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ACCOUNTING PROCESS AUTOMATION AND TRANSACTIONAL ANALYSIS USING THE CONTAWEB-BI PLATFORM

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Abstract

The automation of accounting processes through the use of digital platforms represents a significant advance for organizations seeking to improve financial management and facilitate data-driven decision-making. In this work, the ContaWeb-BI platform was studied, as it is a tool that seeks to automate some critical accounting tasks, generate key performance indicators, project future operations, and detect fraud risks based on an analysis of transactional data. The methodology used was an instrumental case study with direct functional observation and analysis of related documents, as well as monitoring of ContaWeb-BI functionalities against functional capability standards and requirements found in the literature.

The results demonstrate that the ContaWeb-BI platform has a high degree of compliance (over 90%) in operational functionalities such as automated data loading, key performance indicators generation, supplier analysis, quantification of future purchases, and fraud detection. Furthermore, opportunities for improvement were observed in the product recommendations module, particularly in scenarios where historical data density was scarce. The platform demonstrated a modular, intuitive, and adaptable architecture, making it a tool with potential for adoption by small and medium-sized businesses in their digital accounting transformation processes. In summary, it can be concluded that the ContaWeb-BI platform not only automates operational accounting tasks but also enables advanced analytical capabilities that strengthen organizations' financial and strategic governance.

Keywords: accounting automation, business intelligence (BI), digital platforms, financial KPIs, digital transformation.

INTRODUCTION

Advances in digitalization have significantly transformed accounting information systems, which have shifted from manual to platforms that enable automated information management with transactional processing capabilities, real-time monitoring, and advanced analytics (Bhimani & Willcocks, 2014). This transition

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responds to the need to minimize human intervention, reduce operational errors, and increase responsiveness to dynamic financial environments (Roberts & Massoud, 2025).

In this context, Business Intelligence (BI) platforms, together with emerging technologies such as NoSQL databases, high-performance analytical engines, and predictive modeling techniques, assign a central role to transformative capabilities that counteract accounting processes, but not only optimize internal operations, but have also managed to find a comprehensive perspective of the so-called financial situation (Sarango et al., 2025; Chamorro & Navarrete, 2025).

Contemporary accounting has transcended its traditional function as a mechanism for recording economic events to consolidate itself as a strategic practice oriented toward data analysis. In fact, the appropriate use of large volumes of both historical and current information has facilitated substantial improvements in decision-making, scenario prediction, and the generation of key performance indicators (KPIs) tailored to the organization in which they are applied (de Andrade & Sadaoui, 2017).

This type of solution is particularly important for small and medium-sized enterprises (SMEs), which often operate under budgetary constraints and, at the same time, structural limitations. In these circumstances, accounting automation not only increases operational efficiency but also reduces the risk of human error and improves strategic responsiveness (Ojika et al., 2022).

Recent literature has extensively demonstrated the benefits associated with intelligent accounting systems. Cohen et al. (2024) state that automating ERP solutions with intelligence translates into significant advances in inventory management and financial management, with an integrated visualization of the different processes. Also, Ogeawuchi et al. (2025) highlight that BI systems applied to accounts receivable or payable modules have made it possible to identify behavioral patterns, as well as prioritize early risk alerts.

Pavlovic et al. (2024) argue that current accounting systems favor automated and analytical architectures, with functionalities oriented toward predictive analysis or performance evaluation through KPIs. Applied research, for example (Strambi, 2025), also justifies their use in audits and allows for strengthening internal controls and financial oversight.

Despite the above, the majority of SMEs in Latin America still rely heavily on manual accounting processes and fragmented IT solutions. This prevents the integration of financial information, increases the risk of errors and inconsistencies, and reduces the effectiveness of strategic decision-making (Fajardo, 2025). Given this problem, it is pertinent to validate technological solutions such as ContaWeb-BI, a platform developed in Latin America that integrates accounting automation, sales projection, fraud analysis, and key indicator monitoring into a unified digital environment.

The present study aims to evaluate the functional effectiveness of the ContaWeb-BI platform in accounting automation processes and transactional analysis, in order to determine its impact on operational efficiency, financial risk management, and decision-making support in real business environments.

