

## Exploring Digital Accounting Challenges at Vila do Conde City Council

Cristiana Sousa <sup>1</sup> , Helena Costa Oliveira <sup>2\*</sup> , Isabel Maldonado <sup>3</sup> 

<sup>1</sup> ISCAP, Polytechnic of Porto, Porto, Portugal

<sup>2</sup> CEOS.PP, ISCAP, Polytechnic of Porto, Porto, Portugal

<sup>3</sup> CEOS.PP, ISCAP, Polytechnic of Porto, REMIT, Portucalense University and GOVCOOP, University of Aveiro, Portugal

\* Corresponding Author: [helena@iscap.ipp.pt](mailto:helena@iscap.ipp.pt)

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### ABSTRACT

The advancement of information technologies in the digital age has significantly impacted human activity and various professional fields, becoming increasingly prevalent in society. Over time, technology has profoundly transformed public accounting, enabling more efficient, effective, and optimized practices. Innovative tools, such as blockchain, artificial intelligence, and cloud computing, have emerged as key drivers of this evolution. This paper aims to analyze the impact of information technologies on the accounting practices of the Vila do Conde City Council, in Portugal. The study identifies the technological systems and the changes due to the Accounting Standardization System for Public Administrations (SNC-AP) and explores the advantages and challenges of these technologies. This qualitative research method uses interviews and documentary analysis. The findings reveal that while the council has already implemented systems such as Enterprise Resource Planning, there are opportunities to introduce more advanced accounting technologies. Issues such as budgetary constraints and cultural resistance to change influence the pace of technological implementation. However, the council has taken a proactive approach in other areas, focusing on service digitalization and community engagement. This study provides a valuable reference for other public entities looking to modernize their processes and enhance community services. Identifying challenges and barriers in implementing technology enables public administrations to anticipate issues and implement effective solutions.

**Keywords:** Cultural Resistance; Digital Accounting, Information Technologies; Public Accounting; SNC-AP, Vila do Conde City Council

## INTRODUCTION

Digital transformation has played a crucial role in modernizing administrative and financial processes in recent decades, particularly in the public sector. Digitalization, associated with technological innovations, has allowed public institutions, such as City Councils, to increase their accounting procedures' efficiency, transparency and accuracy (Otia, et al., 2022).

The evolution of public accounting in Portugal has undergone significant milestones, culminating in the adoption of the Accounting Standardization System for Public Administrations (*Sistema de Normalização Contabilística da Administração Pública*, SNC-AP) in 2015. Before the 1990s, public accounting in Portugal experienced little reform. However, following Portugal's entry into the European Union in 1986, a foundational transformation began with the enactment of the Basic Law on Public Accounting (Law No. 8/90, of February 20). This law laid the groundwork for a new regime in state financial administration, formalized by Decree-Law No. 155/92, of July 28. It marked the onset of comprehensive reforms in public financial management (Ferreira, 2023).

A key milestone in this evolution was the introduction of the Official Public Accounting Plan (*Plano Oficial de Contabilidade Pública*, POCP) in 1997 through Decree-Law No. 232/97, of September 3. The POCP unified budgetary, financial, and management accounting subsystems into a cohesive framework. It employed the double-entry bookkeeping method and delineated sub-plans tailored to specific sectors, including Local Authorities, Health, Education, and the Social Security System (Ferreira, 2023).

The most transformative development occurred in 2015 with the implementation of the SNC-AP, approved by Decree-Law No. 192/2015, on September 11. This reform aligned public accounting practices in Portugal with international standards, particularly the International Public Sector Accounting Standards (IPSAS), issued by the International Public Sector Accounting Standards Board (IPSASB). The SNC-AP harmonized accounting processes across public entities, replacing disparate legacy systems with a unified framework that strengthened financial reliability, standardized procedures, and enhanced the consolidation of accounts. Additionally, it bridged the regulations governing public, business, and non-profit accounting systems, creating a cohesive approach to financial management (Ventura et al., 2022).

