

# Digital Technologies and Mortgage Performance: An Analysis of the Relationship between Technological Access and Credit Delinquency in Mexico

Tecnologías digitales y desempeño hipotecario: análisis de la relación entre acceso tecnológico y morosidad crediticia en México

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## Abstract

Research on social housing in Latin America has paid limited attention to the role of digitalization in mortgage management, even though technological platforms have become a key resource for financial inclusion. In this article, the objective was to identify the technological factors associated with the non-performing loan portfolio granted by the National Workers' Housing Fund Institute (INFONAVIT, by its acronym in Spanish) in a region of northern Mexico, with an emphasis on access gaps and their relationship with payment defaults. The research used a quantitative approach by administering a questionnaire to 247 borrowers in regional offices. The overall analysis showed that the use of email and the Mi Cuenta Infonavit application is associated with a higher likelihood of maintaining current loans. In the subgroup of 86 borrowers with past-due loans, 74.4% reported having an email account, 45.3% claimed to know how to use the application, but only 17.4% had it installed, revealing a gap between declared knowledge and effective use. The results of a chi-square test show that digitalization, while a support for credit

management, does not in itself guarantee better results. Therefore, it is important to support it with inclusive policies and financial education programs that strengthen the capabilities of borrowers, especially those in the most vulnerable sectors.

**Keywords:** mortgage loans, social housing, digital technologies, non-performing loans, INFONAVIT.

## Resumen

La literatura sobre vivienda social en América Latina ha prestado escasa atención al papel que desempeña la digitalización en la gestión de créditos hipotecarios, a pesar de que las plataformas tecnológicas se han convertido en un recurso clave para la inclusión financiera. El objetivo de este artículo fue identificar los factores tecnológicos asociados a la cartera vencida de los créditos otorgados por el Instituto del Fondo Nacional de la Vivienda para los Trabajadores (INFONAVIT) en una región del norte de México, con énfasis en las brechas de acceso y su relación con el incumplimiento de pagos. La investigación utilizó el enfoque cuantitativo mediante la aplicación de un cuestionario a 247 acreditados en oficinas regionales. En el análisis general, se observó que el uso de correo electrónico y de la aplicación Mi Cuenta Infonavit se vincula con una mayor probabilidad de mantener los créditos vigentes. En el subgrupo de 86 acreditados con cartera vencida, el 74.4% reportó tener correo electrónico, el 45.3% declaró saber usar la aplicación, pero solo el 17.4% la tenía instalada, lo que revela una diferencia entre conocimiento declarado y uso efectivo. Los resultados de una prueba de Chi-cuadrado evidencian que la digitalización, si bien constituye un apoyo para la gestión crediticia, no garantiza por sí sola mejores resultados. Por lo anterior, se manifiesta la importancia de acompañar de políticas inclusivas y de programas de educación financiera que fortalezcan las capacidades de los acreditados, en especial de los sectores más vulnerables.

**Palabras clave:** créditos hipotecarios, viviendas de interés social, tecnologías digitales, cartera vencida, INFONAVIT.

## Introduction

Delinquency in mortgage loans constitutes a key metric for assessing credit risk, as it directly impacts the stability of the banking system and reflects the probability of financial losses. The magnitude of the non-performing loan portfolio not only determines the solidity of financial institutions but also influences the resilience of the banking sector against economic shocks (Khan et al., 2020).

An increase in credit delinquency can compromise the sustainability of the financial system and, indirectly, affect the performance of the real economy. Therefore, reducing the non-performing portfolio is

essential for strengthening financial markets and promoting economic growth. In this context, conducting a comprehensive analysis of credit risk becomes imperative for mitigating losses in the loan origination process (Mahyoub and Said, 2021).

In recent years, the adoption of digital technologies has transformed the interaction between financial institutions and clients, thereby influencing credit risk management. Factors such as the use of mobile applications, internet connectivity, and the availability of electronic communication channels have revolutionized the way people work,

live, and interact with their environment (Sharma, 2024). Consequently, in the housing sector, credit policies and systems are being transformed by the use of digital platforms and automation (Perry and Martin, 2023).