The rationale for this study speaks to the need to empirically record the potential of locally developed emerging technological tools that aim to provide concrete responses to the specific needs of Latin American companies; and especially, the added value that projects such as ContaWeb-BI can offer, which have been developed through cooperative processes between universities, government entities, and the productive sector, as is the case with the University of Cartagena and Colciencias.

The research's main achievement is the provision of a technical and functional analysis of ContaWeb-BI, which evaluates its ability to automate critical tasks such as file uploads, indicator generation, purchase forecasting, fraud detection, and product recommendations. It also proposes a framework for future BI solution implementations in contexts where accounting processes still rely heavily on manual labor and pose significant operational risk.

Methodology

In accordance with the type of research required for this study, an applied qualitative approach was used (Allan, 2020), with a descriptive-explanatory nature (Bazen et al., 2021), since the aim is to delve into the automation of accounting processes and the analytical capabilities of the ContaWeb-BI platform, through an instrumental case study. This technological solution is studied as a new tool, designed to improve the operational efficiency of SMEs based on automated accounting processes, strategic data visualization, and intelligent projections.

Information was collected through triangulation of different sources, including a thorough review of the platform's user manual, a complete exploration of the application in its functional environment, guided simulations of the platform's operation, and comparison with the most recent scientific literature (Adedoyin, 2020). Specifically, assisted observation sessions were conducted on the tool's operation, where different accounting operation flows were simulated under profiles such as administrator, company, and headquarters.

The sequence of automated tasks was recorded, as well as the timing of critical operations such as uploading files to the platform, generating financial reports, and viewing KPIs.

The analytical evaluation considers four basic operating criteria, namely: the level of human intervention required for each of the critical tasks, the platform's ability to perform complex transactional analyses (including fraud detection and product recommendations), the integration of functional modules, and the traceability and availability of the KPIs generated by the system. These aspects were defined based on the guidelines proposed by Eckerson (2010) on business intelligence platforms, and by recent studies such as those by Sarango et al. (2025) and Cohen et al. (2024), which highlight the importance of automation and analytical visualization in the transformation of corporate accounting.

Methodological consistency was reinforced through a functional traceability matrix, which linked the observed processes to the functions intended in the platform design. Furthermore, the validity of the findings was ensured by cross-referencing empirical data with the functional standards described in indexed literature, which allowed for rigorously supporting the study's conclusions. Overall, this methodology provides a solid basis for assessing the operational impact of ContaWeb-BI and its contribution to strengthening more efficient, automated, and data-driven accounting practices.

