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The adoption of digital loyalty programs through fintech: an analysis of Moroccan SMEs through transaction cost theory

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Abstract: This paper examines the adoption of digital loyalty programs via fintech by Moroccan SMEs, utilizing Williamson's (1975) transaction cost theory. The objective is to understand how technologies such as mobile applications and blockchain can optimize customer-business relationships by reducing transaction costs related to information, monitoring, negotiation, and automation. The study demonstrates that immediate access to promotions and rewards helps decrease information asymmetries, while automation reduces human errors and administrative costs. Blockchain enhances transparency and trust through increased traceability, while the simplification of exchanges facilitates interactions between the business and its customers. The analysis is based on a Tobit model to measure the intention to adopt these programs using a Likert scale, applied to a sample of 311 Moroccan SMEs operating in various sectors. The results reveal that reducing information costs, automation, blockchain, and the simplification of exchanges have a significant and positive effect on the adoption of programs. In contrast, strengthening loyalty through the accumulation of points and rewards does not have a significant effect. Larger companies and those from technological sectors more readily adopt these programs, and competition appears to be a stimulating factor. This study recommends tailored support policies, especially for small businesses, to facilitate their digital transition. By optimizing customer relationships and reducing economic frictions, these programs enable SMEs to better adapt to market dynamics and improve their overall performance.

Keywords: Digital Loyalty; Fintech; Blockchain; Transaction Costs; Competitiveness.
JEL Classification: D23; L21; O33; G21; M31.

1. Introduction

Digital loyalty programs have become a strategic lever for companies seeking to strengthen their customer relationships and improve their competitiveness. With the emergence of financial technologies (fintech), SMEs can now adopt innovative solutions such as mobile applications and blockchain. These technologies optimize the management of loyalty programs by reducing transaction costs and facilitating interactions with customers. In a context of increased competition and digital transformation, the adoption of these programs becomes essential for Moroccan SMEs to adapt to market developments. This study is framed within the theoretical context of transaction cost theory

developed by Williamson (1975). According to this theory, companies make their decisions based on minimizing the costs associated with exchanges, such as information, monitoring, negotiation, and managing opportunism. The adoption of digital loyalty programs can thus be viewed as a strategy aimed at reducing these transaction costs while improving efficiency and customer satisfaction. By integrating these technologies, SMEs can also enhance transparency and trust in their business relationships through the traceability provided by blockchain and the automation of processes.

The objective of this research is to explore the transactional factors that influence the adoption of these digital loyalty programs by Moroccan SMEs. SMEs are particularly sensitive to these innovations as they enable the optimization of their operations and improve their positioning against larger or more agile competitors. This work proposes an empirical model based on transaction cost theory to identify the main determinants of adoption intention, considering factors such as reducing information costs, automating processes, simplifying exchanges, and strengthening loyalty. This research relies on a Tobit econometric model to analyze SMEs' adoption decisions. Based on a sample of 311 Moroccan SMEs from various sectors, this study evaluates how transactional dimensions influence the adoption of fintech solutions.

2. Literature review

Muzdalifa et al. (2018) emphasize that fintech acts as a key lever for promoting financial inclusion among SMEs. They stress that fintech services are not limited to capital provision but also include diverse digital solutions, such as payment mechanisms and financial management tools. These innovations contribute to enhancing the competitiveness of SMEs by reducing their dependence on traditional financial structures. Rahardjo et al. (2019) extend this analysis by demonstrating that fintech optimizes the operational performance of SMEs, particularly by offering cashless payment solutions. By reducing banking and administrative fees, these solutions lighten the financial burden on SMEs. Furthermore, easier access to unsecured loans opens new expansion possibilities for these businesses, strengthening their competitiveness in the market. Onyango et al. (2014) complement this perspective by highlighting that the adoption of technologies, including fintech, improves the performance of SMEs by enhancing their operational efficiency. These technologies enable SMEs to optimize their daily operations, expand their market reach, and improve their relationships with customers, thereby contributing to better strategic management of businesses.

Lukonga (2020) emphasizes the importance of digital transformation for improving productivity and competitiveness. Digitalization allows not only access to new markets at a lower cost but also reduces communication expenses and strengthens cash management through tools such as electronic payments and crowdfunding. However, Lukonga nuances the analysis by indicating that this transformation is hindered by limited infrastructures, an inadequate regulatory framework, and insufficient access to digital skills. The author thus proposes an integrated approach to support the adoption of digital solutions, focusing on strengthening infrastructures and training. De la Torre, Gozzi, and Schmukler (2017) join this discussion by focusing on the impact of online platforms, including those from fintech companies, on SMEs' access to financing. They highlight the role of reverse factoring in improving the financial performance of SMEs by accelerating cash flow and reducing fraud risks. By reducing transaction costs and increasing transparency, these platforms become strategic tools for SMEs seeking to enhance their financial management. Thus, the integration of fintech technologies promotes financial inclusion, improves operational efficiency, and strengthens the competitiveness of SMEs, while highlighting the challenges related to the adoption of these solutions. By combining financial innovations and digital transformation, SMEs can not only increase their resilience but also access new growth opportunities.

