Predicción de quiebra empresarial en la auditoría financiera de pymes: un estudio descriptivo

Predicting business bankruptcy in the financial audit of SMEs: A descriptive study

Previsão de falência empresarial na auditoria financeira de PMEs: um estudo descritivo

Eva Lozano Montero
Universidad de Guanajuato, México
monteroe@ugto.mx
https://orcid.org/0000-0002-9721-3023

Resumen

La auditoría financiera es una herramienta enfocada en la confiabilidad de la gestión de los recursos, la cual es utilizada por las grandes empresas debido a que están obligadas a ello. Sin embargo, más que una herramienta que sirva para la detección de fraudes, la auditoría financiera favorece la eficiencia de la gestión empresarial, por lo que también debería ser aprovechada por las pymes como una estrategia de apoyo a la permanencia y a la competitividad en un mercado global. En esta investigación, por tanto, se ha procurado analizar cómo los modelos de predicción de quiebra empresarial en las pymes de la región Laja-Bajío generan beneficios en cuanto al eficiente control de los recursos y a la permanencia en el mercado. Para ello, se empleó un método cuantitativo, con un enfoque interpretativo y transversal, aplicado entre 2019 y 2020. Con base en la técnica de la encuesta aplicada a 305 empresas, y ocho entrevistas con empresas de la región Laja-Bajío de México, se detectó que temen la aplicación de la auditoría, y que están más familiarizadas con la auditoría fiscal, la cual confunden con la auditoría financiera. Asimismo, se observó una correlación directa entre la antigüedad de la empresa y la voluntad de acudir a la auditoría financiera. Igualmente, en cuanto al tamaño de la empresa, se apreció una correlación inversa, ya que a menor tamaño se interesan más por la herramienta mostrada. Cabe mencionar que al conocer los beneficios de la auditoría financiera y al diferenciarla de la auditoría fiscal, las empresas valoraron la aplicación de la herramienta, la cual consideraron

que garantizaría la permanencia y competitividad de las organizaciones. Además, se detectó que 84 % de las empresas consultadas carecían de estados financieros, y al aplicar los modelos, 62.5 % resultaron solventes. Se destaca, por tanto, la necesidad de fomentar una cultura financiera y profundizar en el estudio de los modelos de predicción de quiebra empresarial en pymes.

Palabras clave: auditoría financiera, estados financieros, pymes, quiebra empresarial.

Abstract

Financial auditing is a tool focused on the reliability of resource management, which is used by large companies because they are obliged to do so. However, more than a tool for fraud detection, financial auditing favors the efficiency of business management, so it should also be used by SMEs as a strategy to support their permanence and competitiveness in a global market. In this research, therefore, an attempt was made to analyze how business bankruptcy prediction models in SMEs in the Laja-Bajío region generate benefits in terms of efficient control of resources and permanence in the market. For this purpose, a quantitative method was used, with an interpretative and cross-sectional approach, applied between 2019 and 2020. Based on the survey technique applied to 305 companies, and eight interviews with companies in the Laja-Bajío region of Mexico, it was detected that they fear the application of auditing, and that they are more familiar with fiscal auditing, which they confuse with financial auditing. Likewise, a direct correlation was observed between the age of the company and the willingness to undergo a financial audit. Likewise, with regard to the size of the company, an inverse correlation was observed, since the smaller the company, the more interested it is in the tool shown. It is worth mentioning that by knowing the benefits of the financial audit and differentiating it from the tax audit, the companies valued the application of the tool, which they considered would guarantee the permanence and competitiveness of the organizations. In addition, it was detected that 84 % of the companies consulted did not have financial statements, and when applying the models, 62.5 % were solvent. Therefore, the need to promote a financial culture and to study the models for predicting business bankruptcy in SMEs is highlighted.

Keywords: financial audit, financial statements, SMEs, business bankruptcy.

Resumo

A auditoria financeira é uma ferramenta voltada para a confiabilidade da gestão dos recursos, utilizada pelas grandes empresas porque são obrigadas a fazê-lo. No entanto, mais do que uma ferramenta que serve para detectar fraudes, a auditoria financeira favorece a eficiência da gestão empresarial, pelo que também deve ser utilizada pelas PME como estratégia de apoio à permanência e competitividade num mercado global. Nesta pesquisa, portanto, buscou-se analisar como os modelos de previsão de falências de empresas em PMEs da região de Laja-Bajío geram benefícios em termos de controle eficiente de recursos e permanência no mercado. Para isso, utilizou-se um método quantitativo, com abordagem interpretativa e transversal, aplicado entre 2019 e 2020. Com base na técnica de survey aplicada a 305 empresas, e em oito entrevistas com empresas da região de Laja-Bajío, no México, constatou-se que elas temem a aplicação da auditoria e estão mais familiarizados com a auditoria fiscal, que confundem com auditoria financeira. Da mesma forma, foi observada uma correlação direta entre a antiguidade da empresa e a disponibilidade para comparecer à auditoria financeira. Da mesma forma, em relação ao tamanho da empresa, observou-se uma correlação inversa, pois quanto menor o tamanho mais se interessam pela ferramenta apresentada. Vale ressaltar que ao conhecer os benefícios da auditoria financeira e diferenciá-la da auditoria tributária, as empresas valorizaram a aplicação da ferramenta, que consideraram garantir a perenidade e a competitividade das organizações. Além disso, detectou-se que 84% das empresas consultadas não apresentavam demonstrações financeiras e, na aplicação dos modelos, 62,5% estavam solventes. Destaca-se, portanto, a necessidade de se promover uma cultura financeira e aprofundar o estudo dos modelos de previsão de falências de empresas em PMEs.

