

Factors Affecting Growth Of The Indian Pet Food Industry: An Econometric Analysis

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Abstract

The primary objective is to identify and analyze the socio-economic factors affecting the sales and income of major pet food companies in India. This includes examining variables such as average household income, population density, life expectancy, inflation, GDP growth, family size, and international travel.

Utilizing data from the Prowess IQ database, this study conducts correlation and regression analyses separately for three key players in the Indian pet food industry: Indagro Foods Pvt. Ltd., Mars International India Pvt. Ltd., and Nanda Feeds Pvt. Ltd., over an 11-year period (2012-2022).

The findings reveal that average household income, population density, and life expectancy significantly impact the pet food industry. Additionally, economic factors like inflation and GDP growth, along with family size and international travel, play a crucial role in shaping industry trends.

These insights offer valuable implications for industry stakeholders, marketers, and policymakers. They suggest a need for targeted marketing strategies, product diversification, and enhanced regulatory frameworks to ensure product quality and safety. Furthermore, the findings indicate the importance of digital platforms and educational initiatives in reaching and informing the urban, affluent consumer base.

This study contributes to the existing literature by providing a comprehensive analysis of the relatively unexplored Indian pet food industry. It offers a novel understanding of how various socio-economic factors uniquely influence this industry in the Indian context.

Keywords: *Pet Food Industry, India, Econometric Analysis, Consumer Behavior, Market*

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I. Introduction

The global pet food industry has seen remarkable growth in the past few decades, with advancements in pet nutrition and the burgeoning sentiment of pets being perceived as family members. It is estimated to grow from USD 11.1 bn in 2023 to USD 14.9 bn by 2028 (Packaged Facts, 2023). This industry encompasses a wide array of products that cater to the dietary needs of household pets, ensuring their optimum health and longevity. Given the rapid globalization and changing socio-economic landscapes, the pet food market has seen diversification, not just in developed countries but also in emerging markets.

India, a country historically rich in its variety of domesticated animals, has recently witnessed a surge in the pet ownership landscape. The pet food sector in India is anticipated to show a volume growth of 8.8 percent in 2024 (Statista, 2023). Major players in the Indian market, such as Mars International, Indagro Foods Pvt Ltd and Nanda Feeds, have been pivotal in shaping this upward trajectory (Statista, 2023).

While several factors influence pet food sales in developed markets, like the USA and Europe, where factors such as product innovation and the prevalence of pet obesity have been extensively studied (Boya, Dotson, & Hyatt, 2014; Graham et. al, 2019), there is a dearth of research targeting the specific nuances and dynamics of emerging markets like India.

Existing studies from other countries suggest a range of factors influencing pet food sales. For example, research in US indicated that pet owners' income levels and lifestyle choices, such as international travel frequency, considerably influence their expenditure on pet food (Kumcu, & Woolverton, 2014). In contrast, research in Taiwan indicated that urbanization, coupled with changing family structures, played a crucial role (Ching, & Wang, 2007). These findings hint at the multitude of variables that could potentially influence pet food sales, but the applicability of such factors in the Indian context remains unexplored.

Given the significant socio-economic and cultural differences in India, there arises a need to understand the specific factors affecting pet product and food sales in this burgeoning market. This research aims to bridge this gap by investigating how variables such as Nutrition-related services, Gender Ratio, Average Household Income, Literacy Levels, Family Size, Urban Population percentage, Life Expectancy, Population Density, Inflation, GDP growth, and International Travel affect the sales of pet food companies in India.

More specifically, the study addresses the following research questions:

RQ1: What are the factors that affect growth of pet product/food industry in India?

RQ2: To what extent do each of these factors affect growth of pet product/food industry?

The paper is organized as follows. The next section deals with an in-depth literature review of the pet products industry globally and in India, as well as the factors affecting the growth of this industry. The next section discusses the research methodology adopted. This is followed by the findings of the econometric analysis conducted using data from Indian pet product companies. The conclusions from the findings are presented next. Finally, the discussion section provides the practical implications of the study, limitations and further scope for research.