Given this transformation, it is of interest to analyze these technological variables to evaluate borrower behavior and their payment capacity. In turn, studying these variables allows for an understanding of how digitalization influences mortgage delinquency and provides evidence for designing more effective risk mitigation strategies.

In this regard, the United Nations (UN) (n.d.) indicates that technology and robust connectivity could be key elements driving equality in access to services and commerce. However, in a report presented by the UN Secretary-General's High-Level Panel, the organization noted that these innovations also present significant challenges, particularly for vulnerable populations facing barriers to accessing and utilizing these technologies (United Nations, 2019). Consistent with this, Honecker et al. (2022) concluded that while some consumers have rapidly adopted digital alternatives for basic banking operations, the most vulnerable societal sectors have not been as adept in their adoption. For this reason, the necessity for policymakers to strengthen both access to digital technologies and the trust of the entire population is evident.

In certain contexts, the digital divide in Latin America acts as an obstacle to accessing public housing services. It is therefore indispensable to consider those low-income individuals and families who lack the necessary technology, such as smartphones or reliable internet access, to utilize online payment systems or applications that provide information on housing balances (Inter-American Development Bank, 2020). Research indicates that providing free or low-cost internet access is insufficient, as comprehensive training and support in technology usage are required for marginalized populations to effectively interact with digital platforms (Ellison-Barnes et al., 2021). This lack of access can prevent eligible individuals from appl-

ying for or maintaining their public housing status, thereby exacerbating housing insecurity.

In this specific context, socioeconomic factors play a crucial role in determining access to technology. In many Latin American countries, including Mexico, economic disparities mean that low-income households may prioritize basic necessities over technological investments. The inability to afford smartphones or internet services can lead to a reliance on informal housing solutions, which are often less stable and lack legal protections (Martínez-Jiménez et al., 2020). This situation is aggravated by the fact that public policies often fail to account for the technological barriers confronting these populations, thereby perpetuating a cycle of exclusion from public housing opportunities (Rodríguez-Reyes et al., 2019).

Consistent with the above, the use of technology for applications related to household maintenance and public housing payments disproportionately affects vulnerable groups, including older adults and those with limited technological proficiencies. For instance, studies demonstrate that older adults frequently encounter difficulties with technology, which can impede their ability to navigate online systems for housing-related applications and payments (Ellison-Barnes et al., 2021). In Mexico, several housing initiatives have been digitalized, and as a result, certain population segments have been excluded or marginalized from accessing basic services, thereby deepening the precariousness of their living conditions.

Social housing in Mexico constitutes a fundamental pillar for ensuring the well-being and economic stability of millions of families. This sector not only impacts quality of life but also influences urban development and social equity. Consequently, understanding the factors that affect mortgage delinquency is essential, as this issue impacts both financial institutions and beneficiaries, thereby jeopardizing the sustainability of the system. The Institute of the National Housing Fund for Workers (INFONAVIT) plays a central role in this domain, originating more than 50% of all mortgages in the country and managing nearly all (93%) of the

housing subsidies (Ramírez-Sierra et al., 2024). Furthermore, it has been documented that the average support granted to borrowers is equivalent to approximately one-fifth of the value of the homes, which demonstrates the relevance of these resources for the lower-income population.

Within this context, the objective was to identify the technological factors associated with the non-performing loan portfolio of credits granted by INFONAVIT in a region of Northern Mexico, with an emphasis on access gaps and their relationship with payment default. This is pertinent because, despite the institute being a key factor in housing provision across the country, a significant increase in non-performing loan levels was recorded during 2023, specifically concerning loans granted in Chihuahua City, Mexico. The city showed an average non-performing loan index of 24%, contrasting sharply with the state average of 16% (INFONAVIT, 2023). This phenomenon represents a challenge for both the indebted families and the financial solidity of the aforementioned credit institution (INFONAVIT, 2023).

