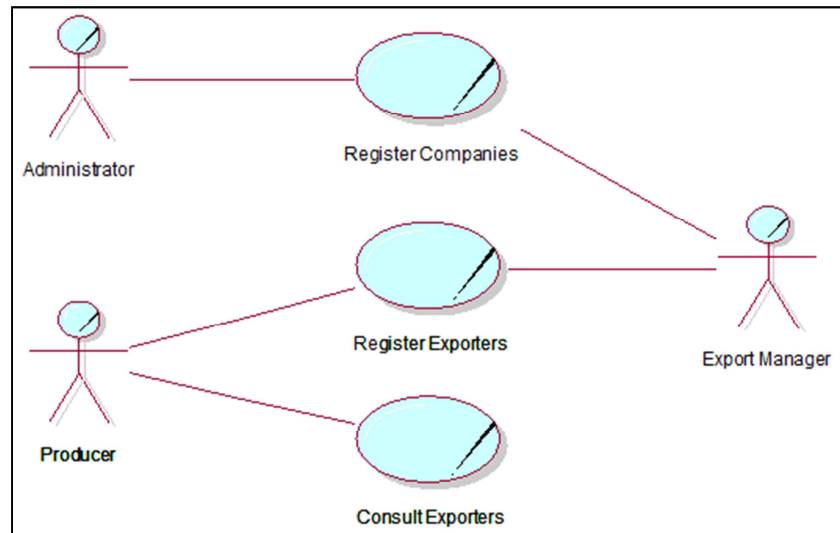


Figure 3. Business Use Case Diagram.

4.2. Activity Diagram

Figure 4 and Figure 5 show the diagram of activities of Business Use Cases (CUN) Register Companies (complete registration, evaluate registry, manage access, register company) and Manage Exports (evaluate period, evaluate market, recommend export, register export, register export).

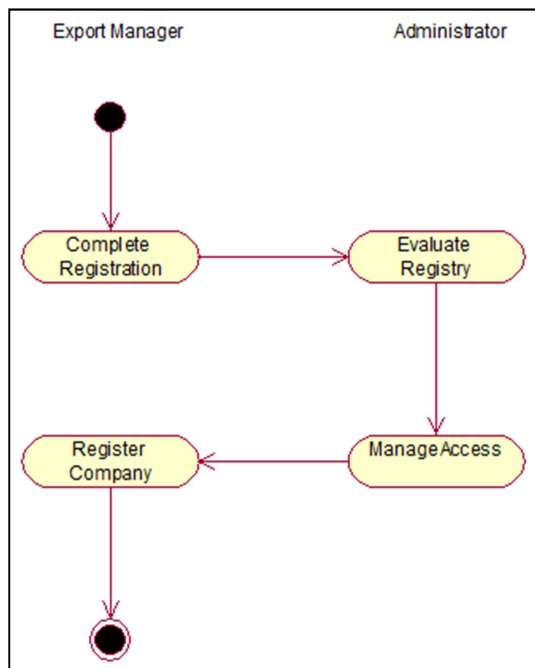


Figure 4. CUN Register Companies Diagram.

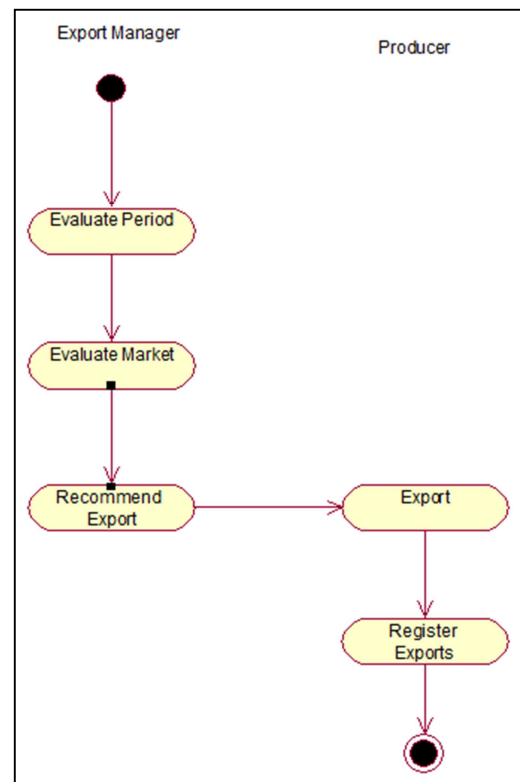


Figure 5. CUN Manage Exports Diagram.