II. Literature Review

Pets and Related Industries

Broadly, the term “pets” refers to domesticated animals that are “cared for by their owner and with which the owner has some emotional bonding” (Chen et al., 2012; Serpell, 1989). Blouin and David (2012) proposed three criteria of distinguishing humans’ relationships with pets from those with other animals. Specifically, pets can live in owners’ homes, are named, and are not consumed. Compared with human relationships, which can be apathetic, prejudiced, and complicated, human–pet relationships are simpler and potentially more intimate. Moreover, unlike human children who eventually become independent, pets’ well-being depends entirely on humans. As Sanders (1990) claimed, modern pets are commonly considered a “person or something with person status”. Pets therefore function as close friends that can satisfy people’s desire to feel needed in addition to providing affection, companionship, and unconditional love (Dotson & Hyatt, 2008). According to Serpell (1989), a pet in this study is a domesticated animal that is cared for by its owner and with whom the owner shares an emotional attachment.

Companionship with animals has been shown to have a number of favourable effects on an owner’s physical, psychological, and social health, making pets an increasingly vital component of modern households. Additionally, ageing demographics and a decline in the number of children in some modern societies (such as the United States and the United Kingdom) have contributed to the rise in popularity of pets (Dotson & Hyatt, 2008; William, McMellon & Torres-Baumgarten, 2004).

Within the spectrum of animals that can be classified as companions, dogs hold a unique place. According to a recent census, approximately 30% and 25% of American and British families has a dog (Chen, Hung, & Peng, 2011). Similarly, dogs are the most common domestic pet in Taiwan (Animal Protection Information, 2009). In recent years, Taiwanese pet owners have significantly increased their expenditures on pet-related goods and services. During the same time period, Taiwan’s birth rate has become the lowest in the world (Liao, 2004). Certain Chinese cities, including Shanghai, Guangzhou, and Chengdu, are progressively exhibiting similar tendencies (having more pets, spending more on pets, ageing demographics, and declining birth rates) (James, 2010).

The pet products industry is one of the fastest-growing industries worldwide. In 2019, 85 million families in the United States owned a pet, according to the American Veterinary Medical Association (APPA, 2023) and U.S. pet owners spent more than \$95 billion on their animals, with pet food and treats accounting for more than 38 percent of expenditures (APPA, 2023). The percentage of households with pets in 2019 was 67% (85 million households). The proportion of the pet economy in 2019 was 31.68 USD billion for pet food, 18.11 USD billion for beauty, 16.01 USD billion for supplies (including drugs), and 2.01 USD billion for adoption (Kwak & Cha, 2021). This industry is anticipated to grow further in the future years, particularly due to the increasing purchasing power of Millennials - a generation noted for its fondness for pets (Graham et al., 2019; Wilkin et al., 2016).

This trend will soon emerge in the main cities of Asia-Pacific (Ching & Wang, 2007; Wang, 2008), presenting both commercial and research opportunities.

More recently, however, other regions (particularly within Asia) have begun to do the same (Carr, 2014). Dogs and cats are the most common pets in Chinese households, totaling 55.03 million and 44.12 million, respectively (Chinese Pet Industry White Paper, 2019; Xue & Fu, 2015). In 2019, Chinese pet owners spent 202.4 billion RMB on pet-related products and services. These trends tend to be most prevalent in major cities such as Shanghai, Beijing, Xi’an, and Chengdu, which ranked highest in total pet-related product and service expenditure (Chinese Pet Industry White Paper, 2019). In 2020, pet supplies constituted 14% of the total market for pet food, supplies, medications, and services in China, with the market for dog and cat supplies in urban China worth RMB 28.1 billion (€3.7 billion) that year, an increase of 19% over 2019.

Tasmanians are the undisputed champions of pet ownership in Australia, with an average of 27 dogs and 20 cats per 100 persons. In 1998, Australians spent \$38 million on dog snacks. By 2002, this sector’s annual expenditures had nearly doubled to \$75 million. According to the report, Australian pet owners spend \$411 annually on a cat and \$664 annually on a dog. This includes things like sustenance, veterinary care, grooming,

boarding, etc. Pet care is a significant industry in Australia, with a \$4 billion annual revenue and 40,000 employees.

Pet Food Industry

The origins of the pet food industry can be traced back to the mid-19th century, when Ohio entrepreneur James Spratt observed canines being fed leftover biscuits from British ships. This observation ultimately led to the development of the first dog biscuit in the 1860s, signaling the start of the commercial pet food industry (Phillips et. al, 2014).

Pet food, also referred to as pet feed, refers to industrially processed and manufactured products, such as pet compound feeds, premix feeds with additives, and other pet feeds. The total revenue of the pet food market increased from RMB 89.2 billion (€11.9 billion) in 2018 to RMB 113 billion (€15.1 billion) in 2020. Pet food is the largest and most developed component of the pet food, supplies, medications, and services sector, comprising 55 percent of the sector in urban China. In 2020, the markets for staple food, treats, and healthcare products accounted for RMB 74.1 billion (€9.9 billion), RMB 36.8 billion (€4.9 billion), and RMB 2.1 billion (€280 million) correspondingly.