Palavras-chave: auditoria financeira, demonstrações financeiras, PMEs, falência de empresas.

Introduction

Before the health contingency caused by covid-19, the number of micro, small and medium-sized companies (MSMEs) in Mexico was 4.9 million (97.3% micro-companies and 2.7% small and medium-sized companies), which contributed about 52 % of the country's gross domestic product (GDP), and generated around 72% of formal employment. However, according to the National Institute of Geography and Informatics Statistics (Inegi) (2019) 65% of these organizations go bankrupt before reaching their first five years of life, mainly due to the lack of affordable financing and the lack of a project viable. In addition to this, Lozano (2014) points out that the owners of these companies generally must play multiple roles (such as administrators, salespeople, technicians, etc.), which can negatively impact the productivity of SMEs. In fact, other factors that contribute to the failure of these companies are the lack of leadership, the inefficient management of resources, the lack of an experienced work team and strategic marketing, as well as financial resources (Lozano, 2013).

In the global context, business risk studies related to the agro-industrial sector have been carried out, where the factors of greatest threat to the sector are pointed out, such as the exchange rate, investments and the time of the assets agreed upon (Kornyliuk; 2014 ; Stevanovski, et al., 2013). In this sense, Restrepo, Díaz and Ocampo (2014) develop an operational risk analysis for SMEs in the chemical sector in Colombia, where the volatilities of the main financial ratios are calculated capturing all the industry indicators, being the reference point risk assessment.

These models were created for large companies that were listed on the stock exchange, so there are numerous studies related to the quantification of risk (Chernobai and Rachev, 2006; Chowdhry and Howe, 1999; Cruz, 2004; Frachot et al., 2003 ; Gillet et al., 2010; Marshall and Marshall, 2001). In fact, there are also some studies dedicated to SMEs, such as that by Altman and Sabato (2007), who develop a model for predicting financial crisis in American SMEs. Likewise, Behr and Güttler (2007) assess the credit risk in German SMEs, and Fantazzini and Figini (2008) measure the prediction of bankruptcy risk by comparing longitudinal models.

Similarly, Alzate Marín (2008) assesses the risk of bankruptcy in companies in the manufacturing sector of Santander in Colombia, for which it uses Altman's Z model, while Khemais et al. (2016) perform bankruptcy prediction in Tunisian SMEs using Altman's Z Score models, as well as through logistic models.

However, and despite inquiries such as the aforementioned, Celaya and López (2004) mention that there are few works dedicated to the determination and measurement of the risk inherent to the activity of the company, particularly of SMEs. In addition, the statistical studies

that allow estimating longitudinal models are minimal to test whether there is a detriment to solvency over time in this type of companies in the agro-industrial sector.

For all the above, the objective of this research was to analyze the way in which, through the business bankruptcy prediction models, as part of the financial audit for SMEs in the Laja-Bajío region, benefits are generated that contribute to the efficient control of resources and permanence in the market.

To do this, it began with the exploration of the perception of SMEs in the Laja-Bajío region, of the state of Guanajuato, about the benefits generated by financial auditing, an activity that, through business bankruptcy prediction models, allows the design of strategies to avoid bankruptcy and to promote your competitiveness in your environment.

The research questions asked were the following:

- Do the business bankruptcy prediction models contribute to the permanence and competitiveness of the economic units of the Laja-Bajío region?
- When SMEs know the benefits of financial auditing, would they come to them voluntarily?

The hypothesis put forward was as follows: SMEs in the Laja-Bajío de Guanajuato region have a greater chance of remaining in the market and being competitive by accessing financial audits through business bankruptcy prediction models.

Financial audit

By Sánchez (2015) This concept is related to the examination of basic financial statements presented by the management of a company or any legal person to determine if the information presented conforms to the standards set according to the characteristics of the transactions.

For their part, the Generally Accepted Auditing Standards (NAGA) and the International Auditing Standards (ISA) establish that the main purpose of financial auditing is to issue an objective and professional opinion on the reasonableness of financial statements prepared by administrative personnel, either from a public or private entity.

The NAGAs offer fundamental principles, rules and procedures that auditors must consider in their work, while the ISAs are rules, principles and procedures that must be applied in audits of financial statements, which must be interpreted according to the context (Díaz , 2011).

To carry out the financial audit, the size of a company does not matter, so SMEs should be encouraged to accept it voluntarily, which provides benefits such as the following: a) credibility of financial information, b) greater confidence to obtain financing, c) increased

competitive capacity, d) added value by improving internal processes, e) guarantees permanence, f) creates a stable financial culture and g) contributes to the reduction of illegal activities and fraud within the company.

On the other hand, it is important to consider that the financial audit is different from the tax audit, although it can be said that this is within the former, since the latter focuses on verifying whether the company has complied with its tax obligations, focusing on accounting results, so it is external to the company. On the other hand, the financial audit is an internal and voluntary process that evaluates economic operations with the objective that they are correctly reflected in the financial information, which serves to propose strategies that contribute to the efficient control of resources.

In fact, authors such as Hellman (2006) and Sánchez (2015) mention that companies expect some additional contribution from the audit because they pay a high cost for it, hence they demand better services from auditors, who must indicate strategies oriented to risk prevention. In addition, Johnson and Lys (1990) indicate that the price of the audit is a determining factor for companies deciding to contract the service independently. According to Collis, Jarvis and Skerratt (2004), Collis (2010) and Chung and Narasimhan (2001), auditing provides benefits that are greater than its cost, so that entrepreneurs are often satisfied. In short, audit procedures can help regulate companies (Collis, 2008; Knechel et al., 2008).