Emerging technologies have further revolutionized public accounting under the SNC-AP framework. Innovations such as blockchain and artificial intelligence have introduced unprecedented levels of automation, security, and transparency, transforming financial transaction management and data analysis. These technological advancements, aligned with the ongoing digitalization wave of the Fourth Industrial Revolution, herald a new era in public financial administration, fostering greater efficiency and reliability in public management.

This study examines the implementation and impact of information technologies in public accounting, focusing on the Vila do Conde City Council. It seeks to identify the technologies employed, understand the systems and tools adopted within the accounting framework, and assess the transformative effects of the Accounting Standardization System for Public Administrations (SNC-AP) on technological practices. The research further aims to evaluate the benefits and challenges of adopting these technologies, providing insights into their role in advancing public accounting processes.

Adopting a qualitative methodology, the study draws on interviews and document analysis to provide a nuanced understanding of the subject. Doing so contributes to the growing literature on digital accounting within municipal contexts. The findings are particularly valuable to the Vila do Conde City Council and to other municipalities seeking to enhance their accounting and financial management by integrating technological tools.

Additionally, the study emphasizes the critical need for continuous investment in employee training, fostering an organizational culture that prioritizes innovation, and allocating sufficient resources for ongoing modernization. Such measures are essential to ensuring the effective and sustainable implementation of new technologies, ultimately enabling public entities to optimize their accounting and financial management practices.

The paper is organized as follows. After the introduction, digitization in public accounting, its advantages and challenges are presented. Information technologies in public accounting are presented in section 3. The methodology is presented in section 4, and the results and discussion are in sections 5 and 6 respectively. The final section presents the conclusions.

## **DIGITALIZATION IN PUBLIC ACCOUNTING – ADVANTAGES AND CHALLENGES**

Technologies are becoming increasingly essential and influential in the public sector, playing a crucial role in its transformation Chen, et al., (2021). The presence of information technologies in public administration is increasingly visible, as the potential to improve the efficiency and quality of public services, public management and public accounting is recognized (Sofyani, et al., (2020). In this context, the government has progressively invested in new technologies, representing a great benefit for public accounting, allowing for more accurate financial analysis, reducing the margin of error, and increasing the reliability of financial information (Sung & Park, 2021; Ruvalcaba-Gomez & Cifuentes-Faura, 2023).

The public sector needs to adapt to changes ranging from technological innovations to the new needs of the population. Traditional bureaucratic procedures, which have been dragging on for decades, need to be rethought, since, although the need for innovation has always existed, changes are occurring faster than in the past. To make this adaptation feasible, the government needs to implement significant transformations, reduce bureaucracy, increase the efficiency of services, and create an environment conducive to developing new technologies (Latupeirissa, et al., 2024; Cardoso, et al., 2008). Consequently, the growing relevance of technologies in public administration has been significantly impacting the accounting sector. All the manual procedures used in the past have begun to be replaced by various technologies, such as artificial intelligence and cloud computing. Some technologies were behind the advance from traditional accounting to digital accounting.

Each of these innovations brings several advantages. Task automation, for example, provided by technologies, eliminates human errors and ensures greater accuracy in calculations and financial management (Rupee, 2023). In addition to improving accuracy, this automation also contributes to greater data security and integrity. Using technologies such as blockchain helps prevent fraud and information loss, ensuring the integrity and reliability of financial information (Baruffi, 2023). Reducing operating costs, such as those related to printing and physical document archiving is also one of the advantages of implementing new technologies (Rupee, 2023).

However, it is crucial to consider that implementing these technologies has challenges, and it is therefore important to address the associated disadvantages. The cost of implementing advanced technologies and integrating with existing systems are two main challenges related to digital transformation, requiring careful budget planning by organizations (Baruffi, 2023). In addition, introducing new technologies requires cultural and organizational adaptation, and it is common to encounter resistance from employees who need to acquire new skills and adjust to new ways of working (Rupee, 2023).

Digitalization represents an important advance in public accounting. In recent years, with the emergence of COVID-19, the public sector and accounting have been forced to apply this technology daily. Digitalization in the public sector has been heralded to improve services and enable greater availability, richness, and access to data and better interaction with other stakeholders (Agostino et al., 2022). For the accounting sector, digitalization means integrating innovative technologies and changing accounting processes to make them much faster, more efficient, and more accurate (Bogasiu & Ardeleanu, 2021).

