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Integration of ICT in the Administrative Management of Small Commercial Enterprises

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Abstract---The research sought to integrate information and communication technologies (ICT) into the administrative management of small commercial businesses in the city of Guayaquil in 2022. Based on the "Buenrostro model", the following categories of analysis were established to guide the study: 1) socioeconomic characteristics of the entrepreneurs, 2) basic ICT equipment, 3) use of ICT in the company's activities, and 4) difficulties in using ICT. A descriptive, observational, cross-sectional, and prospective methodology was applied based on a solely qualitative approach. The problem faced by small business owners is the lack of efficiency in processes and difficulty in accessing relevant information. The objective of the research is to describe the characteristics of the integration of ICT in the Administrative management of small commercial businesses. The study population consisted of 10 owners of small commercial businesses located in the city of Guayaquil, intentionally selected under certain inclusion criteria. Open-ended interviews and a non-participatory observation guide were used as data collection techniques. The results obtained contributed to a state-of-the-art analysis of the phenomenon analyzed for broader and more in-depth studies. Given that there is limited background information or studies on the integration of ICTs at the local level, and even more so in the business sector, it is evident that entrepreneurs are not receiving support from state institutions.

Keywords---administrative management, ICT integration, small businesses.

Introduction

The integration of Information and Communication Technologies (ICT) into the administrative management of small commercial businesses represents a key factor for their development and competitiveness in an increasingly digital and globalized environment. Thus, today, businesses rely on technological tools, primarily information and

communication technologies (ICT), as a vital resource for market growth (Ramos Méndez et al., 2021). According to Buenrostro & Hernández (2019), the incorporation of ICT into businesses is viewed as a factor that enhances their competitiveness through increased productivity, efficiency, and return on investment. However, its effect also depends on the characteristics of the technology, the environmental conditions, and the business's internal capabilities. For Acuña & Medina (2022), ICTs are defined in businesses as a fundamental element of strategic processes and not just as a support process for businesses; they improve and enhance the management capacity of businesses only if the company's constitution is considered a management strategy.

ICTs enable these organizations to optimize their internal processes, improve communication, and facilitate decision-making, all of which are fundamental to their sustainability and growth. According to Mejía (2018), the incorporation of these technologies in small and medium-sized enterprises (SMEs) provides them with competitive and comparative advantages by streamlining and simplifying management processes, which in turn leads to greater productivity and operational efficiency.

There is global evidence that the integration of ICT into business management throughout its organizational, productive, and commercial structure. The results of the research by Morales & Freire (2021) indicated a positive and significant impact on the efficiency of these organizations. The analysis reveals that the adoption of digital platforms and technological tools has made it possible to optimize their internal processes, reduce operating costs, and improve the quality of service offered to their customers. Similarly, Arceo-Moheno et al. (2019) indicated that the incorporation of Information and Communication Technologies (ICT) in companies is a key element that increases their competitiveness, mainly by providing greater productivity and efficiency in internal processes. However, Bermeo-Giraldo et al. (2020) conclude that, although significant progress has been made in the application of ICT in business management, especially in small and medium-sized enterprises (SMEs), there are still significant challenges to their full and effective adoption.

Taking a look at the state of the art on the topic of ICT integration in business management in Ecuador, it is low in the business sector among small businesses (Donnelly et al., 2011). However, to consolidate these advances, it is necessary to continue strengthening the digital infrastructure, promoting technological training, and designing inclusive strategies that allow all companies, regardless of their size, to fully leverage the potential of ICTs to improve their management, competitiveness, and sustainability in the national and international markets. To be truly competitive, an organization must include strategic planning guidelines that automate and improve its processes and manage its business through the use of modern and dynamic technological tools (Costa et al., 2018).

Studies carried out by authors Masi et al. (2016), the efforts of small economy countries, including Ecuador, are noticeable, but still not enough to reach the level of penetration and use by more developed countries. Mejía (2018) found the same results, concluding that Information and Communication Technologies (ICT) are essential tools for business management, whose investment contributes significantly to organizational and community sustainability. Similarly, Méndez et al. (2021), point out that Information and Communication Technologies (ICT) are an important factor for innovation in the organizational processes of small and medium-sized enterprises (SMEs), contributing to improving efficiency and competitiveness.