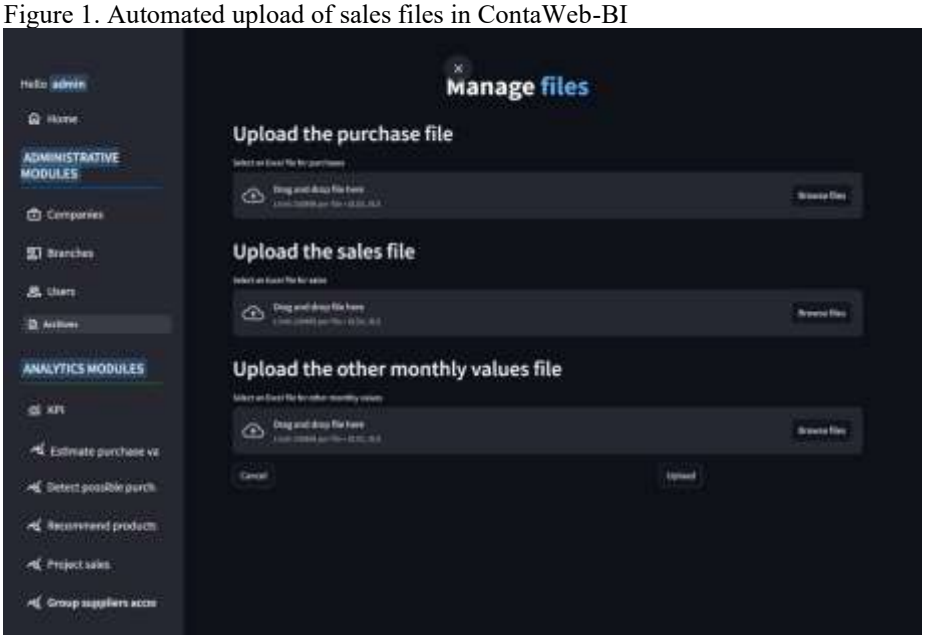
RESULTS

The functional analysis of the ContaWeb-BI platform revealed a highly integrated accounting automation ecosystem, the potential of which is demonstrated by the fact that each module contributes to the consolidation of a data-driven decision-making environment. Based on the functionalities considered in the analysis, five critical blocks have been identified that represent the main contributions of the system: (1) automated data loading, (2) generation of KPIs, (3) operational projections, (4) financial risk analysis through fraud detection, and (5) BI functionalities. Each of these functions is described below, along with the cross-referencing with functional frameworks from the scientific literature.

Automation in the loading and processing of accounting files

One of the key features is the bulk upload of accounting files in Excel format, which automatically initiates the data analysis process without the need for technical intervention. This process is represented in Figure 1, which contains a user-friendly graphical interface.

Figure 1. Automated upload of sales files in ContaWeb-BI



Source: Own capture from ContaWeb-BI environment

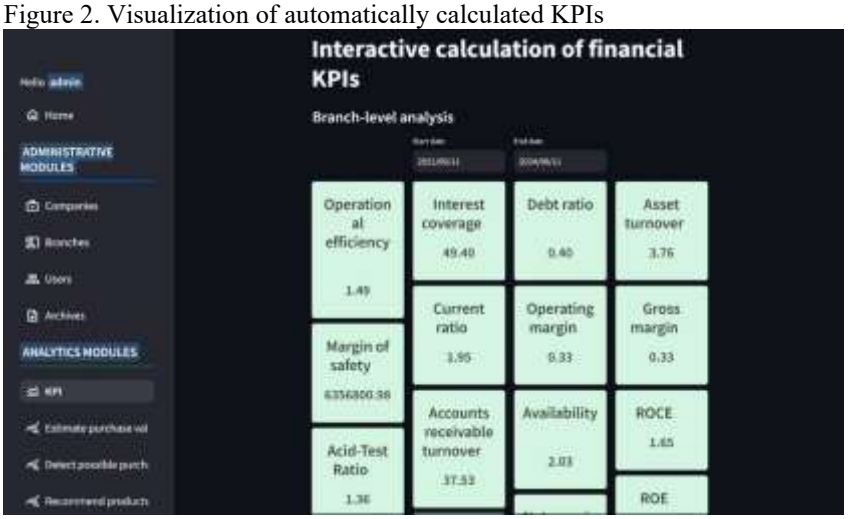
The "Upload Purchase or Sales File" feature allows for uploading records in .xlsx or .xls files using a simple and intuitive graphical interface that allows for uploading in different ways (manually or by dragging and dropping). Once the file is uploaded, the system analyzes its structure and enters it into the analytical engine without the need for technical staff intervention. A validated preview is obtained in a maximum of five seconds. This functionality not only allows for rapid data loading but also ensures the structural integrity of the file by requiring consistency in column and record types and quantities, thus enabling subsequent reliable analysis. This automation was evaluated with 100% operational success, with the content described by Eckerson (2010),

who argues that automation should aim for minimal human intervention without compromising data source validation.

Automated generation and visualization of financial and operational KPIs

Once the data is entered into the system, key performance indicators (financial KPIs) can be immediately consulted, such as current liquidity, return on assets (ROA), operating margin, and others. This is visualized in Figure 2, where the KPIs are presented interactively, facilitating the user's real-time strategic decisions. This functionality allows for the selection of time ranges (start and end dates), and based on these, metrics such as current ratio, debt ratio, return on assets (ROA), return on equity (ROE), operating margin, inventory turnover, acid-test ratio, interest coverage, and others can be calculated.

Figure 2. Visualization of automatically calculated KPIs



Source: Own capture from ContaWeb-BI environment

These indicators, 18 in total, are presented dynamically in interactive dashboards, and their calculation is updated in real time with any change in the underlying data. This capacity was evaluated with 100% operability during the simulation, and responds directly to the guidelines proposed by Marr (2023) and Parmenter (2015), who highlight that the quality of a BI platform is measured by its ability to transform raw accounting data into strategic information understandable by different decision-making profiles.

