Review Article

Implementation and Analysis of Software for Control and Administration of Expenses in Machinery

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Abstract

In the last three years, the use of technological and online resources has increased, going beyond borders. The problem is focused on the insufficiency of control of expenses to manage, therefore, control is lost and as a result of this the need to have a new tool is created; without this, it is believed unnecessary to be able to carry it in an orderly and correct manner. This article is based on the experience and empirical work of the construction specifically in the ERPs or software to keep an effective control, considering that the machinery is a generator of income and with it to put emphasis to obtain good results. A qualitative and quantitative analysis was carried out, in companies that use a similar type of software, a comparison is made in two programs, identifying in the COMPANY-A program the lack of reports unlike CharLow MACHINERY, therefore, the need for Create a new software that includes all the previous reports and therefore a relationship is established from the data analysis of the new software.

The results show that the creation of this type of software solves the problems of administration and control of a company as part of a monitoring in a first phase to obtain the positioning of the user and team and in a second phase the version 2.0 working in customer satisfaction the users.

Keywords: Software technology; Control and administration; Machinery; Competitiveness; Costs

Introduction

In the last three years, the use of technological and online resources has increased, going beyond borders. The central problem is insufficiency, there is no control over expenses; the effects are not applied to the correct team, lack of knowledge of the cost per team, distribution of expenses out of control; the causes, it is not believed necessary and useful, there are few assets, they use rudimentary methods and techniques. According to Sommerville 2011, *"the problem here is that there are no absolutes when it comes to security. Although the system may not be validated according to predefined criteria, those criteria may be too strict"*. This article is based on the experience within construction in the area of machinery, and there are few ERP or software that can take effective control of the company, considering that machinery is a generator of volumes with the function of generating income and thereby getting good results. According to Pressman 2010, *"software must be adapted to meet the needs of new computing and technology environments"*

Diagnostic Analysis of Business Needs

✓   Some companies suggest that a section be integrated to make a purchase order for some input and that, at the same time, be linked to the record of asset expenses as long as the operation has been completed.

✓   Some users suggest that the software version can be operated from a mobile phone; this happens in small companies with less than ten assets in their yards.

✓   Others have expressed interest in handling an icon where fuel consumption is operated only when they hold a container in their facilities or a work in force.

✓   There are users who have expressed the power to capture the database even when they are not connected to the Internet, so the information can be added when connected.

✓   All users currently using the software predict a great technological contribution to companies that have machinery.

✓   At the international level, it is suggested to manage the currency in US dollars, euros and Mexican pesos. In addition to the Spanish-English language.

Narrative research, according to the experience and observation of several years in the field of construction, specifically in the area of machinery, is how the idea of creating software for control and administration of expenses in assets and machinery was born; a narrative will be made of how the data was given to develop the idea of this investigation.

In correlational research, the software precisely generates reports of the relationship between an expense and others VS the hours or kilometers consumed or between one period and another, between one asset and another similar one (Figure 2).

Causal-comparative, the same variables generated in the reports, can be compared against other periods; if there are differentials, it will be the reason to search and determine the cause (Figure 3).

There is evidence of the functions performed by other ERPs, software, or systems that perform similar functions (Table 1), or at least are used in construction projects or different types of companies where machinery and equipment are used; However, in the research carried out so far, the difference lies in the kind of reports that each software products for the control and administration of expenses in machinery and assets, and in decision-making in the company (Figure 4).

Table 1: Comparative analysis Charlow-Machinery and ERPs in the market.

