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Economic evaluation of the transformation of a residential property into an Airbnb type property

Evaluación económica de la transformación de un inmueble con vocación habitacional al tipo Airbnb

MORENO-MARTÍNEZ, Viridiana´†, MORENO-MARTÍNEZ, Tonatiuh´´*, PALACIOS-HERNÁNDEZ, Otoniel´ and MORENO-MARTÍNEZ, Jatziri Yunuén´

´*Universidad de Guanajuato Campus Celaya-Salvatierra, Av. Ing. Barros Sierra No. 201 Ejido de Santa María del Refugio C.P. 38140 Celaya, Guanajuato, México*
´´*Universidad de Durango Campus Morelia, Av. Lázaro Cárdenas No. 1480 Col. Ventura Puente C.P. 58020 Morelia, Michoacán, México*

ID 1st Author: *Viridiana, Moreno-Martínez* / **ORC ID:** 0000-0002-0568-0936, **CVU CONACYT ID:** 1258283

ID 1st Co-author: *Tonatiuh, Moreno-Martínez* / **ORC ID:** 0000-0003-2859-048X, **CVU CONACYT ID:** 1033551

ID 2nd Co-author: *Otoniel, Palacios-Hernández* / **ORC ID:** 0000-0001-9516-6545, **CVU CONACYT ID:** 298500

ID 3rd Co-author: *Jatziri Yunuén, Moreno-Martínez* / **ORC ID** 0000-0002-6798-2067, **Research ID Thomson:** S-8441-2018, **CVU CONACYT ID:** 237707

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Abstract

The worldwide expansion of the Airbnb platform has allowed the growth of residential properties without a lodging vocation in recent years. The work developed evaluates the economic feasibility in terms of profitability, derived from the transformation of a residential property as an Airbnb type business, quantifying the cash flows (income and expenses) for the adaptation, management, and rental of the property. Three options were analyzed to determine the income per night: a) platform price, b) break-even point and c) average of both, with occupancies of 12, 15, 17, 19 and 20 nights per month, two useful life periods are proposed for the project (10 and 15 years). Similarly, the value of the property is simulated by applying a Minimum Acceptable Rate of Return (MARR) that reflects market conditions, representative of the business, as well as quantifying the risk, to calculate the Net Present Value (NPV) and the Internal Rate of Return (IRR); investment criteria that reflect the acceptability of undertaking the transformation. It was found that options b) and c) at 10 years and only b) at 15 years, show profitability at the lowest investment risk.

Profitability, Investment, Hosting

Resumen

La expansión a nivel mundial de la Plataforma Airbnb ha permitido que inmuebles habitacionales sin vocación de hospedaje se hayan multiplicado en los últimos años. El trabajo desarrollado, evalúa la factibilidad económica en términos de rentabilidad, derivados de la transformación de un inmueble habitacional como negocio en marcha del tipo Airbnb; cuantificando los flujos de efectivo (ingresos y egresos) por la adecuación, manejo y renta del inmueble. Se analizaron tres opciones para conocer el ingreso por noche: a) precio de la plataforma, b) punto de equilibrio y c) promedio de ambos, con ocupaciones de 12, 15,17, 19 y 20 noches al mes, se proponen dos periodos de vida útil para el proyecto (10 y 15 años). De igual forma se simula incluir el valor del inmueble; aplicando una Tasa de Retorno Mínima Aceptable (TREMA) que refleje las condiciones del mercado, representativa del giro, así como que cuantifique el riesgo, con la finalidad de calcular el Valor Presente Neto (VPN) y la Tasa Interna de Retorno (TIR); criterios de inversión, que reflejan la aceptabilidad para emprender la transformación. Se encontró que las opciones b) y c) a 10 años y únicamente b) a 15 años, muestran rentabilidad al menor riesgo de inversión.

Rentabilidad, Inversión, Hospedaje

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* Correspondence to Author: (E-mail: tonatiuhmoreno13@hotmail.com).
† Researcher contributed as first author.