5. Project Requirements

5.1. Requirement Specification

The functional requirements of the system are the objectives that the proposed solution must meet, the requirements are shown in Table 3.

5.2. System Use Case Diagram

Security Module. Figure 6 presents the use cases necessary to provide security of access to the system for the different users.

Table 3. Functional Requirements.

Code	Requirement
RF01	Manage and register users
RF02	Manage Export
RF03	Manage Periods
RF04	Manage Market
RF05	Send Performance
RF06	Consult Companies

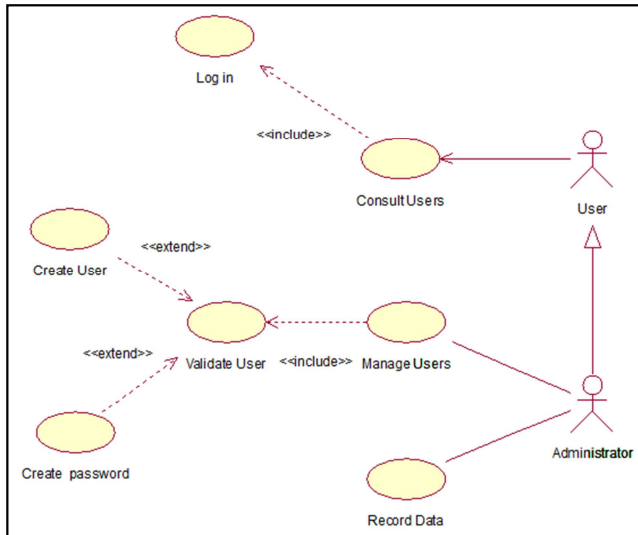


Figure 6. System use case diagram of Security Module.

Registration Module. Figure 7 presents as users of the module the Export Manager and the producer with access to the use cases as foreseen in the business use cases.

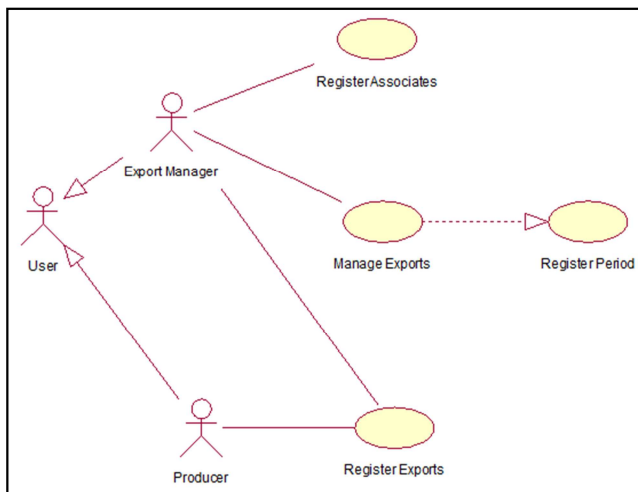


Figure 7. System use case diagram of Registration Module.

Consultation Module. Figure 8 presents use cases of

Consultation Module where the user Export Manager can access to use cases check performance and see activities and the user Producer can access to use cases Single Registration, Associate Registration, Check Performance and See activities.