Comparison of reports issued by different software			
Functions	**Charlow MACHINERY**	**COMPANY-A**	**COMPANY-B**
Asset Catalog	YES	YES	YES
Supplier Catalog	YES	YES	YES
Expense account	YES	YES	YES
Expense record	YES	YES	YES
Capture referrals	YES	YES	YES
Sales report	YES	YES	YES
Cost Report	YES	YES	YES
Yields	YES	NO	YES
Accumulated costs	YES	NO	YES
Hourly cost	YES	NO	NO
Average cost/asset	YES	NO	YES
Total costs/asset	YES	NO	YES
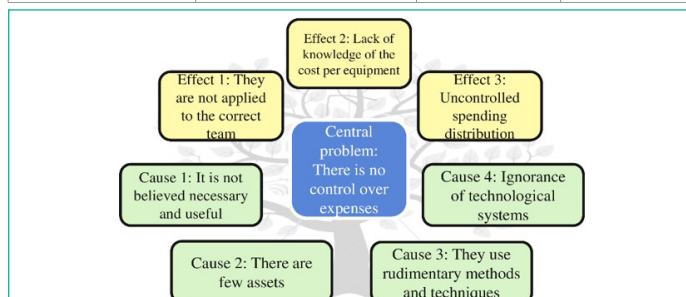
Figure 1: Analysis of the causes and effects of the use and control of machinery.
Source: Own elaboration.

Figure 2: Team hourly cost report.
Source: Own elaboration.

Figure 3: Cost per km report of a work vehicle.
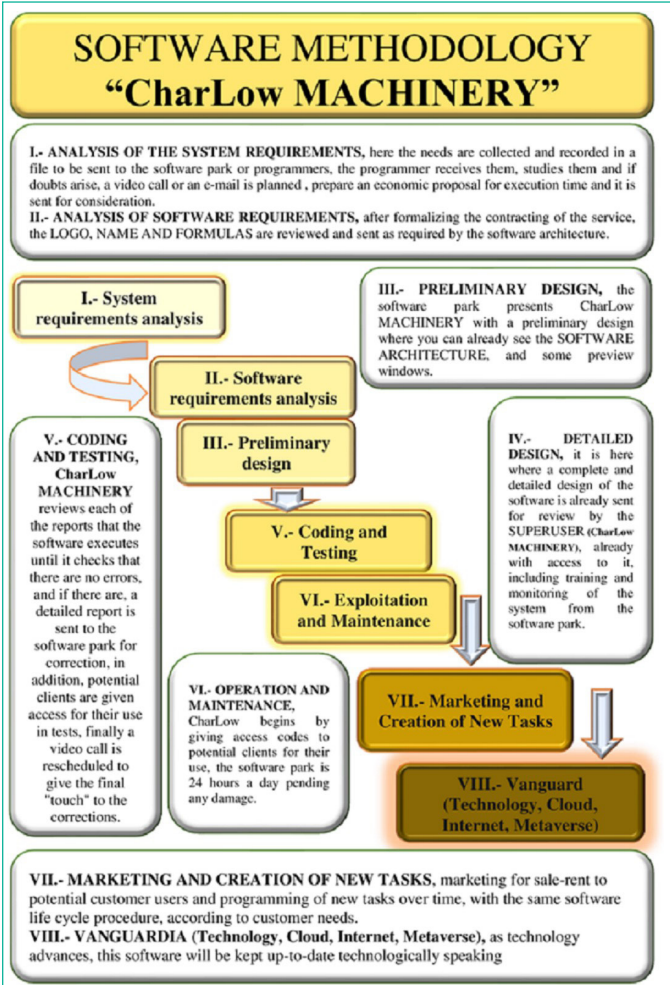Source: Own elaboration.

Figure 4: CharLow MACHINERY software methodology.
Source: Own elaboration.

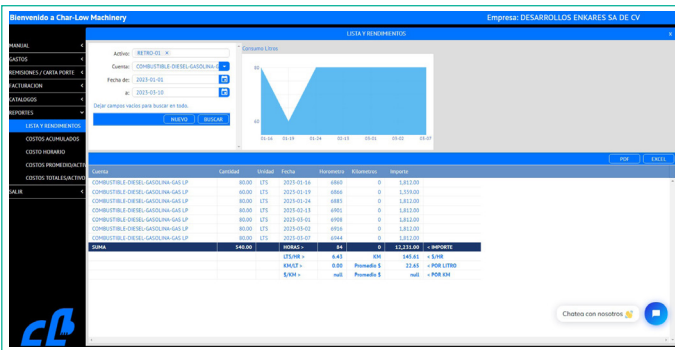**Figure 5:** Several work windows at the same time.
Source: Own elaboration.