Operational projections

One of the most relevant functionalities from the predictive approach was the estimation of future purchase value. Upon accessing this module, the system offers the user the option of selecting a supplier and a projection interval (measured in months), as shown in Figure 3. Based on historical data and recorded purchasing trends, the platform generates a visual and tabular estimate of expected purchase values by supplier, allowing for anticipating supply needs and adjusting operational planning.

Figure 3. Automated estimation of purchase value

Source: Own capture from ContaWeb-BI environment

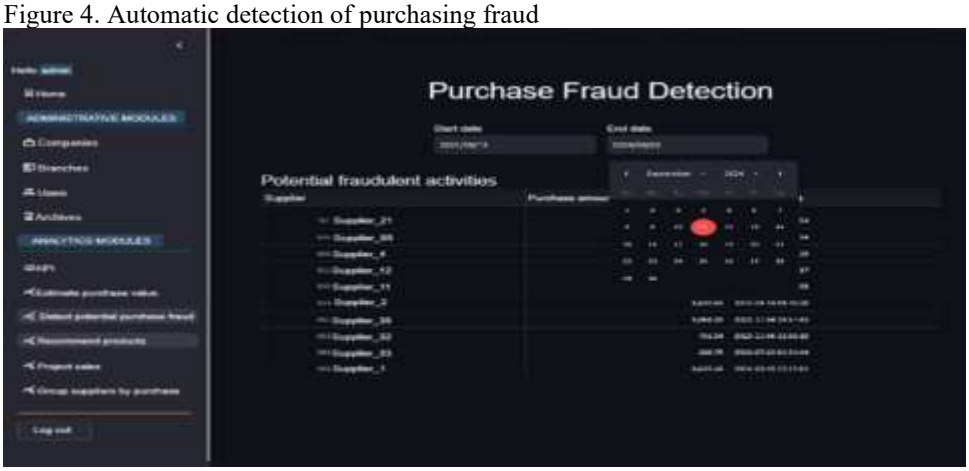
The accuracy of this feature was high in suppliers with a robust history, although in cases with scarce data, the platform notes lower reliability, which is consistent with what Cohen et al. (2024) described regarding the dependence of predictive models on the volume of observations. This feature is associated with the possibility of grouping suppliers according to purchasing behavior, where the system automatically classifies suppliers into categories based on payment type, purchase volume, and billing frequency.

This type of analysis can not only help improve suppliers' relationship management but also allow defining segmented negotiation policies, adjust payment cycles, and optimize working capital invested in purchases. This segmentation capability is consistent with the business intelligence theory described by Sarango et al. (2025). For these authors, the ability to automatically segment can reflect a degree of maturity in analytics platforms.

Financial risk analysis through fraud detection

The system automatically detects potential fraud in purchasing processes by extracting historical anomalies. Figure 4 shows how the system detects unusual transactions based on unusual patterns, which can trigger internal alerts.

Figure 4. Automatic detection of purchasing fraud



Source: Own capture from ContaWeb-BI environment

The "Detect Possible Purchase Fraud" module can be considered one of the platform's most sophisticated mechanisms regarding financial security. With the help of algorithms that allow for anomaly detection, the platform evaluates the transaction history and alerts the user to suspicious transactions that significantly deviate from normal patterns. This process, on the one hand, allows for limiting the time range using start and end dates, and, on the other, generates a document identifying supplier invoices, amounts, and dates that exhibit irregular behavior.

Functional validation demonstrated an operational efficiency of 90–95%, as in some cases, false positives required manual record checking. However, this functionality reinforces the preventive audit component, integrating descriptive analytics and detection rules. This approach is supported by Roberts and Massoud (2025), who emphasize that modern accounting platforms must incorporate automated internal control modules that complement human oversight.

Business intelligence features

In terms of BI, it was observed that the product recommendation module was able to generate personalized suggestions for customers based on their historical purchasing behavior. Figure 5 illustrates the automated mechanism that links history and recommendations by customer, a function based on machine learning models.