The remainder of the article is organized as follows: Section 2 presents a review of the literature. Section 3 describes the data, variables, and methods utilized. Section 4 presents the results and discussion. Finally, the main conclusions and limitations of the study are presented, along with suggestions for future lines of research.

## Contextual Background

In a study conducted by Medina-Conde and Flores-Ilhuicatzí (2019), it was found that despite the constitutional and human rights principles underpinning INFONAVIT, borrowers frequently perceive the interest rates as high. This, coupled with the limited time allotted for interest repayment, eventually leads them to default on payments.

Olivares-Aguayo et al. (2021) posited that this problem is particularly pronounced when the borrower belongs to a lower-middle socioeconomic stratum. Their study examined the financial health of mortgage loans in Mexico and the associated

risks. Using 2015 data and a quantitative amortization approach, the study concluded that individuals earning lower-middle incomes (between \$2,103 and \$6,309 MXN) exhibit a high risk of payment default.

In line with this, Colonello and Dal Borgo (2025) considered whether the inclusion of a third financial entity could counterbalance some of the financial difficulties. Their study analyzed the impacts of co-financing schemes between INFONAVIT and private banking, concluding that both institutions and borrowers could benefit from these alliances. Specifically, INFONAVIT can serve higher-income segments, while private banks benefit from risk sharing and the expansion of potential client acquisition. Conversely, individuals seeking to purchase a home gain access to a lower down payment and better-quality housing.

However, an analysis by the Center for Sustainable Development Research (CIDS) detailed that the housing industry in Mexico operates within a volatile environment that must evolve according to external demands. The CIDS thus concluded that housing developers, authorities, credit managers, and borrowers all need to embrace collaborative processes. Consequently, the organization considers it fundamental to recognize that the incorporation of technology alone will not guarantee the success of housing projects (CIDS, 2018).

In a field study conducted by Reyes and Reyes-Sánchez (2025), the authors indicated that the previously noted problems are compounded by irregular and informal practices. Their research found that families become trapped in unpayable debts because real estate and financial policies, oriented toward maximizing profits, promote housing in isolated developments with numerous deficiencies. Consequently, in addition to having substantial debts, families also resort to informal strategies to cope with the lack of services or infrastructure.

Continuing with the influence of informality, Baird-Zars (2023) examined how municipal land-use offices in a nonurban region of Mexico solidify

practices that are legal yet informal, terming them “gray institutions.” The author concludes that these types of institutions significantly influence urbanization processes because, over the years, the practices become routine. In turn, these practices evolve into collective knowledge and skills for interacting with legal regulations.

## Methodology

A descriptive correlational investigation was conducted utilizing the Pearson Chi-squared test which allowed for the determination of the association between technological variables and their impact on payment omissions for INFONAVIT mortgage loans. The sample consisted of 247 individuals who visited the regional INFONAVIT offices in Chihuahua City, Mexico, between July 3 and July 14, 2023. Access to the data was granted subsequent to obtaining institutional authorization, which caused a delay in the analysis. A convenience sampling technique was applied, wherein all individuals who attended the offices during those dates were invited to participate; only those who voluntarily accepted responded to the questionnaire. The instrument included 25 closed-ended questions, aimed at gathering information on sociodemographic variables, credit status, and the use of digital tools linked to mortgage management. The survey was administered in person at the INFONAVIT facilities, ensuring the anonymity of the responses.

The study hypothesis relates to the technological factors associated with the non-performing loan portfolio of credits granted by INFONAVIT, leading to the following proposition:

H1. The technological variables that impact payment omissions for INFONAVIT mortgage loans in Chihuahua City, Mexico, are:

- a) Internet Access.
- b) Possession of an Email Account.
- c) Knowledge of the “Mi Cuenta Infonavit” Mobile Application.

The latter refers to the Mi Cuenta Infonavit application, which is utilized for mortgage credit ma-

nagement via a digital platform accessible on both smartphones and computers.