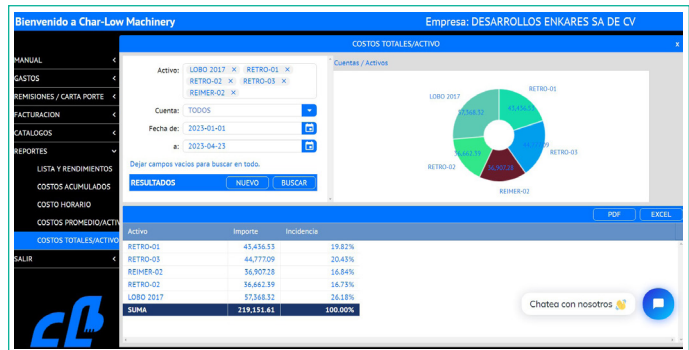**Figure 6:** Report "roster and performance" of a team.
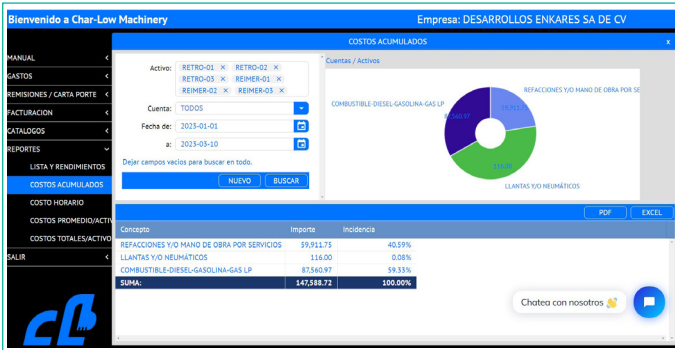Source: Own elaboration.

Figure 7: Report "accumulated costs" of various equipment.
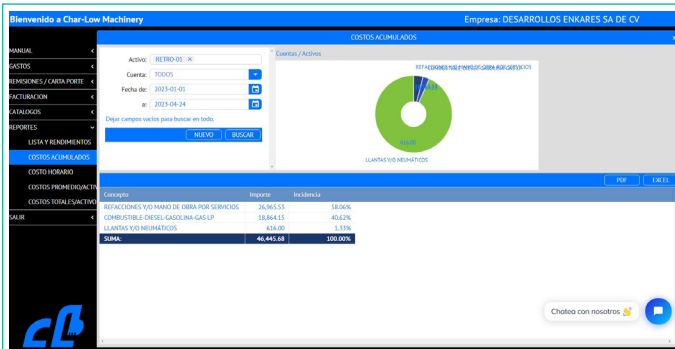Source: Own elaboration.

Figure 8: Report "accumulated costs" for a single team.
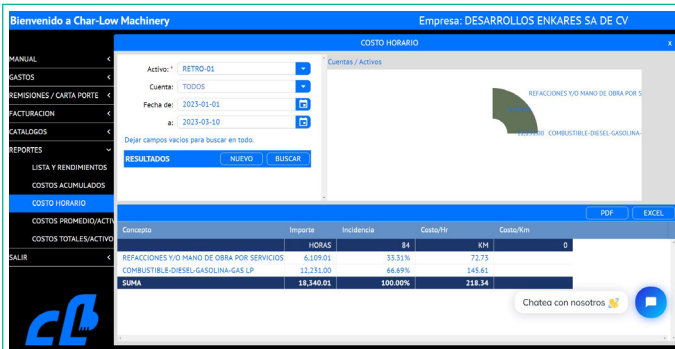Source: Own elaboration.

