


**BARRIERS TO DIGITAL SERVICE ADOPTION: A DATA-DRIVEN ANALYSIS OF
CUSTOMER BEHAVIOR IN AN INTERNET SERVICE PROVIDER CALL CENTER**
**BARREIRAS À ADOÇÃO DE SERVIÇOS DIGITAIS: UMA ANÁLISE ORIENTADA A
DADOS DO COMPORTAMENTO DO CLIENTE EM UMA CENTRAL DE
ATENDIMENTO DE UM PROVEDOR DE SERVIÇOS DE INTERNET**


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ABSTRACT

Purpose: This study aims to identify and analyze the key barriers preventing customers of an internet service provider (ISP) from adopting digital service channels. **Theoretical framework:** Barriers to digital channel adoption continue to drive customer preference for telephone-based human service. **Methodology/Approach:** A structured four-stage data analysis was conducted, integrating Power BI for data tabulation, telephone call transcriptions, and questionnaires with call center agents. **Findings:** Results reveal that invoice inquiries are the primary reason for customer calls. Additionally, security concerns, age-related challenges, and a lack of trust in digital platforms were identified by call center agents as major factors preventing customers from adopting digital service options. **Research, practical, and social implications:** This research contributes to the field by integrating phone call transcription technology with agent-based insights to categorize customer interactions. The methodology provides a deeper understanding of customer behavior, offering valuable guidance for ISPs seeking to optimize digital service adoption and improve operational efficiency. **Originality/Value:** Beyond identifying the key drivers of call center preference, this study proposes a methodology that jointly integrates corporate data analytics, sentiment analysis of customer interactions, and frontline agents' perspectives. It also suggests strategic actions that ISPs can implement to enhance customer trust and engagement with digital service channels. **Keywords:** Internet service provider. Call center. Data transcription. Digital channels. Customer behavior.

RESUMO

Objetivo: O objetivo deste estudo é identificar e analisar as principais barreiras que impedem os clientes de um provedor de serviços de internet (PSI) de adotar canais de atendimento digital. **Referencial Teórico:** As barreiras à adoção de canais digitais continuam a impulsionar a preferência dos clientes pelo atendimento humano via telefone. **Metodologia/Abordagem:** Uma análise de dados estruturada foi conduzida em quatro etapas, integrando o *software Power BI* para tabulação de dados, transcrições de chamadas telefônicas e um questionário com agentes de *call center*. **Resultados:** Os resultados revelam que as dúvidas relacionadas a faturas são a principal barreira para as chamadas dos clientes. Além disso, preocupações com segurança, desafios relacionados à idade e a falta de confiança nas plataformas digitais foram identificados pelos agentes de *call center* como fatores importantes que impedem os clientes de adotarem as opções de serviços digitais. **Contribuições, implicações práticas e sociais:** O estudo contribui para a área ao integrar a tecnologia de transcrição de chamadas telefônicas com *insights* baseados em agentes para categorizar as interações dos clientes. A metodologia proporciona uma compreensão mais aprofundada do comportamento do cliente, oferecendo orientações valiosas para os PSI que buscam otimizar a adoção de serviços digitais e melhorar a eficiência operacional. **Originalidade/Valor:** Além de identificar os principais motivadores da preferência pelo *call center*, este estudo propõe uma metodologia que integra de forma conjunta a análise de dados corporativos, a análise de sentimento das interações com os clientes e as perspectivas dos agentes de *call center*. O trabalho também sugere ações estratégicas que os PSI podem implementar para aumentar a confiança e o engajamento do cliente com os canais de atendimento digital.

Palavras-chave: Provedor de serviços de internet. *Call center*. Transcrição de dados. Canais digitais. Comportamento do cliente.

Introduction

Digital exclusion remains one of the greatest challenges of this century, directly and indirectly affecting various aspects of the knowledge society (Smith & Brown, 2020; Johnson et al., 2023; Da Silva et al., 2024). The development of communication tools, such as websites and applications, enhances access to information at any time. However, certain population segments lack direct or easy access to these technologies, making digital exclusion a persistent issue closely linked to social class and age group (Mitzner et al., 2019).