Studies show that the incorporation of ICTs into business management in Ecuador is a growing and necessary trend for the modernization, efficiency, and competitiveness of companies, especially SMEs. However, they also highlight the importance of training, adequate technological infrastructure, and strategic planning to achieve an effective and sustainable integration of these technologies. concludes that Information and Communication Technologies (ICTs) are an important factor for innovation in the organizational processes of small and medium-sized enterprises (SMEs), contributing to improving efficiency and competitiveness (Di et al., 2020).

The problem faced by small business owners is the lack of efficiency in their processes and the difficulty they face in accessing relevant and timely information in their daily activities. These business owners in the city of Guayaquil are incorporating technological innovations in the management of their companies to meet the new demands of the consumer society. However, they are limited by internal and external factors that make it difficult for them to take advantage of these tools and grow their business. This motivates us to investigate the characteristics of the progressive integration of ICTs in local businesses, as well as the difficulties at each stage of integration. With the intention of responding to the research problem, the objective was to describe the characteristics of the integration of ICTs in the Administrative management of small commercial businesses in the city of Guayaquil, year 2022.

Methodology

The methodology used in the research is divided into two phases; the initial phase consists of a bibliographic analysis through a documentary review, which facilitated the understanding of the current situation on the topic studied. The

Buenrostro Mercado et al. (2019), model emerges from the analyzed literature. Based on this, the following analysis categories were established in the study: 1) socioeconomic characteristics of entrepreneurs, 2) basic ICT equipment, 3) uses of ICT in the company's activities, and 4) difficulties in using ICT. These are operationalized in the table 1.

Table 1
Categories studies

Category of analysis	Dimensions
Socioeconomic characteristics of entrepreneurs	<ul style="list-style-type: none"> ● Age ● Genre ● Professional training of the entrepreneur ● Company size ● Years of service ● Investment capacity for computer systems or equipment
Basic ICT equipment available to small businesses	<ul style="list-style-type: none"> ● It has computers ● It has internet access ● Basic Internet Uses: ● Email ● Online shopping ● Banking operations ● Payment of basic and government services ● VoIP Telephony ● Personnel selection and recruitment ● Market monitoring
Use of ICT in the company's daily activities	<ul style="list-style-type: none"> ● Accounting and payroll ● Electronic invoicing ● Distribution and sales ● Inventory control and management ● Purchases and payments to suppliers ● Manufacturing and product design applications that are not in services ● Control of quality processes that are not in the services ● Internet uses associated with production: Online sales, customer service, suppliers, and more. ● Staff training and access to information ● E-commerce and digital marketing
Difficulties in the use of ICT in business operations	<ul style="list-style-type: none"> ● Lack of budget ● Lack of technological competence ● Resistance to change ● High maintenance cost ● Security issues ● Others

Source: Model for analyzing the integration of ICT into business management. (Buenrostro Mercado et al., 2019)

Having established the categories of analysis and taken into account the research objective, the second phase was defined: the methodology, type, design, and approach, followed by the exploration. The research follows a qualitative paradigm because it describes qualities that characterize the integration of ICTs into the administrative

management of small commercial enterprises. According to [Monje \(2011\)](#), qualitative research attempts to adopt a comprehensive approach to social situations in order to explore, describe, and understand them in their natural context, focusing on the qualities and meanings that emerge from human experience. That is, based on the knowledge of the different people involved, and the use of techniques such as interviews and observation to obtain in-depth and detailed information about the phenomena studied.

Field observation was used for the study to collect relevant information from the landowners. According to [Arias \(2012\)](#), field research involves collecting data directly from the subjects studied or from the reality where the events occurred (primary data), without manipulating or controlling any variables; that is, the researcher obtains the information but does not modify the existing conditions. Hence, its non-experimental nature allows the collection of information of interest for the study from the landowners themselves.

