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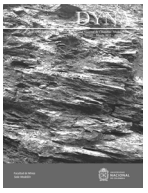

UNIVERSIDAD NACIONAL DE COLOMBIA

Financial sustainability in Colombia's Lodging SMEs: the role of technological transformation in Colombia's Lodging SMEs

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Abstract
Given the role of sustainability and technological transformations in the global economy and in the growth of companies, the objective was to analyze their effect on the financial sustainability of SMEs in the lodging sector. To achieve this, (1) a bibliometric analysis was conducted using VOSviewer and Biblioshiny, (2) a mean difference test (T-student) was performed to compare technological transformation and financial sustainability variables, and (3) a correlation analysis was carried out between indebtedness and liquidity risk, based on financial data from 2022 for SMEs in the top five regions according to the Colombian Regional Tourism Competitiveness Index. The findings highlight a scarcity of research on financial sustainability and digital transformation processes in Colombian SMEs, in contrast to other regions worldwide. Regarding the T-test, no statistically significant differences were found between the variables analyzed. Therefore, we strongly recommend further research incorporating multivariate analyses to include additional variables relevant.

Keywords: lodging sector; financial sustainability; SMEs; technological transformation; liquidity risk; profitability

Sostenibilidad financiera de las PYME hoteleras en Colombia: el papel de la transformación tecnológica en las Pymes de alojamiento en Colombia

Resumen
Dado el papel de la sostenibilidad y las transformaciones tecnológicas en la economía mundial y en el crecimiento de las empresas, se analizó su efecto en la sostenibilidad financiera de las Pyme del sector del alojamiento. Para ello, (1) se realizó un análisis bibliométrico utilizando VOSviewer y Biblioshiny, (2) una prueba de diferencia de medias (T-student) para comparar las variables de transformación tecnológica y sostenibilidad financiera, y (3) un análisis de correlación entre endeudamiento y riesgo de liquidez, a partir de datos financieros de 2022 de Pymes de las cinco primeras regiones según el Índice de Competitividad Turística Regional de Colombia. Los hallazgos resaltan escasez de investigaciones sobre sostenibilidad financiera y procesos de transformación digital en Pyme colombianas, en contraste con otras regiones del mundo. Respecto a la prueba T, no se encontraron diferencias estadísticamente significativas entre las variables analizadas. Recomendamos investigaciones que incorporen análisis multivariados con variables adicionales relevantes.

Palabras clave: sector de alojamiento; sostenibilidad financiera; Pyme; transformación tecnológica; riesgo de liquidez; rentabilidad.

1. Introduction

1.1 An approach to Colombian microenterprises

According to Decree No 957 of June 05, 2019, in its Article 2.2.2.1.13.2.2, the size of the enterprise in Colombia is determined considering the range of their income from annual ordinary activities, according to the economic sector in which they are located, as illustrated in Fig. 1.

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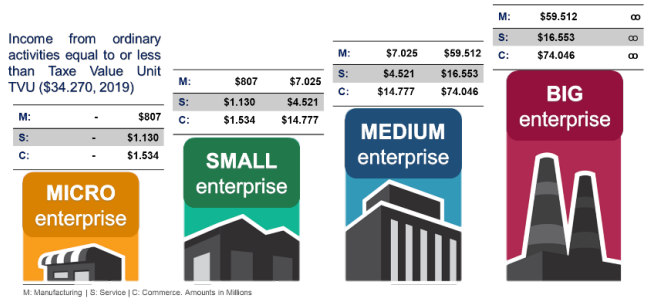


Figure 1. New classification of Colombian companies
Source: based on [1]

The manufacturing sector is made up of those whose income from ordinary annual activities is less than or equal to 23,563 Tax Value Units (UVT), for the services sector, with income from ordinary annual activities less than or equal to 32,988 UVT, and the commerce sector with income from ordinary annual activities less than or equal to 44,769 UVT.

1.2 Financial sustainability in SMEs in the lodging sector

The objective of any company, regardless of its size and scope of activity, is based on maintaining a stable financial situation and results, which is associated with financial sustainability [2,3]. This financial equilibrium is one of the most important aspects in relation to the financial stability of an economic entity and its long-term financial sustainability, which significantly reduces the risk of bankruptcy, ensures healthy financing, efficient use of the company's assets and guarantees an exclusive advantage over companies that have an unfavorable situation [4]. Consequently, one of the economic activities with the greatest volatility in its financial flows is undoubtedly the lodging sector, which is closely related to the tourism industry, whose growth could have a strong influence on the organizational performance of the hotel industry. Therefore, the expansion of tourism activities directly enhances the development of the hotel industry, increasing the occupancy rate and, consequently, sales revenue [5]. However, for companies to be more competitive and achieve their financial objectives, they must invest in processes to transform their business models, strategies and operations, which is related to the concept of financial sustainability [6]. Moreover, a company's financial performance depends on its ability to generate revenues and maintain stable business continuity [5]. Thus, to ensure sustainable existence and growth, companies must analyze the correlations between the assets they own and use, together with their sources of financing, to assess the extent to which these are related to their fixed and working capital requirements [7]. Therefore, the use of an optimal mix of investments and sources of financing ensures the highest level of financial sustainability, which translates into a greater capacity to generate value for the owners and provide continuity of operations over the long term [2].