Service organizations implement relationship marketing strategies to maximize customer lifetime value and enhance retention. Service providers employ various initiatives to increase profitability and differentiate themselves in the market, with customer service centers among the most common and significant (Abdulaziz Alhumud & Alsulami, 2025). These centers leverage technology to meet customer needs and expectations (Khrais & Alghamdi, 2021). Despite substantial investments in technology to facilitate customer interactions, internet service providers (ISPs) often struggle with a lack of customer recognition of these efforts and face challenges in encouraging the adoption of digital tools. In contrast, customers continue to favor traditional service methods, particularly phone support, even though call centers, by definition, represent a form of non-face-to-face interaction (Bouzada & Saliby, 2009).

Within an internet service provider, the Customer Service Department (CSD) plays a crucial role in customer relations, serving as one of the primary channels of communication. Ensuring high-quality service requires attentive responses to customer needs. However, the high volume of incoming calls compels agents to expedite each request, sometimes at the expense of the expected level of attention. Call centers cannot instantly adjust to all fluctuations in demand, necessitating the planning of excess capacity. Designing call centers with minimal excess capacity while maintaining sufficient resources for demand fluctuations is essential for effective workforce management (Koole, 2021). In this context, digital customer service solutions aim to resolve simple issues more efficiently and improve overall customer satisfaction.

A deeper analysis of the barriers to digital service adoption in the ISP sector helps uncover the factors influencing customer behavior and service preferences. Aligned with the goal of identifying the key obstacles preventing the transition to digital channels, this study aims to provide insights that enable companies to develop more effective strategies for encouraging digital engagement.

Beyond its practical contribution to the internet service provider sector by examining the barriers that prevent customers from preferring digital alternatives to phone support, this work innovates by proposing a methodology that jointly integrates corporate data analytics, sentiment analysis of customer interactions, and frontline agents' perspectives. This triangulation not only supports evidence-based managerial decisions but also contributes conceptually to the literature on service operations by offering a replicable method for diagnosing digital adoption barriers in hybrid service systems. This methodological advance enables researchers and practitioners to move beyond descriptive studies and toward systematic, data-driven strategies for increasing digital engagement.

Literature Review

In this section, references are presented regarding data collection and analysis tools that can aid in understanding customer needs and how artificial intelligence can support customer service in the digital era.

Tools for customer data collection and analysis

Call centers across various industries face challenges in accurately identifying the underlying barriers behind customer calls. Traditional information-gathering methods rely on employees manually recording or monitoring calls by sampling recorded conversations. This manual approach often introduces biases and inefficiencies, necessitating the adoption of automated solutions. Consequently, the demand for software that enables call monitoring through transcription and interaction analysis—without requiring the manual review of all audio files—has increased significantly (Huang et al., 2020).

Automatic Speech Recognition (ASR), also known as computer speech recognition or speech-to-text, allows programs to convert human speech into written text. Unlike voice recognition, which focuses solely on identifying an individual speaker, ASR emphasizes transcribing spoken language into text (Yu & Deng, 2016). The growing sophistication of ASR has enhanced the ability of organizations to analyze customer interactions more efficiently, reducing the need for extensive manual intervention. Advances in deep learning and neural networks have significantly improved ASR accuracy, making it a fundamental tool in modern call centers (Xiong et al., 2018).

Several data analysis software solutions support qualitative research and information processing. NVivo, for instance, facilitates the organization, analysis, and retrieval of unstructured or qualitative data, including interviews, open survey responses, academic articles, and social media content (Edwards-Jones, 2014). This software is crucial in industries requiring extensive text analysis, such as healthcare and education. Similarly, Atlas.ti offers researchers tools for analyzing diverse data types across multiple disciplines, providing an interface that streamlines qualitative data exploration (Friese, 2019). Researchers have increasingly adopted these tools to improve the efficiency and accuracy of qualitative analysis, making them essential for decision-making in business environments (Silver & Lewins, 2014).

However, the high costs associated with these proprietary software solutions often limit companies' adoption. Developing in-house software presents a viable alternative, offering cost reductions, improved system customization, and direct access to error fixes. Proprietary solutions tailored to a specific database can enhance performance and support the user's native language. A user-friendly interface improves employee engagement, fostering a collaborative organizational culture and enhancing productivity (Dybå & Dingsøy, 2015). Studies have demonstrated that custom software development can lead to higher operational efficiency and increased adaptability to changing business needs (Mäkinen et al., 2021).

