

Original Article

Success Factors for the Implementation of an ERP and the Improvement of Financial Control in a Local Clinic

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Abstract - This research work was carried out in an important clinic located in the city of Lima that presented difficulties in its system: collections, payments, and payroll, affecting accounting information for the correct preparation of financial statements. Other internal deficiencies were the medical history report and the hospital services. The deficient system did not help in internal control processes and activities, obtaining problems such as sanctions before the National Health Superintendence, deficiencies in collections, inaccurate reporting of accounts payable and unreliable accounting records. The objective of this research is to expose the improvement made through an ERP, such as the accounting operational traceability, the integrity of the information and the provision of the information when being online. The methodology used was applied due to the experience in the sector executing the ERP to the solution of the company's problem presented and explanatory since the interaction with several collaborators allowed us to carry out the research scheme, the development and culmination of it. The results have been various, such as verification of the usefulness of the ERP, as well as the reduction of high-impact fines before supervisory bodies, the correct execution of the various means of payment, operating with local and foreign currency, the use of mobile tools, economic reduction in the payroll and finally comply with the banking law. For the investigation, the case of treasury and collections was taken and how it influences the accounting area to evaluate the benefits of the ERP.

Keywords - Availability, ERP System, Integrity, SIAF, Traceability.

1. Introduction

Before installing the Enterprise Resource Planning System(ERP), The clinical case study had the information disseminated with legacy systems; therefore, they worked with several databases, which generated many problems with the confidentiality, availability and integrity of the information, when acquiring the ERP before implementing it, previous economic projection studies were carried out to know how much would be saved after the implementation statistical tests were made to demonstrate that purchase of the ERP is beneficial for the clinic case study.

The acquisition of an ERP System and its application in an organization implies success or failure; for this, the project committee must select the appropriate provider, such as one with experience in the sector but, the decisive factor in the success of the implementation is the users; therefore, every organization must take it into account. "ERP systems are a category of software that offers extensive support to

manage business processes. They are application software that can be used in most kinds of businesses and organizations. Adoption and implementation of ERP systems involve risks, and a large number of organizations have wasted millions of dollars as a result of failed implementations. Some of these failed implementations may be attributed to selecting an ineffective ERP system. This paper applies Data Envelopment Analysis (DEA) to the process of selecting an ERP system". [1]

The objective of this research is to demonstrate that the adoption of this ERP technology will have benefits in the future in any organization of the various economic sectors, including the health sector, as described in the following paragraph. "Technologies like Electronic Health Records (EHR) and Enterprise Resource Planning (ERP) platforms are being adopted by the hospitals for a better sync between them and their suppliers, which in turn help them to improve



the care quality and benefits down the line to their patients, besides boosting their own performance measures". [2]

It must be borne in mind that when implementing systems, there is a direct relationship with accounting, which implies improving control for a correct accounting relationship with each type of activity and the formulation of financial statements endorsed in the data platform. This implies that implementing an Erp system will require having good servers and innovation in communication, using digital signatures and the digitization of documents.

This will help a business to improve its control processes, having factors such as traceability, integration and availability of information that an Erp system will provide for the security and verification of financial information in a business. It indicates that the correct recording of accounting information allows financial control and the preparation of financial statements to make decisions in their exposure or presentation. [3]

However, the materialities that may arise post-implementation must be taken into account and opt for prevention mechanisms or structures to avoid financial and accounting repercussions. Advances in information and technological systems do not provide a reliable control system; fraud is at a high level worldwide, as in Peru, and they have significant financial impacts affecting the assets of an organization. [4]

In particular, and according to what has been experienced in a banking entity, fraud is usually carried out because there are several systems that manage independent information for a certain activity. Inconsistencies are created when you have isolated systems, and you can see the accounting differences in monetary terms that a SIAF system (integrated financial administration system of government control) had and the old system used for administrative aspects, which work in isolation without reconciling the source of accounting information, being in monolithic independent systems.

Table 1 shows the differences in certain accounting accounts due to the use of systems not integrated into a company's financial system. On the one hand, they used the SIAF system, a Government System; on the other, a Captus system, which had no interconnection or integrity.

To put it in context:

In Perú, The SIAF is software for administrative use with the objective of having the information available according to the user's requirement. [5] The SIAF, or integrated financial administration system, is a system for accounting and administrative use that fulfills multiple functions but does not adjust to the companies' operating environments in the financial system.

Table 1. Accounting differences between the SIAF System and the ERP System

SIAF system	Captus system
Countable balance 12/31/2013	Countable balance 12/31/2013
U.S.\$ 3,562	U.S. \$ - 583,801

Companies suffer fraud detected mostly by chance, by not defining the controls on time or at the time of implementation. It also reports that 94% of the companies in Ecuador, by not having adequate computer security systems, allow such criminal acts. [6]

To improve control, not only the actions to be taken by an auditor or specialist in the processes are enough, but certain factors must also be taken that help the security of the information through an ERP system, such as profiles and security levels of users. But, improving control aspects is not only preventing fraud but also improving the quality of service for both internal and external customers.

Internal control occurs in two ways: preventive control, which defines as supervision activities, and corrective control, which defines as activities to improve the work without inconsistencies or errors. Recommending for it; the implementation of an ERP system, designation of responsibilities, review and control of processes and KPI. [7]

Having good control in cash flow operations implies considering the word risk. That can be translated into a probability of loss, and the fact of reducing the impact of materiality in the financial statement reports must be taken into account, which leads us to have certain considerations in the implementation of an ERP system, such as mentioned below.