1.3 Technological transformations: key tools for SMEs strengthening.

Technological transformation has constantly evolved, generating countless possibilities to access the world. Thus, the Internet has radically changed the way in which people communicate, seek information, make decisions and, above all, purchase goods and services, generating a considerable growth in electronic distribution channels [8]. In order to remain competitive in today's globalized market, SMEs have increasingly turned to the adoption of Information and Communication Technologies (ICTs) as a strategic means to rival large corporations [9,10]. As a primary driver of development and innovation in the modern world, ICTs have become a crucial factor in fostering growth and innovation [11]. Although the literature on the significant positive influence of ICT on business performance is extensive, especially in SMEs [12-14], in the hotel sector this relationship is not so evident [11]. In line with the above, some researchers argue that ICT adoption is a competitive advantage factor, as it improves customer experience, which can increase hotel performance [15,16].

In line with the above, several authors [17-19] have extensively explored the consequences of adopting new technologies and practices on the overall improvement of organizational performance. In this order of ideas, it can be stated that digital orientation focuses on collaboration and the amalgamation of technological and business strategies [20], providing guidance and principles through which organizations adopt and use technologies to achieve superior advantage and sustainable growth [21]. It should be noted that, "travel products in particular have proven to be some of the most suitable ones to sale online" [8]. In fact, it has been stated that SMEs with digitalization processes survive in international markets [22], facilitates organization, to improve communication and information processing [23], [24], [25], increase operational efficiency [26], and expand their businesses [27]. Therefore, companies' orientation towards digitization contributes to organizational learning and information sharing, which is essential for business continuity [28]. However, resource scarcity, financial constraints, lack of technical know-how and government policies are the main challenges and barriers faced by SMEs to organizational digital orientation [29-31]. Although SMEs often lack the necessary skills, they must adopt emerging technologies and methodologies, such as the Internet of Things (IoT) and artificial intelligence (AI), to maintain their competitiveness [32].

1.4 Lodging sector: business models and transformations.

Hospitality and tourism industry became vital to the economic development in several regions worldwide [33]. In Colombia, this sector has experienced remarkable growth and has become a fundamental pillar in the national economy [34]. However, this sector, like others, has resorted to transforming its business models as a result of the opening of markets and the technology revolution, whose rapid advances in innovation, especially smartphones and Internet services, have led to changes in consumer behaviors [35], leading many companies to move from developing tangible products to providing services [36-38]. According to [39], SMEs in the tourism sector must be at the forefront of technologies and propose devices, techniques and technological achievements using the most current and high-level IT developments. Thus,

in the digital economy, most of the hoteliers need to face the new challenges on emerging strategic issues and concerns which were the impact from the information and telecommunication technology revolution [40]. However, other authors consider that the adoption of ICTs cannot increase hotel performance, since it is not directly aimed at improving productivity, but rather these innovative systems aim to improve customer service and increase the number of services offered, which leads to not identifying ICTs adoption as a critical success factor for achieving exceptional company performance [41-43]. In addition to the above, investments in technology lead the company to improve product quality, increasing production costs and, consequently, decreasing the company's performance [43]. "In SMEs, digital technologies will mark the beginnings of a new business change" [44]. However, much remains to be done in the SME sector [45].

Table 1.
Design of the search strategy

Step	Applied search terms Words used	Number of publications	
		Scopus®	WOS™
1	("financial sustainability") AND ("SME*" OR "SMEs" OR "smallor medium-sized enterprises" OR "small and medium-sized enterprises" OR "small to midsize enterprise" OR "small and medium sized business" OR "Small and Medium-Sized Entities" OR "lodging sector" OR "hotel*")	45	22
2	("sustainable business model*") AND ("SME*" OR "SMEs" OR "smallor medium-sized enterprises" OR "small and medium-sized enterprises" OR "small to midsize enterprise" OR "small and medium sized business" OR "Small and Medium-Sized Entities" OR "lodging sector" OR "hotel*")	87	56
3	("financial sustainability" OR "sustainable business model*") AND ("SME*" OR "SMEs" OR "smallor medium-sized enterprises" OR "small and medium-sized enterprises" OR "small to midsize enterprise" OR "small and medium sized business" OR "Small and Medium-Sized Entities" OR "lodging sector" OR "hotel*")	132	78
4	When filtering by item, the result is:	96	76
5	("technological change" OR "technology*" OR "digital tools") AND ("sustainable business model*" OR "financial sustainability") AND ("SME*" OR "SMEs" OR "smallor medium-sized enterprises" OR "small and medium-sized enterprises" OR "small to midsize enterprise" OR "small and medium sized business" OR "Small and Medium-Sized Entities" OR "lodging sector" OR "hotel*")	23	16
6	Adding the results of the steps, the following results are obtained:	119	92

Source: own elaboration

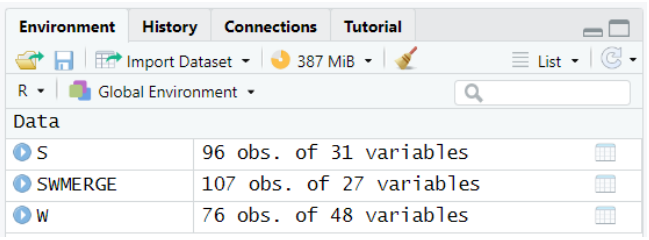


Figure 2. Unification and cleaning of information
Source: Own elaboration by using R Studio 4.4.1

2. Methodology

2.1 Planning

In this first stage, the bibliometric analysis is prepared, for which the scientific databases Scopus and Web of Science (WoS) were selected as inputs in the search for information (Table 1).

After searching for articles through the equations, the information was migrated in BibTeX format to the RStudio software, where the debugging and filtering process was carried out using the mergeDbSources command. The result yielded a total of 107 observations with 27 variables (Fig. 2).