Introduction

In general terms, it can be pointed out that at the beginning, the members of societies used barter as a mechanism to obtain goods or services; then it was enough to locate the one who had "what was needed", proceeding to negotiate "what could be offered in exchange, as well as the amount".

However, sometimes the participants in the barter did not agree on the criteria for determining the resources and amounts to be applied. This led some societies to propose a unique, attractive and generally accepted resource to develop the exchange of goods or services; that is, money emerged. This is a relative means to measure the value of things in consideration of the objectivity and interpretation of societies, so despite being a means of exchange the parties must agree on the amounts that balance the perspectives and interests of the participants (Alvarado, 2015).

Determining the monetary exchange value of a product or service depends on multiple factors, which are partially determined by its controllable characteristics, such as: quantity, types of raw materials used, manufacturing methods and procedures, regulations on which the design is based. It is also partially dependent on circumstances and conditions beyond the designer's control, such as changing market conditions and diversification of consumer demand. Any event that affects the costs of a product will affect its value (Arbones, 2009).

Money is indispensable when we make an investment (any disbursement of financial resources to acquire production goods and that an individual or company uses during several economic cycles to meet its objectives), since we must use an amount of it in the present, which will be transformed into another in the future, taking into account the effects of the circumstances that occur during the elapsed time, this is known as the time value of money, a definition that is accompanied by discount rates, since they reflect this particularity. Since money always shows scarcity, if an individual decides to invest instead of spending, then what he expects is that the payoff in the future will be greater than in the present (Marcelino and Baca, 2016), such compensation is perceived through a recovery rate.

These rates should not only establish the proportion of profit that the investor expects to receive for risking his money, but should also include coverage of all those factors that may affect the change in the value of money over time such as: real rate (opportunity cost of capital), inflation rate (generalized increase in the prices of goods and services (Mankiw, 2012)) and risk premium (conditions of the globalized environment) (Alvarado, 2015).

One of the widely used rates is the Minimum Acceptable Rate of Return or Minimum Acceptable Rate of Return (MARR), it refers to an interest rate that is higher than the rate offered for "safe" investment, such as the one promised by a bank in a promissory note, with yield payable at maturity or the one obtained by investing in Federal Government debt instruments. (Vidaurri, 2013).

In the research to answer the hypothesis and to find out if it is viable to convert a property with a housing vocation into an Airbnb-type business in Morelia, Michoacán, a TREMA will be used that is consistent with the business, speaking in real terms, reflecting market conditions and risk, since Airbnb is not a hotel per se; in order to evaluate the desirability through the calculation of the Net Present Value (NPV) defined as the difference between the sum of the present values of the income and the sum of the present values of the expenses (Mankiw, 2012). To contrast the TREMA, the calculation of the Internal Rate of Return (IRR) of the net cash flows will be used.

The IRR is the interest rate that makes the NPV of an investment project equal to zero (Arbones, 2009). Seeking to warn if the IRR is greater than the IRER, which would indicate a monetary surplus in the useful life of the business.

The Airbnb business model

Founded in 2007 by two industrial designers who shared an apartment in San Francisco; those who developed a digital platform dedicated to the supply of accommodation to individuals and tourists, in which the hosts had the option to advertise and contract the rental of their properties with their guests (Airbnb News, 2022).

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Initially, people who wanted to use Airbnb had to meet some requirements, such as bringing inflatable beds to sleep on, no possibility of using the bed of one of the hosts, plus the landlords had to prepare breakfast for the tenants and it was only possible to rent if the owners were in the same house on the days the traveler planned to stay.

When Airbnb began receiving its first investment, those principles quickly changed. The inflatable mattress requirement was eliminated, beds could be rented, and morning breakfast was no longer required. But the most important change was that it was allowed to rent a property without requiring the owners to be there. This change is fundamental in the history of Airbnb because it opened the door for Airbnb to become the speculative market it is today (Gil, 2019).