According to data provided by the Digital Economy and Society Index (DESI), in 2022, Portugal ranks 14th in the European Union (score of 67.9) regarding digital public services, being in line with the European Union average (score 67.3) (Commission, 2022).

One of the great advantages of digital services is the increase in efficiency and productivity. The dematerialization of processes facilitates access to information anywhere and is currently essential. The volume of information in organizations continues to grow, making its centralization crucial. In this context technology plays a key role, allowing to carry out operations faster, more efficiently, and more productively (Gomes, 2023).

The main theoretical mechanisms that influence local governments' adoption of digital technologies are citizen demands/needs, electoral incentives, isomorphic pressure, and demographic policymaker characteristics. In light of the Diffusion of Innovation Theory (DOI) (Moore & Benbasat, 1991; Sandoval-Almazan, et al, 2023), as for citizen demands/needs local administrations tend to adopt digital innovations to meet the needs of their citizens, in the context of digital accounting, this can translate into implementing more transparent and accessible accounting systems for citizens. As for local incentives, politicians can promote digital accounting to demonstrate efficiency and transparency, aiming to improve their re-election chances. Institutional theory posits that organizations in the public sector face coercive, mimetic, and normative isomorphic pressures that drive conformity to external expectations (Schiavi, et al., 2024). In the context of digitalization, these pressures manifest as mandates from regulatory bodies, emulation of technological advancements by peer institutions, and professional norms emphasizing innovation and efficiency. As for isomorphic pressure, local governments can adopt digital accounting practices to align with best practices observed in neighboring governments, thereby increasing legitimacy and public trust (Hong et al., 2022).

## INFORMATION TECHNOLOGIES IN PUBLIC ACCOUNTING

Public accounting has undergone a significant evolution over the years in the field of information technologies, thus reflecting the progress around the world. With the new digital era, many of the traditional procedures, used for decades, have been replaced by new technologies that, in turn, provide greater value and quality to public accounting services (Kroon, et al., 2021).

Artificial intelligence, blockchain, cloud computing and quick response code are among the most relevant technologies applicable to this sector. Following, each of these technologies will be presented.

Artificial intelligence is one of the technologies that has evolved the most recently and, therefore, one of the most important for public accounting. According to McCarthy (2007), this technology is the science and engineering of creating intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but artificial intelligence does not need to be limited to biologically observable methods.

Artificial intelligence systems produce highly accurate results, replacing and, in some situations, surpassing human efforts. However, they cannot portray human intelligence (ICAEW, 2017a).

This technology aims to replicate human cognitive activity and is considered one of the main drivers of digital transformation in various sectors. This frees professionals from different areas from repetitive, routine and non-value-added tasks (Oliveira, 2021). Thus, as time progresses, this technology grows significantly and therefore begins to be very present in accounting and in the public sector.

The accounting industry is constantly evolving, and professionals need to adapt to these changes and know how to respond effectively (Wasny and Law, 2019). In the short to medium term, artificial intelligence offers several opportunities for accountants to improve their efficiency and offer a greater amount of information. In the long term, artificial intelligence creates opportunities for even deeper transformation, as systems progressively take over the decision-making tasks currently performed by humans (ICAEW, 2017a).

With intelligent mechanisms, artificial intelligence enables the autonomous execution of repetitive tasks, the detection of patterns, and the signaling of errors or failures, promoting agility in repetitive operations and accuracy in data (Oliveira, 2021). There are already several software applications, where we can find artificial intelligence, with several advantages, such as (1) increasing the quantity and quality of data analysis – processing large amounts of data increasing the scale, scope and rigor of the analysis; (2) reduction of errors – detecting errors quickly and ensuring that accounting errors do not exist, something that in a traditional accounting context becomes more frequent; (3) rapid data analysis – performing large-scale tasks faster than humans. For example, providing information that an accountant could also provide but within more time (Wasny and Law, 2019).

Despite a trend to adapt artificial intelligence to accounting (Pinto, et al., 2024) and the fact that it is a fascinating technology, and we often associate the idea of computers replacing people, we should not underestimate the importance of purely human skills such as enthusiasm, creativity or empathy: all are essential characteristics for an accountant (Wasny and Law, 2019).