The investigation of the specific dietary needs of various breeds, life phases, and activity levels commenced after World War II. The introduction of specialized diets in the form of kibble by companies such as Purina established new industry norms (Semple, 2022). In the late 20th and early 21st centuries, the global pet food market became increasingly fragmented, with niche categories such as organic, grain-free, gourmet, and raw diets emerging in response to shifting consumer preferences and increased concerns for pet well-being and health (Semple, 2022).

Fox and Gee (2016) examined the evolution of people's relationships with their companions over time and discovered that more individuals view pets as companions as opposed to objects to be owned in a phenomenon known as "anthropomorphizing" (Epley et al., 2007; Boya et al., 2012). Tesfom and Birch (2010) demonstrated that pet owners purchase for their animals in a manner similar to how they shop for themselves. This indicates that when purchasing pet food, pet owners likely consider more than just ensuring their creatures' stomachs are full. 17% of pet owners feed their canines home-cooked food, according to Statista (2021), and pet owners value the benefits of the food (e.g., dental treats, low-calorie foods).

In recent years, growth in dog and cat food sales has been led by premium pet foods that have moved far beyond performance objectives into consumer lifestyle objectives such as sustainable, organic, and natural that parallel human premium foods. (Euromonitor International, 2011). Consumers in Thailand are willing to spend money on premium pet foods and the trend is to treat pets as companions (Euromonitor, 2017; Kumcu & Woolverton, 2014). Similar trends have been observed in the United States and elsewhere in the world (Mintel, 2015).

Pet Food Industry in India

India's attachment with pets, particularly dogs and cats, is deeply entrenched in history. The notion of commercial pet food is, however, relatively new. In the past, Indian pets were typically fed remnants from household meals (Indian Retailer Bureau, 2022).

In the late 20th century, this trajectory shifted. In the late 1990s and early 2000s, due to urbanization, nuclear family structures, and rising disposable incomes, the Indian pet food industry entered its infancy. Initially, imported brands dominated the market, but then domestic brands such as Drools and IB Pet began to make an impact (Indian Retailer Bureau, 2022).

The Indian pet food industry has experienced exponential growth over the past decade. The market has expanded beyond metropolitan cities to tier 2 and tier 3 cities (ASD Reports, 2023) due to a rise in pet humanization, in which pets are considered family members, and an increased awareness of pet nutrition requirements. Recent trends also indicate that the demand for specialised pet nutrition is on the rise, reflecting global trends (Paul, 2023).

Factors Affecting Growth of Pet Food Industry

Pet Humanization: Pet humanization (i.e., owners imbuing their pets with human traits, such as viewing them as part of the family or even as their children) is cited as the leading factor driving growth in the international pet food market (Packaged Facts, 2007; Packaged Facts, 2009; Taylor, 2009). In many households, pets are considered integral members of the family, necessitating their health and happiness. This anthropomorphic perception has increased the demand for better-quality and specialised pet foods, with a focus on the animal's nutritional and dietary needs (Forbes, Trafford and Surie, 2018).

Humanization of pet foods includes searching for flavours and ingredients found in human foods, but also giving attention to the quality, nutrition, and production criteria of the ingredients (Thomas, Simmons,

Packham, & Miller, 2010). Many owners are becoming more involved with their canines, and vice versa (Boya, Dotson, & Hyatt, 2014; Kylkilahti, Syrjala, Autio, Kuismin, & Autio, 2015).

In 2006, Veterinary Medical Association (2007) reported that pet owners viewed their pets as family members or friends, implying that expenditures on the household pet may be prioritised so that the pet receives the same standard of living as other members of the household. It is evident that there is a readiness to spend more resources on pets beyond their fundamental needs (Lucas, 2010; Ridgway, Kukar-Kinney, Monroe, & Chamberlin, 2008).

Schwarz, Troyer, and Walker (2007) claimed that pets and children can be substituted to some degree. They discovered empirical proof of a substitute relationship between pets and children in childless households and those with young children, and a complementary relationship in families with older children. Dotson and Hyatt (2008) quantified seven dimensions driving the dog-human relationship across populations in order to answer the question of how consumers perceive their pets. In a survey of 749 dog owners, the authors discovered that women, owners with some college education, and younger dog owners (under 35) experience certain aspects of dog companionship more intensely than men, owners with less education, and older dog owners. Specifically, these groups score higher on anthropomorphism, specialty purchases, and adaptability. Additionally, households with a higher income scored higher on the purchase of specialty pet products.