Airbnb manages a model similar to that of a hotel. It is segmented into two groups which are the host and guest, where mostly the host is the one who must manage several items in the description of his ad to attract potential interested parties and rent his property (Modelocanvas, 2022).

While hotel chains follow a pattern that corresponds to the Disaggregated model, Airbnb follows a multi-client/multi-market business model. That is, for them, as important is the tenant (customer) as the host. Renters are usually looking for accommodation with a homey touch that hotels cannot offer, while most hosts want to rent out their homes to supplement their income. The majority of their revenue comes from booking service fees charged to both guests and hosts, managing to cover the cost of the Customer Care team, this fee is charged once the booking is confirmed.

The commissions paid by the host range between 3% and 5%, for advertising the property; the guest on the other hand pays a commission that can reach up to 20%, which includes: use of the platform, booking fees, cleaning, service, occupancy, additional guests, currency exchange, VAT (Value Added Tax) and local taxes (Maldonado, 2018). Airbnb has an effect on raising rental prices significantly, according to studies based on a microeconomic model, which examined the effect of the app on rents and housing prices.

Using in the city of London between 2016 and 2019, by means of regression models GMM System (Generalized Method of Moments), they indicated that the presence of Airbnb has an upward effect on both home purchase and rental prices. The housing price paid is 0.031 % more expensive for every 100 listings in the municipality (Benítez-Aurioles and Tussyadiah, 2021).

Then whether for business stay or vacation Airbnb hosts can obtain better income by converting housing with short-term rentals, with this business model, than for long periods for residents or locals (Deboosere et al., 2019).

A rooming house rented as Airbnb can perceive higher profits in short periods, even in some cases approaching the profits of a hotel room, but with lower infrastructure investment, maintenance costs and permits, adding the facilities and attractions offered by the platform, to generate a bidirectional trust between the lessor (host) and the lessee (guest).

The economic evaluation of the study seeks to confirm, based on the available information, the suitability of the conversion. It is not clear if the hosts who decide to rent their space, at the time of calculating the income per night, consider the value of the property (product of a previous appraisal), since Airbnb makes the calculation of the price per night, using parameters such as location, number of bedrooms, maximum occupants, bathrooms, parking lots and comfort equipment; a circumstance that should be examined within the economic evaluation, as part of the investment analysis, to establish a more complete and dynamic study.

Object of study

The property under analysis is a residential house, located in Manantiales Poniente (Figure 1) west of the city of Morelia, Michoacán, (19°41'55" N, 101°14'19" W).

Less than 100 meters from Francisco I. Madero Poniente Avenue and the junction of Salida a Quiroga (main road in the city of Morelia); the Universidad Latina de América and the H. Ayuntamiento de Obras Públicas (Figure 2).

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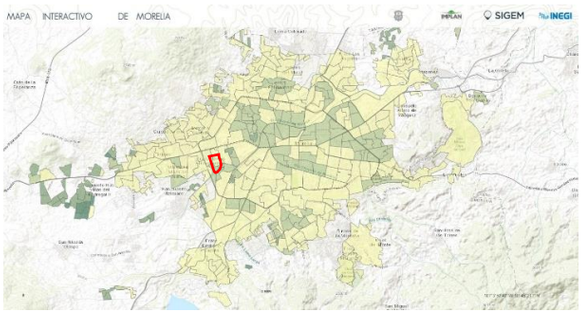

Figure 1 Map of the city of Morelia divided by neighborhoods
Source: (Instituto Municipal de Planeación de Morelia, 2022)

The area is upper middle class, the property has private security and surveillance in the subdivision, at the exit of this, there is a wide range of public transport routes that go to the busiest and most interesting sectors in Morelia.

Figure 2 Micro-localization of the study property
Source: (Google Earth, 2022)

To determine the value of the property included in the simulation, a real estate appraisal was performed, an estimate of the value of a property, determining the measure of its exchange power in monetary units and at a given date.