Figure 9: Report "hourly cost" a-team.
Source: Own elaboration.
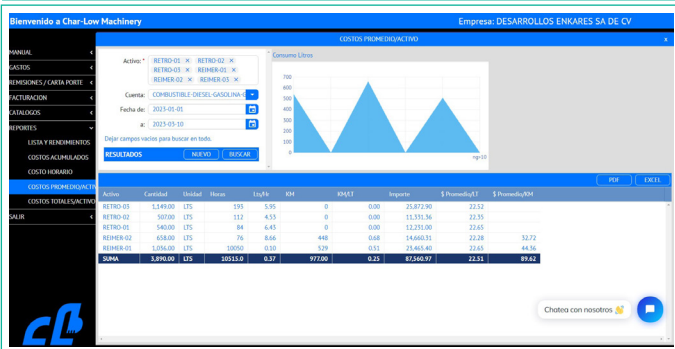
Figure 10: Report "average/asset costs" various equipment.

Figure 11: Report "total/active costs" various teams.
Source: Own elaboration.

Figure 12: Front view of the software.
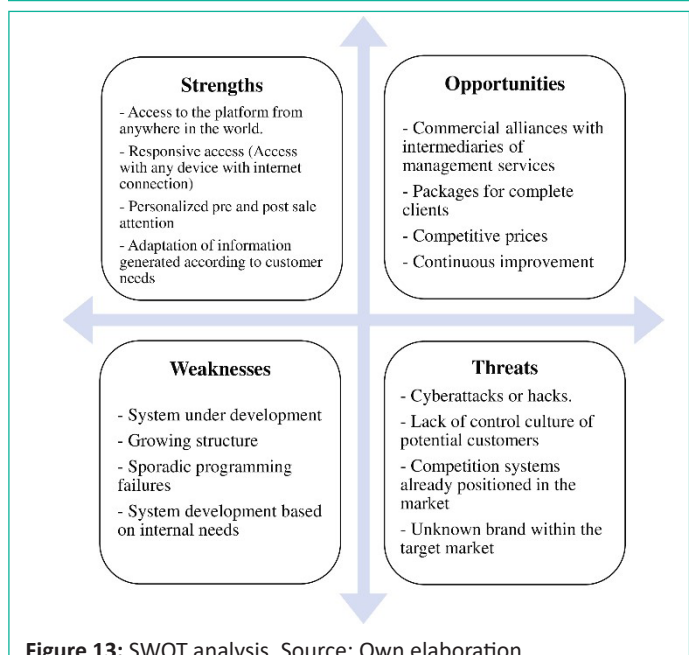Source: Own elaboration.

Figure 13: SWOT analysis. Source: Own elaboration.

Objectives

✓ Develop software to control and manage machinery costs in real time for a company, adaptable to any other.

✓ Develop a 100% online system fed by a database that immediately finds any record of equipment or machinery in real-time.

✓ Update hourly costs to determine sale prices at any time.

✓ Calculate the salvage value, analyze helpful life, and verify its replacement's viability.

✓ Update hourly costs to determine sale prices at any time.

✓ Calculate the salvage value, analyze useful life, verify the viability of its replacement.

Literary Review

To achieve the objectives set out in this research, it is based on the methods to define the objectives of the research project such as PURE, CLEAR and SMART, it is said that these methods are the most used and the most popular today.

1. Research, the subject of study is identified from the observation.

2. Planning, several methods will be analyzed to define the objectives of the research project such as PURE, CLEAR and SMART.