Although in general the adaptation to technologies is accepted by workers, specifically concerning artificial intelligence workers feel less confident. While recognizing its usefulness in improving the efficiency and digitalization of public administration, there are concerns about possible negative impacts, such as dehumanization and high implementation costs (need for a better budget and adequate infrastructure) (Gómez and Faura, 2023).

Blockchain is one of the most recent technologies used and is closely associated with the financial sector and cryptocurrencies, such as Bitcoin. However, this technology goes far beyond that as it has already been applied to several industries.

We can define blockchain as a sequence of blocks used to establish or record ownership of assets between parties (Zhang, et al., 2020). For Rennock, et al. (2018), this technology can be defined as a digital record of peer-to-peer transactions that can be distributed publicly or privately to all users and is therefore said to be decentralized and distributed.

Blockchain allows the creation of smart contracts, i.e. computer programs, that can be executed under certain conditions. For example, an invoice is paid automatically after verifying that the delivered goods were received according to what was ordered and that there are funds in the company's bank account (Andersen, 2016).

Blockchain technology can improve efficiency in accounting for transactions and assets by operating as a universal accounting system. This would provide greater certainty as to rights and obligations, as well as the origin of assets, thus allowing the accounting profession to broaden its range of applications to record a greater diversity of activities than was previously possible and to deepen the understanding of the economic reality underlying the recorded transactions (ICAEW, 2017b).

Trust and security are two very important characteristics of accounting. The more reliable the financial reports, the more efficient they will be and the better the decision-making. The use of blockchain technology helps in this same sense, as its implementation in financial processes and systems ends up reducing the risks of financial fraud and cyber-attacks, providing more security and protection against these types of threats, thanks to its ability to detect tampering (Silva and Papandréa, 2023).

Blockchain is still under development, and it will take some time for it to be easily used. However, this technology has the potential to profoundly transform the nature of accounting today (Andersen, 2016). It can change the accountant's profession but to use it the accountant needs to acquire some skills to better understand how it works and what its main functions are.

Xanthopoulou et al. (2024) studied the adoption of new technologies, emphasizing blockchain and social networks, in the Greek public administration. They concluded that there are elements that significantly influence the adoption of technologies in the public sector, namely the cultural change (integration of new technologies and adoption of new means of communication and interaction with citizens), the ease of use and quality of information, and the need for continuous training (acquisition of digital skills to strengthen citizens' trust in the transparency of government actions on social networks).

Currently, the storage of information and software in the cloud is widely used, in companies and our daily lives. Cloud computing involves making hardware and software applications available as services over the internet, allowing users to store data and use applications on various devices, regardless of location (Dimitriu and Matei, 2014). The cloud computing model is defined as the use, storage and processing of data on computers in a different location, which is accessed via the Internet (Allahverdi, 2017).

The National Institute of Standards and Technology (NIST) defines cloud computing as a model that provides ubiquitous (universal) access to a set of computing resources such as networks, servers, storage, applications, and services over the internet (Mell and Grance, 2011).

Dimitriu and Matei (2014), highlight the advantages of this technology (1) reduced costs, essentially since it is not necessary to make an initial investment in internal computer equipment or software licenses; (2) unlimited geographic access through remote network access or web connection (3) increased performance through greater business agility and flexibility - a high-speed internet connection and the use of mobile technology allow for fast data transfer and real-time interaction. Consequently, it allows organizations to react to changing business conditions.

The fundamentals that underpin cloud computing, along with the activities performed by accounting software companies, have resulted in the emergence of cloud accounting. A cloud-based accounting solution allows you to face multiple and complex demands and activities through an integrated online system, thus reducing the accounting department's workload (Dimitriu and Matei, 2014).

Quick Response Code (QR Code) was created to allow content to be decoded at high speed. The QR Code was invented in 1994 by Denso, a Japanese company that belongs to the Toyota group. It was initially designed to be used in the production control of automotive parts but quickly began to be used in other sectors (Soon, 2008).