Galvão et al. (2018) emphasize the importance of adopting a proactive customer relationship management approach tailored to SMEs, using digital solutions and a strategic exploitation of data. Their four-step approach—identification, differentiation, interaction, and personalization—enables more effective responses to customer needs, thereby strengthening their loyalty. This orientation resonates with the work of Agnihotri et al. (2017), which shows that CRM technologies and the use of social media positively influence post-sale behaviors. By encouraging proactive customer participation, these tools enhance loyalty and contribute to the overall performance of SMEs. Donnelly et al. (2012) highlight the growing interest in digital loyalty cards as marketing intelligence tools. Although traditionally used by large companies, these cards provide SMEs with a better understanding of purchasing behaviors and foster responsive and flexible marketing strategies. By combining these digital tools with their intuition, SMEs can build strong customer relationships even with limited resources. Complementarily, Hutchinson et al. (2015) demonstrate that integrating loyalty programs allows SMEs to personalize their interactions, thereby increasing customer loyalty and optimizing their marketing management. However, Trainor et al. (2014) signal a major risk: poor use of social media and a lack of coherence between online and offline channels can compromise customer loyalty. They emphasize the importance of an aligned strategy across all customer touchpoints to maximize the impact of digital interactions.

By combining the ideas of Trainor et al. (2014) and Donnelly et al. (2012), it appears that SMEs should adopt a mixed and balanced approach, integrating analysis and intuition, to maximize their effectiveness in managing customer relationships. Digital customer loyalty appears as a key strategy enabling SMEs to optimize their relationships with consumers by leveraging data intelligence and digital technologies. The approach proposed by Cortiñas et al. (2008) goes beyond the traditional goal of loyalty through reward programs. These authors highlight the collection of behavioral data as a central value. For SMEs, leveraging this information allows for a better understanding of customer preferences and adjusting their offerings, thereby competing more effectively with large companies in specific market segments. Gupta and Foroudi (2016) reinforce this idea by stressing the role of digital innovations in improving customer relationships. They show that SMEs can use digital platforms to provide more personalized experiences, thereby increasing consumer satisfaction and loyalty. This personalization fosters continuous interaction, solidifying the link between the company and its customers in the long term. In this continuity, Mokhtar highlights that adopting online marketing enables SMEs not only to extend their commercial reach but also to improve customer relationship management at a lower cost. By leveraging digital tools, SMEs can maintain more sustainable and effective relationships, thereby enhancing their competitiveness in the market.

Pramudito et al. (2020) provide another dimension by analyzing the impact of online service quality and recommendations based on big data on e-loyalty. Their study shows that integrating recommendation systems not only maximizes sales but also builds strong relationships with customers. These results are particularly relevant for SMEs, as improving user experience through these practices encourages consumers to return regularly to their online platforms. Thus, by combining behavioral data collection (Cortiñas et al., 2008) with the use of digital innovations (Gupta & Foroudi, 2016) and the adoption of online marketing (Mokhtar), SMEs can strengthen customer loyalty. The addition of personalized recommendation systems (Pramudito et al., 2020) helps create a smooth and engaging experience, fostering sustainable loyalty. By integrating these approaches, SMEs can not only enhance their resilience in a competitive environment but also maximize the benefits offered by digital strategies. In this way, digitalization through Fintech plays a crucial role in customer loyalty and competitiveness for businesses, particularly for SMEs, by improving their operational efficiency and ability to maintain lasting customer relationships.

Abe and Proksch (2017) highlight the positive impact of digital transformation by emphasizing that access to financing through financial technologies (Fintech) not only optimizes operations but also more effectively integrates SMEs into global value chains. This integration is facilitated by improved resource management and simplified access to capital, which enhances competitiveness in international markets. Meanwhile, Gomber et al. (2017) complement this perspective by emphasizing the advantages of digital financial services for securing transactions and reducing financial costs. These aspects are essential for building trust and encouraging customer loyalty. Companies that adopt these solutions can thus provide a smooth and secure customer experience, which becomes a major competitive advantage in an increasingly digitized economic environment. Thus, Fintech solutions enable companies not only to improve their internal performance but also to build stronger and more durable relationships with their customers, based on convenience and security. The increased efficiency provided by these technologies underscores the importance of cost reduction and security in the customer experience. Therefore, the adoption of financial technologies is not limited to operational gains but becomes a strategic lever for loyalty and sustainable growth for businesses in a digitalized context.