2.2 Data Description

The second stage of this research is focused on analyzing the effect of sustainability and technological transformations on the financial sustainability of SMEs in the Colombian lodging sector. To obtain the sample, the financial statements were extracted from the SIIS portal of Superintendencia de Sociedades (Supersociedades), for the period 12/31/2022 for SMEs-Individuals. This query yielded a population of 24,536 companies that reported for the period analyzed. Subsequently, a filter was performed according to the activities: I5511 - Hotel accommodation, I5512 - Aparthotel accommodation, I5513 - Resort accommodation, I5514 Rural accommodation, I5519 - Other types of accommodation for visitors, I5520 - Activities of camping areas and parks for recreational vehicles, I5530 - Accommodation services by the hour and I5590 - Other types of accommodation n.e.c., which yielded 290 companies from different departments. Subsequently, companies from the District of Bogota and the departments of Valle, Risaralda, Antioquia and Bolivar were filtered, obtaining a final result of 74, 23, 7, 44 and 29 companies, respectively. The selection was based on data from the Ministry of Trade, Industry and Tourism, which indicates that these territories accounted for 47% of tourism service operators and 44% of lodging and accommodation services [46].

With the Statement of Financial Position and Income Statement of the selected companies, the different financial indicators were calculated: Acid Test - AT, Working Capital Ratio - WK, Cash Ratio – CT, Current Ratio - CR, Accounts Receivable Turnover - AR, Gross Margin - GM, Operating Margin - OM, Net Margin - NM, Return on Assets - RA, Return on Equity - RE, Total Indebtedness - TI, Financial Indebtedness - FI, Total Leverage - TL and Financial Leverage - FL, necessary

for the correlational analysis and the T-test. On the other hand, dichotomous variables were defined as Technology - TCN, Website - WP, Sustainable Development Goals - SDG and Sustainability Reports - SR, obtained through the websites and reports of each of the companies in the sample.

2.3 Hypothesis

To achieve the objective authors worked with a correlational approach [47,48], and sought to corroborate the following hypothesis: *Ha: there are no statistically significant differences in financial sustainability between companies in the lodging sector that do or do not apply technological transformation processes, Hb: There is a positive relationship between capital structure and liquidity risk.* For the first hypothesis, the independent variable was "technological transformation" (categorical), and the dependent variable was "financial sustainability" (continuous), the latter measured through liquidity and indebtedness indicators. For the second, capital structure was taken as an independent variable and liquidity risk as a dependent variable to prove that the higher the indebtedness, the higher the level of liquidity risk and vice versa.

2.4 Data analysis strategies

The data analysis was divided into two stages: (1) bibliometric analysis, (2) correlation and mean difference analysis. For the first one, bibliometric technological tools such as VOSviewer and R Biblioshiny - bibliometrix were also used. For the second, the R software Version 4.4.1 was used, where it was used for the bivariate correlation analysis, the leveneTest and ShapiroTest were applied for variance and normality validation. Also, the Stata software was used for multivariate analysis. Given that database, parametric tests of mean differences (T-Test) were performed for Bogotá and Antioquia, and nonparametric tests (Mann-Whitney U) for independent samples of less than 30 observations in the case of Valle, Risaralda and Bolívar.

3. Results

3.1 Overview and Historical distribution of papers

Before starting with the bibliometric analysis, describing how the data is structured is essential. Fig. 3 contains 107 articles taken from 71 sources, with the participation of 312 authors, among which a percentage of 1.869% international co-authorship, with an average of 3.12 documents per author and 5.03 documents per year. The average annual citation presented an increase equivalent to 2.81%.

Figure 3. Main information & Annual Scientific Production
Source: Own elaboration by using Biblioshiny in R

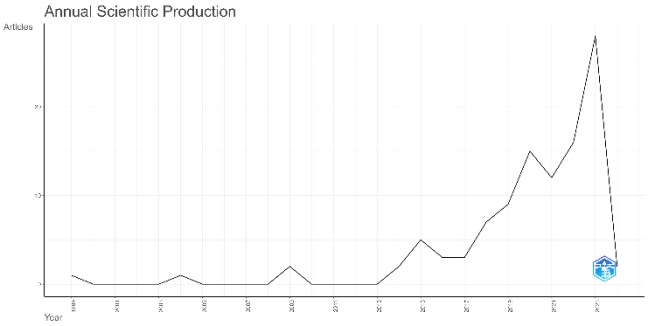


Figure 4. Annual Scientific Production
Source: Own elaboration by using Biblioshiny in R

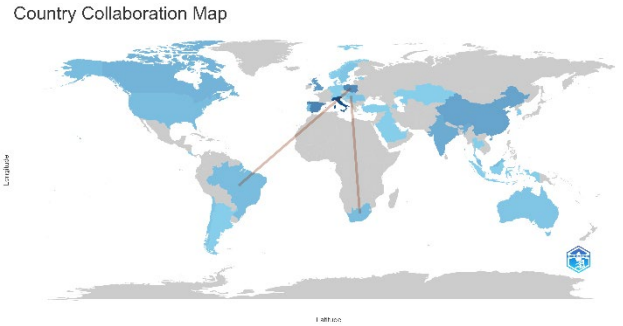


Figure 5. Country Collaboration Map
Source: Own elaboration by using Biblioshiny in R

Fig. 4 illustrates a relatively low production on the topic studied between 1999 and 2024. Nevertheless, from 2014 onwards, an increase in the number of publications is evident, reaching its peak in 2023 with 28 documents. Despite the initially low production, a 54% average growth trend is recorded. The observed decrease in 2024 is attributed to ongoing production at the time of the consultation.