In addition to software-based analysis, organizations can gather qualitative and quantitative insights through employee interview questionnaires. Call center agents who interact directly with customers can provide valuable input regarding customer service experiences. Tools such as Google Forms facilitate the creation of structured surveys, allowing organizations to collect, store, and analyze data efficiently (Fan & Yan, 2010). Digital survey tools have become indispensable for large-scale data collection, enabling businesses to identify trends and areas for improvement in customer service (Couper, 2017). These surveys may include closed-ended questions—such as whether customers could have resolved their issues via digital platforms—and open-ended questions, enabling agents to share personal insights on customer preferences for human assistance over automated solutions.

Another powerful data analysis tool is Power BI, a cloud-based Business Intelligence solution developed by Microsoft. Power BI enables the visualization of interactive dashboards, integrating multiple data sources to generate comprehensive insights. The platform's core components include datasets, reports, and dashboards, which collectively facilitate data-driven decision-making (Srinivasan & Arunasalam, 2013). Business intelligence tools like Power BI allow managers to monitor operational efficiency and improve real-time decision-making

(Chen et al., 2012). By leveraging Power BI, organizations can monitor key call center metrics, such as call volume, agent performance, average handling time, and overall system availability, leading to more informed strategic decisions.

Companies can enhance their call center operations by implementing advanced analytics tools and tailored software solutions, improving efficiency and customer satisfaction. Integrating ASR, qualitative research tools, and business intelligence platforms ensures that organizations remain competitive in an increasingly data-driven environment (Schaefer et al., 2023).

Customer service in the digital era

Modern consumers increasingly demand fast, on-demand services. Industry 4.0 has emerged as a transformative paradigm driven by the development and convergence of advanced technologies that enable near-real-time interaction between physical and digital domains (Olsen & Tomlin, 2020; Mohad et al., 2024). Consequently, technology and automation have gained critical importance, particularly with advances in artificial intelligence (AI).

AI constitutes a scientific field that leverages computing's symbolic processing capabilities to develop generic methods for automating perceptual, cognitive, and manipulative activities through computational systems (Russell & Norvig, 2021). Researchers have increasingly focused on designing AI systems that interact with humans in naturalistic ways, often leading users to perceive these systems as conversational partners rather than machines. This pursuit is central to human-robot interaction (HRI) studies, which aim to create collaborative environments where robots and humans complement each other's capabilities (Sheridan, 2016).

Beyond the research environment, AI has also reshaped consumer behavior, particularly under the influence of Industry 4.0. This transformation has accelerated the shift from traditional retail to online and mobile platforms, driven by advanced digital technologies with global reach. Smart digital devices and sophisticated AI-driven systems now enable businesses to provide seamless, automated customer support, minimizing the need for direct human interaction (Majeed et al., 2025). These technologies extend beyond retail, influencing service industries by offering personalized and efficient solutions to meet customer demands.

The COVID-19 pandemic accelerated the digital transformation of enterprises, compelling organizations worldwide to migrate their operations to online platforms due to the

widespread closure of physical businesses, sports activities, and educational institutions (Paules et al., 2020; Adedoyin & Soykan, 2020). This shift led many companies to enhance their digital presence, particularly in customer-facing services, by adopting web-based and app-integrated solutions. During and after the peak of COVID-19 infections, the expansion of digital service platforms became a strategic imperative. Despite the operational efficiency these technologies offer, a significant portion of customers continues to value interpersonal engagement. A persistent challenge in designing AI-mediated communication lies in the system's limited ability to interpret and respond to human emotions, especially in chat-based interactions. Research suggests that when users are aware they are interacting with AI rather than humans, they tend to engage less, spend cautiously, and perceive the system as lacking empathy and expertise. These reactions often stem from cognitive biases and emotional expectations that shape human attitudes toward machine agents, regardless of their technical competence (Luo et al., 2019).

Methodology

This section details the study object and outlines the data collection and analysis procedures adopted.

Study object

The study focuses on an ISP company with a customer base of 180,000 clients. Customer service is conducted via a call center, and the study centers on the CSD. This department comprises 39 employees, including one coordinator, one supervisor, one analyst, back-office support agents, and 34 customer service representatives. The department operates Monday through Friday from 8:00 a.m. to 8:00 p.m. and Saturdays from 8:00 a.m. to 4:00 p.m.

The company's primary product is high-speed fiber-optic internet, available through residential and business plans, offering differentiated speeds and advantages. The main attributes valued in customer service are agility and customer satisfaction provided when handling client needs. The department's performance is assessed through performance indicators available in the business intelligence tool Power BI, such as the customer satisfaction index, average unavailable time, and manual call monitoring.