Audits, in general, are very necessary not only to comply with legal guidelines, but also to add value to companies by reducing the cost of information asymmetry and moral hazard, which are detected by audit procedures.

In Mexico, the obligation of tax auditing is exempted for a large number of companies, although the same is not the case with financial auditing. The companies that were not obliged to be audited resorted to this service in order to prevent possible fines or administrative misconduct, which notably increased the demand for audits; However, interest has been diminished in hiring this service, since - in accordance with the provisions of article 32-A of the Federal Tax Code (CFF) (2021) - the possibility of being audited, in the terms of article 52 of the CFF, with the exception of parastatal entities of the federal public administration.

The interested parties of a financial audit are mainly the owners, as well as the banks and the tax authorities, which seek compliance with the Financial Reporting Standards (NIF) (2019). This procedure is useful to check whether the figures in the financial statements reflect the image of a company in accordance with the regulatory framework applied at that time in a given country.

It is known that there are firms that are obliged to be audited and to publish their audited financial statements, since they must comply with the International Auditing Standards (NIA)

- issued by the International Federation of Accountants (IFAC) -, which in Mexico are accepted both by the National Banking and Securities Commission (CNBV) and by the Ministry of Finance and Public Credit.

However, it should be noted that the audit of financial statements, as well as the audit in general, presents great challenges, since clients are not usually fully satisfied, hence they demand better services from independent auditors, especially with regard to risk prevention (Sánchez, 2015). In addition to this, García and Vico (2003) and Herreros (February 22, 2015) explain that society tends to perceive that auditors have been acting with extreme freedom and have become defenders of the interests of the managers of companies that they audit.

Therefore, and since the purpose of audits is to contribute to the efficient control of resources to reduce business risks, this research proposes bankruptcy prediction methods as tools within the financial audit to prevent this from happening, mainly in SMEs.

Competitiveness

To remain in the market, economic units must show that they are competitive, the latter being understood as the ability to generate satisfaction in consumers because they offer added value in their goods or services. A company can be competitive according to its ability to export products and compete in the international market (Morales and Pech, 2000), but it can also be competitive when it can differentiate itself from its competitors, which drives consumer preference.

In the case of Mexico, the Law for the Development of Competitiveness of Micro, Small and Medium Enterprises defines competitiveness as follows:

> The quality of the economic and institutional environment for the sustainable and sustainable development of private activities and the increase in productivity; and at the company level, the ability to maintain and strengthen their profitability and participation of MSMEs in the markets, based on advantages associated with their products or services, as well as the conditions in which they are offered. (Diario Oficial de la Federación, 2019).

For economic units to be competitive, they must be attractive to their clients, which implies offering quality goods and services, producing at low costs, implementing marketing strategies, having technological infrastructure, etc., which requires investments. Therefore, it is imperative that economic units manage their resources efficiently through tools and models that help them improve and make sound decisions.

Business bankruptcy prediction

The concern for predicting financial risk and insolvency has led institutions to use the analysis of financial ratios, for which mathematical models have been developed that allow diagnosing and predicting corporate insolvency (Romero Espinosa, 2013) of companies listed in the stock market (Modica-Milo, Baixauli and Álvarez, 2012), although later models applicable to any organization were developed.

The tools proposed to support SMEs in the prevention of financial risks and business bankruptcy are the following:

Altman's Z Score

Using financial ratios and based on a statistical analysis of multiple discrimination, Edward Altman (1968) determines the probability of bankruptcy (financial risk) of companies (Altman and Hotchkiss, 2010). This model starts with the determination of the risk of insolvency in manufacturing companies and tries to measure their viability for up to two years, which helps to avoid panic among investors regarding the probability of default, insolvency and the cost of asymmetry of information (Giner and Albornoz, 2013).

Altman began studying him with publicly traded manufacturing companies, finding the following discriminant function:

$$Z = 1.23\, X_1 + 1.4\, X_2 + 3.3\, X_3 + 0.6\, X_4 + 0.99\, X_5$$

The original formula is:

Z = Breakpoint.

Vn = Discriminant coefficient.

Xn = Financial ratios, from where:

Z = Global indicator (general index).

X1 = Working capital / total assets.

X2 = Total retained earnings / total assets.

X3 = EBIT / total assets.

X4 = Equity / book value of total liabilities.

X5 = Sales / total assets (Altman, 1968).

Subsequently, Altman develops other business models, with activities other than manufacturing and not publicly traded, which were implemented in 2006 applicable to all sectors.

$$Z_2 = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

This model is the one that is proposed to be applied in SMEs, and the scores obtained are interpreted according to the criteria established by Altman, where depending on the result of Z, it can be predicted if the company is safe or has a high probability of failure within of the next two years of operation (table 1).

Tabla 1. Interpretación de puntajes de Z Altman

Puntaje	Interpretación
Z arriba 3.0	La empresa se considera como "segura".
Z entre 2.7 y 2.99	"En alerta". Precaución en la empresa.
Z entre 1.8 y 2.7	Posibilidad de quiera en los siguientes dos años de operación.
Z por debajo de 1.8	Alta probabilidad de fracaso financiero.

Fuente: Altman (1968)

The Altman Z-score classifies companies into solvent and insolvent: if it exceeds a cut-off value, the company is considered solvent; otherwise, a significant risk is indicated in the near future, with an accuracy of between 80% and 90% (Bernal, 2011).

Springate Model

Gordon Springate (1978) developed a model with an accuracy of 92.5%, considering Altman's procedures and working with 19 financial ratios that help detect businesses with a solvent future and others with tendencies to solvency problems. The Springate model is as follows:

$$Z = 1.03A + 3.07B + 0.66C + 0.40D$$

As

A = Working capital / total assets.