The QR code is a 2D code that represents an evolution of the barcode and works as a hyperlink. By pointing a device's camera at it, it is possible to activate specific functions, such as opening a browser page, a section of an application, or a form on a website (Almeida, 2021).

Almeida (2021) states that this technology has two dimensions, that is, it uses both horizontal and vertical in its images, unlike the barcode which has only one dimension and, therefore, can store up to 100 times more information.

Currently, there are already codes to view restaurant menus, and codes to access mobile applications, such as WhatsApp, and now invoices have also entered the digital age. Thus, this technology is one of the most recent innovations in the accounting field and public accounting.

Ordinance no. 195/2020 of 13 August determined that as of January 2021 a QR code, issued by computer programs certified by the Tax Authority, would be introduced in invoices and other tax-relevant documents. However, its obligation ended up happening only from January 1, 2022.

The main advantage of using the QR code on invoices is the ease of access to information. Introducing this code not only promotes the document's dematerialization but also facilitates the control of operations carried out by taxpayers, to combat tax fraud and evasion (Gomes, 2022).

## METHODOLOGY

The present study aims to explore the application of digital accounting and its implications in the accounting of the Vila do Conde City Council. This Council is in the district of Porto, in Portugal, with 80,921 resident inhabitants (CMVC, 2021a) and a total area of 149.03 km<sup>2</sup>, and consists of 21 parishes.

The study focuses on emerging technologies such as artificial intelligence, blockchain, cloud computing, and QR Codes. More specifically, the aim is to:

- Identify the information technologies used in the City Council's accounting,
- Analyze the impact of the SNC-AP on the City Council's accounting information systems,
- Study the advantages and challenges of implementing new technologies.

Considering the objectives, the chosen research method is qualitative. The collection of data was carried out through interviews with employees who work in the accounting department and at the Customer Desk Service of the Vila do Conde City Council. At the time of the face-to-face interviews, they were not possible, so the interviewers responded in writing.

The interview script had two parts. The first one, collected information on the characteristics of the interviewees, namely the function they perform in the council, the length of service and their academic qualifications. The second part consists of eight questions, organized into three main themes. The first questions focus on the identification of current technologies, then on new technologies and finally the challenges to keep up with technological evolution. **Table 1** presents the main characteristics of the interviewees.

**Table 1.** Characteristics of the Interviewees

Interviews	Age	Gender	Function	Seniority	Education
A	50	Male	Senior Technician	2001	Master's Degree in Municipal Management
B	50	Male	Technical Assistant	2011	Bachelor of Public Management
C	52	Female	Higher Technique	2003	BSc in Economics
D	49	Male	Senior Technician	2001	Bachelor of Business Administration

After the interviews with the accounting department, it was necessary to conduct a new interview with the person responsible for the Customer Desk Service of the City Council, to understand the operation of the new concept and thus obtain more information about the technologies used beyond the accounting department.

In addition to the interviews, a documentary analysis was also carried out (such as Management and Accounts Reports for the years 2021, 2022 and 2023, and the Major Plan and Budget Options for 2022, 2023 and 2024) available by the City Council. Additionally, the local magazines distributed to the citizens of Vila do Conde were analyzed to collect complementary information.

Finally, after collecting all the information, the identified topics were analyzed. To this end, the answers provided by each employee were analyzed and the main themes were identified, using thematic analysis. Subsequently, the data obtained in the interviews were compared with the information collected documentary, to validate the results and ensure a more comprehensive understanding of the context under study.

## RESULTS

### Current Technologies in Accounting

In the accounting department of the City Council of Vila do Conde, an Enterprise Resource Planning (ERP) is used, specifically Sigma from Medidata, which is integrated with other platforms, such as Wiremaze's ERP systems. These systems centralize the management of several sectors, such as finance, budgets, purchasing and asset control, offering an integrated view of operations and facilitating quick access to information (interviewees A and B).

The ERP system is composed of more than 30 Medidata applications covering all departments, from the back office, with technical-administrative management applications, to the front office, with municipal service and document management solutions (interviewee C). This scope allows us to respond to specific needs, focusing on the relationship with the citizens and promoting more efficient and transparent public management (interviewee C).