It is also a technical opinion that indicates the value of a property based on its physical characteristics, location, use and market research and analysis (INDAABIN, 2022), performed by a qualified person, the accuracy and usefulness of the value estimate depends on the faculty, experience and judgment of the person performing the analysis (Moreno-Martínez, 2005). The selection of the comparables is delimited in an interval of 18% for the land and building areas and for the age of 5 years (Table 1).

Comparative or market value:	**$85,625.61**
Physical or direct value:	$77,106.99
Residual value:	No aplica
Value by capitalization of income:	$34,412.86

Table 1 Property values according to valuation approaches in USD
Source: (Moreno, 2022)

It was determined that the most representative value is the market value. Therefore, the property has a value of $85,625.61 USD as of April 20, 2022 (Moreno, 2022).

Research design

For the purposes of the study, we have the following preliminary considerations:

- Service life

The useful life of the business (N) for calculation purposes is separated into two periods, at 10 years, to try to compensate the expenses and is extended up to 15 years, with the purpose of knowing how the NPV will vary.

- Choice of the TREMA

The calculation of the EIRR depends on the prevailing economic conditions in the country, as well as the degree of risk associated with the investment project. However, in general, the minimum acceptable rate of return is calculated with the following equation (Vidaurri, 2013):

$$\text{TREMA} = \text{actual rate} + \text{inflation rate} + \text{risk premium} \quad (1)$$

A real interest rate of 3.49% was used, representative of the turn (Demuner and Lopez, 2017); the inflation rate used, is the average from May 2021 to May 2022, being 6. 7131 % (BANXICO, 2022); while the risk premium due to its complexity and subjectivity, coupled with the volatility of the market, derived from the COVID-19 pandemic, where people stopped traveling and because it is a platform that in theory, establishes trust between the host and guest, it is possible to consider that there is a low risk (before a misconduct of the guest that could totally damage the property). A risk premium of 3.1969% average of the financial analysis of two applicable sources of the hotel business was used (Rivera, 2018) and (Demuner and Lopez, 2017). Therefore:

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$$TREMA = (3.49\%) + (6.7131\%) + (3.1969\%)$$

$$TREMA = 13.40\% \quad (2)$$

- Proposal of the property as Airbnb

The rooming house that was offered on the platform receives the name "Casa Moreno" the complete house was available (Figure 3), with 3 bedrooms, equipped kitchen, 1 ½ bathrooms, 2 parking spaces, backyard, outdoor furniture, washing machine, iron, cable TV, wifi, basic elements (towels, sheets, pillows, extra blankets, soap, toilet paper and hot water), available 365 days a year for analysis and with seven people maximum to host, in addition to accepting pets.

Figure 3 Baseline ad information on the platform
Source: (Airbnb, 2022)

- Occupancy rate

These values were calculated with the AirDNA statistical program, based on the historical occupancy rate in the area, type of property (whole house), number of bedrooms (three rooms) and the maximum number of guests (seven people), assuming that the object of study will have clients, equal to the statistical average of the ads that there are for Airbnb in Morelia, initially we proceeded with a 50th percentile, from which we extracted a historical record from May 2021 to May 2022 (Figure 4), for greater certainty we obtained the average for the entire year, being 38. 46%.

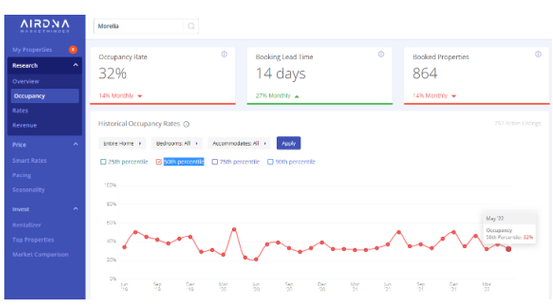

Figure 4 Annual occupancy percentage
Source: (AirDNA, 2022)

To move from occupancy percentage to days, it was multiplied by 31, obtaining 12 days rounded up, this value will be the basis for monthly revenues. As the occupancy percentage is expected to increase over time due to the learning curve and market strategies, a new calculation was made, now based on the statistical graph of the 75th percentile, with an average of 63.69% per occupancy, rounded to 20 days. The occupancy days will be as follows: year one and two, 12 days per month; year three and four, 15 days per month; year five and six, 17 days per month; year seven and eight, 19 days per month; and from year nine to fifteen, 20 days per month.

