

Pets...

A Friendly Business



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A GROWING MARKET

Pets play a very important role at households; they represent emotional support, company, and security. A study published by the White Mountain Group (n/d), pointed out that Latin America was the leading region in pets' population growth. In 2017, there were 670 million pets, and by 2022, an estimated 730 million, that is, dogs, cats, reptiles, amphibians, birds, small mammals, invertebrates, and fish. Nevertheless, dogs and cats are still the most popular species among the population.

With these figures, the industry is undoubtedly demanding more entrepreneurs; a larger variety of services and products are being offered, and more pet friendly places can be found. Owners consume and turn to more aesthetic care, med-

ical care, training services, products such as clothing, shoes, and toys, among others, for their pets.

The options in pet food are multiplying, as solving/tending to the different needs and tastes of the animals and their owners are being sought. It is thus that there are new health and safety services for pets; it is possible now to find insurance that will cover veterinary and legal assistance, counseling in case of loss, guidance when traveling with pets, clinical studies, hospitalization, and discounts in beauty and vaccine services. From a fiscal perspective, it was in October 2021 that Mexico approved the proposal of eliminating the Value Added Tax to pet food and agricultural and livestock products.

INCREASE IN THE NUMBER OF PETS BETWEEN 2017 AND 2022



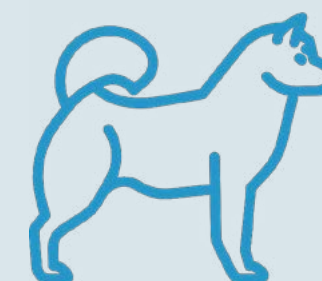
5 %
CATS



4 %
SMALL DOGS



3 %
MEDIUM-SIZED
DOGS



0 %
LARGE
DOGS

Source: White Mountain Group, (s/f).

Images: Freepik in Flaticon, 2023.

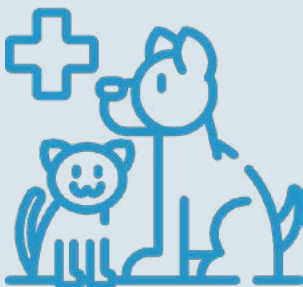


ACCESORIES

Sofía and Renato are two young entrepreneurs who observed the growth dynamics of this industry, and intuitively realized there was an opportunity to explore in this type of business. First, they made a survey in their neighborhood to learn the market potential in their vicinity. They asked 300 pet owners which services they had paid for their pets in the last few weeks, and when they saw the results of their study, they realized there was an opportunity in the dog grooming sector. Nonetheless, they also saw that there were two well-positioned services near their neighborhood. Considering this, they thought about selling products such as pet accessories that could be offered at the end of their aesthetic service and that is how their first article was developed: pet bandanas in two sizes: one for small breeds, and another for medium-sized/large breeds; all of them made in cotton fabric.

Images: Smashicons, Photo3idea_studio, Freepik and Mafer in Flaticon, 2023.

SURVEY: WHICH SERVICES HAVE YOU PAID FOR YOUR PET?



100 %
VETERINARY /
DOG GROOMING



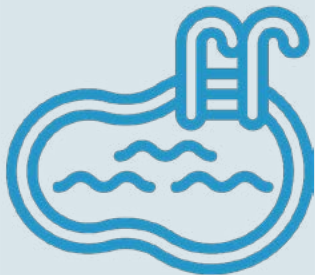
54 %
BOARDING
(ONE DAY OR MORE)



15 %
DOG CARE
(A FEW HOURS A DAY)



34 %
TRAINING



7 %
POOLS
(FOR REHAB
OR FUN)



4 %
GYM
(EQUIPPED SPACES)

Source. Own elaboration, 2023.



LINEAR PRO-GRAMMING

Throughout that year, Sofía and Renato agreed they had made a good decision by making pet bandanas. They offered the product with a 10-bandana package with different designs. Sales were increasing and more staff was needed for production. Renato was responsible for the financial part, so he was engaged in making the operation of resources more efficient for the elaboration of their product.

Renato is wondering how to optimize the current resources to produce the bandanas for pets. He oversaw obtaining the necessary information to analyze this decision with mathematical models.

Images. Smashicons and Surag in Flaticon, 2023.

BANDANAS PRODUCTION PROCESS			
Departments*		Q MODEL small bandanas package	MODELO M medium-size bandanas
 TAILORING	900 hours	1 hour	1 hour y 30 minutes (3/2 hour)
 FINAL DETAILING	300 hours	30 minutes (1/2 hour)	20 minutes (1/3 hour)
 PACKING AND SHIPPING	100 hours	7.5 minutes (1/8 hour)	15 minutes (1/4 hour)
		Profit: 5 pesos (MXN)	Profit: 8 pesos (MXN)

* The hours available in each department are different due to the necessary workforce.



Image. Freepik, 2023.

Renato wants to maximize the total contribution to profits through the production of a model bearing in mind the packages of their products.

1. Which is the linear programming model for this problem?
2. Which is the optimal solution using the graphical solution model?
How many packages of each model should be produced?
3. Which are the total profits contributions that can be obtained with the given production numbers?
4. How many production hours will be programmed in each department?
5. Which is the slack time in each department?

In terms of the sensitivity analysis.

6. Which is the shadow price? How should this data be interpreted?
7. Renato must establish the coefficient ranges of the objective function and interpret these ranges.
8. Interpret the ranges of the right side of the sensitivity problem.
9. If overtime can be programmed in one of the departments, where should this be done?
10. If 20 hours of overtime of packaging and shipping are available, how much will the optimal solution improve?

PROJECTIONS

As the business has progressed, Sofía and Renato want to diversify to continue growing. They are now interested in learning which sector could have a higher sales potential: either the pet food one, or continue with the accessories diversifying with new products. Which category of the business (food or accessories) can have higher growth potential?

It is recommended for the entrepreneurs to:

1. Prepare a graph with this information to visualize the annual sales of all the categories. Identify: which is the trend pattern of these categories?
2. With the information of the table, prepare projections choosing two methods. Justify the choice and interpret the findings.
3. Generate the accuracy indicators of the two models prepared in the previous point. What do they mean? Which model is more accurate? Explain the differences between both.
4. Research updated information about the context and check the projections trends by comparing the results. What can be observed? Why are there such differences?
5. What should be recommended to entrepreneurs in the pet business and to anyone in that business category?

For the simple regression topic, data extracted from the reports of ©Euromonitor International Limited are presented, by 2019, which include the general category of pet care and its two groups: pet food and products.

 [See data HERE.](#)



Image. Freepik, 2023.

WAITING LINES

Sofia's and Renato's business has been growing in the last few years and they offer a dog grooming service. One of its advantages is the fast attention and immediate service. Customers' registration follows a Poisson probability distribution, with an arrival rate of 15 customers per hour, and the time necessary to provide the service follow an exponential distribution with a rate of 20 customers per hour. Three alternatives for this service are being considered:

1. Which are the operation characteristics of this service?

Two alternatives to improve this service are being considered, with the idea of having a five-minute waiting time at the most.

- **Alternative A:** Hire one more employee to take care of billing. With this, the service rate improves to 30 customers per hour.
- **Alternative B:** Hire one more employee so both can give the complete service (grooming and billing). A two-channel operation would have a service rate of 20 customers per hour in each channel.

2. Which are the characteristics of the operation in each alternative?

3. Which should be recommended and why?

REFERENCE

White Mountain Group. (s/f). "Latinoamérica: líder en el crecimiento poblacional de mascotas".
<https://wmg-pet.com/latinoamerica-lider-en-el-crecimiento-poblacional-de-mascotas/>