In addition, the system allows for complete accounting processes digitization, replacing work previously carried out on paper with digital processes, which facilitates the organization, storage, and real-time information on expenses and income (interviewees A and D). The ERP also has a workflow that allows effective management, archiving and document consulting, ensuring interoperability with Central Administration platforms and other entities (interviewee A).

Digitalization and centralization are fundamental to modernizing council management, supporting public services transparency and efficiency (interviewees A, B, C and D).

The introduction of cloud technology (cloud computing), a more recent adaptation, offers benefits such as greater flexibility, scalability and security (interviewees B and C). The transition to cloud solutions has allowed hardware and software to be accounted for as services, rather than fixed investments, contributing to reducing costs associated with infrastructure and technology maintenance (interviewees B and C).

In addition, cloud technology was pointed out to optimize available resources, by reducing costs related to updates and maintenance of hardware and software. Implementing this technology also frees human resources from Information and Communication Technologies (ICT), directing them to essential activities of the Council, thus initiating an organizational change process (interviewee C).

Respondents stressed that the adoption of cloud computing aims to increase process agility and promote transparency in operations, improving the management and accounting of the City Council. The goal is to optimize the public resources use and ensure efficient accountability and transparency and control of the council's resources (interviewee B).

### New Technologies in Accounting

One of the main projects referred to in the 2023 Management and Accounts Report is the acquisition of various equipment, including computers, the promotion of digital public services and internal efficiency improvement through ICT (CMVC, 2024c). In the Management and Accounts Report for 2022 and 2021, one of the main projects is the acquisition of computer and administrative equipment (CMVC, 2023a; CMVC, 2023c and CMVC, 2022b).

The Major Plan and Budget Options for 2022, 2023 and 2024 presents the expenditure budget in capital on computer equipment and software (CMVC, 2023b; CMVC, 2022a and CMVC, 2021b). **Table 2** summarizes the estimated computer expenses.

**Table 2.** Information Technology Expenditure Budget in 2022, 2023 and 2024

Outgoings	2022	2023	2024
Computer equipment	101.005,56€	151.005,56€	161.005,56€
Computer Software	150.527,78€	260.527,78€	155.527,78€
Rental of computer equipment	100€	100€	100€

Source: CMVC, 2023b; CMVC, 2022a and CMVC, 2021b

Despite the investments in the accounting sector of the Council more advanced technologies have not been implemented, such as artificial intelligence, blockchain, or Quick Response Codes (QRC), as mentioned by interviewees A, B and D. However, these interviewees highlighted that these technologies would bring significant advantages, such as improved analysis and decision-making, greater efficiency in management of operational processes, in addition to increased information security and accuracy (interviewee A). Interviewee C stressed that implementing new technologies is essential for the growth and development of the council, and it is crucial to keep up with constant technological evolutions.

While digitalization was present before, the introduction of this SNC-AP has driven significant evolution, leading to the adoption of the 'NoPaper' platform. This change enabled greater efficiency and scope in accounting operations. According to interviewee D, the SNC-AP was a determining factor, regarding Medidata's SIGMA applications, so the currently available versions were significantly complete and more comprehensive, allowing greater efficiency and comprehensiveness in accounting management.

The benefits of implemented technologies were widely recognized. Respondents A, B and C highlighted automation and digitalization processes as increased efficiency, productivity and accuracy in processes, improving the quality of municipal services. In addition, interviewee C mentioned that cost reduction was a significant advantage, replacing manual or outdated processes leads to savings in financial and human resources. Interviewee B stressed that technologies promote transparency and operations control, facilitating accountability and optimizing public resources.

Implementing new technologies, according to interviewee C, is a continuous effort and regular training is provided whenever needed. When difficulties arise, employees have the support of IT services. Despite the challenges, all respondents considered that the technologies adopted so far have been beneficial and necessary to improve council management.

The technology that most benefited accountants' activities is the digitization processes contributing significantly to efficiency and document management (interviewee B). In addition, direct access to files allows more agile and effective accounting management (interviewee C).