B = Net income before interest and taxes / total assets.

C = Net income before taxes / current liabilities.

D = Sales / total assets.

Criterion to consider: When Z <0.862, the company can be considered insolvent.

Modelo Fulmer

The Fulmer model was developed in 1984 and considered nine financial ratios, with 98% accuracy. This is valued as the most complete because it considers forty financial ratios applied to a sample of 60 companies. The equation is the following:

$$H = 5.528X_1 + 0.212X_2 + 0.073X_3 + 1.270X_4 + 0.120X_5 + 2.335X_6 + 0.575X_7 + 1.083X_8 + 0.894X_9 - 6.075$$

As

X1 = Retained earnings / total assets.

X2 = Total sales / assets.

X3 = Earnings before taxes / stockholders' equity.

X4 = Cash flow / total liabilities.

X5 = Total liabilities / total assets.

X6 = Current liabilities / total assets.

X7 = Total tangible assets.

X8 = Working capital / total liabilities.

X9 = Log operating profit / financial expenses.

Once the result is obtained, it must be considered that when H <0, the company may be "insolvent" in a future of more than one year (Fulmer *et al*., 1984).

CA-SCORE Model

Jean Legault (1987), from the University of Quebec, developed the CA-Score model, one of the most recommended by financial analysts in Canada, although it has a confidence level of 83% on average, in addition to being only applicable in manufacturing companies (Jiménez, 2013) . This model was developed using thirty financial ratios in a sample of 173 manufacturing companies, using the following formula:

Punctuation CA-SCORE = $4.5913X_1 + 4.5080X_2 + 0.3936X_3 - 2.7616$, donde:

X_1 = Stockholders' equity / total assets.

X2 = (Profit before taxes and extraordinary items + financial expenses) / total assets.

X3 = Total sales / assets.

When CA-SCORE <-0.3, the company is very likely to be considered insolvent.

Table 2 shows a comparison of the models with their precision percentages, their applicability with the type of company and some observations. It can be deduced that the model that would not be advisable to apply to SMEs in this study is the CA-Score, used in manufacturing companies.

Tabla 2. Comparativa de los modelos de predicción de insolvencia financiera

Modelo	Precisión	Dirigido a	Observaciones
Z Score de Altman	80 % y 90 %	Manufactura Negocios de diversas actividades	Aplicable a empresas de fabricación y cualquier tipo de negocio, ya sea con capital abierto o cerrado.
Gordon Springate	92.5 %	Negocios de diversas actividades	Aplicable a cualquier tipo de negocio.
Fulmer	81 % y 98 %	Negocios de diversas actividades	Aplicable a cualquier tipo de negocio.
CA-Score	83 %	Manufactura	Solo aplicable a empresas de manufactura.

Fuente: Elaboración propia

It is important to clarify that for any model to be efficient, it is recommended to use it in SMEs that have at least two years of operation. In this sense, it is also worth noting that before the health contingency, 80% of MSMEs closed due to lack of financial and administrative foresight (International Labor Organization, 2020). For this reason, emphasis must now be placed on those struggling to survive.

In the case of Mexico, of the 4.9 million economic units that existed in December 2020, more than a million closed, according to the Survey on the Impact Generated by Covid-19 on Companies (ECOVID-IE) and the Study on Business Demographics 2020 (EDN). However, it is also recognized that more than 600,000 businesses have been born, so it is estimated that there are 4.5 million economic units in the country (Meza, December 2, 2020).

There are bankruptcy prediction studies that have used transactional and variable data based on the payment network (Kou et al., 2021), as well as the model proposed by Tobback, Bellotti, Moeyersoms, Stankova and Martens (2019), which complements the low-dimensional financial figures with high-dimensional data on company directors and managers, where - through a network between SMEs - two companies are related if they share a director or senior manager; while Gordini (2014) compares the potential of genetic algorithms (GA) with logistic regression (LR) and the support vector model (SVM). His conclusion is that AGs are more effective in assessing the probability of bankruptcy of SMEs.

Methodology

To test the hypothesis raised, the level of insolvency was analyzed using the Altman, Springate, Fulmer and CA-SCORE Z Score models, which measure bankruptcy risk and show the benefits they generate for SMEs in the Laja-Bajío region.

To know the perception of SMEs, as well as their voluntary participation in this research, the survey technique was used, with the support of the SPSS software, through an interpretive and cross-sectional approach.

Study population and sample

The interest was focused on analyzing SMEs in the Laja-Bajío region, which includes the municipalities of Celaya, Apaseo El Alto, Apaseo El Grande, Salvatierra, Comonfort, Jaral del Progreso and Tarimoro. In the state of Guanajuato there are 222,969 companies, of which Table 3 shows the number per municipality that make up the Laja-Bajío region (Business Directory, 2019). Of all, 2.7% are SMEs (Inegi, 2019).

Tabla 3. Número de empresas por municipio de la región Laja-Bajío

Municipio	Unidades económicas	Porcentaje de participación	Ponderación de empresas
Celaya	33306	60	127
Apaseo El Alto	3834	6.8	14
Apaseo El Grande	3901	7.0	15
Salvatierra	6511	11.7	24
Comonfort	3856	6.9	15
Jaral del Progreso	2424	4.3	9
Tarimoro	1861	3.3	7
Total	55393	100	211
Pymes 2.7 %	1496		

Fuente: Elaboración propia con información del Inegi (2019) y el Directorio Empresarial (2019)

Considering a finite population of 1496 companies, the sample was calculated with a confidence level of 95% and a margin of error of 5%, using the following formula:

$$n = \frac{N\,Z^2 pq}{e^2(N-1) + Z^2 pq}$$

The sample consisted of 211 economic units to which the survey should be applied; however, 305 were used thanks to the active participation of the municipalities of Celaya and Salvatierra. In addition, it is noted that the participating companies were SMEs (since they had between 11 and 250 employees), with a minimum stay in the market for two years. They carried out various commercial and manufacturing activities, and had passed through the period of "survival".