"The implementation of an ERP system helps improve the traceability of processes, and other aspects, contributing to the control of operational activities, reflecting in cost reduction and competitiveness in the productive sector to which it belongs".[8]

With traceability, the transactional records are related to numbers of verifiable accounting receipts and leave evidence in the event of any refund or cancellation of the operation. Integrity strengthens the areas of a business by improving functional activities, facilitating good information management with the use of digital media and focusing on serving an increasingly computerized market in the best way. [31]

The integration between areas will improve the productivity of an area or department since the information will be shared with constant feedback. The availability of information is an instrument of protection and control since the data is available and according to each user's profile

when required. [10] With the availability of information, it is ensured that the data is used or consulted 24 hours a day on a platform or information system.

Implementing an ERP system involves the accounting area determining operational traceability, that is, the recording of all activity without alterations and interventions from the systems area, integrity, which will avoid document duplication or lack of information, obtaining a single balance, and the availability that will allow the review of supported or verifiable information, as many times as required or consulted.

The important thing is that control and accuracy of accounting accounts will be achieved, making the formulation of financial statements and other inherent tasks reliable, for example, the verification of records. Apart from showing the benefits of ERP in the health sector, the investigation tries to cover gaps in important aspects, such as:

1. Regarding state of the art, there are not many studies of implementations related to hospital clinics, considering details of financial aspects and validation of the research statistically, taking into account characteristics of an information management system, such as availability, integrity, information security, adding to it usability, which are basic characteristics that an integrated business system must have and, in turn, that allows predicting the quality of the ERP based on the aforementioned characteristics.

2. Likewise, this research calculates the projected benefits (net present value) and the recovery time of the investment when acquiring and implementing the ERP, which has not been observed in the reviewed literature.

These 2 points that the research develops make the article interesting and novel for a researcher to consider what should be considered when implementing an ERP.

2. Literature Review

In order to see certain details of the ERP, the literature review was carried out, answering research questions based on the Kitchenham Barbara methodology:

- **Planification:** Research questions are asked, defining a search protocol. Based on a search string, Inclusion and exclusion criteria are built.
- **Realization:** The search chain is executed in each repository the researcher decides, obtaining articles after applying the inclusion and exclusion criteria.
- **Results:** In this stage, statistics of the selected documents and review are made: In this phase, the statistics, the analysis of the selected documents and the discussions are presented, the analysis. It is noted the key facts of the investigation.[11]

2.1. Planification of this Investigation

As part of the investigation, The questions were posed:

RQ1. What must carry out in ERPs oriented to clinics or in general?

RQ2. What should be measured from ERPs?

The following string is used to answer research questions that serve as a reference point or complement to the present investigation:

(ERP OR "integrated system" OR "resource planning system") AND (clinic OR hospital) AND "cash flow."

The inclusion criteria are from the last 5 years, only journals, ERP articles oriented to the sector of hospital clinics, and articles that answer the research questions and in relation to the exclusion criteria, discard papers that do not correspond to the keywords, thesis is not considered state of the art, and articles that do not have research results.

2.2. Realization

The systematic search has been used to carry out in various repositories, such as Scopus, Web of Science, Emerald, and Google Scholar, in order to answer the research questions.

2.3. Results (Answering the Research Questions)

RQ1: What must carry out ERPs oriented to clinics or in general?

The Health System must be integrated, in its entirety, that is, scientific research, the consultation database in a structured manner, and financial management information to obtain indicators of the various operations that have to do with the economy of hospitals. [12]

Enterprise information systems improve access to information, optimize processes and integrate all information, which has effects on performance in different aspects of the corporation. [13]

To ensure performance (efficiency and effectiveness), the conditions that ensure financial sustainability are identified. For it was carried out in the study in 15 major hospitals in Greece. [14]

What health professionals perceive is taken into account to improve the quality of services through enterprise resource planning; in addition is evaluated and observed the organizational impression and the quality of the ERP system, which impact the quality of medical services. [15]

RQ2: What should be measured from ERPs?



Fig. 1 Criteria to take into account to implement an ERP

The quality of the system must be measured, that is, the quality of the information, the use of the system, user satisfaction and the impact that occurs individually and at the organizational level. [16]

Observe the improvements in productivity in the clinic as a result of the integration of information. [17]

2.4. Analysis

From the research questions, it can be deduced that for an ERP to be successful, it is required that all the areas concerning the hospital clinical areas must be integrated; on the other hand, the key characteristics that must be measured are the quality of the information, the usability that is, the ease of use, the integrity of the information, which is reflected in the quality of the System (ERP), also implies measuring the productivity that impacts the organization and the people who use the system, which in the end is reflected in the best patient care.

It is key to take into account the perception of the staff working in the health center for improvements or adaptation to change and to measure the impact del ERP on the end user.

The conditions that make the organization financially sustainable and that impact the organization must be considered. In relation to the ERP, the attributes that appear in Figure 1 should be considered as basic elements to implement an ERP.

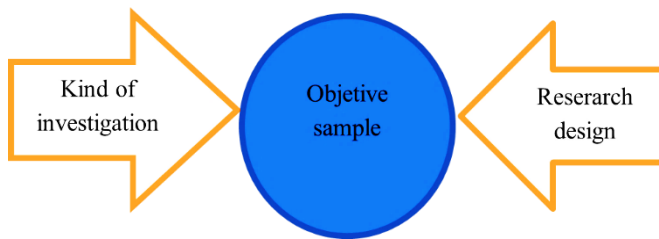


Fig. 2 The investigation and objective sample

3. Methodology

Applied research originates from the researcher's experience and applies his knowledge in developing a specific topic in an organization. It also mentions that field research is carried out through interviews, as this work was carried out. [32]

Explanatory research has two approaches, a quantitative approach, where a theory is argued for the solution of a study problem and the qualitative approach occurs with the interaction of collaborators to address the problem under study and draw conclusions to design the research. [19]

As for the design, it was non-experimental, it worked with a small group of workers who performed their work in the box after implementing the ERP system, and the research variables were not manipulated.