The company offers self-service options to customers via a website and mobile application, yet it still receives a high volume of call center inquiries. To better understand this

scenario, data analysis tools were implemented to identify why customers avoid digital service channels, enabling improvements to be proposed.

Data collection procedures

Data collection from calls was conducted automatically in Power BI. Each supervisor reviews data for their respective teams and overall CSD metrics, such as customer satisfaction data, average handling time, average unavailable time, and service categorization, which reflects the barrier to the customer's call, as noted by the service agent.

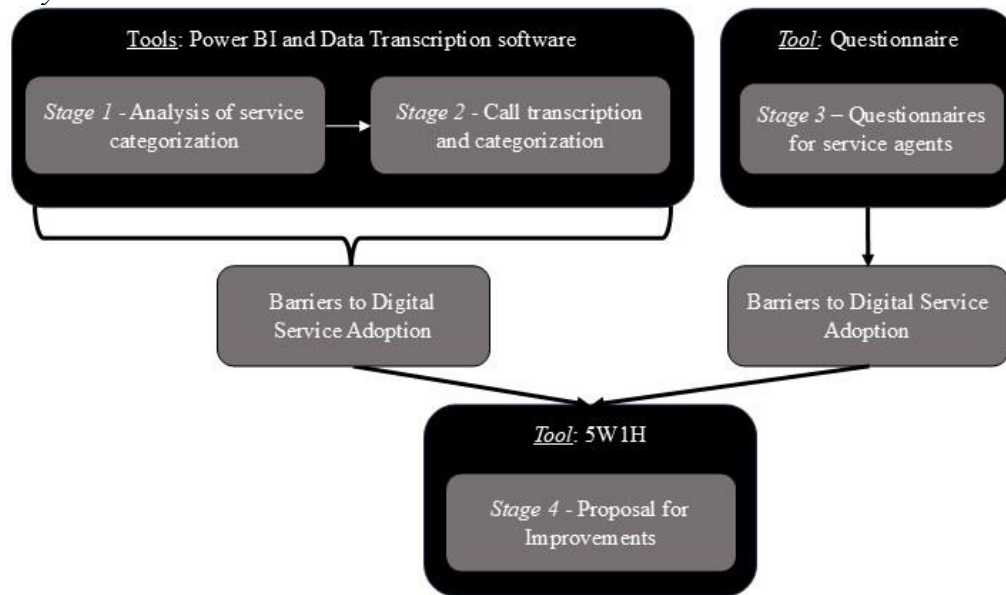
To gather data concerning the barriers to digital service adoption encountered by customers, a three-stage methodology was implemented: (i) collection of service categorization data recorded by agents in Power BI from September 2022 to November 2022; (ii) collection of recorded audio from the CSD, available in the Five9 call center software library—a total of 30 recorded calls from September 2022 to November 2022 were collected; and (iii) administration of a questionnaire to customer service representatives to identify the reasons underlying customers' non-utilization of the available digital technologies. The questionnaire included three multiple-choice questions and one open-ended question to capture additional information not covered in the main questions.

The questionnaire was pre-tested for potential adjustments, resulting in 21 completed responses.

Data analysis procedures

The data analysis procedure was structured into four stages, as shown in Figure 1. The first two stages aim to identify why a customer contacts the CSD via phone by analyzing data from Power BI and the call transcription software. Stage three seeks to identify the barriers to customers' non-use of available digital channels through questionnaires completed by CSD agents. Finally, process improvements are proposed to reduce the volume of call center inquiries.

Figure 1
Data analysis method



Note. Elaborated by the authors.

Each stage is detailed below:

Stage 1 – Analysis of Service Categorization: The main service categorizations used by agents were identified through Power BI, allowing the determination of the primary barriers to customer calls. This analysis revealed which requests had a high volume of phone calls and assessed whether these could be resolved through digital channels.

Stage 2 – Call Transcription and Categorization: A call transcription software, specifically customized for the ISP company (Dias, 2022), initially conceived to facilitate the monitoring of a large volume of service calls, was adapted to elucidate the barriers encountered during each customer's call. The software was created to analyze customer sentiment in call center interactions, labeling calls as negative, neutral, or positive. Thus, the barrier for each call is identified based on the main words expressed by the customer and the agent. Keywords used by the software to detect and categorize calls are stored in a database, which was enhanced with new terms commonly used in customer service to ensure accurate categorization.