The financial audit survey was applied to these organizations, which is combined with the business bankruptcy prediction methods as a way to propose alternative solutions to their specific realities (the questionnaire is attached at the end of the manuscript).

This research was carried out between 2019 and 2020, since - due to the pandemic that is still being experienced - the economic units to which the information was sent via email were

slow to respond. In fact, others that were visited personally were closed or opened for a few hours, prolonging the investigation.

Results

The analysis made it possible to determine the variables of greatest relevance for this research, as well as their significance and correlation between them. It should be noted that this study focused only on SMEs (without considering microenterprises), since they are the ones that are most likely to keep accounting records and financial statements, which are essential for financial auditing and for insolvency analysis.

Regarding the perception that SMEs have about the benefits provided by financial auditing and to verify the reliability of the documentary instrument, the statistical test of Cronbach's alpha coefficient was used for ordinal qualitative items, and the Kuder Richardson coefficient for those. Nominal qualitative items. The results obtained were 0.92 and 0.87, respectively, which are interpreted with high reliability. SPSS software was used for this first analysis and Excel was used for the second.

Table 4 shows the relationship of the variables used in this research with their corresponding items of the documentary instrument.

Tabla 4. Relación de las variables de estudio con el instrumento documental

Variable		Ítem
Dependiente	Auditoría financiera-modelos de predicción de quiebra	3
Independiente	Antigüedad de la empresa	
	Grado de estudios del dueño	
	Tamaño de la empresa	

Fuente: Elaboración propia

By using descriptive statistics on elements of an ordinal nature, Table 5 shows the mean and standard deviation. The average age was from 3.1 to 10 years and the average size of the economic units was from 11 to 50 employees, which means that they are SMEs (Franco-Ángel and Urbano, 2016). However, due to the health contingency caused by covid-19, some companies stated that if a business opening did not occur, they would be forced to lay off some employees.

Tabla 5. Media y desviación estándar de los ítems

Estadística descriptiva		
	Media	Desviación estándar
1. Antigüedad de la empresa	1.95	.805
2. Tamaño de la empresa (por el número de empleados)	1.86	.793
5. Grado de estudio del dueño	3.43	.507

Fuente: Elaboración propia

Next, a comparison between the dependent variable financial audit-bankruptcy prediction models with some of the independent variables of ordinal nature is shown through a non-parametric analysis using the Wilconxon statistical test.

The first comparison measures the willingness to participate in the financial audit with the age of the company, which results in the test statistic, whose asymptotic significance value is less than 0.05; Therefore, it is concluded that the disposition for the financial audit differs between the seniority of the organization, so that the companies with the longest seniority are the ones that show the greatest willingness to participate in the application of the financial audit (table 6).

Tabla 6. Estadísticos de prueba[a] Auditoría financiera y antigüedad de la empresa

|	1. La antigüedad de la empresa es: - 9. ¿Estaría dispuesto(a) a acceder de manera voluntaria a la misma?
Z	-4.064[b]
Sig. asintótica (bilateral)	.000

[a]. Prueba de Wilcoxon de los rangos con signo.

[b]. Se basa en rangos negativos.

Fuente: Elaboración propia

The second comparison was to test the financial audit, specifically if it was the same or different for the various company sizes, which yielded a test statistic of $Z = -3,666$, thus it is concluded that the financial audit is perceived differently depending on the size of the company. It should be noted that the smaller the size of the company they would be more willing to have a financial audit, in this case specifically the business bankruptcy prediction models (figure 1).

Figura 1. Disposición para la auditoría financiera relacionada con el tamaño de la empresa
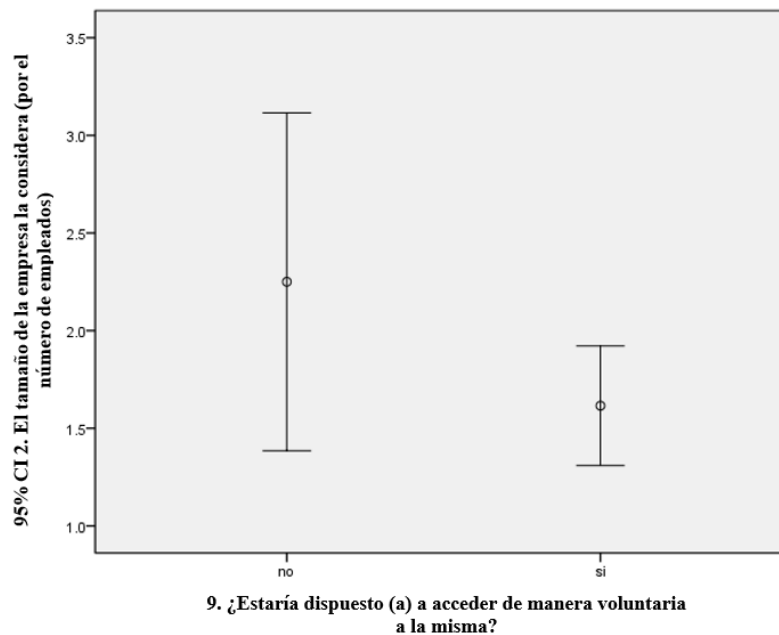
Fuente: Elaboración propia

The results of the descriptive statistics study for the variables of a nominal qualitative nature indicate that 90.48% of the SMEs participating in the research were constituted as legal entities, which favors the permanence of the companies, since the responsibility does not fall on a single person and builds trust with third parties. Likewise, 57.8% are considered as family businesses, which indicates that it is a common form of incorporation. Furthermore, 64% have not heard of financial auditing, although 86% think audits are expensive. Likewise, they confuse it with the tax audit, since when mentioning the term audit, 60% of the owners expressed fear of it because they associate it with the detection of fraud. However, it is comfortable to note that once the financial audit process and benefits were explained, 78% were willing to participate in the project. Finally, 89% of companies have never had an audit.