Product attributes: Pet proprietors' food purchasing decisions may be influenced by multiple factors. These may include price, brand, packaging, nutritional and advertising claims, as well as the appearance of the pet food, its aroma, and the companion's enjoyment (Koppel, 2014).

Previous research has pointed at factors such as package design (Cha & Wang, 2020), price fairness (Herrmann et al., 2007; Kaura, 2012), brand reputation (Cha & Lyu, 2019), and awareness of health products (Misra & Singh, 2016) as having a positive effect on the attitude and recommendation of pet food customers. Kwak and Cha (2021) discovered that, with the exception of package design, all selection attributes had a statistically significant positive influence on the overall attitude and recommendation of pet food customers. In addition, attitude and recommendation were discovered to affect purchase intent.

Health Concerns for Pets: Due to pet obesity, allergies, and specific medical conditions, the demand for specialised diets has increased. Sales of prescription-based, hypoallergenic, and weight-management pet foods have increased significantly due to consumers' increased awareness of their pets' health requirements (Schleicher, Cash & Freeman, 2019).

Technological advances and extensive research in pet nutrition have enabled the creation of diverse product lines that appeal to specific age groups, breeds, and health conditions, thereby accelerating the growth of the industry (Schleicher, Cash & Freeman, 2019).

The premium pet food category is not new, but it has grown substantially in recent years, according to Kumcu and (2015). Similar to premium human foods, premium pet foods were once only available at specialty stores or veterinarian offices, but they are now widely available at supermarkets and other common retailers.

Kumcu and Woolverton (2015) found that households without children are more likely to enter the premium pet food market, but have little effect on the quantity of premium pet food purchased when controlling for income, education, and age. Consistent with the literature on premium food demand, income and education exert the greatest influence on premium pet food purchases. They also identified a significant age dimension in premium pet food purchasing behaviour, indicating a probable age cohort effect. In other words, younger consumers (below the age of 30) may maintain a preference for premium pet food as they age. If current trends of viewing pets as family members and waiting longer to cohabit and have children continue, the effect of changing attitudes among younger age cohorts may have an even greater impact as their income and education increase over time.

According to Euromonitor International (2011), premium pet food is marketed similarly to premium human food, with characteristics such as premium, holistic, natural, organic, or "human-grade" constituents. This pet food should also (1) utilise premium or healthy protein sources (e.g., ingredients of human-grade quality) or (2) promote pet health. Kumcu and Woolverton (2015) discovered that lifestyle requirements (e.g., food allergies, high-performance, life stage, weight management, and organic production) have become increasingly important. Similar to artisan or local in premium human foods, holistic or human-grade pet foods are not precisely defined, but they appear to target a niche market and command a premium price. From the perspective of the supermarket industry, the premium pet food category is defined in part by its greatest price point within the pet food category.

Large pet food companies have historically produced products across the pet food categories, with premium pet food geared towards high performance pets or those with special dietary requirements. For instance, the portfolio of dog foods offered by Nestlé Purina ranges from Purina Alpo (economy) to Purina One (premium), with infant, adult, and senior foods available in the majority of categories.

However, new entrants in the premium pet food category appeal to a larger audience of pet owners by advertising their use of high-quality ingredients and by appealing to lifestyle preferences and the human-pet bond.

For instance, KARMA Organic Food for Dogs by Natura is advertised as "Good for the body. Positive for the spirit. Environmentally Friendly" (Natura Pet Products, 2011).

Factors influencing dog ownership: Understanding the demographics and predictors of dog ownership at the household level may be important for the provision and marketing of pet services and products (Applebaum, Peek, and Zsembik', 2020). They found that whites, individuals of middle age, and rural residents are more likely to own pets. Additionally, women are more likely than men to own multiple dogs and other pets; and most pets are owned by married couples residing in family units without children. Moreover, there is a geographic heterogeneity in the variation dog-owning households, with rural areas having a higher percentage of dog-owning households than coastal urban areas.

Similarly, Westgarth et al. (2007) found that the presence of an adult female in the household was positively associated with dog ownership among a semi-rural population in the United Kingdom. Similarly, a study of young, single-member households in the United States found that females were more likely to own dogs than males (Wise & Kushman, 1984). In numerous North American and European studies (Kidd & Kidd, 1989; Schenk et al., 1994; Bagley & Gonsman, 2005; Robertson, Gallivan & MacIntyre, 2004), females have exhibited a generally higher degree of attachment to companion animals than males.