Descriptive research was adopted because it describes the characteristics that allow us to gain insight into the behavior of companies in the process of integrating ICT into internal company management as it occurs, based on the experience of the subjects of the study. According to [Arias \(2012\)](#), descriptive research consists of the characterization of a fact, phenomenon, individual, or group, in order to establish its structure or behavior, and to specify the properties, characteristics, and relevant features of the object of study.

The research is a prospective cross-sectional study, as the data were collected at a single time point in a single session in 2022. The study population consisted of 10 purposively selected small business owners from the commercial center of Guayaquil, Republic of Ecuador. The selection followed the following inclusion criteria: they had to be engaged in the self-service sector; they had to be small and legally established in the city (RUC, patent, etc.); they had to be dedicated to the purely commercial sector; they had to be located in the city of Guayaquil; and they had to have basic technological resources for business management.

The following were taken into account in the exclusion: micro, medium, and large-sized companies, the industrial sector, and rural areas.

Interviews and observations were used as data collection techniques. A face-to-face interview guide supported by a voice recorder was used to gather all the information from the interviewees. Each small business owner completed one interview guide and one recording session. An observation sheet was also used to verify the characteristics of ICT integration in business management ([Riemenschneider et al., 2003](#)).

The data analysis plan includes an initial breakdown of the interviews, a data refinement, and a qualitative narrative analysis of everything expressed by the interviewees. These results will be compared with the results of the observations. Both sources will reveal the thoughts, ideas, and perceptions that entrepreneurs experience in the process of integrating ICTs into the business.

Company management. Therefore, the results will be presented in a written report that will include detailed arguments. This report may contain verbatim quotes from interviewees' responses or excerpts obtained during observations. Based on the data analysis, a connection will be established between the knowledge generated and primary sources, as well as with other research, through theoretical interpretation.

Analysis and Discussion of Results

Analysis category 1. Socioeconomic characteristics of entrepreneurs

The average age of those interviewed ranges from 22 to 55 years, with men predominating as the main group of owners of the commercial companies analyzed. These companies are small, primarily operating in the self-service sector. Regarding educational level, the owners have completed secondary education but lack basic computer training. The average length of operation of these companies is between 4 and 10 years, and the budget allocated exclusively for the acquisition of computer systems or equipment varies between \$5,000 and \$10,000.

Analysis category 2. Basic ICT equipment is available to small businesses

Interviewees were asked about the basic ICT equipment available in their businesses, and all agreed that they have computers with internet access and business management and accounting software. These resources are used exclusively by the owner and the cashier, as they explained, employees have limited knowledge of these technological tools, primarily computers. Their work is generally restricted to managing collections, which involves entering product data for the issuance of electronic invoices to customers.

Ignoring other functionalities such as detailed control of income and expenses, stock management, recording and organizing inventory purchases, as well as timely tracking and accounting of expenses. Furthermore, the POS system is integrated into the software. Some owners expressed that they are unable to fully utilize the potential of the ICTs

incorporated into their businesses due to a lack of knowledge about how they operate and the lack of technologically skilled personnel capable of handling these tools. They also indicated that they decided to implement computers and software with the expectation of significantly improving their business management, based on the promises made by analysts of these systems; however, in practice, they have not yet been able to verify the full benefits of the hardware and software in which they invested.

This information highlights the limited technological and digital skills of both the owners and employees of the SMEs analyzed, highlighting the need to provide them with training to optimize the use of the technologies they already have in their businesses. This is consistent with similar studies that highlight the low utilization of ICTs in business management (Pravia et al., 2016).

Regarding the characteristics of the computer equipment, the interviewees were unable to provide much detailed information; however, during the interviews, it was evident that many of the devices are not recent models, and the majority are desktop computers (PCs). This reflects an investment in outdated hardware and software, with slow operating systems that, according to most interviewees, sometimes crash when collections management involves a large volume of purchases. Therefore, they believe their systems and equipment require maintenance and updating to streamline the company's processes. However, they face difficulties in implementing these improvements due to the high cost of maintenance and lengthy processes, which, they mentioned, could delay their business.