Stage 3 – Questionnaire for Service Agents: As previously described, a questionnaire was administered to agents to better understand the barriers behind calls from customers who could have potentially resolved their issues digitally via the app or website. The responses were tabulated and analyzed to identify common themes in the barriers to these calls.

Stage 4 – Proposal of Improvements: After data analysis, the 5W1H tool was employed to create an action plan for implementing improvements in digital channels, considering the needs identified by these customers.

Results and Discussion

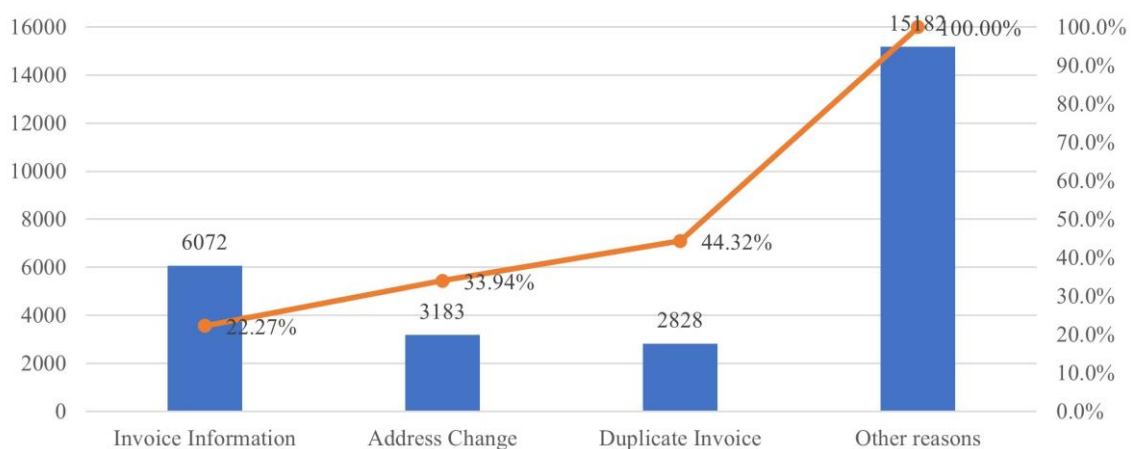
After the data collection and analysis procedure, the results and discussions are presented following the four stages described in the Method section.

Analysis of service tabulation

After data collection, three main service categories (Figure 2) were identified as predominant across the evaluated period: Invoice Information, Address Change, and Request for a Duplicate Invoice. The “Duplicate Invoice” category differs from “Invoice Information” mainly due to the volume of calls received. A higher volume of calls requesting a “Duplicate Invoice” suggests that there may have been an issue with the automatic sending of invoices. On the other hand, the “Invoice Information” category concerns inquiries about amounts, discounts, and charges for additional services, such as extra costs related to the customer’s phone plan. Just over 40% of the calls received each month were related to these three issues, amounting to 12,083 out of 27,265 calls received between September 2022 and November 2022. The remaining calls were distributed across 88 other categories, each receiving significantly fewer calls.

Figure 2

Barriers for digital service adoption are categorized in Power BI



Note. Elaborated by the authors.