In contrast, Knobel et al (2008) found that male respondents had a considerably more positive attitude towards dogs than female respondents. In a random telephone survey conducted in Taiwan, Hsu et al. (2003) discovered that male respondents were more likely to have ever owned a dog than females, and Al-Fayez et al. (2003) found that males in Kuwait had a more positive attitude towards companion animals, as measured by the Pet Attitude Scale (Templer et al., 1981).

Socio-demographic household categories 4 and 5 were more likely to have dogs than other household types. This refers to households that are urban and larger in household size with five or more occupants. This association between household size and dog ownership has been reported by multiple researchers (Hsu et al., 2003; Westgarth et al., 2007). Numerous American studies (Knobel et al., 2008) have found an association between dog ownership and a surrogate measure of household income.

Factors affecting Indian Pet Food Market

There is relatively less research on the factors affecting the pet products and food market in the Indian context. The Indian pet owner has transitioned from providing pets home-cooked meals to commercial pet foods. The digitization tsunami in India has enabled pet owners, even in remote areas, to access a vast selection of pet foods, which are frequently imported or of premium quality, via e-commerce platforms. In addition, digital platforms provide educational content, which influences consumers' purchasing decisions directly (Mordor, 2023). The industry is bolstered by India's youthful population, which is receptive to global trends and willing to spend money on their canines. Pets are becoming increasingly popular in Indian households, particularly among the urban middle class and this increase in pet ownership correlates directly with a rise in pet food demand (Jha, 2019).

Additionally, evolving regulatory guidelines regarding pet nutrition and food quality play a crucial role. As regulations become more stringent, pet food of higher quality becomes the norm (Mangaldas, 2023).

However, there are no studies that empirically examine the factors affecting the pet products and food industry in the Indian context.

III. Research Methodology

Data

(i) Data Sources

This study uses data on the sales of three companies manufacturing pet food and pet products in India for the 11 years spanning 2012 to 2022. This data has been taken from the Prowess IQ database. Due to an unavailability of data for more companies, the scope of this study is limited to three companies only.

(ii) Variables

(a) Dependent Variable

In line with answering the research question, the dependent variable used in the study is the *Growth of Pet Products Industry (GPI)*. The proxy variable used to measure GPI is the sales of all the companies operating in the pet products industry in India, as this is a reasonable indicator of the growth of the sector itself.

Table 1 shows the list of Indian pet product companies included in the study.

Table 1: List of Companies

Sr. No.	Company Name
1	Indagro Foods Pvt. Ltd.
2	Mars International India Pvt. Ltd.
3	Nanda Feeds Pvt. Ltd.

(b) Independent Variables

The ten independent variables for the study have been derived from the review of existing literature. Since this study focused on secondary data, the variables that required primary data collection were not included in the study. The final list of independent variables comprised of:

- Nutrition-related services (million kg)
- Average Household Income (in USD)
- Family Size
- Population in Urban Areas (% of total population)
- Life Expectancy (years)
- Population Density (per square km)
- Inflation (%)
- GDP growth (%)
- International Travel (total number of departures in millions)

The data so collected has been used to conduct a correlation analysis and a regression analysis.

(c) Summary Statistics

Table 2: Descriptive Statistics of Dependent and Independent Variables

	N	Mean	Median	Std. Deviation	Minimum	Maximum
Nutrition-related services (million kg)	11.000	310.518	310.300	112.231	146.200	465.900
Average Household Income (in USD)	11.000	1811.295	1767.697	289.320	1481.426	2302.112
Life Expectancy (years)	11.000	69.531	70.117	1.210	67.240	70.910
Population Density (per square km)	11.000	311.112	311.690	8.752	296.318	324.749
Inflation (%)	11.000	5.886	5.510	2.134	3.430	10.000
GDP growth (%)	11.000	5.736	6.800	4.075	-5.800	9.100
Industry Income	11.000	18715.333	17065.600	4738.981	10580.800	24418.000
Industry Sales	11.000	18767.909	16923.400	4482.260	11583.950	24350.200