Despite having limited knowledge of ICT use, seven of the interviewees agreed that they generally use computers to search for general information on Google and to access social media sites such as Facebook or YouTube. Furthermore, three of them indicated that they place orders online, although they make payments via telephone transfers or, occasionally, through bank deposits, without taking advantage of the online banking features or the POS system available in most of the businesses studied. It is important to note that most of the interviewees acknowledged being aware that virtual POS tools, often free, allow these types of transactions to be performed even from a mobile phone with an internet connection. Only two owners mentioned that they make payments and other banking transactions online, using their bank's mobile apps. This confirms what was previously mentioned: there is a lack of awareness about the advantages available in the market that could streamline, improve the precision and reliability of companies' organizational management, leveraging, at no additional cost, the same technological and digital tools these businesses already have.

None of the interviewees make payments for government services, such as municipal taxes, online, even though these are available through digital systems. Nor do they use technological resources to recruit or select personnel. Furthermore, no company uses social media platforms such as LinkedIn or Facebook to search for potential candidates. This reflects the low adoption of digital tools in these processes.

None of the interviewees monitor the market through social media or search engines like Google, where services are rated. Their use of social media is limited to posting on their businesses' Facebook pages and, primarily, WhatsApp statuses, usually from personal profiles of owners and employees. They also don't use paid advertising on platforms like Facebook, Instagram, Twitter, or Google. Therefore, they are unaware of the true reach of their campaigns, as these tools allow them to segment their target audiences and accurately measure advertising results.

Analysis category 3. Uses of ICT in the company's daily activities

Although all businesses have at least one computer with internet access and several have administrative and accounting software, only four use a computerized system for invoicing, while the rest continue to manually complete sales receipts. These four businesses also use this system to manage and control their inventories. Furthermore, two owners indicated that they use technology for inventory control, although they do so personally, using Excel spreadsheets. In general, the use of ICT is limited primarily to basic and administrative functions. Therefore, digitalization in these businesses is still partial and focuses on specific tasks.

Guayaquil's MSMEs still face difficulties with invoicing, despite the existence of specialized programs that, along with a basic printer, such as a dot-matrix printer, would allow for almost complete automation of this process. Interviewees explained this lack of utilization with the common phrase "I have a hard time understanding technology," indicating that they are unaware of the various ways they can use the available technological tools. This situation reflects a gap in knowledge and confidence in adopting digital solutions in their businesses.

Regarding the use of technological tools for accounting management, only two interviewees use specialized software, while the majority delegate this task to their accountants. When asked why, they responded that they do not know how to use these tools for accounting management. Specifically, they do not take advantage of functions such as daily liquidity monitoring, real-time inventory control in different areas, or other administrative tasks such as cash, banking, payroll, payments, budgets, technical support, and taxes. Their use is mainly limited to cost and sales

management. Furthermore, only three owners mentioned making purchases and payments to suppliers using ICT. This demonstrates a significant underutilization of the advantages offered by administrative and accounting systems in MSMEs, limiting their ability to improve efficiency, control, and competitiveness in their operations (Mendoza et al., 2020).

All companies acknowledged that ICTs are present in their sales and customer service processes, with smartphones being the primary tool used. They maintain communication and interaction with their customers through messaging apps like WhatsApp and social media like Facebook and Instagram. In this context, one of the participating companies even has its app to directly manage the sales process of its products.

Regarding ICT training, four companies offer training to their employees, primarily salespeople, on the use of purchased software, focusing on specific functions used in the cashier area. Of these, only three receive support from IT interns to assist with training and ICT management. Among the companies that provide training to their staff, three indicated that training is limited to the onboarding period for new employees or when they assume a new position. On the other hand, the other owners stated that they conduct training periodically. The remaining companies indicated that they expect new employees to already have prior IT knowledge and the digital skills necessary to manage the company's system and software. This again reflects a lack of use of the free training offered by state institutions, which provide accessible courses to improve the digital skills of MSME staff.