An examination of the international collaboration map (Fig. 5), reveals sparse co-authorship among nations, with collaborations between Poland and Brazil, and Hungary and South Africa, being particularly noteworthy. Within Latin America, only Brazil, Argentina, Chile, and Costa Rica are represented these scientific production efforts. This underscores the potential for initiatives aimed at promoting international research collaboration, which could significantly increase the global reach and dissemination of scientific knowledge.

3.2 Collaboration and research trends

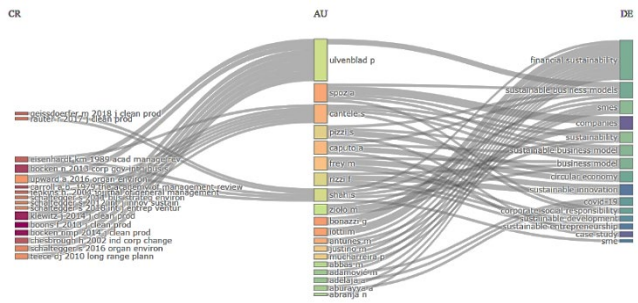


Figure 6. Three-Field Plot
Source: Own elaboration by using Biblioshiny in R

In accordance with the previous figures, among the authors with the greatest production, Ulvenblad, P. out and has published on the topics of sustainable business models. On the other hand, there is Spoz, A. contributed to the lines of sustainable business models, sustainability & corporate social responsability. Other authors on the list include Cantele, S., Pizzi, S., Caputo A., and Frey M., as shown in Fig. 6.

This figure also shows the topics that set a trend in research, for which the analysis is divided into four quadrants, where the driving themes such as sustainability, innovation, financial sustainability, which have been studied in SMEs, stand out. On the other hand, basic topics such as business models, sustainable development, sustainable business and business development are shown. As shown in Fig. 4, these are topics that despite being located in the quadrant of basic topics, there is a tendency towards motor topics, given their connection with other areas of research.

The analysis of co-occurrence networks (Fig. 7), yielded four clusters, which prominently feature terms such as *small and medium-sized entreprise, sustainability, sustainable develpment, innovation, model, profitability, tourism, bankruptcy, financial sustainability, hotels, developing countries, business model innovation*. These terms reflect the importance of co-occurrence among the topics under investigation, highlighting the complex relationships between these key concepts.

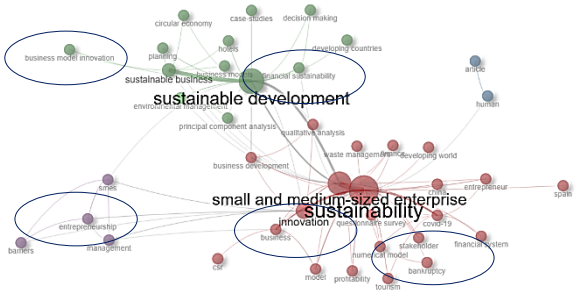


Figure 7. Co-occurrence Network
Source: Own elaboration by using Biblioshiny in R

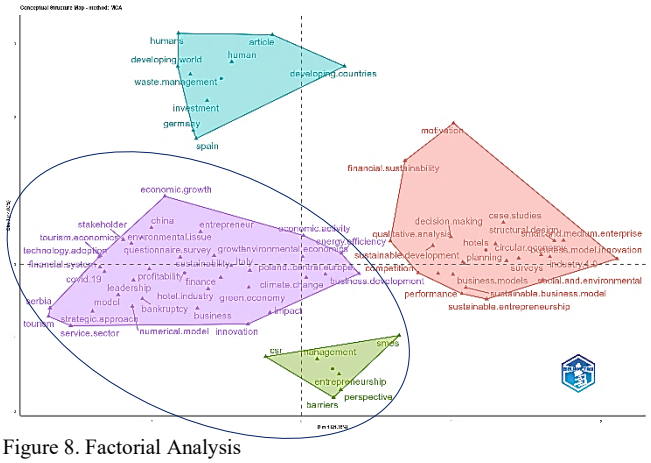
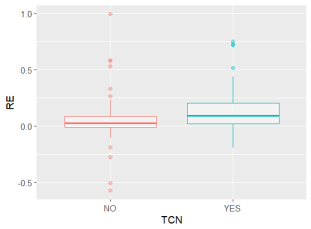


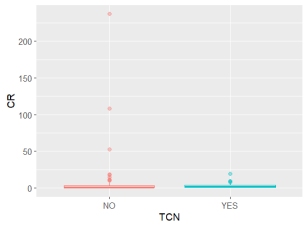
Figure 8. Factorial Analysis
Source: Own elaboration by using Biblioshiny in R



> t.test(RE ~ TCN, data = DATOS_B, var.equal = T)

data: RE by TCN

t = -1.8204, df = 72, p-value = 0.07285

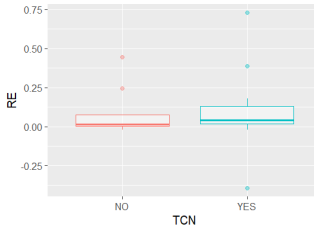


> t.test(CR ~ TCN, data = DATOS_B, var.equal = T)

data: CR by TCN

t = 1.1371, df = 72, p-value = 0.2593

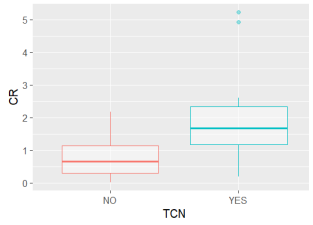
Figure 9. Bogota T-test analysis
Source: Own elaboration by using R Studio 4.4.1