- Costs per service

Every business always needs an initial investment; in this context, to make the house more attractive, minor remodeling, purchase of furniture and appliances, lighting, white goods, security equipment, front garden and general painting are proposed, for a total of $3,511.00 USD. For the operation of the business, the fixed costs (Table 2) were quantified, being those expenses that will always be paid month to month, and the variable costs (Table 3), which are a function of the number of nights that the property is rented.

Fixed costs for different occupations	
Nights/month	Fixed monthly cost (FC)
12	$506.51
15	$611.79
17	$681.97
19	$752.16
20	$787.25

Table 2 Fixed monthly costs of the property per occupancy in USD

Fixed costs for different occupations	
Nights/month	Variable cost (CV)
12	$73.59
15	$85.59
17	$93.20
19	$107.97
20	$119.33

Table 3 Variable monthly real estate costs per occupancy in USD

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- Estimated income per night

The economic analysis was performed with three different options, with different amounts per night, including cleaning fee, service and taxes. These range from a static, dynamic and mixed analysis of prices and revenues for the financial run. The three types of revenue that were used to conduct the research are shown below.

a Revenue per night, Airbnb (smart pricing).

Using a smart algorithm, the Airbnb platform calculates an average price per night of: $96.57 USD or $1,885.00 MXN (Figure 5), including cleaning fee (10.61%), service fee (13.85%) taxes and fees on accommodation (11. 88%) of the total; it should be noted that the pricing algorithm only uses a statistic based on the parameters described above but does not include elements fully appreciated by the traveler (finishes, furnishings, interior design, landscaping, floor area and land); the Airbnb algorithm provides a minimum price of $34. 12 USD or $666.00 MXN and a maximum of $146.26 USD or $2,855.00 MXN with fees and taxes included (Airbnb, 2022), so the income per night is within limits.

Figure 5 Breakdown of prices shown on the platform in MXN
Source: (Airbnb, 2022)

- Revenue per unit at the break-even point (r)

The break-even analysis finds the value of a parameter that makes two elements equal. The break-even point Q is determined from the revenue and costs of a product. It obeys the following mathematical expression (Arbones, 2009):

$$Q = \frac{CF}{r-v} \tag{3}$$

Where:

Q = equilibrium quantity

CF = fixed costs

r = revenue per unit

v = variable cost per unit

For the analysis it is necessary to clear the income per unit or per night (r), since the equilibrium quantity (Q), is the number of nights it is possible to rent, the fixed and variable costs per exhibition were described in Tables 2 and 3 respectively, therefore:

$$r = \frac{CF}{Q} + v \tag{4}$$

It is considered that the minimum number of nights rented per month $Q = 12$, up to a maximum $Q = 20$ (Table 4):

Dynamic income per unit (r)	
Nights/month	r
12	$115.80
15	$126.37
17	$133.32
19	$147.56
20	$158.69

Table 4 Dynamic income per unit, r in USD

- Average income per night

As a third option, an average is calculated between the total amount expressed on the Airbnb platform and that of the break-even point of occupancies per night (Table 5). This mixed analysis would complete the picture of possible options to choose from.