The cross-sectional design for the study variables is fast, cheap, and fixed for a certain period. [20] The author says that the correlational design is used to statistically measure quantitative variables, such as time, and determine the acceptance or rejection of the hypothesis. [21]

The population was made up of 6 collaborators who knew the M. Sante system and the ERP system and only carried out their work using the cashier module in the clinic distributed in three locations.

The determination of the sample was non-probabilistic, and sampling by quotas on the number of workers mentioned above.

Quota sampling is non-random sampling for a small population that objectively represents the study and ensures correct extrapolation and also mentions that there is no rule on the minimum number of subjects to study in an investigation. [22]

In Figure 2, it is mentioned that the type of research and the design used for this study was carried out on an objective sample to obtain concrete results; the sample was made up only of cashier workers and was the object of the population studied at a certain time.

To validate the research, it was done using inferential statistics.

3.1. Data Collection Techniques

3.1.1. The Interviews

The interview questions were validated by academic experts familiar with the research topic; these questions were validated with the Aiken formula.

$$CVRi = \left(Ne - \frac{N}{2} \right) * \frac{2}{N}$$

According to [23], they express as a reference, in their research work, those who establish that items with a value less than 0.75 should be eliminated.

CVRi= Content validity ratio, which, if the calculated value is greater than or equal to 0.75, indicates that the item is essential.

Ne = Number of experts who indicate that the survey item is relevant.

N= Number of experts

In this investigation, the questionnaire validated by Aiken, each item varied between 0.85 and 0.92. Therefore, the questionnaire was not reduced.

Then the reliability was measured using Cronbach's alpha, according to Table 2; the validation was determined with the Cronbach's alpha formula and applied to calculate and determine the instrument's reliability, providing a validation of 83.59%. The margin is above the minimum required for reliability, which is 70%.

This is the :

Cronbach's alpha formula

$$\alpha = \frac{N}{N - 1} \left[1 - \frac{\sum v_i}{vk} \right]$$

Where:

N = number of questions = 20

Vi = variance of each question

Vk = Variance of the raw scores of the subjects

For the development of the interviews, the objective was to determine how control has improved with respect to pre and post-implementation.

The questionnaire had 20 questions, collecting the information directly from the user and by telephone, that is, question and answer.

With this instrument, the time required by each activity was evaluated before and after the implementation of the ERP.

Finally, with this instrument, factors such as the traceability of operational-accounting activities, the integrity of the areas and the availability of information were established.

Table 2. Questions validated by expert judgments

#	Questions
1	What time do you use for the issuance of payment vouchers for the client?
2	What time do you use to issue the payment receipts for the client, with their conversion into currency?
3	How much time do you use to collect from the patient, exactly what you have to pay?
4	How much time do you use to make a charge for a reserved medical appointment, for a patient, including doctors' availability and in which office it is located?
5	How much time do you use to make a medical appointment without the availability of a medical appointment?
6	How much time do you use to charge for an additional or unreserved medical appointment?
7	What time do you use to issue credit notes with the supervisor?
8	How much time do you use to refer credit charges from a patient to the credit and collections area in coordination with the supervisor?
9	How much time do you use to refer the appropriate documentation to the area of credits and collections?
10	How much time do you use to correct a charge on a day-to-day basis?
11	What time do you use when extorting or reversing?
12	How much time do you use to make advances or cash cuts?
13	What time do you use to correct the accrued payment methods?
14	How much time do you use to select the different currency charging methods?
15	How much time does the supervisor use to review your cash operations?
16	What time do you use to balance the different payment methods?
17	How much time do you use to correct or modify the payment methods at the closing of the box?
18	How much time do you need to know the cash collected from the different means of payment?
19	How much time do you use in the cashier module to attach the payment receipts to what was collected on the day?
20	What time do you use in the module for reprinting payment receipts?

3.1.2. Statistical Inference

The next method was the statistical measurement; for the development of this method, the spreadsheet was used to tabulate data and, using the SPSS version 26 statistical tool, to obtain results with the six specialized users in boxes.

For the descriptive analysis, the mean, median, variance, standard deviation, asymmetry, and kurtosis were exposed, both for the pre and post-implementation.

For the analysis of the statistical inference, two statistical formulas were used, such as:

The Shapiro-Wilk test and thereby determine the normality or abnormality of data.

Then, the Wilcoxon T. with a significance value of 5% or 0.05, a p. value < 0.05 and a Z value = +/- 1.96 and determine the acceptance or rejection of alternative hypotheses.

4. Results and Discussion

4.1. Results

4.1.1. *The Operational – Accounting Traceability was Measured, and with its Response, the Results Presented below were Obtained*

He says that traceability is a tool that facilitates control since it allows obtaining reliable information and verifying it in detail at each stage of operational activity. [24]

The importance of traceability is to ensure that the information systems become reliable, and with them, the transmission of information becomes easy to locate for any audit.

The results of a question that formed the part of traceability exposed in Table 3 as an affirmation were disclosed.

Table 3 explains the times that each more experienced user used in their collection tasks by box, and then both systems were compared; it is a fact that after the implementation, they were able to optimize the times, leading to avoiding the manipulation of the transaction and information.

Table 3. Time used by a user in collections by cash, before and after implementation, equivalent in minutes.

Data	Before ERP	After the ERP
Cashier 1	4	1
Cashier 2	3	0.30
Cashier 3	3	0.30
Cashier 4	4	0.30
Cashier 5	4	0.40
Cashier 6	3	1

The following alternative hypothesis was formulated to determine its acceptance or rejection:

H0: It does not improve the operating time in the collection processes by box through the ERP system in an important health sector company.

H1. Improves the operating time in the collection processes by box through the ERP system in an important health sector company.

In Table 4, the Shapiro-Wilk test was applied for a sample $N = 6$ and determined the abnormality or normality test; the result for the posttest obtained a value = 0.003, less than $\alpha = 0.05$; therefore, the distribution according to the type of statistical test shows abnormality.