> wilcox.test(x = YES$RE, y = NO$RE, alternative = "two.sided", paired = F)

data: YES$RE and NO$RE

W = 76, p-value = 0.4389



> wilcox.test(x = YES$CR, y = NO$CR, alternative = "two.sided", paired = F)

data: YES$CR and NO$CR

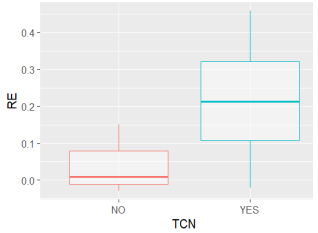
W = 97, p-value = 0.03275

Figure 10. Valle Mann–Whitney U test analysis
Source: Own elaboration by using R Studio 4.4.1

The Factor Analysis (Fig. 8) provides a clearer visualization of the cluster configuration, revealing that the lilac and olive-green clusters constitute the network with the most diverse array of terms. These clusters include prominent concepts such as tourism, sustainability, innovation, entrepreneurship, and SMEs, which underscore the complex relationships between the aspects investigated in this study.

3.3 Technological transformation processes in companies of the lodging sector in Bogota, Valle, Risaralda, Antioquia and Bolivar

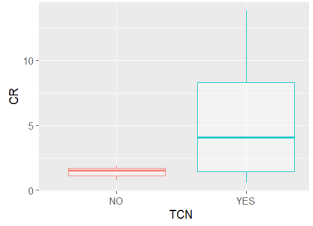
In the case of Figures 9 to 13, it can be observed that all variables are at the same level, which at first glance reflects the non-existence of a difference in means, although there are some outliers, which may in turn generate the difference between the averages.



> wilcox.test(x = YES$RE, y = NO$RE, alternative = "two.sided", paired = F)

data: YES$RE and NO$RE

W = 9, p-value = 0.4

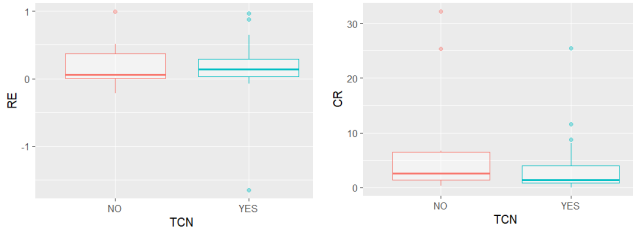


> wilcox.test(x = YES$CR, y = NO$CR, alternative = "two.sided", paired = F)

data: YES$CR and NO$CR

W = 8, p-value = 0.6286

Figure 11. Risaralda Mann–Whitney U test analysis
Source: Own elaboration by using R Studio 4.4.1



> t.test(RE ~ TCN, data = DATOS_A, var.equal = T)

data: RE by TCN

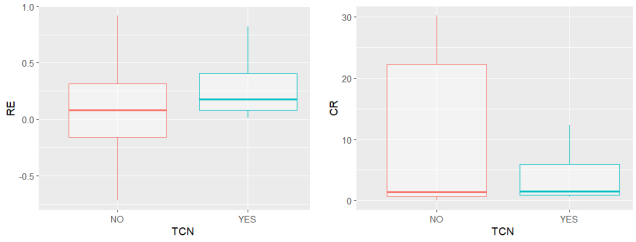
t = 0.23826, df = 42, p-value = 0.8128

> t.test(CR ~ TCN, data = DATOS_A , var.equal = T)

data: CR by TCN

t = 1.6098, df = 42, p-value = 0.1149

Figure 12. Antioquia T-test analysis
Source: Own elaboration by using R Studio 4.4.1



> wilcox.test(x = YES$RE, y = NO$RE, alternative = "two.sided", paired = F)

data: YES$RE and NO$RE

W = 115, p-value = 0.2534

> wilcox.test(x = YES$CR, y = NO$CR, alternative = "two.sided", paired = F)

data: YES$CR and NO$CR

W = 86, p-value = 0.8714

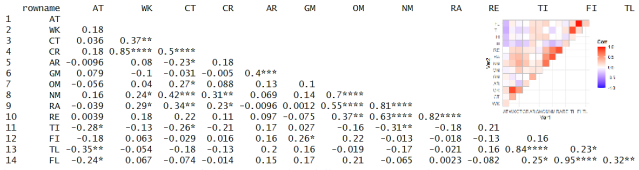
Figure 13. Bolivar Mann–Whitney U test analysis
Source: Own elaboration by using R Studio 4.4.1

However, the results of the test show that there are no statistically significant differences between the means of variables (RE and CR) at a 5% significance level, for Bogota, Valle, Risaralda, Antioquia and Bolivar. At the financial level, this means that the fact of applying technology in the selected companies has no effect on their profitability or liquidity. In other words, if the company makes the decision to invest in new technology, it will not increase or decrease profitability. However, in the case of Risaralda there is a statistically significant difference in the CR indicator, reflecting a higher indicator for those companies that choose to invest in technologies.

3.4 Indebtedness and liquidity risk in companies of the lodging sector.

Since the goal of businesses is to achieve a stable financial position, called financial equilibrium, this can be analyzed with the help of specific indicators which are aimed at the relationship between the permanent and temporary needs compared to the permanent and temporary sources [36]. For this purpose, two types of indicators are used, i.e., indicators in absolute sizes such as working capital [37], working capital needs, net treasury, as well as indicators in relative sizes, such as liquidity and solvency ratios [38].