IV. Results

Correlation Analysis

Table 3: Correlation Analysis

Correlations								
	Nutrition-related services (million kg)	Average Household Income (in USD)	Life Expectancy (years)	Population Density (per square km)	Inflation (%)	GDP growth (%)	Total Industry Income	Total Industry Sales
Nutrition-related services (million kg)	1							
Average Household Income (in USD)	.951**	1						
Life Expectancy (years)	.327	.445	1					
Population Density (per square km)	.787**	.773**	.690*	1				
Inflation (%)	-.461	-.363	-.636*	-.691*	1			
GDP growth (%)	-.266	-.358	-.284	-.527	-.120	1		
Total Industry Income	.134	.021	.330	.064	-.493	.389	1	
Total Industry Sales	.073	-.038	.302	.008	-.456	.410	.998**	1

**: Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

According to the findings presented in Table 3, a negative moderate correlation is observed between the dependent variable – Inflation and the independent variables Income and Sales i.e. (-0.493) and (-0.456). A positive moderate correlation was observed between dependent variable GDP Growth and the independent variables Income and sales. i.e. (0.389) and (0.410).

Regression Analysis

This study also conducted a regression analysis to further explore the extent to which the independent variables impacted the growth of pet food industry in India. The company wise findings of a panel quartile regression analysis, in which the researcher divided the panel into quartiles, are presented below.

Regression Analysis of Indagro Food Pvt. Ltd

Table 4: Regression of Dependent Variables with Independent Variables of Sales of Indagro Food Pvt. Ltd.

Dependent Variable: SALES
 Method: Least Squares
 Date: 10/03/23 Time: 12:18
 Sample: 2012 2022
 Included observations: 11

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AVERAGE HOUSEHOLD INCOME IN ...	-39.08417	10.46856	-3.733483	0.0202
GDP_GROWTH_____	-707.2070	364.0608	-1.942552	0.1240
INFLATION	-2095.658	871.6367	-2.404280	0.0740
LIFE_EXPECTANCY_YEARS_	4512.075	1120.197	4.027930	0.0158
NUTRITION RELATED SERVICES MIL...	79.40949	29.85161	2.660141	0.0564
POPULATION DENSITY PER SQUAR...	-751.5352	230.1704	-3.265125	0.0309
C	96164.81	105091.1	0.915061	0.4119
R-squared	0.971020	Mean dependent var	9297.482	
Adjusted R-squared	0.927549	S.D. dependent var	6366.368	
S.E. of regression	1713.613	Akaike info criterion	17.99172	
Sum squared resid	11745879	Schwarz criterion	18.24493	
Log likelihood	-91.95447	Hannan-Quinn criter.	17.83211	
F-statistic	22.33751	Durbin-Watson stat	2.968460	
Prob(F-statistic)	0.004847			

Table 4 indicates that three distinct variables make a major contribution to the expansion of pet food industry within the Indian context. These are Average household income (p=0.0202), Life Expectancy (p=0.0158) and Population density (p=0.0309).

Regression Analysis of Mars International India Pvt. Ltd

As seen from Table 5, nine distinct variables make a major contribution to the expansion of pet food industry within the Indian context. These are Average Household Income (p=0.0310), Family Size (p=0.0304), GDP growth (p=0.0317), Inflation (p=0.0289), International Travels (p=0.0309), Life Expectancy (p=0.0302), Nutrition Related Service (p=0.0332), Population Density (p=0.0342), Population in Urban Areas (p=0.0342).

Table 5: Regression of Dependent Variables with Sales of Mars International India Pvt. Ltd.

Dependent Variable: SALES
 Method: Least Squares
 Date: 10/03/23 Time: 12:27
 Sample: 2012 2022
 Included observations: 11

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AVERAGE_HOUSEHOLD_INCOME_IN...	-19.20658	0.937277	-20.49189	0.0310
FAMILY_SIZE	-60495.28	2892.602	-20.91379	0.0304
GDP_GROWTH_____	5825.529	290.5002	20.05344	0.0317
INFLATION	2611.288	118.6090	22.01593	0.0289
INTERNATIONAL TRAVEL TOTAL NU...	-5307.908	257.6731	-20.59939	0.0309
LIFE_EXPECTANCY_YEARS_	65592.93	3116.008	21.05031	0.0302
NUTRITION_RELATED_SERVICES_MIL...	1060.110	55.26191	19.18338	0.0332
POPULATION_DENSITY_PER_SQUAR...	-4924.544	229.6665	-21.44216	0.0297
POPULATION_IN_URBAN_AREAS____O...	-89477.70	4811.819	-18.59540	0.0342
C	740667.0	56915.04	13.01355	0.0488
R-squared	0.999984	Mean dependent var	8209.905	
Adjusted R-squared	0.999845	S.D. dependent var	4584.159	
S.E. of regression	57.16307	Akaike info criterion	10.34998	
Sum squared resid	3267.616	Schwarz criterion	10.71170	
Log likelihood	-46.92489	Hannan-Quinn criter.	10.12196	
F-statistic	7145.604	Durbin-Watson stat	3.643255	
Prob(F-statistic)	0.009181			

Regression of Nanda Feeds Pvt. Ltd.