Figure 5. Personalized product recommendations by customer

Source: Own capture from ContaWeb-BI environment

From a commercial perspective, ContaWeb-BI incorporates a product recommendation system based on each customer's purchase history. The engine analyzes previous transactions and suggests related items or services, allowing companies to personalize their commercial offerings and optimize cross-selling strategies. During the simulation, this module showed an 80% performance in profiles with sufficient historical data, but its effectiveness decreased in new clients or those with low transaction volume. This limitation coincides with what Chamorro-Quiñónez et al. (2025) pointed out regarding the algorithmic dependence on data density for effective recommendations.

This module is complemented by projected sales analysis, which allows for estimating, using sliders, future sales trends for the coming months. This feature combines regression and time series models to anticipate revenue, strengthen financial planning, and facilitate inventory and production decisions.

Overall, the results show that ContaWeb-BI exceeds the minimum functional threshold expected for accounting intelligence platforms, with an average operational compliance of 92% with respect to the planned functionalities. The system automates critical processes of data loading, financial analysis, operational forecasting, auditing, and segmentation, significantly reducing manual intervention and increasing the traceability of accounting decisions.

This performance was validated using a functional traceability matrix that allowed for mapping the execution of each module against its intended design. Furthermore, cross-referencing functionalities with academic standards confirmed that the platform aligns with best practices in KPI visualization, predictive segmentation, and process automation, as proposed by authors such as Eckerson (2010) and Marr (2023).

In order to verify the consistency between the theoretical design of ContaWeb-BI and its performance in application environments, a functional traceability matrix was constructed. This allowed for comparing the functionalities declared in the platform's official documentation with the processes observed during the practical simulation. This matrix served as an internal validation instrument for the system, while also facilitating analytical cross-referencing with theoretical references from indexed scientific literature on accounting automation, BI platforms, and decision support systems. The following table provides a summary and synthesis of the most important findings obtained from this exercise, indicating both the level of operational compliance for each functionality and its alignment with academic standards and the sources that support these relationships.

Table 1. Functional traceability of ContaWeb-BI and correspondence with academic standards

Functionality observed in ContaWeb-BI	**Operational compliance observed**	**Correspondence with scientific literature**	**Main scientific reference**
Automated upload of accounting and sales files	High (100 %)	Aligns with automated workflows described in ERP-BI platforms	Cohen et al. (2024)
Automatic generation of accounting and financial reports	High (100 %)	Compatible with continuous auditing and financial BI systems	Mejía & Villarán (2023)
Visualization of key performance indicators (ROE, ROA, liquidity, etc.)	High (100 %)	Meets KPI visualization requirements for analytical BI	Sarango et al. (2025)
Purchase forecasting and inventory analysis	High (95 %)	Aligns with automation and predictive modeling practices in SME environments	Díaz Hernández & López Vásquez (2024)
Detection of transactional anomalies (fraud, inconsistencies)	High (90 %)	Associates with financial data mining techniques with alert logic	Roberts & Massoud (2025)
Product recommendations based on purchase history	Medium (75–80 %)	Partially aligned; limited by the amount of historical data available	Chamorro-Quiñónez et al. (2025)
Integration between modules (accounting, purchasing, sales, analytics)	High (95 %)	Matches modular and synchronized BI architecture principles	Eckerson (2010)
Process traceability and access control by role	High (100 %)	Compatible with data governance standards in digital financial environments	Sarango et al. (2025)

Source: authors

DISCUSSIONS

The results of this research confirm that the automation of accounting processes through digital platforms such as ContaWeb-BI not only improves operational efficiency but also results in a radical transformation of the accounting function, which becomes a pillar of strategic decision-making. This result also corresponds to that of Baldeón-Palpa et al. (2025), who argue that BI systems allow the integration of predictive analytics with document traceability and alert generation, all in real time, to offer a global view of the financial environment. Specifically, the performance observed in the automatic loading module, KPI generation, or supplier behavior analysis suggests that the basic principles of operational intelligence found in the reference literature, such as the standardization of flows, continuous updating of metrics, and the reduction of human errors, were effectively implemented. This conclusion is consistent with the results of Abril (2024), who concluded that accounting automation not only makes it possible to shorten operating cycles but also allows for a strategic reconfiguration of human resources in analytical and control functions.