Accordingly, Figure 14 to 18 present the correlation analyses between the liquidity and indebtedness variables, in order to establish whether there is a relationship between indebtedness and liquidity risk.



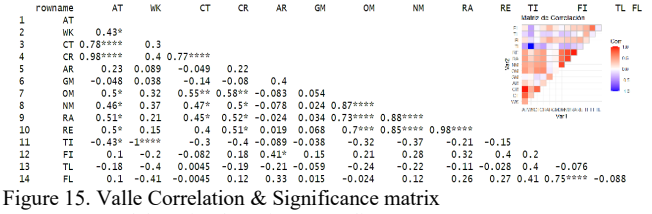
rowname	AT	WK	CT	CR	AR	GM	OM	NM	RA	RE	TI	FI	TL
AT													
WK	0.18												
CT	0.036	0.37**											
CR	0.18	0.85****	0.5****										
AR	-0.0096	0.08	-0.23*	0.18									
GM	0.079	-0.1	-0.031	-0.005	0.4***								
OM	-0.056	0.04	0.27*	0.088	0.13	0.1							
NM	0.16	0.24*	0.42***	0.31**	0.069	0.14	0.7****						
RA	-0.039	0.29*	0.34**	0.23*	-0.0096	0.0012	0.55****	0.81****					
RE	0.0039	0.18	0.22	0.11	0.097	-0.075	0.37**	0.63****	0.82****				
TI	-0.28*	-0.13	-0.26*	-0.21	0.17	0.027	-0.16	-0.31**	-0.18	0.21			
FI	-0.18	0.063	-0.029	0.016	0.16	0.26*	0.22	-0.013	-0.018	-0.13	0.16		
TL	-0.35**	-0.054	-0.18	-0.13	0.2	0.16	-0.019	-0.17	-0.021	0.16	0.84****	0.23*	
FL	-0.24*	0.067	-0.074	-0.014	0.15	0.17	0.21	-0.065	0.0023	-0.082	0.25*	0.95****	0.32**

Figure 14. Bogota Correlation & Significance matrix
Source: Own elaboration by using R Studio 4.4.1

Before analyzing the results in Figure 10 to 14, it is important to note that these are presented at the 0.01 ** and 0.05 * levels of bilateral significance. In this order of ideas, when analyzing the relationship between the liquidity and indebtedness variables of the companies of the lodging sector in Bogota, it is observed that in the case of the Acid Test - AT, it presents significant negative correlations at 0.01 with the Total Leverage indicator - TL (-.35), and significant negative correlations at 0.05 with the Total Indebtedness - TI (-.28) and Financial Leverage - FL (-.24) indicators. On the other hand, when analyzing the Cash Ratio - CR, there is a significant negative correlation at 0.05 with the Total Indebtedness - TI indicator (-.26). The Working Capital Ratio - WK, Current Ratio - CR and Accounts Receivable Rotation - AR do not have a negative correlation with the debt indicators.

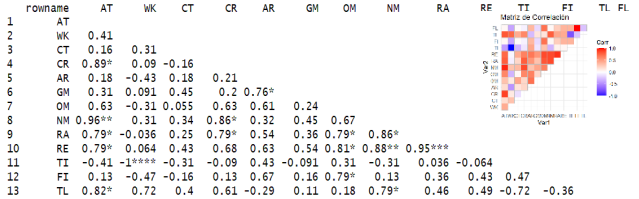
Regarding the analysis of the relationship between the liquidity and indebtedness indicators of the SMEs of the lodging sector in Valle, the AT indicator presents significant negative correlations at 0.05 with the TI (-0.43). With respect a negative correlation significant at 0.01 is observed between the indicators WK and TI (-1). Finally, AR presents a positive relationship significant at 0.05, with the indicators FI (0.41).

Regarding the analysis of the relationship between the liquidity and indebtedness indicators of the SMEs of the lodging sector in Risaralda, the AT indicator presents significant positive correlations at 0.05 with the TL (0.82). On the other hand, a negative correlation significant at 0.01 is observed between the indicators WK and TI (-1).



rowname	AT	WK	CT	CR	AR	GM	OM	NM	RA	RE	TI	FI	TL	FL
AT														
WK	0.43*													
CT	0.78****	0.3												
CR	0.98****	0.4	0.77****											
AR	0.23	0.089	-0.049	0.22										
GM	-0.048	0.038	-0.14	-0.08	0.4									
OM	0.5*	0.32	0.55**	0.58**	-0.083	0.054								
NM	0.46*	0.37	0.47*	0.5*	-0.078	0.024	0.87****							
RA	0.51*	0.21	0.45*	0.52*	-0.024	0.034	0.73****	0.88****						
RE	0.5*	0.15	0.4	0.51*	0.019	0.068	0.7***	0.85****	0.98****					
TI	-0.43*	-1****	-0.3	-0.4	-0.089	-0.038	-0.32	-0.37	-0.21	-0.15				
FI	0.1	-0.2	-0.082	0.18	0.41*	0.15	0.21	0.28	0.32	0.4	0.2			
TL	-0.18	-0.4	0.0045	-0.19	-0.21	-0.059	-0.24	-0.22	-0.11	-0.028	0.4	-0.076		
FL	0.1	-0.41	-0.0045	0.12	0.33	0.015	-0.024	0.12	0.26	0.27	0.41	0.75****	-0.088	