## Results

The results are presented in two levels of analysis. In the first, the general findings for the total sample of 247 borrowers are described. Subsequently, the subgroup of 86 individuals with non-performing loans is specifically examined to identify in greater detail the conditions linked to payment default.

Firstly, it was observed that 39% of the surveyed population belonged to the 31 to 45 age group. However, it is notable that 42% of the respondents were between 46 and 60 years old. This indicates that this older age group exhibits a greater interest in regularizing and paying their mortgage loans, and they also represent the group with the highest number of active credits.

Next, the total sample was classified into two groups: performing portfolio and non-performing portfolio. This division was defined according to the current payment status of the respondents’ mortgage loans, allowing a clear differentiation between those who maintained up-to-date payments and those who presented delinquencies or defaults of up to 9 months on their mortgage obligations. Table 1 illustrates that 65.2% of the respondents were in the performing portfolio category, while the remaining 34.8% were in the non-performing portfolio.

**Table 1.**  
Classification of portfolio type

| Portfolio | Frequency | Percentage |
|-----------|-----------|------------|
| Current   | 161       | 65.20      |
| Past due  | 86        | 34.80      |
| Total     | 247       | 100.00     |

The results for the subgroup of borrowers with non-performing loans (n=86) are presented next. Within this subgroup, and regarding specific questions concerning the use of technology, the findings are shown in Table 2. The data indica-

tes that 74.4% of these individuals reported possessing an email account, suggesting they have internet access. Furthermore, 45.3% of the individuals in this subgroup declared knowing how to use the “Mi Cuenta Infonavit” application; however, only 17.4% have this application downloaded on their mobile phones. This finding highlights the necessity of strengthening financial and technological literacy among borrowers to improve their ability to manage their mortgage loans.

**Table 2.**

Questions about Technological Variables

| Questions about Technological Variables                            | Frequency | Percentage |            |      |      |            |
|--------------------------------------------------------------------|-----------|------------|------------|------|------|------------|
|                                                                    | Yes       | No         | Don't Know | Yes  | No   | Don't Know |
| Do you have email?                                                 | 64        | 22         |            | 74.4 | 25.6 |            |
| Do you know how to use the Mi Cuenta Infonavit online application? | 39        | 47         |            | 45.3 | 54.7 |            |
| Do you have the Mi Cuenta Infonavit online application?            | 15        | 71         |            | 17.4 | 82.6 |            |
| Do you know the balance to be paid?                                | 18        | 48         | 20         | 20.9 | 55.8 | 23.3       |
| Are you familiar with the different payment channels?              | 22        | 64         |            | 25.6 | 74.4 |            |

Table 3 presents the analysis of the relationship between the portfolio type and the possession of an email account relative to the total number of surveyed individuals (n=247). The results show a higher proportion of borrowers with performing loans who possess this communication tool (139 cases), in contrast to borrowers with non-performing loans (64 cases). Although email users are present in both groups, the difference in magnitude suggests that having access to this medium could facilitate the receipt of payment notifications or reminders, thereby increasing the probability of keeping the loan current.

**Table 3.**

Association of information between the questions: Type of portfolio? and Do you have an email address?

| Portfolio | e-mail |    | Total |
|-----------|--------|----|-------|
|           | Yes    | No |       |
| Current   | 139    | 22 | 161   |
| Past due  | 64     | 22 | 86    |
| Total     | 203    | 44 | 247   |

In concordance with the previous findings, Table 4 displays the association between the portfolio type and the use of the “Mi Cuenta Infonavit” application. These results indicate a low level of technological adoption among the sample members: only 66 borrowers reported having the application installed, compared to 181 who do not utilize it. Nevertheless, it is observed that the percentage of application users is higher among those with a performing portfolio (31.7%) than among bo-

rowers with a non-performing portfolio (17.4%). This finding suggests that the use of digital mortgage management tools may be linked to better financial administration practices and higher compliance with payment obligations.