Only four of the companies studied reported having Facebook and Instagram profiles, but they lack comprehensive websites that facilitate deeper customer engagement. These profiles lack product catalogs, payment options, or methods to fully leverage the platforms, so their use is limited primarily to advertising and promotions. This means that, although they are present on social media, they do not leverage the advanced commercial features they offer, such as direct sales or integrated payments.

Analysis category 4. Difficulties in the use of ICT in business operations

Several entrepreneurs interviewed expressed fear about incorporating ICTs into their business management, leading them to limit their use to avoid potential negative impacts on performance. They prefer not to apply them to all processes for fear of not adapting properly. Some mentioned phrases like "just in case, I don't use technology" or "I only turn on the computer when the cashier arrives," reflecting their concern about potential failures and repair costs. In general, owners consider cost and lack of knowledge about the use of these technologies to be the main barriers to their effective adoption.

The fear of damaging the acquired technological equipment represents a significant barrier preventing owners from fully leveraging the available tools. This concern is reinforced by the unanimous opinion of the ten interviewees, who point out that the high investment cost is the main obstacle to incorporating new information and communication technologies that could improve business management. Thus, the financial expense and lack of confidence in proper management limit the effective adoption of these ICTs in their businesses. Studies by Ortiz (2020), and Juárez (2021), who face similar difficulties in properly adopting ICTs in business management, often face barriers related to a lack of knowledge.

Business owners were asked whether MITIC had offered them technical advice, training, or consulting to leverage technological tools in their businesses, but all ten interviewees were unaware of the ministry's role and stated they had not received any support. This situation highlights a gap that government entities should address, as MITIC has technological innovation platforms and projects aimed at MSMEs. Therefore, it is necessary to strengthen the dissemination and reach of these services so that business owners can effectively benefit.

Most of the business owners surveyed cited a lack of trained personnel to quickly resolve any ICT-related issues as a challenge. Some interviewees stated that "there are no people who know how to use this software" and that "they barely learn how to issue electronic invoices and check prices in the system." This problem was mentioned by five of the interviewees. Analysis of their responses reveals that all companies need to invest in developing technological skills, as the lack of competency in the effective use of ICT remains a significant constraint in today's market.

Conclusions

A critical socio-analysis of the integration of ICTs into the administrative management of small commercial businesses in Guayaquil reveals that, although they have the basic equipment to carry out operations, their hardware is often outdated. Furthermore, they do not fully utilize the programs and tools, both commercial and free, available on the Internet, that could boost their businesses. This indicates an important opportunity to improve technological use and strengthen the competitiveness of these businesses.

The main reason for the limited adoption of ICTs is the lack of training among both owners and employees. It is necessary to foster interest and investment in training so that they can improve their organizational processes. Only by overcoming this barrier will a more effective and widespread use of technologies be achieved. Thus, entrepreneurs will be able to reap the benefits of digital administrative and accounting management, driving sustainable growth in line with current economic trends.

Government support is essential, although according to those interviewed, it is currently lacking. Businesses do not receive the necessary support from public entities and must invest their resources to improve ICTs due to their high cost. Therefore, the State must implement existing business innovation policies, offering support measures such as accessible financing, ongoing training, and other resources that facilitate the technological development of companies.