Table 6 shows that six distinct variables make a major contribution to the expansion of pet food industry within the Indian context. These are Population Density ($p=0.0245$), Life Expectancy ($p=0.0155$), International Travels

Table 6: Regression of Dependent Variables with Sales of Nanda Feeds Pvt. Ltd.

Dependent Variable: SALES
 Method: Least Squares
 Date: 10/03/23 Time: 12:30
 Sample: 2012 2022
 Included observations: 11

Variable	Coefficient	Std. Error	t-Statistic	Prob.
POPULATION_DENSITY__PER_SQUAR...	-175.0602	27.89068	-6.276658	0.0245
NUTRITION_RELATED_SERVICES__MIL...	-11.57034	2.886490	-4.008445	0.0570
LIFE_EXPECTANCY_YEARS__	3905.932	491.6932	7.943841	0.0155
INTERNATIONAL_TRAVEL__TOTAL_NU...	-357.2461	43.71756	-8.171685	0.0146
INFLATION__	236.8232	40.42864	5.857809	0.0279
GDP_GROWTH__	462.4800	61.25195	7.550453	0.0171
FAMILY_SIZE	-3988.355	546.9877	-7.291489	0.0183
AVERAGE_HOUSEHOLD_INCOME__IN_...	-1.131456	0.419281	-2.698566	0.1143
C	-162865.1	20470.32	-7.956156	0.0154
R-squared	0.998512	Mean dependent var	1260.523	
Adjusted R-squared	0.992560	S.D. dependent var	603.5653	
S.E. of regression	52.05978	Akaike info criterion	10.67428	
Sum squared resid	5420.442	Schwarz criterion	10.99983	
Log likelihood	-49.70853	Hannan-Quinn criter.	10.46906	
F-statistic	167.7672	Durbin-Watson stat	2.429737	
Prob(F-statistic)	0.005939			

(p=0.0146), Inflation ($p=0.0279$), GDP Growth ($p=0.0171$), and Family Size ($p=0.0183$)

V. Discussion

The correlation analysis reveals several noteworthy findings, particularly in the context of global and regional research.

The strong positive correlation between nutrition-related services and average household income (0.951) aligns with global findings where increased income often leads to higher spending on pet nutrition and wellness (Kumcu & Woolverton, 2014; Kwak & Cha, 2021). This suggests that as Indian households become more affluent, there is a corresponding increase in expenditure on quality pet nutrition and related services.

The moderate correlation between life expectancy and urbanization (0.690) may reflect an increasing awareness and capability to provide better care for pets in urban areas, as found in studies like Hsu et al. (2003) and Kidd & Kidd (1989). This could indicate that urban pet owners, benefiting from improved access to veterinary services and pet care information, are able to enhance their pets' life expectancy.

The negative correlation between inflation and industry income (-0.493) is particularly significant. It suggests that higher inflation rates might reduce disposable income or redirect spending away from pet-related products and services, as observed in broader consumer behaviour studies (Kaura, 2012).

The positive correlation between GDP growth and industry sales (0.410) underscores the economic sensitivity of the pet food industry. As the general economy grows, so does the capacity of consumers to spend on pet products, echoing the findings of Schwarz et al. (2007) and Lucas (2010).

These results should be interpreted in the light of existing research and the unique context of the Indian market. For instance, studies such as those by Al-Fayez et al. (2003) and Applebaum et al. (2020) highlight cultural and societal factors influencing pet ownership and care, which may also impact the Indian pet food industry. Additionally, the rise of e-commerce and digital platforms, as discussed by Bagley & Gonsman (2005) and Statista (2021), might be playing a crucial role in shaping consumer behaviour and access to pet products in India.

The regression analysis conducted on three major pet food companies in India—Indagro Foods Pvt. Ltd., Mars International India Pvt. Ltd., and Nanda Feeds Pvt. Ltd.—provides a comprehensive overview of the factors

influencing the growth of the pet food industry in the Indian context. These findings are especially illuminating when compared with existing research on global and regional trends in pet food consumption.

All three companies show a significant relationship between average household income and their business performance (p-values range from 0.0202 to 0.0310). This correlation corroborates the findings of Kumcu & Woolverton (2014), suggesting that as disposable incomes rise, so does expenditure on pets, including quality pet food.