3. Methodology

3.1. Construction of research hypotheses and econometric model

Transaction cost theory (Williamson, 1975) posits that organizations make decisions based on minimizing costs related to information, negotiation, monitoring, and opportunism. In this context, the adoption of digital loyalty programs through mobile applications or blockchain solutions proves to be an effective strategy. These programs facilitate relationships between businesses and their customers by reducing various types of transaction costs, making their adoption more attractive for Moroccan SMEs. Therefore, the decision to implement these programs is based on an assessment of the gains realized through the reduction of transaction costs. The following are the main transactional dimensions influencing this decision:

- **Reduction of Information Costs:** Digital loyalty programs provide immediate access to relevant information, such as available rewards, point balances, and ongoing promotions. By reducing information asymmetries between SMEs and their customers, these programs decrease uncertainties, promoting more informed decision-making. SMEs perceive these gains as a reduction in risks associated with exchanges, which positively influences their adoption decision.
- **Automation of Transaction Processes:** The technologies used in these programs allow for the automatic allocation of points and the processing of rewards without human intervention, thus limiting errors and delays. The increased efficiency, coupled with a reduction in administrative costs, motivates SMEs to opt for these solutions, as they simplify operations while maintaining high levels of customer satisfaction.
- **Reduction of Monitoring and Control Costs:** Blockchain ensures perfect traceability of transactions, ensuring transparency and trust. This allows SMEs to reduce costs related to supervision and fraud management. Trust in these systems positively influences SMEs' decisions to adopt these programs by limiting internal control costs.
- **Simplification of Exchanges and Negotiations:** Digital programs offer standardized rules that eliminate the need for renegotiations for each transaction. The reduction of negotiation costs and the fluidity of exchanges encourage SMEs to adopt these systems, as they enable more flexible management of customer relationships.
- **Reduction of Opportunism Costs through Loyalty:** The accumulation of points and rewards encourages mutual dependence between SMEs and their customers. This loyalty reduces opportunistic behaviors, as customers are incentivized to stay with the business to

maximize their benefits. Limiting the risk of supplier switching is a key factor in SMEs' decisions to adopt these solutions.

In this spirit, the adoption of digital loyalty programs by Moroccan SMEs can be seen as a logic of minimizing transaction costs. The decisions made by these businesses are based on evaluating the ability of the technologies used to reduce economic frictions and strengthen customer relationships. Based on these considerations rooted in transaction cost theory, we formulate the following hypotheses:

- ***H1: The reduction of information costs has a positive impact on the decision of Moroccan SMEs to adopt digital loyalty programs.***
- ***H2: The automation of transactions significantly improves the likelihood of Moroccan SMEs adopting digital loyalty programs.***
- ***H3: The reduction of monitoring costs through blockchain has a positive effect on the adoption decision of digital loyalty programs by Moroccan SMEs.***
- ***H4: The simplification of exchanges and the standardization of programs increase the likelihood of Moroccan SMEs adopting digital loyalty programs.***
- ***H5: The strengthening of loyalty through the accumulation of points and rewards reduces opportunistic behaviors and has a positive effect on the decision of Moroccan SMEs to adopt digital loyalty programs.***

The decision of Moroccan SMEs to adopt digital loyalty programs through fintech is not limited to a mere modernization of processes. It may be based on an economic logic of minimizing transaction costs, with the ultimate goal of improving competitiveness and strengthening the resilience of customer relationships. The proposed econometric model based on the research questions is as follows:

$$IAADi = \beta 0 + \beta 1.INFOi + \beta 2.AUTOi + \beta 3.SURVi + \beta 4.SIMPi + \beta 5.LOYAi + \gamma 1.SIZEi + \gamma 2.SECTi + \gamma 3.AGEPi + \gamma 4.COMPi + \varepsilon i$$

The intention to adopt digital loyalty programs (IAAD) is measured on a 5-point Likert scale, ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). This variable assesses the attitude, motivation, and propensity of SMEs to consider adopting these programs in the near future. Since these SMEs have not yet adopted these solutions, the explanatory variables measure the importance attributed by SMEs to various factors likely to influence their decision. The reduction of information costs (INFO) measures the importance for SMEs of quickly accessing point balances and promotions via applications. The automation of transactional processes (AUTO) evaluates the extent to which SMEs value the simplification of operations and the reduction of human errors. The reduction of monitoring costs (SURV) captures the importance of ensuring greater transparency and security through technologies like blockchain. The simplification of exchanges (SIMP) measures the importance that SMEs place on standardized programs that reduce renegotiations and facilitate interactions. The strengthening of customer loyalty (LOYA) assesses the importance for SMEs of reducing opportunistic behaviors and increasing customer retention. Each explanatory variable is measured through five items on a 5-point Likert scale, allowing for the quantification of the importance attributed by SMEs to these different aspects. The mean or sum of the scores is used to calculate the value of each variable.

Control variables include company size (SIZE), measured by the number of employees, and the industry sector (SECT), a dummy variable distinguishing high-tech sectors. The age of the programs (AGEP), expressed in years, examines whether experience with traditional programs influences the intention to adopt a digital solution. The intensity of competition (COMP) is measured on a 5-point Likert scale to assess whether competitive pressure encourages the adoption of these programs.