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Summary of revenue per night (Airbnb and Airbnb average r)	
Nights/month	Income per night
12	$106.18
15	$111.47
17	$114.94
19	$122.06
20	$127.63

Table 5 Average revenue per night Airbnb and r in USD

- Inclusion of the value of the property

The object of study is considered as equity, i.e. it was not necessary to go to a lending institution and obtain financing for its purchase. Consequently, the initial investment is $89,136.61 USD (value of the property, $85,625.61 USD and initial adjustments, $3,511.00 USD).

At the end of both useful life periods of the project (N=10 and N=15), the value of the property is added without depreciation, as described in the appraisal, since, at the end of the business, the property is retained.

- Economic evaluation methods

The NPV calculation is used as an acceptability criterion, determined by the expression:

$$VPN = \sum_{n=0}^{N} \frac{A_n}{(1+i)^N} = \sum_{n=0}^{N} \frac{A_n}{(1+TREMA)^N} \quad (5)$$

Where:

VPN = net present value

A_n= net cash flow at the end of period N

i = TREMA (13.40%)

N = service life of the project (10 and 15 years)

When the NPV is positive it indicates that the present value of the net income fully covers the cost of the investment; in case of a negative NPV it means that the present value of the net income is not enough to cover the cost of the initial investment (Alvarado, 2015).

The second acceptance criterion is the IRR, to deduce it we follow the method of trial and error or iteration, until we convert the NPV to zero, mathematically:

$$VPN = \sum_{n=0}^{N} \frac{A_n}{(1+TREMA)^N} = 0 \quad (6)$$

Both decision criteria were estimated for the three nightly revenues: a), b) and c), described above, over the two life spans; 10 and 15 years.

Results and conclusions

Following the application of the proposed methodology, the results are shown for the three options, depending on the revenue per night.

a) Revenue per night, Airbnb (smart pricing)

For this first option, it is essential to individually perform the NPV calculation (Table 6), with eq. 5 and IRR (Table 7), using eq. 6, for each number of nights rented per month (12, 15, 17, 19 and 20), since the revenue per night provided by Airbnb is a static profit and when calculating net cash flows, fixed and variable expenses, are directly proportional to the number of nights, as shown in Tables 6 and 7.

Airbnb recommendation $96.57 USD per night				
N	Night /month	VPN		
Useful life 10 years				
10	12	-$29,031.08	< 0	Rejected
10	15	-$17,980.86	< 0	Rejected
10	17	-$10,589.25	< 0	Rejected
10	19	-$3,656.62	< 0	Rejected
10	20	-$444.62	< 0	Rejected
Useful life 15 years				
15	12	-$46,710.30	< 0	Rejected
15	15	-$33,610.69	< 0	Rejected
15	17	-$24,848.21	< 0	Rejected
15	19	-$16,629.84	< 0	Rejected
15	20	-$12,822.14	< 0	Rejected

Table 6 Summary of 10 and 15 year NPV analysis with Airbnb's recommended static income in USD

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Airbnb recommendation $96.57 USD per night				
N	Nights /month	TIR	TREMA (13.40%)	
Useful life 10 years				
10	12	7.221%	< 13.40%	Rejected
10	15	9.575%	< 13.40%	Rejected
10	17	11.148%	< 13.40%	Rejected
10	19	12.623%	< 13.40%	Rejected
10	20	13.306%	< 13.40%	Rejected
Useful life 15 years				
15	12	1.532%	< 13.40%	Rejected
15	15	5.306%	< 13.40%	Rejected
15	17	7.585%	< 13.40%	Rejected
15	19	9.596%	< 13.40%	Rejected
15	20	10.495%	< 13.40%	Rejected

Table 7 Summary of 10- and 15-year IRR analysis with Airbnb's recommended static income

b) Revenue per unit with the break-even point (r)

For the second option, the revenue per night (r) obtained through the break-even point (eq. 4), it is not necessary to individually estimate the NPV and IRR (Table 8) for each number of nights rented per month, since the net cash flow is direct.