Table 4. Processing of cases to determine the normality or abnormality test

Normality test			
Shapiro-Wilk			
	Statistical	Gl	Sig.
PRETEST1	,796	6	,054
POSTTEST1	,666	6	,003

In Table 5, it has been carried out to find the test statistic, using Wilcoxon, obtaining the following results as indicated:

The P. Value obtained = 0.027, is less than the alpha value ($\alpha = 0.05$), and a statistical value = -2.207 lower to the critic of $Z = -1.96$. From what has been said, the alternative hypothesis is accepted.

Table 5. Test statistic

Statistician test ^a	
	POSTTEST1 - PRETEST1
Z	-2,207 ^b
Sig. asymptotic (bilateral)	,027

4.1.2. *The Factor of the Integrity of the Information was Corroborated by the Cashier Users*

However, the response of the 6 users to a question that was part of this factor was released, and it is mentioned as follows:

Measurement of the time to derive the appropriate documentation to the area of credits and collections can be seen in Table 5.

He mentions that enterprise resource planning systems allow integration between all functional areas, making it easier to have and obtain information for each type of activity in an orderly and centralized manner. [33]

The integration of the information will allow the accounts receivable records or data to be reliably recorded and continuously updated with the users involved.

Table 6 shows the time each cashier used in their routine tasks and that they had to refer to the credit and collections area, since collections per cashier, given the patient's condition, for example, being hospitalized, required more time and attention; therefore, the charge also increased, which was referred to the specialized area.

Table 6 . Use minutes to derive the appropriate documentation for the area of credits and collections using the system

Cashier	Before ERP	After the ERP
Cashier 1	11	6
Cashier 2	8	5
Cashier 3	14	5
Cashier 4	7	5
Cashier 5	10	4.30
Cashier 6	10	4

After the explanation, the following alternative hypothesis was formulated to determine its acceptance or rejection:

H0: Control of cash flow and its equivalent does not improve, with the use of integrated information from various functional areas with an ERP system, in an important health sector company.

H1. Improves control of cash flow and its equivalent, with the use of integrated information from various functional areas with an ERP system, in an important health sector company.

The following statistical test was developed to obtain an answer according to the lines below.

In Table 7, the Shapiro-Wilk test has been applied, both to PRETEST 2 and POSTEST 2 and determine the distribution of abnormality or normality of the data.

The result indicates that POSTEST 2 has obtained a p. value = 0.047 less than alpha ($\alpha = 0.05$); therefore, it presents an abnormal distribution.

Table 7. Normality test, according to Shapiro – Wilk

Normality test			
Shapiro-Wilk			
	Statistical	Gf	Sig.
PRETEST2	,990	5	,980
POSTTEST2	,772	5	,047

In Table 8, the test statistic Wilcoxon was applied to find values and make the results known;

a P value of = 0.043 was obtained, indicating that it is less than the alpha value ($\alpha = 0.05$), and a statistical value = -2.023 less than the critical of $Z = -1.96$. With these results, the alternative hypothesis is accepted.

Table 8. Test statistician

Statician test	Wilcoxon
	POST2 - PReTEST2
Z	-2.023
Sig. asymptotic (bilateral)	,043

4.1.3. The Information Availability Factor was Demonstrated with the Six Cashier Users

[26]. They mention that the availability of information will allow decisions to be made in the different activities carried out by a user.

With the implementation of an ERP system, the availability of information will allow the creation of access profiles for each user based on the specified work performed. Preventing misuse by leaving evidence of what the user has done.

As in the previous cases, one of the questions that were part of the study of this factor was revealed, such as the time that each ATM is used to make cash advances or cuts.

Table 9. Measurement in minutes to make advances or cash cuts

Data	Before ERP	After the ERP
Cashier 1	12	0.30
Cashier 2	9	0.40
Cashier 3	8	0.30
Cashier 4	14	0.30
Cashier 5	10	0.30
Cashier 6	10	0.30

Table 9 shows the time spent by each user in their cashier work to cut or advance the cashier and, at the same time, make a comparison. Before the ERP, the work was complex when making progress, given that the system only worked with printed reports and used exclusive printers such as matrix printers.

Exposed, the following alternative hypothesis is enunciated to determine its acceptance or rejection:

H0: No Improves the time when closing the box with the ERP system in an important health sector company.

H1. Improves the time when closing the box with the ERP system in an important health sector company.

The following statistical tests were applied to verify the results and are presented below. In Table 10, the Shapiro - Wilk test has been applied, both to PRETEST 3 and POSTEST 3 and determine the distribution of normality or abnormality of the data. The result indicates that POSTEST 3 has obtained a p. value = 0.000 less than alpha ($\alpha = 0.05$); therefore, it presents an abnormal distribution.

Table 10. Normality test, according to Shapiro - Wilk

Normality test			
Shapiro-Wilk			
	Statistical	Gf	Sig.
PRETEST3	,946	9	,642
POSTTEST3	,496	9	,000

In Table 11, the test statistic Wilcoxon was applied to determine the results and the following values were obtained: the P. Value obtains a value = 0.008, indicating that it is less than the alpha value ($\alpha = 0.05$), and a statistical value = -2.666, less than the critical of $Z = -1.96$. Therefore, the alternative hypothesis is accepted.

Table 11. Test statistician

Statistician test ^a	
	POST - PRE
Z	-2,666 ^b
Sig. asymptotic (bilateral)	,008

In Figure 3, it was verified through the survey the general satisfaction of the users with the post-implementation obtained a value of 80.78%, defined as a value of great acceptance.

To verify, a user satisfaction survey was carried out to compare before and after the implementation of the ERP.