3.2. Justification for the choice of Tobit Regression

Tobit regression is particularly suited to this study because it takes into account the censored nature of the dependent variable, the intention to adopt digital loyalty programs. This intention is measured using a five-point Likert scale, which imposes limits on the possible values. The use of ordinary least squares (OLS) regression could lead to predictions outside this range, thereby compromising the relevance of the results. The Tobit model corrects this limitation by adjusting the estimates to respect the bounds defined by the scale. Furthermore, the intention to adopt a digital loyalty program reflects a latent behavior. In this context, not all SMEs have necessarily made an explicit decision, but their responses reflect a potential interest. The Tobit model allows for a better understanding of this dynamic by considering cases where the intention might be hindered by external constraints, such as a lack of information or insufficient resources.

This approach is also suitable for handling the explanatory variables used in the model, such as the reduction of information costs, automation of processes, monitoring, simplification of exchanges, and strengthening of loyalty. Each variable may influence the intention to adopt differently. The Tobit model enables precise estimation of these effects, even when the dependent variable is limited by a Likert scale, by incorporating SMEs that are at the extremes of the scale. The choice of this method is also justified by the model's ability to reflect the combined influence of several transactional factors. The decision to adopt these loyalty programs is not binary but depends on multiple considerations, including economic constraints, competitive pressure, and the capacity to automate processes. By taking this complexity into account, the Tobit model allows for more relevant and consistent results that align with the realities of Moroccan SMEs. Additionally, this model is particularly useful in contexts where a low intention to adopt may result from external constraints rather than a lack of genuine interest. The Tobit model captures this nuance by modeling not only potential adoption but also the barriers that may influence the decision. This allows for a more refined interpretation of the data, which is essential for better understanding the dynamics that encourage or hinder SMEs in their adoption of digital loyalty solutions via fintech.

3.3. 1.3.Presentation of the sample

The sample of this study comprises 311 Moroccan SMEs operating in various sectors. These companies were selected to represent diversity in terms of size, age, and sector, thus ensuring a comprehensive view of the dynamics related to the adoption of digital loyalty programs. Regarding company size, this is measured by the number of employees. The sample includes microenterprises (fewer than 10 employees), small enterprises (10 to 49 employees), and medium-sized enterprises (50 to 250 employees). This distribution allows for capturing the potential impact of size on the ability to adopt digital loyalty solutions, such as mobile applications or blockchain technologies.

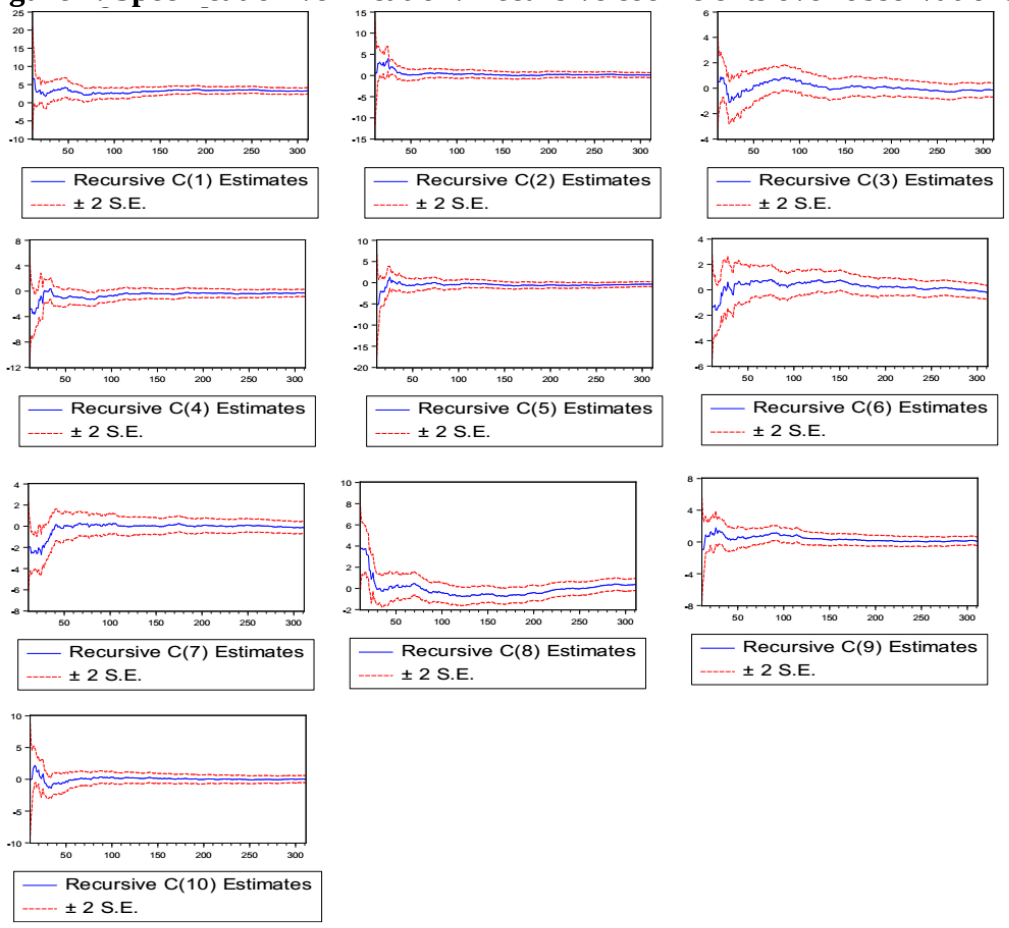
The age of the companies, expressed in years of existence, is also considered to verify whether accumulated experience with traditional loyalty programs influences the intention to adopt digital solutions. This variable helps to understand whether more established companies are more inclined to adopt new technologies or if, conversely, younger companies are more likely to integrate these innovations. The sample also includes sectoral diversity, distinguishing between high-tech sectors (for example, ICT) and more traditional sectors (such as retail or crafts). This sectoral differentiation, modeled by a dummy variable, allows for examining whether the nature of the industry influences the decision to adopt fintech-based loyalty programs.