**Table 4.**

Association of information between the questions: “Type of portfolio?” and “Do you have the Mi Cuenta Infonavit internet application?”

| Portfolio | Application |     | Total |
|-----------|-------------|-----|-------|
|           | Si          | No  |       |
| Current   | 51          | 110 | 161   |
| Past due  | 15          | 71  | 86    |
| Total     | 66          | 181 | 247   |

The joint analysis of the results demonstrates that the access and use of technological tools are associated with better performance in credit compliance, although important limitations persist. On the one hand, the majority of borrowers with



a performing portfolio possess an email account, while this proportion is lower among those with a non-performing portfolio. This suggests that having access to this communication medium facilitates notifications and reminders, which can influence payment timeliness.

Similarly, although the usage of the “Mi Cuenta In-foнавit” application is low overall, its adoption is proportionally higher among those who maintain a performing portfolio (31.7%) than among borrowers with a non-performing portfolio (17.4%). Furthermore, according to Table 2, 74.4% of respondents possess an email account, but only 17.4% have the application downloaded on their mobile phone, despite 45.3% claiming to know how to use it. These data reflect that the possession of digital means does not always translate into effective use. This underscores the need to strengthen both the financial literacy and technological training of borrowers to enhance the utility of these tools in managing their mortgage loans and reduce the risk of default.

For the verification of the hypothesis, the Chi-squared test was performed using the following formula, where O = Observed Data and E = Expected Data:

$$X^2 = \sum \left( \frac{(O - E)^2}{E} \right)$$

Significance Level: 0.05

- Email Account: 2 categories
- Reason for Non-Payment: 5 categories
- Degrees of Freedom = (2 - 1) (5 - 1) = 4

At this stage, the questionnaire question corresponding to the email account was selected (a dichotomous decision: “yes” or “no”). Separately, one of the questions from the “demographic data” section related to the principal reason for non-payment was selected. The question was presented as follows:

Question. What is the main reason why you do not make your monthly payment?

- a) I do make the payments
- b) I do not have a job
- c) I do have a job, but I cannot afford the monthly payment
- d) The monthly payment is too high
- e) Other

Table 5 presents the observed and expected frequencies of the hypothesis, while Table 6 shows the count of observed cases.

**Table 5.**  
Observed and expected frequencies

| Has email      | Doesn't pay |          | Pay      |          |
|----------------|-------------|----------|----------|----------|
|                | Observed    | Expected | Observed | Expected |
| No             | 26          | 21.5547  | 18       | 22.6286  |
| Yes            | 95          | 99.4453  | 108      | 103.3714 |
| Total, overall | 121         | 121      | 126      | 126      |

The Chi-squared analysis (Table 7) applied to the relationship between possessing an email account and the reasons for non-payment yielded a significance value (p>0.05). This result indicates that there is insufficient statistically significant evidence to assert that the two variables are associated. This means that the mere possession of an email account, by itself, does not explain the reasons why borrowers failed to meet their payment obligations. This suggests that economic and social factors may have a greater influence on default.

**Table 6.**  
H1 tally table

|                    |       | What is the main reason for not paying? |                    |                                                                 |                                 |       | Total |
|--------------------|-------|-----------------------------------------|--------------------|-----------------------------------------------------------------|---------------------------------|-------|-------|
|                    |       | Yes, I make the payments                | I don't have a job | Yes, I have a job, but it's not enough to pay the monthly bill. | The monthly payment is too high | Other |       |
| Do you have email? | Yes   | 108                                     | 54                 | 16                                                              | 10                              | 15    | 203   |
|                    | No    | 18                                      | 16                 | 5                                                               | 3                               | 2     | 44    |
|                    | Total | 126                                     | 70                 | 21                                                              | 13                              | 17    | 247   |

**Table 7.**

Calculation of the Chi-square X2 of H1

|                              | Value  | gl | Asymptotic sign (bilateral) |
|------------------------------|--------|----|-----------------------------|
| Chi-square                   | 3.474a | 4  | 0.482                       |
| Reason for plausibility      | 3.449  | 4  | 0.486                       |
| Linear association by linear | 0.310  | 1  | 0.578                       |
| n valid cases                | 247    |    |                             |

a. 3 boxes (30.0%) have expected a count lower than 5. The minimum expected count is 2.32.