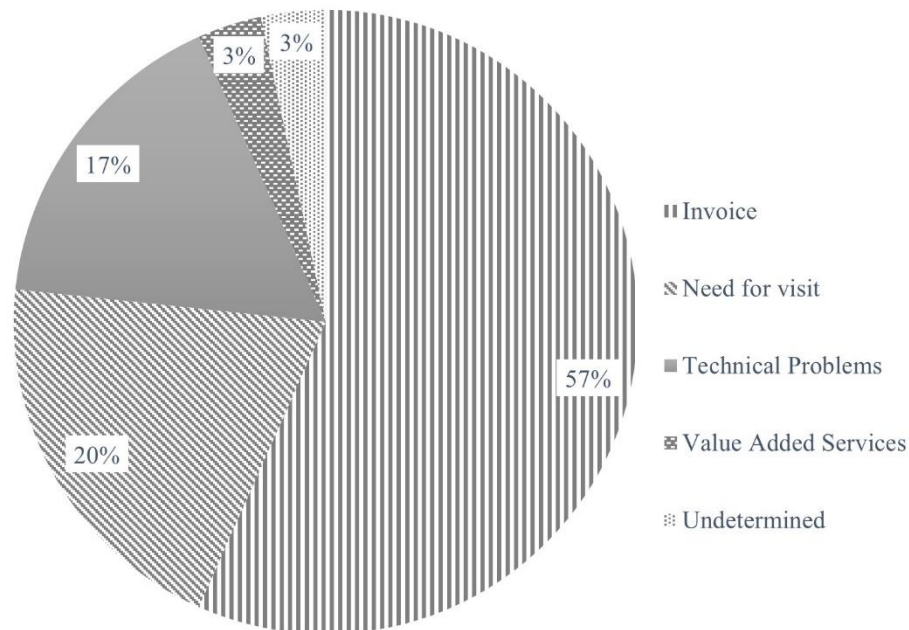
To resolve the issue of “Invoice Information,” the app and the website offer a dedicated section, including the option to access a “Duplicate Invoice” and make payments via Pix or credit card. However, the digital channels do not provide functionality to resolve “Address Change” requests, the second most common barrier to contact. This finding suggests that customers are discouraged from adopting the company’s digital channels, as the digital platform does not address a key barrier they face. This is consistent with the work of Khrais and Alghamdi (2021), who argue that in developing e-customer service, companies must recognize that consumers prioritize convenience and usability. Therefore, to successfully navigate the ongoing digital transformation, companies must develop business models based on personalized services that consistently meet the specific needs of their customers.

Call transcription and categorization

After transcribing the 30 phone calls analyzed, it was identified that 57% were related to “Invoice,” 20% to “Need for a Visit,” and 17% to “Technical Issues.” The remaining calls were categorized as undetermined and as Value-Added Services, such as paid streaming platforms, as shown in Figure 3. This result corroborates the findings from Power BI, indicating that most calls are related to “Invoice” issues, followed by concerns about “Technical Visits,” many of which are linked to address changes.

The software also enabled sentiment analysis of the customer, showing that 50% of customers felt neutral or relaxed during the interaction, 37% had a negative sentiment, and only 13% showed positive sentiment. Sentiment analysis helps understand how customers feel during interactions and assists companies in determining their level of satisfaction.

Figure 3
Barriers for digital service adoption identified in transcribed calls



Note. Elaborated by the authors.

To accurately comprehend sentiment, an algorithm must be trained to recognize terms specific to a given topic (Stappen et al., 2021). Consequently, in addition to our algorithm being customized with terms frequently used in a customer service context, three sentiment categories were considered: positive, negative, and neutral. This constitutes a key strength of our data collection and analysis, as Arief and Samsudin (2023) note that the neutral class is often neglected in this type of study. The importance of analyzing the neutral class stems from the fact that not all comments about a product or service fit a purely positive versus negative dichotomy. A neutral category can be useful for several reasons: it helps identify trends in sentiment data, provides a baseline against which positive and negative sentiments can be measured, and mitigates the risk of misclassifying texts that do not express a clear sentiment.

Since most of the calls had a large portion of time in the neutral sentiment field, few expressions indicating that the customer was satisfied with the service, such as “thank you very much,” “you solved my problem,” or “that’s great,” were used to classify the call as positive. Additionally, since most customers contacted the company for “Invoice Information,” which also has a neutral sentiment, it can be suggested that the main barrier for contact is primarily related to inquiries or doubts.

Finally, the word cloud of barriers (Figure 4) shows why customers sought to contact the call center.

Figure 4

Word cloud of barriers for digital service adoption in the transcribed calls



Note. Elaborated by the authors.

It can be observed that words like “payment, pay, invoice, value, discount, enable” stand out in the cloud, indicating that many customers who contacted the call center about billing issues were not able to resolve their concerns through digital channels. This interpretation can be made by considering that many customers dealing with these issues have difficulty understanding the information already provided through digital channels. For example, a customer may have the invoice but cannot understand the value due to an unexpected discount. In such cases, they seek human assistance for specific help.

These findings underscore the importance for companies to consider the adoption of digital channels not just from an internal perspective, such as cost reduction derived from a smaller call center workforce. As reported by Abdulaziz Alhumud and Alsulami (2025), by leveraging digital technologies like AI, companies can gain valuable insights into consumer preferences, habits, and needs. This enables the personalization of communications, services, and product recommendations for each user. Ultimately, this leads to greater consumer engagement, thereby improving interaction and conversion rates.