Figure 15. Valle Correlation & Significance matrix
Source: Own elaboration by using R Studio 4.4.1



rowname	AT	WK	CT	CR	AR	GM	OM	NM	RA	RE	TI	FI	TL	FL
AT														
WK	0.41													
CT	0.16	0.31												
CR	0.89*	0.09	-0.16											
AR	0.18	-0.43	0.18	0.21										
GM	0.31	0.091	0.45	0.2	0.76*									
OM	0.63	-0.31	0.055	0.63	0.61	0.24								
NM	0.96**	0.31	0.34	0.86*	0.32	0.45	0.67							
RA	0.79*	-0.036	0.25	0.79*	0.54	0.36	0.79*	0.86*						
RE	0.79*	0.064	0.43	0.68	0.63	0.54	0.81*	0.88**	0.95***					
TI	-0.41	-1****	-0.31	-0.09	0.43	-0.091	0.31	-0.31	0.036	-0.064				
FI	0.13	-0.47	-0.16	0.13	0.67	0.16	0.79*	0.13	0.36	0.43	0.47			
TL	0.82*	0.72	0.4	0.61	-0.29	0.11	0.18	0.79*	0.46	0.49	-0.72	-0.36		
FL	0.039	-0.38	0.04	-0.059	0.37	-0.14	0.7	0.039	0.26	0.33	0.38	0.88**	-0.26	

Figure 16. Risaralda Correlation & Significance matrix
Source: Own elaboration by using R Studio 4.4.1

	rowname	AT	WK	CT	CR	AR	GM	OM	NM	RA	RE	TI	FI	TL	FL
1	AT														
2	WK	0.45**													
3	CT	0.63****	0.36*												
4	CR	0.99****	0.47**	0.62****											
5	AR	0.31*	-0.0067	-0.16	0.27										
6	GM	0.08	0.13	-0.25	0.08	0.28									
7	OM	0.37*	0.18	0.26	0.35*	0.2	0.16								
8	NM	0.41**	0.15	0.28	0.39**	0.15	0.34*	0.78****							
9	RA	0.21	-0.11	0.1	0.18	0.11	-0.12	0.57****	0.56****						
10	RE	0.21	-0.28	0.16	0.18	0.065	-0.26	0.36*	0.35*	0.78****					
11	TI	-0.45**	-1****	-0.36*	-0.47**	0.0067	-0.13	-0.18	-0.15	0.11	0.28				
12	FI	-0.088	-0.0064	0.14	-0.11	-0.0082	-0.12	0.33*	0.13	0.18	0.049	0.0064			
13	TL	-0.23	-0.069	-0.22	-0.21	-0.25	-0.11	-0.17	-0.22	-0.19	-0.1	0.069	-0.1		
14	FL	-0.1	-0.064	0.16	-0.11	-0.071	-0.36*	0.1	-0.1	0.18	0.36*	0.064	0.73****	0.11	

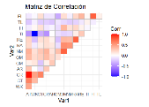


Figure 17. Antioquia Correlation & Significance matrix
Source: Own elaboration by using R Studio 4.4.1

	rowname	AT	WK	CT	CR	AR	GM	OM	NM	RA	RE	TI	FI	TL	FL
1	AT														
2	WK	0.76****													
3	CT	0.7****	0.69****												
4	CR	0.97****	0.67****	0.7****											
5	AR	0.38*	0.49**	0.2	0.38*										
6	GM	0.047	0.23	-0.0085	-0.032	0.47*									
7	OM	0.32	0.42*	0.38*	0.27	0.39*	0.47*								
8	NM	0.42*	0.52**	0.57**	0.38*	0.37	0.38*	0.88****							
9	RA	0.26	0.45*	0.53**	0.27	0.38*	0.34	0.58***	0.71****						
10	RE	-0.018	0.22	0.17	0.014	0.27	0.2	0.15	0.3	0.7****					
11	TI	-0.41*	-0.33	-0.68****	-0.4*	-0.12	-0.077	-0.56**	-0.57**	-0.3	0.34				
12	FI	-0.5**	-0.44*	-0.39*	-0.43*	0.067	-0.11	0.086	-0.21	-0.24	-0.035	0.15			
13	TL	-0.42*	-0.34	-0.68****	-0.4*	-0.12	-0.076	-0.56**	-0.57**	-0.31	0.33	1****	0.16		
14	FL	-0.63***	-0.57**	-0.52**	-0.55**	-0.13	-0.2	-0.14	-0.4*	-0.36	-0.093	0.28	0.9****	0.29	

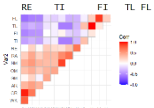


Figure 18. Bolivar Correlation & Significance matrix
Source: Own elaboration by using R Studio 4.4.1

Regarding the analysis of the relationship between the liquidity and indebtedness indicators of the SMEs of the lodging sector in Antioquia, the AT indicator presents significant negative correlations at 0.01 with the TI (-0.45). On the other hand, a negative correlation significant at 0.01 is observed between the indicators WK and TI (-1). In the same way, a negative correlation significant at 0.01 is observed between the indicators CR and TI (-0.47). Finally, CR presents a negative relationship significant at 0.05, with the indicators TI (-0.36).

Following the previous, the null hypothesis is rejected, and the researchers' hypothesis is accepted since there is a negative correlation between the variables analyzed: AT, at 99% confidence; and TI and FI, at 95% confidence, as explained, which leads to corroborate the existence of a positive relationship between capital structure and liquidity risk.