The finding above is consistent with the trend observed in the responses regarding the technological theme, which indicates that non-compliance is not attributable to a lack of internet access, but rather suggests a lack of familiarity, skills, or confidence in the use of electronic means provided by INFONAVIT. This result underscores the importance of strengthening financial and technological literacy among borrowers to enhance their capacity for financial management.

## Discussion

The importance of understanding the determinants of mortgage loan delinquency lies in the potential to identify a set of early warning indicators, enabling timely intervention, and minimizing the associated probability and costs (Msomi, 2022).

Ramírez-Sierra et al. (2024) noted that in Mexico, the Institute of the National Housing Fund for Workers (INFONAVIT) originates more than 50% of all mortgages in the country and manages nearly all

(93%) of the housing subsidies. Furthermore, their study found that the average support received by borrowers was equivalent to almost one-fifth of the homes' value, reflecting the relevance of these resources for the population with lower economic incomes.

Despite the above, Peña-Barrera and Sandoval (2017) argue that Mexico's housing finance model has proven insufficient to address the most urgent housing needs. The rapid production of housing in large volumes, coupled with a lack of risk assessment in the initial stages, has fostered the construction of numerous low-quality homes that have failed to alleviate the housing shortage. The authors add that these deficiencies have resulted in a system prone to mortgage payment default and the assignment of credits for real estate purchases.

Hence, housing policy must not focus merely on the construction of homes or a technical evaluation of costs, materials, or delivery timelines. It also requires an integrated system that incorporates social, cultural, and environmental dimensions to ensure not only the quantity but also the quality of housing (Rincón-González, 2006). In this regard, the author explains that housing can be viewed from three perspectives: the instrumental, the cognitive, and the systemic. The first, the instrumental approach, relates to the use of technique and technology to produce and disseminate innovations; that is, the belief that technological advancements stimulate cultural and social changes.

For example, in the specific case of INFONAVIT, many attempts have been made to improve



its collection and communication systems with mortgage holders. Specifically, the research work by Pardo (2006) compiles the institute's transformation events, highlighting the strengthening of technology topics, but also the creation of substantive areas like social collection, aimed at serving beneficiaries through the control and follow-up of credit collection. However, insufficient access to technology, particularly to online payment systems and mobile applications for managing public housing finances, can significantly hinder mortgage credit compliance. In a study conducted in the United States, Greene et al. (2023) concluded that households without access to digital means for making and receiving payments cannot fully participate in an increasingly digitalized economy.

Furthermore, as previously mentioned, the housing problem is multifactorial, intertwining not only technological literacy but also socioeconomic status and the existing public services infrastructure. For instance, areas with better technological infrastructure tend to have higher housing prices, which can deter low-income families from accessing these neighborhoods (Yu et al., 2023). This spatial inequality not only affects housing availability but also limits access to essential services that are increasingly offered online, such as job applications and social services, thereby further cementing socioeconomic divisions (Atuesta et al., 2018). In this sense, the CIDS emphasizes the importance of considering factors such as location, proximity to schools, urbanization, and safety in INFONAVIT's housing programs to prevent homes from being abandoned and ultimately becoming part of the non-performing portfolio (CIDS, 2018).

Finally, besides technology, the economic situation of the beneficiaries is key. Individuals with unstable employment or financial difficulties suffer the most in meeting their credit payments. In Mexico, labor conditions have changed significantly in recent years, affecting the capacity of many people to keep up with their debts (Zavala Villagómez, 2018). This phenomenon highlights the necessity for housing policies to not only adapt to

technological advancements but also to consider the economic realities of the beneficiaries.