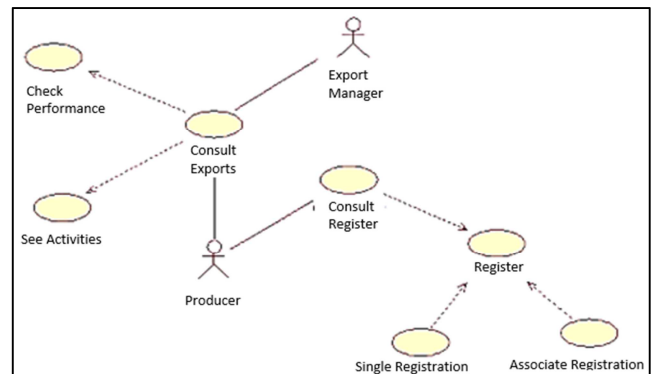


Figure 8. System use cases diagram of Consultation Module.

Management Module. Figure 9 presents use cases of Management Module where the user Producer can access to use cases National Export, International Export, Export, and recommended Export; and the user Export Manager can access to use case Evaluate Performance and to uses cases assigned to Producer.

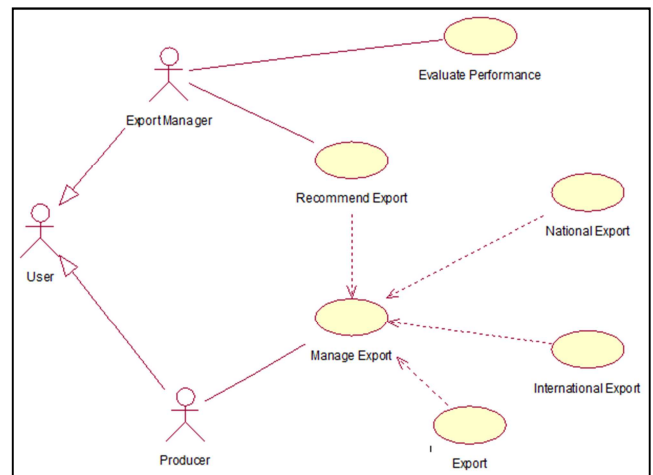
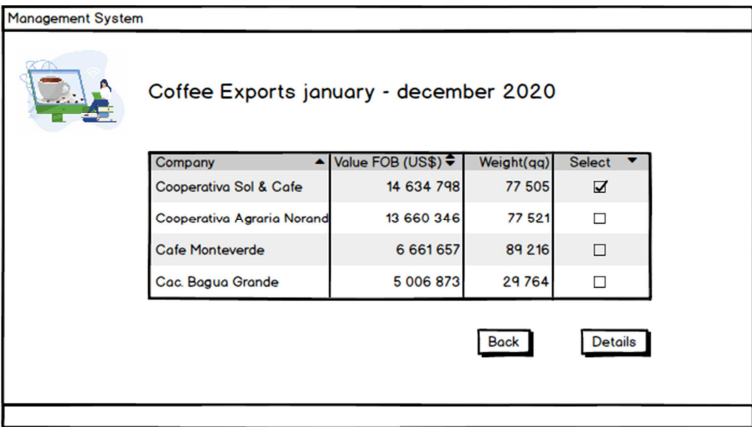


Figure 9. System use cases diagram of Management Module.

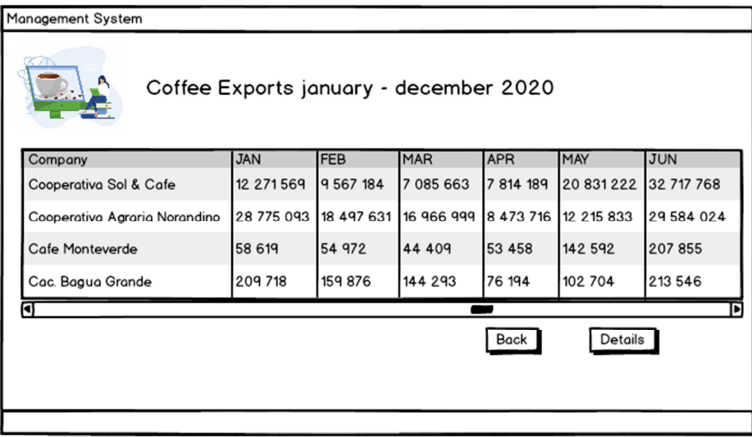
Management System				
Register Producers				
Producers	SSN	COD	Address	Email
Marcos Paredes	45231489	1045231489	Av. El Sol 2030	mparedes@gmail.com
Juan Rodriguez	60762356	1060762356	Av. Los Jardines 1550	mrrodriguez@gmail.com
Miguel Casas	07845261	1007845261	Av. Piramides 4060	mcasas@gmail.com
Luis Sanchez	78125388	1078125388	Av. Pacifico 1001	lsanchez@gmail.com
Andres Lopez	0647834	100647834	Av. Portugal 7089	alopez@gmail.com

Figure 10. Show Producers Log.