Regarding the analysis of the relationship between the liquidity and indebtedness indicators of the SMEs of the lodging sector in Bolivar, a negative correlation significant at 0.01 and 0.05 is observed between the indicators mentioned, except between the liquidity variable WK and the indebtedness variables TI and TL. In this order of ideas, the AT indicator presents significant negative correlations at 0.01 with the FI (-0.05) and FL (-0.63) indicators, as does the relationship between WK and FL (-0.57), CT and the TI (-0.68), TL (-0.68) and FL (-0.52) indicators, and finally the relationship between CR and FL (-0.55). With respect to the negative relationships significant at 0.05, the behavior between AT and the indicators TI (-0.41) and TL (-0.42), WK and FI (-0.44), CT and FI (-0.39), and finally CR and the indicators TI (-0.4), FI (-0.42) and TL (-0.4) was observed.

3.5 Multivariate analysis: technology and profitability in departments

The analysis corresponds to a logistic regression, which considers as independent variable the adoption of technologies by the companies and as explained variables the departments, profitability indicators. The results show that there is a statistical relationship between technology and the departments of Antioquia and Bolivar, indicating that these departments are between 3.3 and 5.5 times more likely to adopt technologies in the companies than the others (Fig. 19).

TCN	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
GM	1.117856	.6848489	0.18	0.856	.336435	3.714242
OM	1.652084	1.048908	0.79	0.429	.4759969	5.73403
NM	1.070089	.1423391	0.51	0.611	.8245111	1.388812
RA	19.49117	50.33395	1.15	0.250	.1235085	3075.947
RE	.9032762	.8453434	-0.11	0.913	.144282	5.654955
DEPARTAMENTO						
VALLE	2.379621	1.19046	1.73	0.083	.8926366	6.343674
RISARALDA	1.717115	1.408542	0.66	0.510	.3440033	8.571093
ANTIOQUIA	3.367482	1.455573	2.81	0.005	1.443374	7.856548
BOLIVAR	5.47779	2.909515	3.20	0.001	1.934157	15.51383
_cons	.5008874	.2536987	-1.37	0.172	.1856128	1.351675

Figure 19. Logistic regression TGN~ departments, GM, OM, NM. RA , RE
Source: Own creation using Stata software

TCN	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
GM	1.408862	.8918571	0.54	0.588	.4074076	4.872005
OM	.7033381	.4276339	-0.58	0.563	.2136133	2.315794
NM	1.024056	.1466484	0.17	0.868	.7734441	1.355873
RA	316611.4	1794738	2.23	0.025	4.736089	2.12e+10
RE	.5819148	.7849793	-0.40	0.688	.0413641	8.186448
_cons	.3179293	.1860457	-1.96	0.050	.1009776	1.001005

Figure 20. Logistic regression Bogota TGN~ GM, OM, NM. RA , RE
Source: Own creation using Stata software

TCN	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
GM	.321153	.9350107	-0.39	0.696	.0010678	96.58631
OM	2794.285	11632.98	1.91	0.057	.7991085	9770927
NM	.2843828	1.126184	-0.32	0.751	.0001211	667.9512
RA	1.91e-11	1.80e-10	-2.62	0.009	1.79e-19	.0020473
RE	3510.431	18822.07	1.52	0.128	.0958133	1.29e+08
_cons	7.01155	15.67962	0.87	0.384	.0875608	561.4594

Figure 21. Logistic regression Antioquia TGN~ GM, OM, NM. RA , RE
Source: Own creation using Stata software

In this multivariate model there is no evidence of a relationship between profitability indicators and technology in all the departments studied except Antioquia and Bolivar; however, when analyzing the individual results, important relationships between the return on assets (RA) and technology in the departments of Bogota (Fig. 20) and Antioquia (Fig. 21) are found.

4. Discussion and Conclusions

It was found that the relationship between liquidity risk and its financial structure is higher in Bolivar than in Bogota, which constitutes a challenge for lodging companies when applying for loans or leveraging the growth of their operations. However, when analyzing the relationship between the technological transformation processes and the increase in the company's profitability or liquidity, it is observed that there is no correspondence whatsoever, which highlights the fact that those companies interested in betting on new technologies that decide to leverage such growth through financial indebtedness, will be involved in risk levels that may lead them to incur not only in crisis but also in the

possibility of bankruptcy.

This is in line with what was established by [4,39], for whom financial equilibrium is one of the most important aspects regarding the financial and economic stability of an entity, and its long-term financial sustainability. In line with the above, some researchers argue that ICT adoption is a competitive advantage factor, as it improves customer experience, which can increase hotel performance [15,16,1,2].

Although some authors suggest that SMEs are increasingly resorting to the adoption of Information and Communication Technologies (ICT) as a strategic means to compete with large companies [9,10,40,41] , or as a crucial factor to foster growth and innovation [42], the results of the present study show the opposite.

Regarding the T-test, no statistically significant differences were found between financial sustainability and the application or not of technological transformation processes in the companies analyzed. The above coincides with what has been stated by [41-3,28-30], for whom the adoption of ICTs cannot increase hotel performance, since it is not directly aimed at improving productivity, but rather these innovative systems are intended to improve customer service and increase the number of services offered.

However, when analyzing the individual results supported by multivariate analysis, significant relationships were found between return on assets (RA) and technology in the departments of Antioquia and Bogota.

On the other hand, although the literature on the significant positive influence of ICT on business performance is extensive, especially in SMEs [12-14,43-45], in the hotel sector this relationship is not so evident [42]. This coincides with the findings of the authors, who reflect that there is little research on financial sustainability and digital transformation processes in SMEs in Colombia, unlike in other parts of the world.

This motivates research and business strengthening in this field of study, and the creation of synergies between the business and academic sectors.

For future research, multivariate analyses should be carried out to establish relationships and find causes of the risks derived from decisions related to investments in technologies, as well as their effect on the profitability and sustainability of companies in the hotel sector.

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