## Conclusions

INFONAVIT views investment in technology as a priority. However, the sheer volume of users represents a challenge for maintaining and updating the technological infrastructure. The rapid pace of technological advancement implies that obsolescence can occur overnight, necessitating constant modernization to maintain competitiveness and meet demand.

Another significant challenge is achieving universal user connectivity. Although millions of people utilize smartphones, 100% effective access to the internet and necessary applications for managing mortgage loans has not been achieved, especially among low-income or older users. The lack of infrastructure in rural areas also impedes access to digital services, thus limiting the inclusion of these vulnerable groups in public housing programs.

To more thoroughly examine the population at higher risk of default, this research conducted a specific analysis of the 86 borrowers in the non-performing portfolio. The findings indicate that 74.4% of them had an email account, 45.3% claimed to know how to use the "Mi Cuenta Infonavit" application, but only 17.4% had it installed on their mobile device. These data reflect that, even with a certain level of technological access and knowledge, the effective adoption of digital tools remains limited. Furthermore, the disparity between "knowing how to use" and "having installed" the application reveals a gap between declared familiarity and practical use of the platform, which limits its potential to support credit management.

In conjunction, the analyses show that while technological adoption is associated with better credit performance descriptively, the inferential results indicate that these variables do not solely explain payment default. This underscores the necessity of considering additional economic and social factors.

The integration of new technologies into mortgage credit management represents a significant advance, as it allows for the optimization of payment processes and improved efficiency in the administration of beneficiary accounts. These digital tools, such as online platforms for payments and balance inquiries, have the potential to reduce defaults and facilitate real-time information access.

However, for these technological innovations to achieve their maximum impact, they must be accompanied by inclusive policies that take into account the diverse economic, social, and technological situations of users.

Therefore, it is fundamental to address these barriers by implementing financial and technological literacy programs that train users in the use of digital tools. Simultaneously, public policies must be oriented toward reducing socioeconomic inequalities that prevent the most vulnerable sectors from having equitable access to dignified and sustainable housing. Only through an integral approach that combines technology, training, and economic support can all citizens, especially the most disadvantaged, be guaranteed equal opportunities for access to adequate housing.

## Limitations of the Study

This study presents several limitations that must be considered when interpreting the results. First, the sample was constructed using convenience sampling, comprising 247 individuals who visited the regional INFONAVIT offices in Chihuahua City between July 3 and July 14, 2023. Participation was voluntary, and the data obtained reflect the characteristics and perceptions of those who attended during those specific dates. Therefore, the findings cannot be generalized to the entirety of the institute's beneficiaries.

Second, in the statistical analysis using the Chi-squared test, approximately 30% of the cells exhibited expected counts of less than five. This limits the robustness of the statistic and necessitates a cautious interpretation of the absence of a significant association between the technological variables and the reasons for default. These limitations suggest the need for future research employing probabilistic sampling designs and utilizing statistical techniques that allow for greater explanatory power regarding the factors influencing mortgage delinquency.

## Future Lines of Research

Future research must deepen the analysis of mortgage credit delinquency determinants by incorporating socioeconomic, demographic, and contextual dimensions to more precisely explain default patterns. We also recommend broadening the scope to include representative samples from diverse regions, which would allow for the identification of territorial differences and context-specific factors. Furthermore, it is pertinent to explore the measurement of technological variables through alternative approaches that consider their impact on credit management and risk mitigation. Finally, the application of more robust analytical methods is suggested, such as advanced predictive models, machine learning techniques, and multivariate analysis. These methods would contribute to the construction of more comprehensive explanatory frameworks and the formulation of effective strategies for the sustainability of the social housing system.

## Author Contributions

**Yarena Molina Torreblanca:** Initial drafting (writing), Methodology, Results analysis.

**Sonia Esther González-Moreno:** Methodology, Initial drafting (writing), Final writing (review and editing).

**Jesús Manuel Palma-Ruíz:** Validation, Analysis, Final writing (review and editing).

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