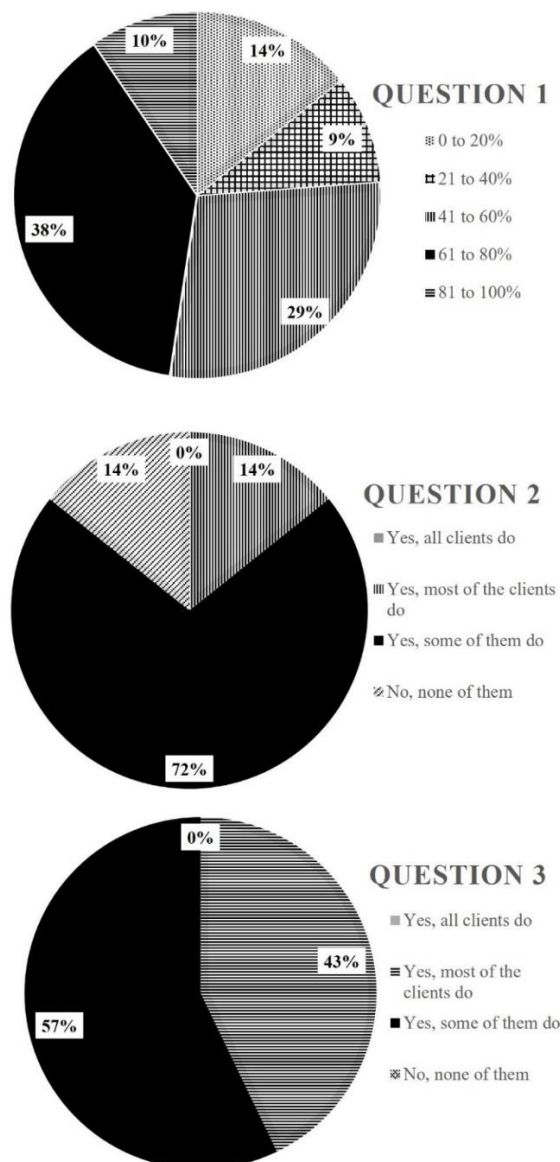
Questionnaire with attendants

After understanding the main barriers to customers’ digital service adoption, a questionnaire was applied to gather the perspectives of the 21 call center attendants.

For Question 1: “From your perspective, what percentage of call center requests do you estimate could have been resolved through digital channels?” (Figure 5, Question 1), a division

was observed among the respondents. Six (29%) of the respondents indicated that between 41% and 60% of requests via the call center could have been solved through digital channels, while eight (38%) believed this proportion was between 61% and 80%. Since many requests were related to invoice issues, most attendants believed the answers customers sought were available through digital channels.

Figure 5
Responses from the questionnaire



Note. Elaborated by the authors.

Figure 5 (Question 2) shows the result for Question 2: “When digital channels CANNOT resolve requests, do customers report searching the website or app before calling?” Most respondents (72%) reported that “some customers” had attempted to address their requests

through digital channels before contacting the call center. This suggests that customers still prefer the convenience of calling and interacting with a human representative rather than using the available digital channels. However, it is also possible that customers who tried digital channels before contacting the call center did not mention this during the call, as attendants do not commonly ask this question.

The third question (Figure 5, Question 3), “When digital channel solutions ARE available and communicated to customers, do they demonstrate willingness to utilize them?” shows that most customers agree to access the digital channels and make their requests through them. However, some resistance is observed, which can be better explained by the responses to the fourth question.

The analysis of Question 4, “When requests can be resolved through digital channels, yet customers opt for call center contact, what are the primary barriers identified?” was conducted by studying a word cloud (Figure 6). According to the attendants, the main barriers for customers contacting the call center instead of using digital channels are security, customer age, trust, and fear.

Regarding the specific barrier related to older adults, the likelihood of this demographic adopting digital technologies depends not only on a deeper analysis of their customer profile to offer them specifically tailored products, but also on empowering them to achieve a better experience with such technologies (Mitzner et al., 2019). This would help mitigate their insecurity, lack of trust, and fear of using digital channels.

Figure 6

Word cloud on barriers to non-adoption of digital technologies in the questionnaire



Note. Elaborated by the authors.