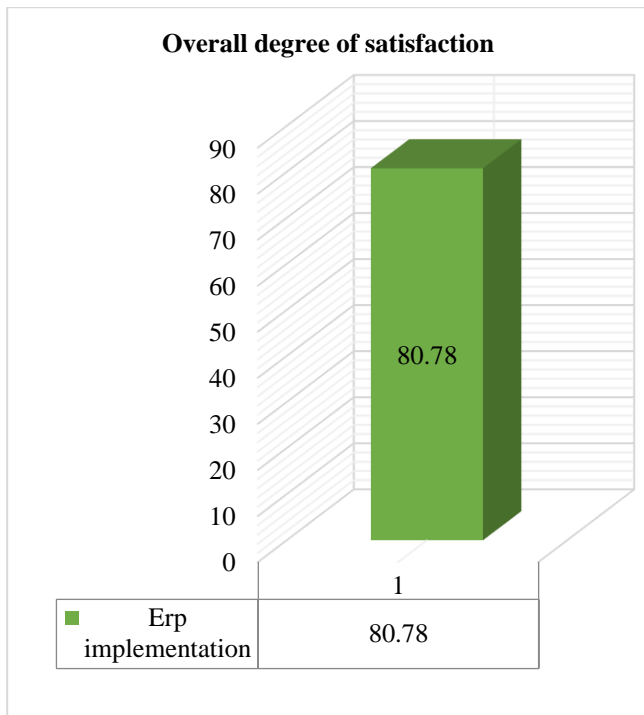


Fig. 3 Degree of satisfaction with the implementation of an ERP

It worked with the following hypotheses:

H0: There is no significant difference in relation to user satisfaction when implementing the ERP.

H1: There is a significant difference in relation to user satisfaction when implementing the ERP.

For this, it applies a non-parametric test of 2 related samples; since they are the same users, their impressions are taken at different times. (See Table 12)

Table 12. Satisfaction of the end user before and after the implementation of the ERP. Using Likert scales from 1 to 5.

Users	Satisfaction_Before	Satisfaction_After
1	2	5
2	2	5
3	3	5
4	2	5
5	1	4
6	2	5
7	3	5
8	2	5
9	2	5
10	2	5
11	2	4
12	2	5
13	3	5
14	2	5
15	2	5

First, we check the normality of the dataset in Table 13.

Being a sample of less than 40, Shapiro Wilk is used, and it is observed that there is no normality because the significance of the satisfaction before and after is 0.000 less than 0,05.

Table 13. Test of normality or abnormality to the satisfaction of the user

	Shapiro Wilk		
	Statistical	gl	Sig.
Satisfaction_Before	,402	15	,000
Satisfaction_After	,514	15	,000

For thence, it will be used the Wilcoxon test which is not parametric and the significance is observed to be less than 0.05, being 0.000, for which the null hypothesis is ruled out; therefore, there is a significant difference regarding user satisfaction when implementing the ERP. (See Table 14)

Table 14. Satisfaction check

Test statistics ^a	
	Satisfaction_After - Satisfaction_Before
Z	-3,578 ^b
Sig. Asymptotic (bilateral)	,000

The satisfaction of the suppliers with respect to the ERP service in relation to past years was also contrasted, since before it took time to collect invoices, the inference is stated as:

H0: There is no significant difference regarding supplier satisfaction at present

H1: There is a significant difference regarding supplier satisfaction at present

Next, the provider's satisfaction was validated because, before the implementation, there were many non-conformities regarding payments and observation of the traceability of documents.

Table 15. Supplier satisfaction before and after the ERP. Using Likert scales from 1 to 5.

Users	Satisfaction_Before	Satisfaction_After
1	1	4
2	2	5
3	2	5
4	3	4
5	2	4
6	2	5
7	3	5
8	2	5
9	2	4
10	2	5
11	2	4
12	3	5
13	3	4
14	2	5
15	2	5

Normality is observed first in Table 15.

It is obtained that the data is not normal when having values less (0,001,0,000), which are values less than 0.05, as observed in Table 16; therefore, a non-parametric test must be applied.

Table 16. Test of normality or abnormality

Test of Normality of Shapiro Wilk			
	Statistical	gl	Sig
Satisfaction Before	0,734	15	0,001
Satisfaction After	0,630	15	0,000

In the following Table 17, it is observed that the significance is less than 0.05. Therefore, the null hypothesis is ruled out; therefore, implementing the ERP improved supplier satisfaction.

Table 17. Acceptance or rejection of the null hypothesis

Test statistician ^a	
	Satisfaction_After - Satisfaction_Before
Z	-3,482 ^b
Sig. asymptotic(bilateral)	,000

Given the facilities of the ERP to be able to interact with suppliers to be able to place their supply offers, to be able to receive information on ONLINE payments from the ERP.

4.1.4. Results of the Implementation of the ERP in the Area of Accounts Payable, Accounts Receivable and Accounting

After implementing the ERP, the materiality or financial loss of more than one million has been significantly reduced; with this, the clinic has obtained a better liquidity flow during the post-implementation period by having the information available and integrated.