Business Bankruptcy Prediction Models

Of the 305 economic units to which the survey was applied, 238 voluntarily agreed to participate in the application of the bankruptcy prediction models, for which the updated financial statements were requested, that is, the balance sheet (statement of financial position) and income statement (profit and loss statement). In this regard, 84% lacked financial statements. Therefore, only 38 companies (16%) were considered, although a large portion of these did not have updated financial statements by the date of application or were incomplete, leaving only eight economic units (3.4%), which provided the information for the year 2019 and available for the application of the models.

This situation is very worrying. In Mexico it is very common for companies to comply with their tax obligations, but do not prepare financial statements, which are only created when they are required to apply for a loan or to have access to a call.

The eight SMEs that were able to participate had more than three years of operation in the market, with different numbers of workers and different business activities. For this reason, an interview was carried out prior to the application of the business bankruptcy prediction models in order to know them and build trust. Thus, it was observed that the main factors that affected business development were focused on the management of its assets, the capacity for strategic planning, affordable financing to expand or improve its business, and the management of liabilities and cost reduction (figure 2).

Figura 2. Principales factores por considerar para el desarrollo empresarial
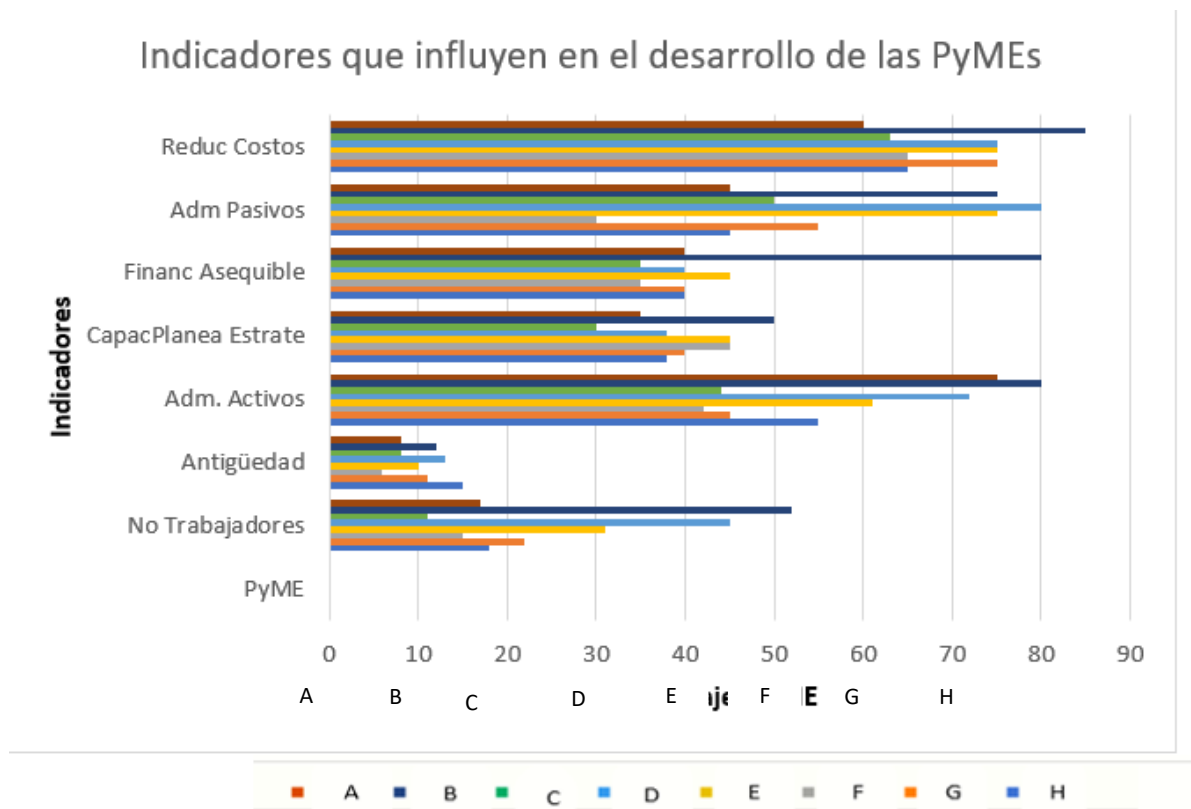
Fuente: Elaboración propia

However, they expressed certainty in inventory control, in their fiscal situation and in their positioning in the market, since they mentioned that they knew their clients. The results indicate that the average seniority of the organizations ranges between six and fifteen years, and the average number of workers is 28.

Likewise, they require access to adequate financing according to their possibilities and the capacity for strategic planning, since they mention that the requirements and interest rates exceed them; Furthermore, they do not know how to carry out strategic planning for their

business. With the knowledge and experience they have, they try to manage their assets and liabilities, as well as reduce costs in very short terms.

The result regarding the use of high technology has been left separately, since some economic units expressed that at that time they did not require an investment in machinery or equipment. However, due to the health contingency, they were forced to use an application or technological tool to continue to satisfy the customer in a virtual way. In fact, they commented that they lost some clients due to not having the appropriate technological means. They recognize, therefore, that it is imperative to invest in infrastructure and human resources that develop technological tools according to the good or service they offer, since now the economy is based on digital.