4. Results

4.1. Robustness of the method

The use of recurring coefficients to verify the specification of a Tobit model is preferable to the Ramsey RESET test for several reasons related to the specificity of this type of model and the nature of the data being handled. The Ramsey test assesses the omission of non-linear terms or variables, but it can be limited in the presence of censored data, as is often the case in a Tobit regression. In contrast, recurring coefficients allow for the dynamic verification of the stability and consistency of estimates over iterations, providing a more nuanced assessment of the model specification over time. This method is more suitable when the quality of estimates depends on the stable convergence of parameters across multiple iterations, particularly in a maximum likelihood (ML) framework.

Figure 1: Specification verification: recursive coefficients over observations



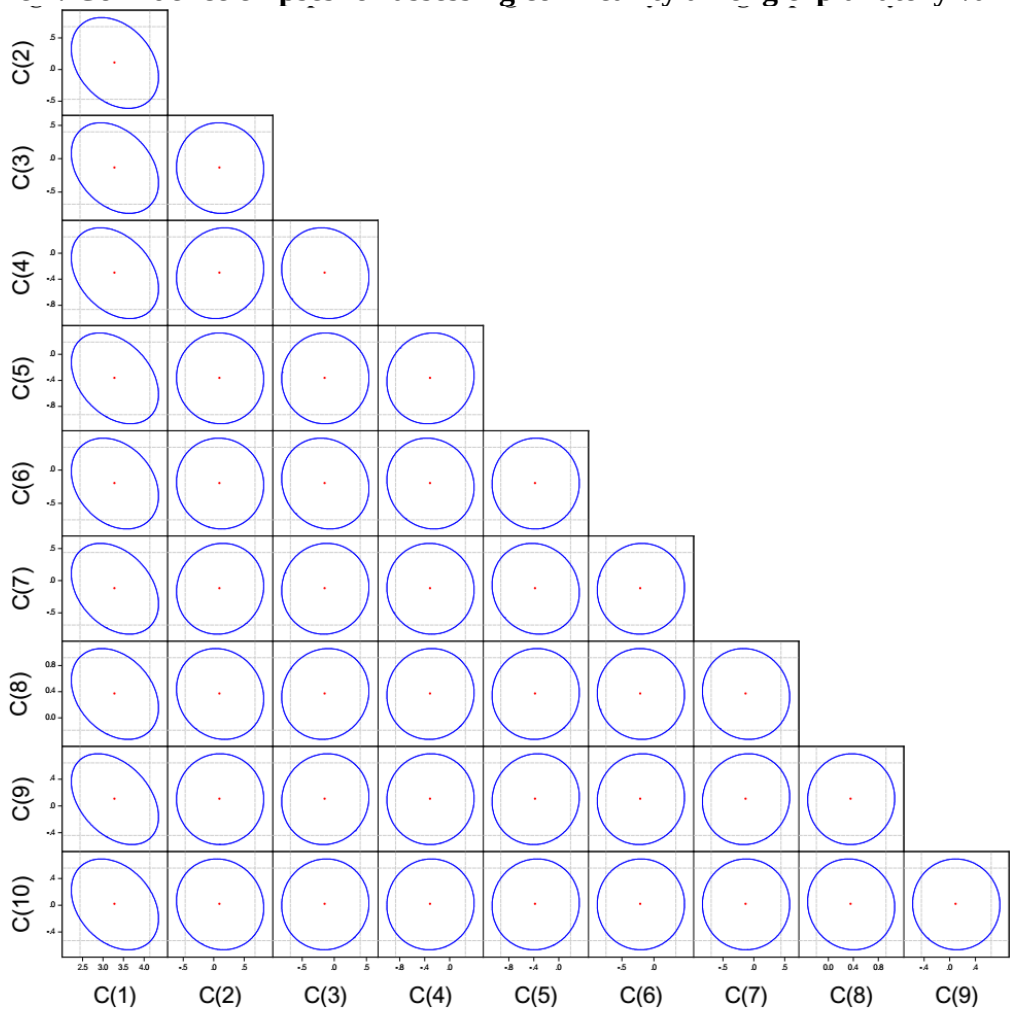
Source: authors

Figure 1 shows the evolution of the estimated coefficients over iterations. A correct specification of the model is indicated by coefficients that quickly converge to a stable value and remain within a narrow range around the confidence threshold. It is observed that for most variables, the coefficients achieve stability after only a few iterations, indicating that the model is correctly specified. If the coefficients had shown significant fluctuations or a lack of convergence, this would have suggested a poor model specification or an estimation issue.