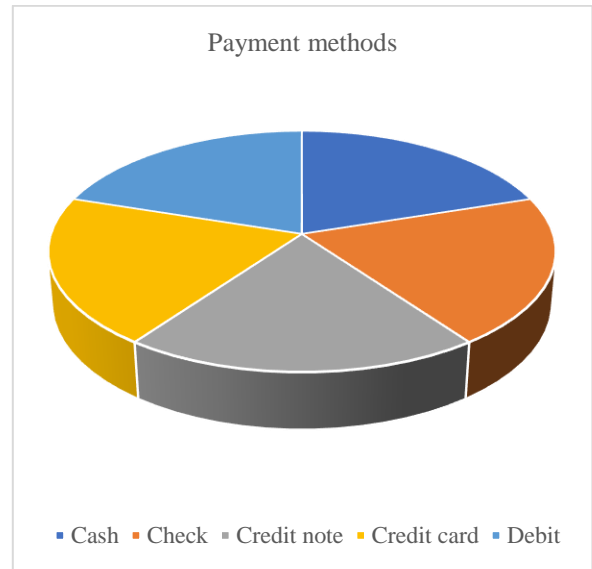


Fig. 4 Payment methods

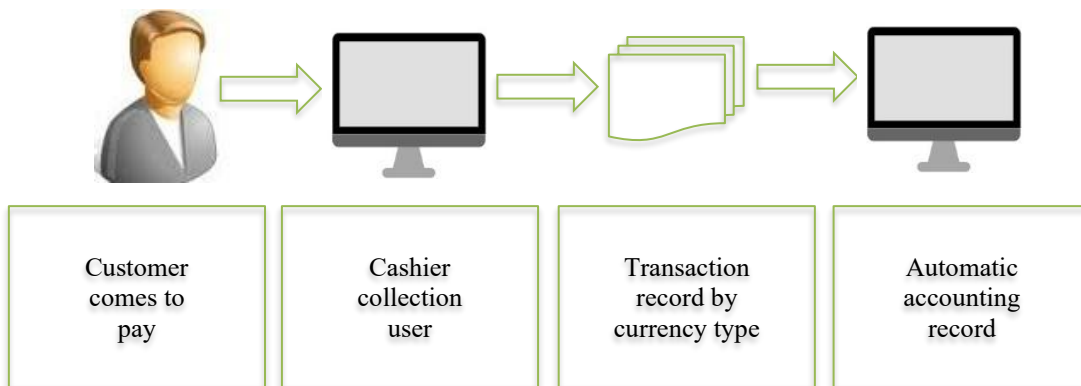


Fig. 5 Collection by types of currency

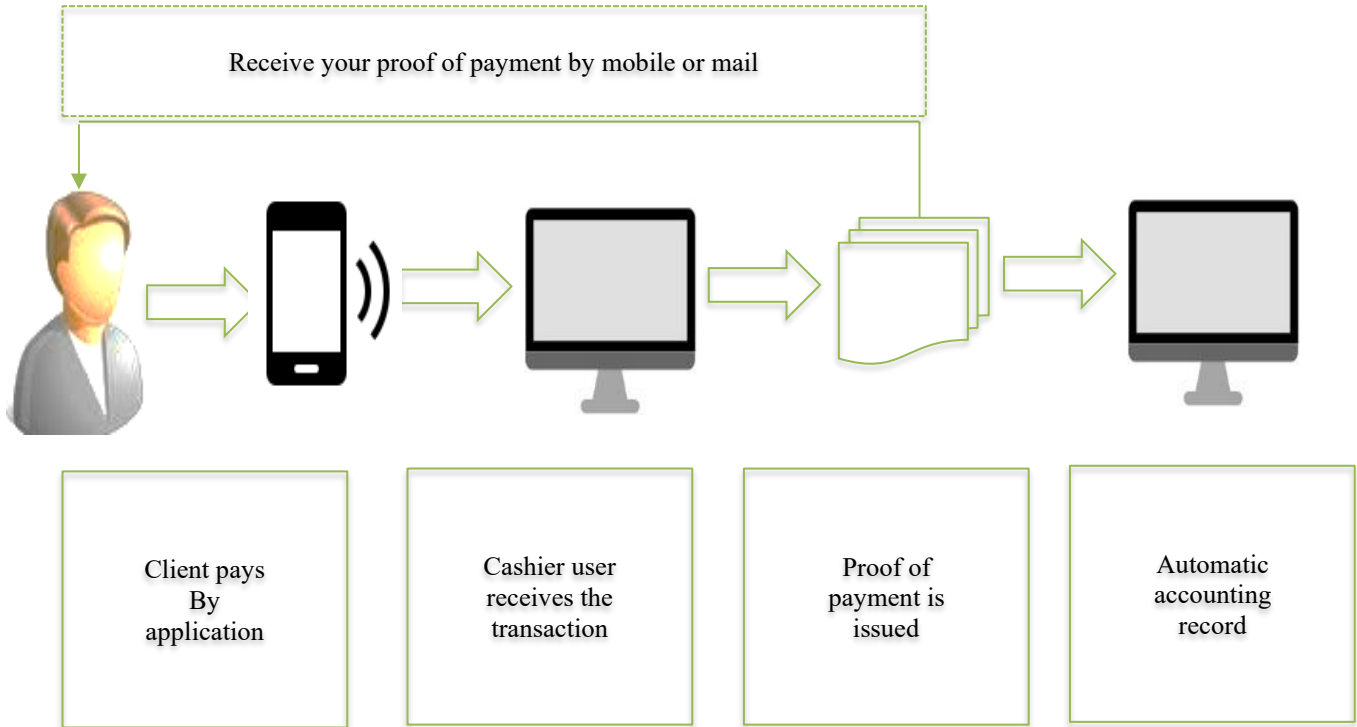


Fig. 6 Collection with mobile applications

Figure 4 shows the post-implementation results, in which the system ERP has the various payment methods available to the client, and their immediate correction by the supervisor and constant manipulation by the systems area is avoided. as it happened with the previous system.

With the implementation, it has been possible to collect transactions in local currency and foreign currency, such as the dollar by cash, generating their correct accounting automatically, giving reliability to the available Asset.

Figure 5 shows that after implementation, the system has allowed the collection of transactions in both currencies, both soles and dollars, without hindering the activity and accounting record of the transaction by the cashier. Before the implementation, the cash and bank area was used to request the conversion with a special exchange rate of the currency to subsequently execute the collection.

In Figure 6, it is explained that the implementation has allowed the money collection by using a mobile application, which immediately issues the payment voucher so that the patient can be attended to, recording the operational and accounting transaction immediately; this mobile application is included in the ERP.

Before the implementation of the ERP, with the M. Sante System (Monolithic System) and other Systems in several areas of the clinic, it depended on the systems area, a division that processed daily transactions and then, with the

processed information, referred them to the area accounting and other areas the next day. The other areas executed their processes similarly, and the systems were fed back the information.