Company	Value FOB (US\$)	Weight(qq)	Select
Cooperativa Sol & Cafe	14 634 798	77 505	<input checked="" type="checkbox"/>
Cooperativa Agraria Norandino	13 660 346	77 521	<input type="checkbox"/>
Cafe Monteverde	6 661 657	89 216	<input type="checkbox"/>
Cac. Bagua Grande	5 006 873	29 764	<input type="checkbox"/>

Figure 11. Show coffee export summary.



Company	JAN	FEB	MAR	APR	MAY	JUN
Cooperativa Sol & Cafe	12 271 569	9 567 184	7 085 663	7 814 189	20 831 222	32 717 768
Cooperativa Agraria Norandino	28 775 093	18 497 631	16 966 999	8 473 716	12 215 833	29 584 024
Cafe Monteverde	58 619	54 972	44 409	53 458	142 592	207 855
Cac. Bagua Grande	209 718	159 876	144 293	76 194	102 704	213 546

Figure 12. Show exports by month.

5.3. Prototypes

The prototypes of the implemented system are shown in Figure 10 (show producer log), Figure 11 (show coffee export summary.) and Figure 12 (Show exports by month).

6. Conclusions

At the end of this work, it can be concluded that:

1. Coffee associations are choosing to carry out their tasks in a new way with the help of information technologies.
2. The system developed has been of great help to them to have an adequate control of their activities and improve the export processes, being more efficient and above all making better decisions based on the stored information.
3. This export management tool allows producers to implement differentiated sales strategies considering the size and characteristics of the market.
4. Finally, we conclude that the proposed objective is being achieved since by the year 2022, an increase in coffee exports of more than 10% is expected in Peru with respect to the exports of the year 2021 [20].

Acknowledgements

We express our recognition acknowledgments and gratitude

to the teachers who, have been supporting the research work [21].

References

- [1] Agencia-Agraria-de-Noticias, "Agencia Agraria," 2022. [https://agraria.pe/noticias/usda-produccion-mundial-de-cafe-al-canaria-los-175-4-millones-23516#:~:text=El Perú se ha mantenido, respecto a la campaña previa\).](https://agraria.pe/noticias/usda-produccion-mundial-de-cafe-al-canaria-los-175-4-millones-23516#:~:text=El Perú se ha mantenido, respecto a la campaña previa).)
- [2] SIICEX, "Sistema Integrado de Información de Comercio Exterior," 2022. <https://www.siicex.gob.pe/>.
- [3] Min. Com. Ext. Tur. Perú, *Análisis Integral de la Logística en el Perú*. Lima Peru, 2016.
- [4] C. Díaz and M. Carmen, "Línea de base del sector café en el Perú," vol. 1, no. 1, 2017.
- [5] R. Lapiedra, C. Devecce, and J. Guiral, *Introducción a la gestión de sistemas de información en la empresa*. España, 2011.
- [6] R. Fernandez, *Segmentación de Mercados*. Mexico: Universidad Tecnológica de México, Campus AtizapánEscuela de ComunicaciónUniversidad Anáhuac Norte, 2008.
- [7] P. Kotler and G. Armstrong, *Fundamentos de Marketing*. 2013.
- [8] N. O. Urbina, "El proceso de posicionamiento en el marketing: pasos y etapas. RAN-Revista Academia & Negocios," vol. 7, no. 1, 2021.