The classical use of Variance Inflation Factors (VIF) to detect multicollinearity is not always relevant in the context of a Tobit model, due to the specificities of censored data and the assumptions of

linearity and normality of errors that these tests imply. Therefore, adopting a visual approach, such as confidence ellipses, allows for a more suitable and intuitive analysis of the relationships between the variables. Confidence ellipses provide a graphical representation of the bivariate relationships between the variables, enabling observation of their correlation level. In a Tobit model, excessive collinearity between explanatory variables should be avoided, as it can lead to instability of estimates and affect the convergence of the Newton-Raphson and Marquardt algorithms used for maximizing likelihood.

Figure 2: Confidence ellipses for assessing collinearity among explanatory variables



Source: authors

These ellipses allow for the quick detection of potential interactions between the variables by showing whether some of them are too strongly correlated, which could undermine the reliability of the model's results. The analysis of Figure 2 shows that most of the ellipses are close to a circular shape, suggesting a weak correlation between the explanatory variables. This relative independence among the variables is a positive sign, as it ensures that each variable contributes uniquely to the explanation of the phenomenon under study, thus avoiding redundancy. An absence of strong collinearity promotes the stable convergence of estimated coefficients and enhances the interpretability of the results obtained with the Tobit model.

The White test is particularly suited for detecting the presence of heteroscedasticity, regardless of the functional form of the errors. Although originally designed for classical ordinary least squares (OLS) regression models, it can also be useful within the context of a Tobit model, especially for adjusting standard errors and ensuring reliable estimates. Heteroscedasticity is characterized by non-

constant variability of the residuals, which can distort statistical inference if not corrected. Therefore, the White test allows for assessing whether the variance of the errors is homogeneous, offering the possibility of adjusting errors with robust estimates if necessary. The results of the White test (Table 1) show an F-statistic of 0.793 with an associated probability (Prob. F(54,256)) of 0.845, which greatly exceeds the conventional threshold of 5%. This indicates that we cannot reject the null hypothesis of homoscedasticity, meaning that the errors appear to have a constant variance.

Table 1: Results of the White Heteroscedasticity Test

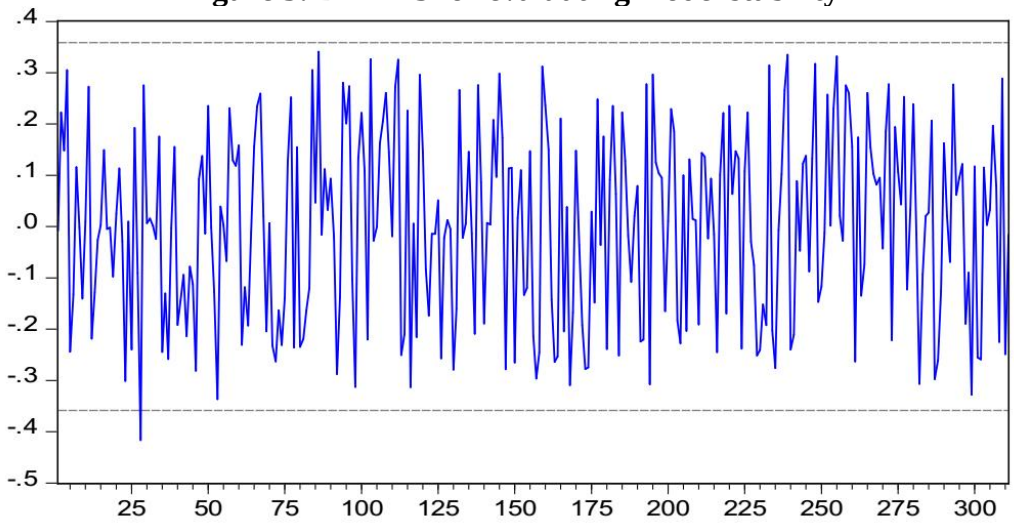
Statistic	Value	Probability
F-statistic	0.793099	Prob. F(54, 256) = 0.8458
Obs*R-squared	44.57190	Prob. Chi-Square(54) = 0.8162
Scaled explained SS	17.24926	Prob. Chi-Square(54) = 1.0000

Source: authors

Moreover, the Obs*R-squared statistic of 44.571 and its associated Chi-Square(54) probability of 0.8162 also confirm this conclusion. These values suggest that the residuals do not exhibit significant variability based on the explanatory variables. The Scaled explained SS with a Chi-Square(54) of 1.0000 further reinforces the conclusion that heteroscedasticity is not present in the model. These results indicate that the standard errors obtained from the Tobit model estimation do not require any particular adjustment for heteroscedasticity, and the inferences made about the model coefficients are valid with the initial standard errors.