These indicators obtained in the first intervention are very useful to be combined with the results obtained in the application of the business bankruptcy prediction models, since they help to prevent and implement strategies that prevent business bankruptcy.

The following are the findings of the application of the business bankruptcy prediction models in an SME. For confidentiality reasons, the name of the economic entity is omitted, and table 7 shows information for the seventh and eighth year of operation, which corresponds to 2018 and 2019.

Altman's Z-Score Model

The Z2 Score model was used, suitable for generic companies and those with closed capital.

$Z2 = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$

As

X_1 = Working capital / total assets.

X_2 = Accumulated earnings / total assets.

X_3 = EBIT / total assets.

X_4 = Stockholders' equity / book value of total debt.

Tabla 7. Información contable-financiera de una PyME

Concepto	Octavo año	Séptimo año
Activos corrientes	$ 21 793.40	$ 20 852.00
Activos totales	62 548.00	53 498.09
Pasivos corrientes	5 178.00	5655.50
Pasivos totales	9080.00	10 431.75
Capital de trabajo	16 615.40	15 196.50
Ganancias retenidas	11 148.00	8 238.00
EBIT	48 820.00	41 328.34
Utilidad antes de Impuestos	30 640.00	23 148.34
Ventas	114 060.00	96 434.00
Capital contable	53 468.00	43 066.34
EBITDA	58 680.00	53 181.34
Total activo fijo	40 754.60	32 646.09
Gastos financieros	18 180.00	18 180.00
Capital contable	53 468.00	43 066.34

Fuente: Elaboración propia

Results: Altman Z-Score, seventh year calculation, Z = 11.8915542 and eighth year Z = 13.7517192, which indicate that the company is in a solid and reliable area in both years of operation, since the parameter is z> 3.0, so it can be said that in the next two years there will be no insolvency problems.

Gordon Springate Model

$Z = 1.03A + 3.07B + 0.66C + 0.40D$

Seventh year Z = 6.08666; eighth year Z = 7.30468

According to the established parameter, the company obtains a score higher than Z> 0.862 in both years, which confirms what is established by the Altman method, as solvent for the next two years.

Application of the Fulmer model

$H = 5.528X1 + 0.212X2 + 0.073X3 + 1.270X4 + 0.120X5 + 2.335X6 + 0.575X7 + 1.083X8 + 0.894Log X9 - 6.075$

Seventh year H = 18771.0861; eighth year H = 23434.4746, so it is observed that H> 0, so that it is considered solvent for two more years, according to this model.

It is clarified that the CA-Score model was not applied because the company is not engaged in manufacturing processes.

On the other hand, just as in this company financial solvency could be predicted for up to two years, in others it was observed that three would be insolvent, of which strategies were

sought to reduce the risk of business bankruptcy (table 8) . It should be noted that the accounting year of the financial statements provided by the economic units corresponded to the year 2019.

Tabla 8. Modelos de predicción de quiebra empresarial en las pymes

Nombre/modelo	Z Score Altman	Springate	Fulmer	CA-Score	Estado
Empresa A	1.52	0.345	0.0023	N/A	Insolvente
Empresa B	1.61	0.546	0.035	N/A	Insolvente
Empresa C	2.45	0.658	0.059	N/A	Insolvente
Empresa D	3.84	2.11	4861.45	N/A	Solvente
Empresa E	5.36	3.65	5631.13	0.002	Solvente
Empresa F	2.91	1.87	2356.78	N/A	Solvente
Empresa G	8.19	5.461	11315.42	1.89	Solvente
Empresa H	13.75	7.304	23434.47	N/A	Solvente

Fuente: Elaboración propia

The results obtained in this research will serve as support for the discussion and conclusions, where the relevant opinions on the subject of other researchers are highlighted.

Discussion

This research shows that audits are perceived by SMEs as a process that serves to detect fraud and that they are only used by large companies because they are obliged to carry them out. Likewise, they confuse it with the tax audit, so they express their fear about it.

Likewise, they believe that audits are expensive, which coincides with what was reported by Hellman (2006) and Sánchez (2015), who state that companies demand better services that contribute to the efficient control of their resources and prevent risks, and not so much to detect fraud. Indeed, organizations that resort to audits are discouraged because price is a factor that determines the decision to hire such services (Johnson and Lys, 1990; Pitman and Fortin, 2004), especially when they do not generate the expected benefits. Despite the fact that there are authors who are in favor of audits and who affirm that they provide benefits that exceed costs (Chung and Narasimhan, 2001; Collis, 2010; Collis et al., 2004), companies do not perceive it that way since state that the studies are very technical, and expect the contribution of solutions associated with the detection of irregularities.

However, it is satisfactory to underline that when the purpose of the financial audit is explained to SMEs, they agree voluntarily, provided the cost is affordable. In this regard, Carey, Simnett and Tanewski (2000), Senkow et al. (2001), Minnis (2011) and Collis (2012) point out

the rewards of a voluntary audit, such as easy access to bank financing, even to obtain a lower interest rate, since it reduces the risk of asymmetry information and moral hazard.

Regarding the size of SMEs, the results indicate that the smallest ones show a willingness to go voluntarily to the financial audit, which does not coincide with what was mentioned by Collis (2008), Collis et al. (2012) and Niemi (2012), who indicate that as companies grow, the probability of requesting the audit service increases. Even so, other authors do not agree with this, since they assure that the size of the companies is not a determining factor that influences the willingness to hire the audit service (Senkow *et al*., 2001).