### **Challenges to the Implementation of New Technologies**

The Council has sought to keep up with technological advances gradually, responding mainly to legal requirements or to the need to update systems and processes (interviewees A, B and C). Technological updates occur, mainly, because of regulatory changes or the need to modernize systems that have become obsolete, allowing the councils to align with the best practices in the sector.

For technological evolution to be effective, it is not enough to adopt new tools, it is also essential to promote cultural and organizational transformation. It is important for continuous training and requalification of employees, to maximize the benefits of new technologies and ensure their effective integration into the reality of the Council (interviewee A). The Council has a good level of technological maturity, evidenced by the implementation of solutions that generate concrete benefits for management, but there is potential for additional progress if the Council keeps up with the latest technological trends and fosters a culture of innovation (interviewees B). Technologies have been adjusted to meet the Council's needs but there is still space for improvement (interviewee C).

Despite the innovations being considered fundamental, as they provide greater efficiency, cost reduction and improvement in public services, some challenges arise.

The main challenge faced in this implementation is the resistance of most employees to change and the budgetary limitations (interviewees C and D). Although, it is essential to evolve technologically, maintaining an openness to the market and following the most appropriate innovations.

## Other Features Technologies

It was also possible to identify three significant features for the Council: the Face-to-Face and Digital Customer Service Desk, the 'NoPaper' platform and the Online Services platform.

The Customer Service Desk represents a new concept that emerges both face-to-face and online, aiming to centralize service, facilitate online access, improve the citizen experience and promote innovation and modernization of public services. One of the main advantages is the possibility for citizens to solve their problems through online services, with no need to be face-to-face (CMVC, 2024a).

In this context, a virtual assistant, called 'Clara', was introduced on the City Council's website. Although it was recently inaugurated, the development of Clara involved an effort that lasted approximately two years. During that period, all possible questions to be made by citizens were gathered, as well as the appropriate answers, to effectively program it. Thus, through artificial intelligence, citizens can have access to information in a much faster and less bureaucratic way.

The Online Services platform allows citizens, at any time and place, to solve several problems such as social action, inspection and administrative offenses, and metrology, among others, thus eliminating the need for face-to-face. The platform provides several electronic requirements and detailed and specific information for each type of request (CMVC, 2024b).

The 'NoPaper' service allows the digital submission of urban processes. This project aims to reduce the paper in urban licensing areas, simplify and reorganize internal procedures, and improve the efficiency and quality of the service provided to the citizens. Also noteworthy is the emphasis on mobility, security, document preservation and cost reduction, ensuring more effective process monitoring and greater productivity (CMVC, 2020).

## DISCUSSION

The results reveal a consistent technological modernization in the Vila do Conde City Council, particularly regarding digital accounting. The documentary analysis and the employee perceptions highlight the gradual and significant use of technologies aiming to optimize administrative and accounting processes.

The ERP systems, namely Medidata's Sigma technology, are completely integrated and transversal, having a workflow that allows the management, archiving and quick and effective access to documents stored in the information system. This technology covers the different departments, from the back office to the front office, ensuring interoperability with other applications of the Central Administration. In other words, this technological tool organizes and stores information digitally, namely information on the management of finances, budgets, purchases and asset control, thus facilitating access to information. This is corroborated by the documents analyzed, which show continuous growth in investment in technological infrastructure, including equipment and software essential for the operation of these systems.

However, an important aspect mentioned in the interviews is the absence of more advanced technologies in the accounting department, such as artificial intelligence and blockchain. These are fields with significant potential for future development. Although the council progressed, there is still space to expand its technological capabilities. Implementing solutions such as the virtual assistant 'Clara', based on artificial intelligence, demonstrates the interest in exploring innovations, albeit gradually and with a more citizen-oriented strategy.

The recent investment in cloud computing brought advantages such as cost reduction and greater flexibility. Similarly, Dimitriu and Matei (2014) highlighted reduced costs and higher performance through greater business agility and flexibility as advantages of adopting cloud computing. This investment is also evident in the analysis of the Management and Accounts Reports, which show a significant increase in software spending in 2023, suggesting a strong investment in the digital transition. This investment in cloud computing reflects an important step towards modernizing data management and improving the municipality's operational efficiency.