3. Diagnosis, the way in which they currently manage their expenses in machinery is analyzed and documented.

4. Execution, version 1.0 of the software will be launched, carrying out a qualitative analysis.

5. Evaluation and control, evaluation implies the act of describing and making a judgment, which means comparing.

6. Monitoring, follow-up and control will be done to carry out phase 2.0

Software realities, according to García, F., García, A., Vázquez, A. (2020)

• *55% of the systems cost more than expected, 68% exceed the delivery date and 88% had to be substantially redesigned* **IBM Report (1994)**

• *Average was $100 per line of code, expected to pay $500 per line, ended up paying between $700 and $900 per line, $6 billion of work was wasted* **Advanced Automation System (FAAm 1982-1994)**

• *Every 6 new systems put into operation, 2 are cancelled, the probability of cancellation is around 50% for large systems, the average number of projects that exceed the schedule is 50%, 3 out of 4 systems are considered to be operational failures* **Bureau of Labor Statistics (1997)**

• *52.7% of projects related to information technology cost 189% of their estimated initial cost* **The Standish Group, as reported by Solutions Integrator (June 1999)**

• *74% of all information technology projects fail because they go over budget because they do not meet the delivery deadline... and 28% of projects fail. The Standish Group (1998)*

completely

• *Every year, 75 billion dollars are spent on failed information technology projects in the* **USA. The Standish Group (1998)**

• In large companies (where the average development project cost is $2,322,000), only 9% of projects were on schedule and within budget. **The Standish Group, as reported by Solutions Integrator (June 1999)**

• *31.1% of projects are canceled before completion The Standish Group, as reported by* **Solutions Integrator (June 1999)**

• *Close to half of development projects cost 70% more than initially budgeted. Managers cite a lack of user input as the main reason for project failure.* **The Standish Group, as reported by InternetWeek (September 1999)**

Some causes of software problems, according to García, F., García, A., Vázquez, A. (2020)

○ *Unqualified managers*

○ *Lack of communication between parties*

○ *Ignorance of new trends or resistance to change*

○ *Lack of recognition of the figure of the computer scientist*

○ *A broad mythology and lack of "computer culture" in society*

The software does not "wear out," according to Pressman, R. (2010)

It is common to use a phrase called "tub curve", which says that hardware has high failures in an initial stage of use (failures attributed to design or manufacturing defects); the deficiencies are corrected, and the faults are brought down to a stable or low level for a time. However, as time passes, failures increase again as components resist dirt, vibration, temperature variations, and other environmental issues. Inevitably, the hardware begins to wear out.

Software is not affected by environmental issues that cause hardware to wear out. Therefore, and in theory, the failure curve is the "idealized curve". Hidden defects will cause high failure rates early in the life of a program, which can be corrected, and the curve flattens. In conclusion, the software does not wear out, but it does deteriorate!

In the phases of the CharLow MACHINERY software methodology, we identified eight stages where, in an articulated manner, phases I and II correspond to the analysis of every one of the prerequisites for starting up to the contracting of programming services. At the same time, Phases III and IV allowed us to find specific designs regarding the layout and architecture of the software, the preview on the screen, in addition to the system already operating preliminarily ready for a first review, however when it came to the coding part Phase V, we found some poorly programmed formulas, words or phrases susceptible to rearrangement. The software tests allowed us to verify that the system could perform other tasks to complement the reports already programmed within the software. Lastly, we began piloting individual cases in various companies in the construction industry. Sale-rent-lease of machinery Asia Maquinaria de México SA de CV (Sonora, Sinaloa, and BCS), construction Minar Grupo Constructor SA de CV (Sonora), CIA. Constructora

Pericúes SA de CV (Sonora) and Desarrollos Enkares SA de CV (Sonora and BCN), of spare parts and sales Export Sonora Brocker, represented by the agent Jesús Córdova (Sonora), among others, where some preliminary results were obtained.

✓ Export Sonora Brocker suggests that a section be included to place a purchase order for some input and that, at the same time, be linked to the asset expense record as long as the operation has been completed.

✓ Other users suggest that the software version can be operated from a mobile phone; this happens in small companies with less than ten assets in their yards.

✓ Asia Maquinaria de México SA de CV has expressed interest in managing an icon where fuel consumption is operated only when they handle a container in their facilities or any work in force.

✓ Other users have expressed the power to capture the database when not connected to the Internet, so the information can be added when connected.