References

- Acuña, N. C., & Medina, P. A. A. (2022). Características de la integración de las TIC en la gestión administrativa de las medianas empresas comerciales de la ciudad de Pilar, año 2022. *Ciencia Latina Revista Científica Multidisciplinar*, 6(6), 1066-1083.
- Alcívar, M. A. M., Gómez, L. K. Á., & Segura, G. N. R. (2020). Los procesos administrativos y su contribución en el fortalecimiento de las MiPymes del cantón Quevedo. *Dilemas contemporáneos: Educación, Política y Valores*.
- Arceo-Moheno, G., Ramos-Méndez, E., & Acosta-De la Cruz, J. T. (2019). Una visión de las competencias digitales de empresarios de Villahermosa, Tabasco. *Vinculatégica EFAN*, 5(2), 1323-1335.
- Arias, F. (2012). The research project: Introduction to scientific methodology. *Venezuela: Editorial Episteme*.
- Bermeo-Giraldo, M. C., Montoya-Restrepo, L. A., Valencia-Arias, A., & Cardona, M. A. M. (2020). Incursion of ICT in financial information management in commercial SME companies: a case study. *NOVUM, Journal of Applied Social Sciences*, 1(10), 25-41.
- Buenrostro Mercado, H. E., & Hernández Eguiarte, M. D. C. (2019). The Incorporation of ICT in Firms. Factors of the Digital Divide in MSMEs of Aguascalientes. *Economía: teoría y práctica*, (50), 101-124.
- Costa, M. P., Armijos, V. A., Loaiza, F. S., & Aguirrez, G. I. (2018). Investment in ICT in Ecuadorian companies to strengthen business management. Analysis period 2012-2015. *Spaces Magazine*, 39(47).
- Di, D., Wu, Z., Wang, H., & Huang, S. (2020). Optimal water distribution system based on water rights transaction with administrative management, marketization, and quantification of sediment transport value: A case study of the Yellow River Basin, China. *Science of the Total Environment*, 722, 137801. <https://doi.org/10.1016/j.scitotenv.2020.137801>
- Donnelly, D., McGarr, O., & O'Reilly, J. (2011). A framework for teachers' integration of ICT into their classroom practice. *Computers & education*, 57(2), 1469-1483. <https://doi.org/10.1016/j.compedu.2011.02.014>
- Juárez, A. M. P., & Golovina, N. S. (2021). La gestión empresarial en las micro, pequeñas, medianas empresas. *Revista Científica Estelí*, 96-114.
- Masi, S. D., Davalos, L. A. D., & Correa, E. S. (2016). Information and Communication Technologies in the Business Sector of Paraguay. *Global Journal of Computer Science and Technology*, 16(1).
- Mejía, J.L.L. (2018). New information and communication technologies for PYME's development. *REVISTA DE INVESTIGACIÓN SIGMA*, 5 (02), 61-71.
- Méndez, E. R., Moheno, G. A., & Aguilar, M. A. A. (2021). Las TIC' s en la innovación de los procesos organizacionales de las pequeñas y medianas empresas. *Vinculatégica EFAN*, 7(2), 797-809.
- Mendoza-Rivera, R. J., Lozano-Díez, J. A., & Venegas-Martínez, F. (2020). Impacto de la pandemia Covid-19 en variables financieras relevantes en las principales economías de Latinoamérica. *Economía: teoría y práctica*, (SPE5), 125-144.
- Monje Álvarez, C. A. (2011). *Quantitative and qualitative research methodology*. Colombia.
- Morales Peña, G. A., & Freire Morán, J. F. (2021). Technological innovation: creating competitiveness in software development companies. *Podium*, (39), 139-154.
- Pravia, A. C., Rodríguez, W. J. T., Calderón, B. P. L., & Herrera, B. C. (2016). Comparative analysis of the use of information and communication technologies (ICT) in the business management of hotels located in the city of Estelí, Nicaragua between 2008 and 2016.
- Ramos-Méndez, J., LaVerne, J. A., Domínguez-Kondo, N., Milligan, J., Štěpán, V., Stefanová, K., ... & Faddegon, B. (2021). TOPAS-nBio validation for simulating water radiolysis and DNA damage under low-LET irradiation. *Physics in Medicine & Biology*, 66(17), 175026.

- Riemenschneider, C. K., Harrison, D. A., & Mykytyn Jr, P. P. (2003). Understanding IT adoption decisions in small business: integrating current theories. *Information & management*, 40(4), 269-285.
[https://doi.org/10.1016/S0378-7206\(02\)00010-1](https://doi.org/10.1016/S0378-7206(02)00010-1)
- Valeriano Ortiz, L. F. (2020). The management audit in Peru and its impact on business development.