The figure presents the DFFITS (Difference in Fits Statistics), an influence indicator used to assess whether certain individual observations exert excessive influence on the model estimates. This tool helps detect potential outliers or influential observations that could compromise the stability of the model and distort the reliability of the results. Visual analysis of the figure shows that the DFFITS values (Figure 3) fluctuate around zero, with regular fluctuations and no observations crossing the thresholds indicated by the dashed lines (-2; 2).

Figure 3: DFFITS for evaluating model stability



Source: authors

This balanced distribution suggests that our model is stable and converges properly without being disturbed by excessive influential points. The observations remain consistent and do not exhibit anomalies that could compromise the accuracy of the estimates. The absence of extreme values in the figure also indicates that the model is not biased by outliers or disproportionately influential

observations. Each data point contributes evenly to the results, which enhances the overall stability and reliability of the model. Indeed, this stability ensures that the estimation process is robust, and the obtained coefficients can be interpreted with confidence.

4.2. Results of the Tobit regression

The methodology is based on Williamson's (1975) transaction cost theory, which suggests that SMEs' decisions aim to minimize various costs associated with exchanges, such as those related to information, monitoring, and relationship management. The adoption of digital loyalty programs through technologies such as mobile applications and blockchain is analyzed from this perspective, demonstrating how these tools facilitate interactions and strengthen ties with customers. The chosen econometric model is a Tobit regression, suited to the censored nature of the data, allowing for the capture of the intention to adopt these programs while accounting for constraints that may limit this adoption. The sample includes 311 SMEs operating in various sectors. The validity of the results is ensured by statistical tests focusing on model stability, the absence of excessive collinearity, and the homogeneity of errors. The results of the regression are presented in the following table:

Table 2: Tobit regression results

Dependent Variable: IAAD				
Method: ML - Censored Normal (TOBIT) (Newton-Raphson / Marquardt steps)				
Sample: 1 311				
Included observations: 311				
Left censoring (value) series: 1				
Right censoring (value) series: 5				
Convergence achieved after 6 iterations				
Coefficient covariance computed using observed Hessian				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-1.069038	0.695809	1.536395	-0.1255
INFO	***1.243015	0.467401	2.659419	0.0082
AUTO	*0.846602	0.445744	1.899301	0.0585
SURV	**1.012807	0.456101	2.220576	0.0271
SIMP	***1.376851	0.455475	3.022890	0.0027
LOYA	0.358767	0.444872	0.806449	0.4206
SIZE	*0.812994	0.461355	1.762187	0.0790
SECT	**1.074846	0.458109	2.346268	0.0196
AGEP	-0.178224	0.443254	0.402082	0.6879
COMP	**0.964411	0.441828	2.182775	0.0298

Source: authors; ***Significant at 1%; **Significant at 5%; *Significant at 10%.

The variable INFO (reduction of information costs) has a positive effect and is significant at the 1% level ($p < 0.01$). This result suggests that quick access to information such as promotions and point balances reduces information asymmetries between the company and its customers. This promotes informed decision-making and increases trust, thereby validating hypothesis H1, which posited that reducing information costs would positively influence the adoption of digital loyalty programs. AUTO (automation of transactions) also displays a positive effect and is significant at the 10% level ($p < 0.10$). Automation simplifies processes by reducing manual interventions, errors, and administrative costs. It also enhances customer satisfaction through smooth management of loyalty points and rewards. Although the effect is moderate, it supports hypothesis H2, which suggests that automation positively influences adoption.

For SURV (reduction of monitoring costs), the effect is positive and significant at the 5% level ($p < 0.05$). The use of technologies like blockchain ensures greater transparency and traceability of

transactions, reinforcing trust and reducing costs related to monitoring and fraud management. This increased trust encourages adoption, validating hypothesis H3. The variable SIMP (simplification of exchanges) shows a positive effect and is significant at the 1% level ($p < 0.01$). Standardizing operational rules eliminates the need for constant renegotiations, thereby simplifying interactions between SMEs and their customers. This reduces friction and transaction costs, encouraging the adoption of digital programs, confirming hypothesis H4.

LOYA (strengthening customer loyalty) shows a positive effect but is not significant ($p > 0.10$). Although the accumulation of points and rewards could theoretically encourage a lasting relationship between customers and the company, this result suggests that this loyalty does not play a significant role in the adoption of digital programs. Therefore, hypothesis H5 is not validated. The control variables show varied effects. SIZE (company size) has a positive effect and is significant at the 10% level. This suggests that larger companies, with more resources, are more likely to adopt these programs. SECT (industry sector) also presents a positive effect and is significant at the 5% level, indicating that companies operating in high-tech sectors are more inclined to adopt digital loyalty programs. COMP (competitive intensity) has a positive and significant effect at the 5% level, showing that competitive pressure acts as a driver of innovation and encourages SMEs to adopt these solutions to remain competitive. Finally, AGEP (age of traditional programs) shows a negative effect and is not significant. This indicates that the experience accumulated with traditional loyalty programs does not have a significant influence on the decision to adopt digital solutions.