Calculated dynamic revenue per unit (r)			
N	VPN		
10	$21,223.15	> 0	Accepted
15	$23,613.86	> 0	Accepted
N	TIR	TREMA (13.40%)	
10	17.300%	> TREMA	Accepted
15	17.306%	> TREMA	Accepted

Table 8 Summary of NPV and IRR analysis at 10 and 15 years with dynamic revenue per unit (r) in USD

c) Average revenue per night

As in option b), it is possible to summarize the net cash flows, for the two life periods (Table 9).

Average income per night (Airbnb and r)			
N	VPN		
10	$2,641.57	> 0	Rejected
15	-$2,351.83	< 0	Rejected
N	TIR	TREMA (13.40%)	
10	13.907%	> TREMA	Rejected
15	12.968%	< TREMA	Rejected

Table 9 Summary of NPV and IRR analysis at 10 and 15 years with average revenue per night (Airbnb and r) in USD

In order to have greater certainty in the analysis and to corroborate that it is appropriate to consider the value of the property within the initial investment, a financial run was made, where the start-up expenditure is clearly equal to the initial adjustments ($3,511.00 USD), i.e., disregarding the value of the property obtained by the appraisal. Showing that the NPV (Table 10) is disproportionate with reference to the investment, the NPV rises to $109,239.47 USD in comparison with the maximum value of $23,613.86 USD of the analysis that does consider it.

N	VPN		
a) Airbnb revenue per night (average of VPNs)			
10	$48,936.57	> 0	Accepted
15	$58,701.37	> 0	Accepted
b) Revenue per unit (r)			
10	$82,500.21	> 0	Accepted
15	$109,239.47	> 0	Accepted
c) Average income per night (Airbnb & r)			
10	$63,918.63	> 0	Accepted
15	$83,273.77	> 0	Accepted

Table 10 Summary of the 10 and 15 year NPV analysis with the three income per night: a), b) and c); not including the value of the property in USD

The same happens with the IRR (Table 11), obtaining a maximum of 283.627%, 31.17 times higher than the proposal (13.40%).

N	TIR		
a) Revenue per night, Airbnb (average IRR)			
10	283.626%	> 13.40%	Accepted
15	283.627%	> 13.40%	Accepted
b) Revenue per unit (r)			
10	283.098%	> 13.40%	Accepted
15	283.099%	> 13.40%	Accepted
c) Average income per night (Airbnb & r)			
10	242.545%	> 13.40%	Accepted
15	242.548%	> 13.40%	Accepted

Table 11 Summary of IRR analysis at 10 and 15 years with the three income per night: a), b) and c); without including the value of the property.

The result of a very high IRR is implausible, it would indicate that the risk of the business is proportional, i.e., that it is extremely volatile, of course this context does not apply in a lodging business. Consequently, the assumption of including the value of the property in the financial simulation is confirmed to be correct.

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The results obtained from the financial run through the NPV and IRR, show that, in a first moment, where the useful life is equal to 10 years, acceptability is shown in options a) and b); as well as in option b) when the useful life is 15 years; simplifying, we can answer that, it is convenient to transform a property with a housing vocation into Airbnb, if fixed and variable costs are considered. The analysis discarded at both times (10 and 15 years), the income per night, which yields the Airbnb platform with the intelligent algorithm; the most likely reason lies in the exclusion of the costs mentioned above, because the profits are not real and it would be necessary to keep the property rented for the whole month; to prorate the expenses for the property service. Circumstance that becomes little presumable, because of the occupancy percentages of the city of Morelia. Given that they are distributed at specific times of the year, unlike other cities with higher attendance.

If it were imperative to increase it, we would have to consider extending the useful life of the business beyond 15 years and carefully analyze inflation, micro and macroeconomic conditions, as well as emerging businesses of the same type.

Airbnb despite being a rising business, where more and more owners undertake the adventure of being hosts, begins to show signs of market saturation, if to such context we add the national and international conditions, which momentarily, show a hindered future, at least in the immediate, it is prudent to invite the management of production assets with caution.

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