By the way, the M. Sante is an old legacy system with only text lacking graphic structures, which only worked with printed reports; the information was unavailable at the user's request.

Figure 7, after the implementation, shows the functionality or interconnection between the various areas; the ERP system has made the information obtained immediately by shortening users or intercommunications, as well as the absolute dependence of the systems area, which it was not good since many times data was manipulated manually.

Another of the benefits that have been obtained with the implementation is to comply with the bankarization law and avoid fines or sanctions before the supervisory entity, such as SUNAT, which is the government entity that collects taxes from all companies.

In Figure 8, cashiers are aware of the cap or the maximum amount of collections for the means of payment in cash, including dollars, and it is that the implementation has allowed the generation of alerts in order to avoid errors or comply with the law of bankarization in order to avoid sanctions by the supervisory entity.

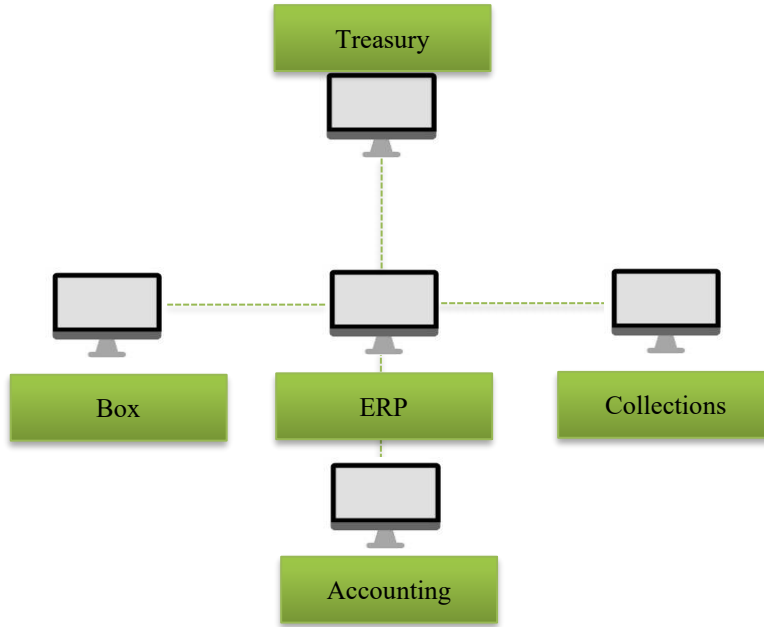


Fig. 7 Information processing after implementation

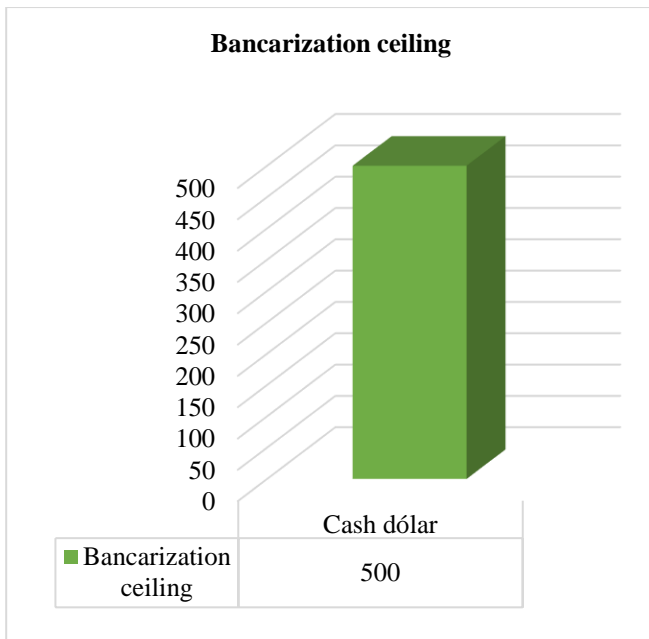


Fig. 8 Maximum amount of cash payment

Table 18 shows the results of the impact on the reduction of the payroll cost by 1'578,947.37 million Dólares; the implementation was carried out from May 2018 to December 2019.

Table 18. Payroll cost (\$)

Period	Pre-implementation	Post-implementation
Payroll cost	\$ 8'775,879.74	\$7'206,690.26

Table 19 shows the cost of the ERP and implementation; it was 350 thousand dollars.

Table 19. Implementation cost

Campus/cost	Campus 1	Campus 2	Campus 3	Total
Costo U.S.\$	218,750	76,563	54,687	350,000

Later on, it will be seen studies that were previously done to estimate the recovery time and the NPV to show the benefit of the ERP implementation.

4.1.5. Economic Benefit of ERP

The net present value is used to project the benefit of the investment.

"The Van finds the difference between the updated value of the benefit flows and the value, also updated, of the investments and other cash outflows".[27]

For this investigation, indicators such as the VAN and the period of recovery of the investment were used.

Monetary values in US dollars

$$VAN = -350,000 + \sum_{i=1}^6 \frac{73,529}{(1 + 0.05)^i}$$

I_0 = Initial investment

CF_i =Cash Flow

k = Update rate, comparative in the market, was taken at 5% as the opportunity cost rate.

i = period (it is 6 months)

In the collected information, the following monthly flows were obtained

Considering the investment in the ERP (Io), which was 350,000, it was projected to recover the investment in 6 months.

The CFi being the average cash flow of 73,529 per month, the product of payroll savings due to staff reduction and consultancies for maintenance of old legacy systems such as the Spring name.

$$VAN = -350,000 + \sum_{i=1}^6 \frac{73,529}{(1 + 0.05)^i}$$

After 6 months, it gives \$ 23,212.64, which indicates that it is profitable, and you can earn more than 5% than investing in another investment item.

Now the investment recovery time is seen, which according to [28], is the time it takes to recover the initial investment of the project. Table 20 shows the flows and the initial investment.