It is undeniable that a quality financial audit in SMEs increases confidence in the control of resources, because by making known the areas of opportunity detected, risk prevention strategies and business bankruptcy can be established, which would increase confidence towards auditors and reviewers.

Regarding the business bankruptcy prediction models, it is worth considering that they should be chosen with caution and applied by economic sector and company size to ensure the efficiency of the results, since - as observed - some models are only suitable for a production sector. Also, it should be noted that these methods only predict the probability of bankruptcy two years in advance.

Finally, financial indicators should be considered, especially in these times of pandemic, when the company's situation has to be evaluated more frequently to prevent possible bankruptcies.

Conclusions

The audit must be conceived as a tool not only to support the efficient use of resources, but also to establish strategies that contribute to the permanence and competitiveness of companies, which requires efforts to eradicate the idea that said practice is only used by large companies and that their costs prevent their implementation. In this sense, this research provides an overview of what companies perceive and guides where the policies of the government sector and academic studies should be directed. Therefore, it is recommended that SMEs in the municipality of Celaya and the Laja-Bajío area, as well as in other regions, consider audits as a resource for the prevention of insolvency and strength for competitiveness, since their benefits will be reflected in the highest trust of customers, suppliers, banking institutions, chambers, among others.

Therefore, it is necessary to consolidate an audit culture, mainly the financial one, which can boost competitiveness and permanence in the market, as well as guarantee obtaining a loan and reducing the risks of information asymmetry and risk. moral, which have an impact on the

establishment of interest rates. By achieving this, improvement strategies that combine qualitative and quantitative variables that impact business development can be designed on a regular basis.

On the other hand, in terms of the application of business bankruptcy prediction methods, the main obstacles found in SMEs had to do with mistrust and not having financial statements, which made it difficult to assess the situation and help in predicting bankruptcy.

Therefore, it would be advisable to apply the methods before and during unforeseen situations —such as that arising from the health contingency— so that actions that benefit the organization can be established and the information used to request a loan.

Future lines of research

The results obtained serve to affirm that the financial audit is applicable to all economic units. For this reason, universities can contribute to its application and foster a culture around the preparation of financial statements, which would promote the permanence and competitiveness of organizations.

Likewise, it can be indicated that in Mexico there are few studies dedicated to financial auditing in SMEs, hence it is necessary to carry out more inquiries in this regard. In addition, work should be done on the development of new business bankruptcy prediction models that offer higher certainties, as well as continuing research on the benefits of financial auditing in SMEs and microenterprises.

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Appendant

Questionnaire

The objective of this questionnaire is to analyze the concept that SMEs have regarding financial auditing and its benefits, as well as voluntary participation in the application of business bankruptcy prediction models. We appreciate your participation in the application of this questionnaire. The information will be used for academic purposes and will be treated confidentially.

Name of the economic unit (optional) _____

1.**- Antiquity:**

a) Up to 2 years, b) more than 2 and up to 5 years, c) more than 5 and up to 10 years, d) more than 10 years.

2.**- The size of the company considers it: (by number of employees)**:

 a) Micro (0-10), b) small (11-50), c) medium (51-250), d) large (more than 250).

3.**- Main business-activity**: _____

4.- **The economic unit is**:

a) Natural person, b) Legal person

5.**- What is the educational level of the owner or general manager of the economic unit?**

a) Primary and secondary b) Baccalaureate c) Bachelor's degree d) Postgraduate

6.**- Do you consider that your company is a family one? (the shares are owned by the family and they are the decision makers)**

a) Yes, b) No

7.**- When you hear the term audit, what impression does it make on you?**

a) Confidence, b) fear, c) indifferent, d) did something wrong, e) other:

_____

8.- **Have you heard of financial auditing?**

a) Yes, b) No

The financial audit is a review process that consists of evaluating the financial and accounting management of a company to provide improvement strategies that support permanence and prevent business bankruptcy for up to two years in advance.

9.- **Now that you know what the financial audit consists of, would you be willing to access it voluntarily?**

a) Yes, b) No

10.- **Have you ever participated in an audit?**

a) Yes, b) No.

11.- **If your answer is yes, in what type of audit?**

_____

12**.- Do you think that financial audits are expensive?**

a) Yes, b) No

13.- **Do you think that financial audits are only applicable for large companies?**

a) Yes, b) No

Comments

_____

_____

_____

Interview for SMEs

In order to know directly some relevant aspects, both favorable and areas of opportunity, you are asked to answer the following questions:

1.- What are the main strengths of the economic unit? Consider 5 for the highest and 1 for the lowest.

Factors	Consideration
a) Financial situation	
b) Access to financing	
c) Administration of your assets	
d) Inventory control	
e) Efficient portfolio control	
f) Market positioning	
g) Tax situation	

Ask questions with the elements that have been detected as strengths.

Why do you consider them as strengths?

What improvements have been implemented?

Is there another strength that you would like to mention?

Additional comments:

_____

_____

_____

2.- **What are the main weaknesses and areas of opportunity presented by the economic unit?** Consider 5 for the highest and 1 for the lowest.

Factors	Consideration
a) Financial situation	
b) Administrative efficiency	
c) Affordable financing	
d) Overdue portfolio	
e) Obsolete fixed assets	
f) State-of-the-art technology (high technology)	
g) Reduction of costs and expenses	
h) National and international competition	

Ask questions with the elements that have been detected as weaknesses.

What obstacles have been presented to overcome the aforementioned weaknesses?

Have you identified other areas of opportunity that you can take advantage of?

What does it take to develop and exceed those areas of opportunity?

Additional comments:

_____

_____

_____

3.- **What benefits do you expect after voluntarily participating in the application of the business bankruptcy prediction models?**

_____

_____

_____

_____