5. Discussion

The results highlight that the reduction of information costs plays a fundamental role in the adoption of digital loyalty programs. Quick and smooth access to information about rewards and promotions not only improves decision-making but also strengthens customer relationships. This suggests that SMEs should invest in technologies that reduce information asymmetries to maximize customer engagement. The automation of transactions also emerges as an important lever. Simplifying processes and reducing administrative errors allow SMEs to enhance their operational efficiency while providing a better customer experience. These results show that SMEs adopting these solutions can benefit from gains in productivity and customer satisfaction, thereby enhancing their competitiveness. However, the moderate effect suggests that automation should not be viewed as an isolated solution but rather combined with other strategies. The reduction of monitoring and control costs through the use of blockchain has a significant impact. This indicates that transparency and traceability are key trust factors essential for the adoption of new technologies by SMEs. These results encourage the integration of blockchain systems to ensure transaction security and reduce fraud management costs. The simplification of exchanges and the standardization of programs is one of the most influential variables. This finding shows that digital loyalty programs offering simple processes and minimal friction promote increased adoption. For SMEs, it is therefore essential to choose loyalty solutions that limit the complexity of interactions with customers and reduce the need for frequent renegotiations. This reinforces the idea that user experience is paramount in the digitalization of customer relationships.

The lack of significance for strengthening customer loyalty indicates that the accumulation of points and rewards, while having a positive effect, is not sufficient to fully motivate adoption. This suggests that SMEs need to rethink their loyalty programs by integrating more engaging and personalized mechanisms beyond simple rewards to encourage sustainable customer retention. The results indicate that company size and industry sector influence the propensity to adopt digital loyalty programs. Larger companies and those operating in high-tech sectors find it easier to integrate these innovations. This means that smaller companies, often limited in resources, could benefit from support policies or tax

incentives to facilitate their digital transformation. Competitive pressure also has a positive effect, showing that in a competitive environment, companies are encouraged to innovate to differentiate themselves. This underscores the importance of promoting healthy competition to encourage the adoption of loyalty technologies. Fintech providers must also adapt their offerings to meet the specific needs of less technological sectors, making these solutions more accessible. The fact that the age of traditional programs does not significantly influence the adoption of digital programs suggests that past experience with traditional tools is not a determining criterion. This implies that SMEs of all sizes or ages can undertake digital transformation, provided they are supported by suitable and easy-to-implement solutions.

6. Conclusion

This study highlights the strategic interest of digital loyalty programs through fintech for Moroccan SMEs. Drawing on transaction cost theory (Williamson, 1975), the analysis shows that reducing economic frictions facilitates the adoption of these solutions. These programs optimize customer-business relationships by decreasing costs related to information, monitoring, exchanges, and negotiation while limiting opportunistic behaviors. The results demonstrate that the reduction of information costs has a significant and positive impact on adoption, confirming that quick access to data such as promotions and point balances reduces information asymmetries and promotes informed decision-making. The automation of transactional processes also proves to be a determining factor by simplifying operations, reducing human errors, and improving customer satisfaction. The transparency ensured by blockchain enhances trust by reducing monitoring costs and fraud risks, encouraging businesses to adopt these programs. The simplification of exchanges and standardization of rules represent another key lever for adoption. The ability to streamline interactions without constant renegotiation reduces costs and fosters a more effective customer relationship. In contrast, the effect of loyalty through the accumulation of points and rewards is not statistically significant. This indicates that merely implementing reward systems is insufficient to ensure widespread adoption. SMEs must rethink these programs by integrating more engaging and personalized approaches to maximize customer involvement.

Control variables provide additional insight. Larger companies and those operating in high-tech sectors are more inclined to adopt these innovations, suggesting that the availability of resources and familiarity with technologies influence the adoption decision. Competitive pressure also appears as a driver of innovation, prompting SMEs to equip themselves with new tools to stand out and remain competitive in the market. An interesting point of the study is the absence of a significant effect from past experience with traditional loyalty programs. This shows that the adoption of digital solutions does not depend on the past but on the ability to adapt to new market dynamics. This finding suggests that, regardless of their age, SMEs can benefit from digitalization, provided they receive support during their transition. Additionally, this study highlights the importance of public policies and support measures to encourage the adoption of these technologies, particularly among small businesses often limited by financial and human resources. Tax incentives, subsidies, or training programs can help overcome barriers to adoption. Overall, digital loyalty programs represent a strategic opportunity for Moroccan SMEs, allowing them to strengthen their competitiveness and improve their resilience to economic challenges. By minimizing transaction costs and fostering stronger customer relationships, these programs enable SMEs not only to modernize their operations but also to position themselves more agilely and effectively in a constantly evolving market environment.

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