- [9] A. Prieto and M. Martínez, “Sistemas de Información en las Organizaciones: Una Alternativa para Mejorar la Productividad Gerencial en las Pequeñas y Medianas Empresas,” *Rev. Ciencias Soc.*, vol. 10, no. 2, 2009, doi: 10.31876/rcs.v10i2.25256.
- [10] A. E. Pineda Henao, “La comunicación organizacional en la gestión empresarial: retos y oportunidades en el escenario digital,” *Rev. GEON (Gestión, Organ. y Negocios)*, vol. 7, no. 1, pp. 9–25, 2020, doi: 10.22579/23463910.182.
- [11] C. Albarrán Peralta, “Desconocimiento del e-commerce en las empresas exportadoras de café (0901.21.10.00) con destino a Chile en el periodo 2015 - 2019,” 2020.
- [12] C. Regalado, “Asociatividad de productores rurales de café orgánico en la provincia de Rodríguez de Mendoza para la exportación,” 2020.
- [13] M. Hilario, D. Esenarro, H. Vega, and C. Rodriguez, “Integration Of The Enterprise Information To Facilitate Decision Making,” *J. Contemp. Issues Bus. Gov.*, vol. 27, no. 1, pp. 1042–1054, 2021, [Online]. Available: <https://cibg.org.au/>.
- [14] J. Cordova, H. Vega, and C. Rodriguez, “Firma digital basada en criptografía asimétrica para generación de historial clínico,” *3C Tecnol.*, vol. 9, no. 4, pp. 65–85, 2021, doi: 10.17993/3ctecno/2020.v9n4e36.65-85.
- [15] R. Saldarriaga, H. Vega, C. Rodriguez, and P. De La Cruz, “Academic approach about E-learning modules from the teacher/student perspective at the National University Mayor de San Marcos, Lima-Perú,” *3C TIC Cuad. Desarro. Apl. a las TIC*, vol. 10, no. 3, pp. 121–139, 2021, doi: 10.17993/3ctic.2021.103.121-139.
- [16] G. Martínez, H. Vega, C. Rodriguez, and Y. Guzmán, “Marketing de proximidad mediante aplicación móvil con dispositivos Beacon,” *3C TIC Cuad. Desarro. Apl. a las TIC*, vol. 9, no. 4, pp. 89–111, 2020, doi: 10.17993/3ctic.2020.94.89-111.
- [17] C. S. Arbaiza, H. V. Huerta, and C. R. Rodriguez, “Contributions to the Technological Adoption Model for the Peruvian Agro-Export Sector,” *Int. J. E-Adoption*, vol. 13, no. 1, pp. 1–17, 2021, doi: 10.4018/ijea.2021010101.
- [18] H. Vega, S. Moquillasa, C. Rodriguez, F. Escobedo, O. Benito, and J. Gamboa, “Increase of Graduates by the Thesis Development at Public Universities in Peru through Collaborative Motivation,” *Turkish J. Comput. Math. Educ.*, vol. 12, no. 3, pp. 4310–4319, 2021, doi: 10.17762/turcomat.v12i3.1722.
- [19] Y. Guzman, A. Tavera, R. Zevallos, and H. Vega, “Implementation of a Bilingual Participative Argumentation Web Platform for collection of Spanish Text and Quechua Speech*,” *3rd Int. Conf. Electr. Commun. Comput. Eng. ICECCE 2021*, no. June, pp. 12–13, 2021, doi: 10.1109/ICECCE52056.2021.9514251.
- [20] Camara-Cafe-Cacao, “Pronósticos de café peruano 2022,” 2022. [https://camcafeperu.com.pe/ES/articulo.php?id=160#:~:text=Desde el punto de vista, un conservador \(3.8M\).](https://camcafeperu.com.pe/ES/articulo.php?id=160#:~:text=Desde el punto de vista, un conservador (3.8M).)
- [21] H. Vega, S. Moquillaza, O. Pacheco, and P. De La Cruz, “Support in research work for the increase of graduates by the thesis dissertation mode,” *3C TIC*, vol. 11, pp. 171–189, 2022, doi: 10.17993/3ctic.2021.104.17-31.