It is important to acknowledge that the findings of this study are based on a small sample of consumers and call center agents from a single internet service provider. Consequently, the insights obtained regarding barriers to digital technology adoption should be generalized with caution. Nevertheless, these results may be useful as a starting point for future studies in companies with similar activities and characteristics that are considering adopting digital technologies and wish to anticipate potential barriers that may arise.

Proposition of improvements

The mapping of barriers to customers' non-adoption of digital channels, based on information from phone calls and the attendants' perspective on customer needs, allowed for the proposal of improvements and, through the 5W1H tool, the development of a plan for executing these actions (Table 1).

Table 1
Proposal to Overcome Barriers

What?	Why?	Where?	When?	Who?	How?
Insert pop-up warnings and details in digital channels	To make digital channels more intuitive and reduce the number of calls received through the call center	App and website	Immediate	Technology and Development Department	Periodically update the website and app with notifications about issues that can be resolved digitally
Develop procedures and train attendants to instruct customers to use digital channels	To encourage attendants to promote digital channels to customers who contact the call center and, consequently, help reduce the number of calls received	Customer Service Department	Immediate	Quality Department	Develop a procedure outlining how attendants should guide customers to use digital channels for problem resolution during calls, providing greater security and confidence to older customers
Investigate the profile of customers who do not adopt digital channels	To understand the specific needs of customers who do not access digital channels and to develop or adapt new services to fit their profiles	Customer Service Department	Immediate	Customer Service Department	Develop and administer a questionnaire to assess the profiles of customers who do not access digital services, investigating their demographic characteristics and potential barriers

Note. Elaborated by the authors.

Among the most highlighted barriers to the non-adoption of digital channels, as pointed out by the attendants, are security, trust in the procedures, and customers' age. Therefore, it is understood that making digital channels more intuitive and providing detailed information is a crucial step to take. It is suggested that pop-ups and notifications be inserted into the digital channels to promote these new system features. Additionally, listening to the voice of the customer is crucial. Thus, a questionnaire is suggested to be developed and applied to profile customers who call the call center. This proactive approach aims to investigate the demographic profile of users and identify the main barriers to adopting digital technologies from the customers' perspective. It is believed that more assertive actions can then be proposed.

Another suggestion is to train attendants to guide customers in using digital channels to resolve inquiries and problems. Therefore, it is proposed that the company's Quality Department develop guiding procedures to standardize this activity.

Conclusion

This study successfully identified the key barriers preventing customers of an ISP from adopting digital service channels. By integrating qualitative and quantitative methodologies, including Power BI analytics, call transcriptions, and questionnaires with call center agents, we gained a comprehensive understanding of customer behavior and the underlying factors influencing their preference for phone-based support.

The findings highlight three primary obstacles to digital adoption: invoice-related issues, which constitute a significant portion of customer inquiries; the necessity of address changes, which currently lack digital resolution; and a broader reluctance to transition to digital platforms due to concerns regarding security, trust, and usability. Additionally, sentiment analysis of customer interactions revealed that most customers engage with call center representatives in a neutral state, suggesting that their primary motivation for preferring phone support is not dissatisfaction but rather a preference for human interaction to clarify doubts and resolve issues efficiently.

From the perspective of call center agents, security concerns, customer age, and a general lack of trust in digital service channels emerged as the most significant barriers. This highlights the need for ISPs to enhance their digital interfaces, improve customer education regarding online security, and implement trust-building measures such as guided digital navigation and proactive customer support.

To address these challenges, several strategic actions were proposed, including the integration of targeted pop-ups and notifications in digital platforms to highlight their capabilities, structured training for call center agents to encourage digital service adoption, and the deployment of customer profiling surveys to refine digital service offerings. These measures aim to foster a smoother transition to digital service usage, ultimately enhancing customer satisfaction while reducing call center workload and operational costs.

Despite its valuable insights, this study is limited by its reliance on call center data, which may not fully capture the perspectives of customers who never engage with phone support. Future research should incorporate direct customer interviews and usability studies to further refine strategies for digital adoption and enhance the robustness of the findings.

Additionally, expanding this study to include multiple ISPs could improve the generalizability of the results and provide a more comprehensive understanding of digital service adoption trends across different customer demographics and service environments.

By addressing these barriers systematically, ISPs can drive greater engagement with digital service platforms, improve customer experience, optimize resource allocation, and foster a more seamless integration of digital solutions into everyday customer interactions.

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