The introduction of the SNC-AP catalyzed the digitalization and dematerialization of processes in the Council. Implemented in 2018, the SNC-AP required a significant adaptation, which, in addition to promoting transparency and financial rigor, brought challenges, such as the need for continuous training and adaptation to a new

regulatory and technological framework. According to Silva (2023), the implementation of SNC-AP requires substantial changes in the computer applications to support the new accounting needs, which led to new staff hires and training actions.

The SNC-AP fosters the implementation of the 'NoPaper' innovation. This facilitates the digital submission of urban processes and allows more efficient documentation management, reducing the use of paper and simplifying procedures. This platform represents one of the most relevant milestones in the technological modernization of the Council, in line with global trends in sustainability and administrative efficiency.

Despite progress in digitalization, financial constraints limit the implementation of more advanced technologies. The increase in spending on software and technological infrastructure has been significant, but the long-term sustainability of these investments depends on a resource allocation strategy that balances innovation with budgetary constraints.

Despite this, and in line with the Baruffi (2023) and Rupee (2023), current technologies offer significant advantages, such as increased operational efficiency, security and accuracy of information, accuracy and transparency in financial control, improvements in the quality of the service provided, reduction of operating costs, both in terms of financial and human resources and improved decision-making.

The Council had no difficulties adapting to new technologies due to continuing training. This demonstrates an adequate support strategy for the technological transition and reflects a continuous effort to adapt to changes. However, the resistance to change remains an obstacle to fully implementing these technologies. So, the success of these initiatives depends on an integrated effort, which involves not only the adoption of new technologies but also human resources management and the creation of an organizational culture that welcomes innovation. According to Perides et al., (2020), organizational changes affect employees generating varied individual responses. A common barrier is precisely the resistance to change. The success of technologies in public accounting depends on tool implementation and an integrated approach that involves people, culture and processes.

In short, both the interviews and the documentary analysis point to a strong commitment of the Vila do Conde City Council to technological modernization. The use of ERP systems, the development of the platform 'NoPaper', the investment in cloud computing and the introduction of artificial intelligence through the assistant 'Clara' are important milestones, but there are still opportunities for improvement. To ensure sustained progress, it is necessary to continue to innovate, overcome resistance to change and optimize the available financial resources, ensuring that the council keeps up with current and future technological demands. Exploring new technologies, such as the QR Code, would facilitate access to financial and administrative information, allowing employees and citizens to consult documents and data directly from mobile devices.

## CONCLUSION

This study explored the impact of information technologies on the accounting processes of the Vila do Conde City Council, emphasizing the implementation of digital tools and the challenges associated with the digital transition. Through qualitative research involving interviews and document analysis, the Council's modernization efforts and barriers to adopting more advanced technologies were examined.

The findings highlight the Council's commitment to gradual digitalization, demonstrated by adopting tools such as the ERP system (Medidata's Sigma) and cloud computing, which have streamlined processes, reduced costs, and enabled staff to focus on strategic tasks. Initiatives like the 'NoPaper' and Online Services platforms, supported by the virtual assistant 'Clara,' have further enhanced efficiency, transparency, and user accessibility. However, the adoption of cutting-edge technologies remains limited, constrained by budgetary challenges and cultural resistance to change.

The SNC-AP has played a pivotal role in driving digital transformation, catalyzing modernization and aligning practices with global standards. While the Council has made significant progress, a complete digital transition will require continued investment in employee training, fostering an innovative organizational culture, and securing resources for sustained modernization. Integrating technology, human resources, and processes will be key to ensuring long-term success and meeting future demands.

Given the Council's central role in governing and implementing policies that directly influence citizens' quality of life, its technological advancements in accounting provide a valuable case study. The insights gained reflect broader challenges and opportunities municipal bodies faced striving for efficiency and transparency in their financial and administrative operations.

The study's limitations, including the lack of in-person interviews, highlight the need for further research employing diverse methodologies to enrich understanding. Future studies could conduct comparative analyses of multiple municipalities, exploring how contextual factors influence technology adoption and identifying best practices. Additionally, examining cultural and organizational barriers to digitalization and strategies for fostering innovation can offer actionable insights for enhancing public accounting modernization.

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