Table 20. Investment recovery time

Period	Investment	Cash lows	Cumulative cash flow
0	-350000	0	0
1		73,529	73,529
2		73,529	147,058.82
3		73,529	220,588.23
4		73,529	294,117.64
5		73,529	367,647.05
6		73,529	441,176.46

Being A = 4

B = 350,000

C = 294,117.64

D = 73,529

Using the formula:

$$PRI = A + (B - C)/D$$

A = Period before the investment is recovered

B = Initial investment

C = Cumulative cash flow

D = Cash flow of the period where the investment is recovered

Replacing values gives 4.760004352 Months.

Which taken to months and days gives, and the investment was recovered in 4 months and 23 days.

4.1.6. Critical Success Factors for the Implementation of the ERP, Social Costs and the Predictive Function of the Quality of the ERP.

It was observed that the success of the ERP is based mainly on the commitment of the user community, but with strong leadership and management authority.

There is a social cost when implementing an ERP, since personnel who previously did necessary or repetitive tasks, now with the ERP it is no longer necessary; for this reason, the management created new jobs based on the digital transformation and according to the expertise and the skills of the employees that the position requires, but even so, there was an ostensible reduction in the payroll.

Information security has been considered [29], which is a set of techniques aimed at obtaining high levels of security in computer systems.

Usability [30], which is the ease with which a system can be used, has been added as an important factor. Likewise, given the scenario before the implementation of the ERP, the quality of the information that was previously not good due to the dispersion of the information has been added; in this way, an equation of predictability of the quality of the ERP is proposed.

Using the following multiple regression formulae:

$$F(X) = k + b1 * X1 + b2 * X2 + b3 * X3 + \dots \dots + bn * Xn$$

Table 21. Information security dataset, information quality and usability

ERP-QUALITY	IQ	INT	AVAI	SEC	USAB
4	4	4	5	5	4
5	4	5	5	5	4
4	5	4	4	4	4
5	5	5	5	5	4
4	4	4	5	4	3
4	5	5	5	5	4
4	5	4	5	4	4
4	4	5	4	5	4
4	4	4	5	5	4
5	4	5	5	5	4
4	5	4	4	4	4
5	5	5	5	5	4
4	4	4	5	4	3
5	5	5	5	5	4
4	5	4	5	4	4

Being the dependent variable, the quality of the ERP, and the independent variables being, the quality of information (IQ), Integrity (INT), Availability (AVAI), Security (SEC) and Usability (USAB), are shown in the following table the surveyed dataset.

The information was obtained from the clinic management and systems management, as shown in Table 21.

Running the Dataset in IBM -SPSS obtained based on the survey with liker scale:

An R= 0.809 was obtained, which is a strong correlation value, between the predictor variables and the variable under study, which is the quality of the ERP.

The following coefficients were obtained, shown in Table 22:

Table 22. Standardized coefficients of the predictor function

Variables	Coefficients
CONSTANT	-.750
QUALITY-INFO(IQ)	-0.050
INTEGRITY(INT)	0.800
AVAILABILITY(AVAI)	0.400
SECURITY(SEC)	-0,250
USABILITY(USAB)	-0.250

Being the predictive function of the quality of the ERP:

$$F(ERP_QUALITY) = -0.750 - 0.05 * IQ + 0.8 * INT + 0.4 * AVAI - 0.25 * SEC + 0.25 * USAB$$

In the investigation, it is assumed that all the values regarding the dependent variables must be values greater than or equal to or equal to 3 on the Likert scale for the ERP to be of quality.

If we substitute values in the range from 1 to 5, we will obtain an approximate value of the quality of the ERP.

4.2. Discussion

The development of the ERP system has produced a drastic reduction in the cost of the payroll and also in the sanctions imposed by the National Health Superintendence. These results affirm the success of the implementation of an ERP system in terms of improving the situation of Current Assets in an important clinic in the city of Lima.

The success of this implementation of an ERP system has allowed the generation of charges in its different modalities, charging with applications, charging by type of currency, and enforcing the banking law.

The results have also affected the holistic sense of the workers who express their satisfaction with the implementation.

It is shown that the end users are satisfied with the ERP, apart from the suppliers' compliance, due to the agility of the purchase and payment procedures.

The cash closings, balanced with the use of the ERP, are more agile not only for the user in his accounting activities but also for the provider due to his faster payments and placement of offers.

The recovery as a result of the implementation of the ERP is appreciated due to the savings basically in the payroll, which with monolithic systems with scattered information becomes bureaucratic and with inaccurate financial results.

This article agrees with state of the art regarding the attributes that must be taken into account when acquiring an ERP, such as the availability, integrity, usability and security of information, in addition to the study of user performance and the impact of the ERP in the organization, also of the commitment of the personnel and management for the success of the implementation of the ERP, but this investigation is distinguished and therefore contributes showing statistical validations of the benefits of the implementation of the ERP, as well as the previous study to project the costs and benefits (VAN) and the recovery time of the investment which must be taken into account to buy an ERP, these details are not observed in the papers reviewed with the search string.

5. Conclusion

Favorable results have been obtained in improving cash flow control and its equivalent, through operational-accounting traceability through the ERP system, in an important Clinic located in the city of Lima, obtaining p. value = 0.027.

An improvement in cash flow control and its equivalent was obtained, with the use of integrated information from various functional areas with an ERP system, in an important Clinic located in the city of Lima, obtaining p. value = 0.043.

The improvement in cash flow control and its equivalent has been demonstrated, with the availability of information through an ERP system, in an important Clinic located in the city of Lima, obtaining p. value = 0.008.

Recommendations

The company developing an ERP system must consider the accounting issue at each stage or part since it will allow the use of adequate control processes and logical support.

The use and development of digitalization are necessary when implementing an ERP system since these systems have large data storage without affecting operability.

Any implementation will be successful in the operational and accounting part if the correct execution or implementation within the processes or activities is determined: traceability, integrity and availability of information.

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