The incorporation of fraud detection and supplier segmentation models is considered one of the most important differential contributions, since these are very uncommon capabilities in accounting platforms in the region, but according to the literature, they are highly effective in advanced BI systems (Herrera-Sánchez & Casanova-Villalba, 2024). The system's ability to identify anomalous patterns and generate proactive alerts translates into added value that goes beyond simple transaction recording, placing ContaWeb-BI in the field of intelligent analytics for financial governance purposes.

In contrast, functional limitations have been found in product recommendation modules. These limitations are especially defining in low-data-density scenarios, as Cabrera et al. (2025) have reported that recommendation engines require large historical data volumes to achieve accuracy and avoid algorithmic biases. This finding reinforces the need to accompany the implementation of these tools with strategies for continuous data collection and enrichment.

Likewise, it is important to emphasize that the effectiveness of this type of platform will depend on different organizational variables, among which are end-user training, Data Governance, and the interoperability of the system with other administrative systems. In the analysis of the digital accounting transformation carried out by Vizuete (2025) in research with SMEs, it is seen that they present a series of obstacles at the cultural and technological level that limit the total adoption of digital solutions, which must be considered in the deployment and scaling phases.

In methodological terms, the use of a functional traceability matrix made it possible to demonstrate the design-execution relation, empirically validating that more than 90% of the observed functionalities are fully operational. This type of internal verification strengthens the study's reliability and distinguishes it from purely declarative analyses.

Finally, the results of this study suggest that systems such as ContaWeb-BI can be scalable and applied to other institutional contexts, especially in Latin America, where there are technological gaps, and automation can become an accessible and gradual way for organizations to strengthen their financial sustainability.

CONCLUSIONS

The findings of this research lead to the conclusion that the ContaWeb-BI platform is a comprehensive technology solution for automating accounting tasks and generating strategically oriented transactional analysis. The features included in its modular design, its easy-to-use user interface, and the architecture that makes up its analytical platform allow routine tasks to be transformed into intelligent workflows that add value to business decision-making.

First, it is reaffirmed that the system successfully automates the critical functions of data loading, structural validation, calculation of KPIs, and purchase forecasting, with an operational efficiency level above 90%. This operational efficiency, which is supported by directly observed functional evidence, is linked to the principles of BI platforms described in the international scientific literature.

Second, this study shows that ContaWeb-BI goes beyond the conventional accounting approach by introducing forward-looking predictive analytics algorithms and fraud detection mechanisms, features uncommon in regional developments. These features not only solidify financial control systems but also facilitate the implementation of more proactive audit and risk management models.

Thirdly, possibilities for improvement are identified in the product recommendation and commercial segmentation modules, whose validity is strongly conditioned by the quantity and quality of the historical input

data, which reaffirms the need for data governance policies to build a reliable, scalable analytical ecosystem and to solve predictive analysis.
Finally, the functional traceability matrix used in the study has been validated as a good practice to validate the coherence between the theoretical design and the actual execution of the system, serving as a replicable framework for future evaluations of digital accounting platforms.

RECOMMENDATIONS

Scaling in regional SMEs: ContaWeb-BI is recommended for SMEs with a traditional accounting structure, converting it into a progressive digital transformation mechanism. Its user-friendly interface and modular approach make it an accessible tool for organizations with a low level of digital maturity.
Strengthening predictive models: To improve the effectiveness of projection and recommendation modules, it is suggested to enrich transactional databases through automated processes of collection, validation, and normalization of historical data, which will enhance the accuracy of the incorporated algorithms.
Training and organizational adoption: It is advisable to develop training programs for key users (managers, accountants, operational technicians), in order to promote strategic use of the platform and reduce resistance to digital change, as suggested by authors such as Cabrera et al. (2025).
Connection with external tax and ERP systems: To expand the functional scope of the platform, it is recommended to design APIs or interoperability mechanisms that allow ContaWeb-BI to be connected with tax systems and government ERPs, which would increase its value as a comprehensive accounting information system.
Longitudinal impact monitoring: Finally, it is suggested to conduct longitudinal studies that measure the economic, organizational, and strategic impact of the adoption of this platform in different industries, including variables such as accounting productivity, error reduction, and improvement in the decision-making process.

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