✓ Desarrollos Enkares SA de CV comments that it would be essential to have related news, a location temperature marker, and some videos related to machinery at the front when entering the system, and before joining as a user.

✓ Minar Grupo Constructor SA de CV believes that the customer's operation manual in PDF should be uploaded to the system once logging in as a user

✓ CIA. Constructor a Pericúes SA de CV predicts a significant technological contribution to companies that have machinery.

✓ Most companies have suggested registering work carried out in concrete freight equipment and that the system crosses the information with the previously registered expenses. And the comparison in machine hours or kilometers traveled.

This type of testing in several companies allowed us to find the development for the pilot test of the first approach to the CharLow MACHINERY software. From the pilot test, a restructuring or increase in functions is planned, and you return this part to phases III and IV to complete and adapt to the needs of the users, which is the most significant contribution to which it is intended to reach. Below is the request made to the software park via a written document about the pilot topic.

Currently, this software, CharLow MACHINERY, is still working on a pilot plan; it already performs most of the functions and reports reviewed and, at the same time, programming in phases III and IV to immediately move on to stage V. It is worth mentioning that these three phases will be the of greater use technically speaking when it comes to changes and updates. You must move in this circle of three steps to review the needs, program, and code until the software works technologically.

This software is being developed in the JAVA programming language, (Cloud-based, technology that allows remote access to software, file storage and data processing through the Internet, thus being an alternative to running on a personal computer or local server) so that the user has the option of seeing several windows or modules at the same time, without deleting the registered information when the window is changed, this language precisely has that particularity, unlike the others. Java

language, is general purpose, allows you to design or insert objects, and is designed for minimal implementation. In this language you can create applications on many devices, it is very widely applicable, it allows you to create software on mobile devices, sales terminals and web pages.

In this "list and returns" port, the list of each expense charged to one or several computers, the selected ones, of the designated account and in the indicated period is obtained.

In this report, "accumulated costs" indicates the accumulated amount of expense accounts. For example, in addition to the total of this report, fuels, spare parts, tires, and accumulators of one or more pieces of equipment, the % of incidence, in the indicated period.

In this "hourly cost" report, the $/HR ratio of each team is obtained one by one, the amounts of each expense account, in addition to the % of incidence and the hours or kmts. Consumed in the required period.

In this report "average costs / asset" the ratio lts/hr, kmts, amount, average cost of liters or kmts, in the indicated period, of one or more assets, of the indicated account, in the required period, is obtained.

This "total costs/asset" report indicates each and every one of the marked equipment, the amount spent on the account or accounts that you indicate and the % incidence of spending on each asset, in the selected period.

When entering the page www.charlowmachinery.com, the screen of Figure 12 appears, where you can see news or technology articles with a link to the complete information, as well as the temperature of the city or place where the user is located. . On the other hand, you can see and listen to any of the five videos that can be seen in Figure 12.

Once enjoying the front shown in figure 12, if you are already a user, enter with the password assigned inside the software to start working.

Conclusions and Recommendations

Using software to control and manage costs in machinery will help convert an inventory of assets into an independent business unit within companies.

Currently, it has the institutional support of the Chambers in Mexico, the necessary facilities and relevant resources, and access to the information that supports this work.

The necessary conditions exist to carry out this project, there will also be many companies that need it, and when they find out about it, there will be interest in its implementation.

There is evidence that when talking with many of the colleagues dedicated to construction and others devoted to another business but who have machinery in their business, they have shown interest in using the software as a way of controlling and managing their expenses and keeping logs and leaving to do it as they do up to now, those who do, because there are countless people who do not even do that.

It is specifically designed for companies that have assets, machinery and equipment, it will cover their expenses control and administration needs, it is usually simple to use and easy to integrate into the company's infrastructure, technology adds value to a business by having quality procedures installed, great flex-

ibility compared to existing software packages on the market, according to what was investigated for machinery there is not much, in this software market for asset cost control and management in real time, few companies They use it. The above, according to research so far.

Author Statements

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