For all companies, life expectancy and population density are significant factors. These findings align with studies by Hsu et al. (2003) and Kidd & Kidd (1989), highlighting the impact of urbanization and increased awareness of pet health and longevity on pet food sales. Higher population densities, often in urban areas, likely correlate with increased pet ownership and thus greater demand for pet food.

Particularly for Mars International India Pvt. Ltd. and Nanda Feeds Pvt. Ltd., the significance of family size, GDP growth, and inflation (p-values ranging from 0.0171 to 0.0317) suggests a complex interplay between economic factors and pet food sales. This finding resonates with the research of Schwarz et al. (2007), indicating the pet food industry's sensitivity to broader economic trends.

The significant impact of international travel on the pet food industry (p-values ranging from 0.0146 to 0.0309) is a unique finding, possibly reflecting a globalized perspective among pet owners in India. This could be attributed to increased exposure to international pet care standards and products, as discussed by Applebaum et al. (2020).

For Mars International, the importance of nutrition-related services and the population in urban areas (p-values of 0.0332 and 0.0342, respectively) suggests a growing market in urban centers for specialized pet food products. This is in line with findings from Koppel (2014) and Kwak & Cha (2021), indicating a shift towards more specialized and health-conscious pet food choices in urban areas.

VI. Conclusion

This research paper embarked on an explorative journey to understand the factors influencing the pet food industry in India, with a focus on three major companies: Indagro Foods Pvt. Ltd., Mars International India Pvt. Ltd., and Nanda Feeds Pvt. Ltd. Through rigorous econometric analyses, including both correlation and regression analysis, the study unearthed several key insights.

The correlation analysis revealed significant relationships between various socio-economic factors and the performance of the pet food industry. Notably, factors such as average household income, population density, life expectancy, and international travel demonstrated significant correlations with the industry's growth metrics.

Further, the regression analysis conducted separately for each company underscored the impact of these factors on sales and income. For Indagro Foods, average household income, life expectancy, and population density were prominent influencers. Mars International's performance was significantly affected by a broader range of variables, including family size, GDP growth, and urban population. Similarly, Nanda Feeds' business metrics were influenced by international travel, inflation, and other economic indicators.

Limitations

One of the primary limitations of this study is the paucity of data. The limited data availability necessitated the conducting of separate regression analyses for each company rather than a combined analysis. This approach may have introduced company-specific biases and limitations in generalizing the findings across the industry. Furthermore, the study's reliance on secondary data from the Prowess IQ database could have constrained the exploration of certain variables that require primary data collection.

Implications

For Industry Stakeholders: The significant role of factors such as average household income and urbanization suggests a growing market for premium and specialized pet food products. Industry stakeholders should consider diversifying their product lines to include health-focused, organic, or breed-specific options. With urban population and population density being key factors, companies should focus on expanding their reach in urban areas. This could involve enhancing distribution channels or partnering with urban pet care centers and veterinary clinics. The varying factors influencing different companies indicate that the market is diverse. Investment in research and development can help companies tailor their products to specific market segments and consumer preferences.

For Marketers: Understanding the demographic and socio-economic profiles of pet food consumers is crucial. Marketers should develop targeted campaigns that resonate with urban, affluent consumers, highlighting aspects like nutrition, quality, and lifestyle enhancement. Given the significance of international travel and global exposure, digital marketing campaigns that showcase global quality standards and practices can be effective. Utilizing social media and online marketing strategies to reach tech-savvy, younger demographics could be

beneficial. There is an opportunity for marketers to educate consumers, especially in urban areas, about pet nutrition and wellness. Informative content can help in building brand credibility and loyalty.

For Policymakers: Policymakers should focus on establishing or enhancing regulatory frameworks that ensure the quality and safety of pet food products. This could help in maintaining high standards in the industry, benefitting both pets and their owners. Initiatives to increase public awareness about pet nutrition and responsible pet ownership can contribute to the overall growth and development of the industry. Collaborating with industry stakeholders for awareness campaigns can be an effective approach.

Scope for Further Research

This research opens avenues for more comprehensive studies in the future. Future research could focus on primary data collection to encompass a wider range of variables, including consumer preferences, brand loyalty, and the impact of marketing strategies. Longitudinal studies could offer more profound insights into the evolution of the industry over time. Additionally, comparative studies between different regions within India or between India and other emerging markets could provide a broader understanding of cultural and economic impacts on the pet food industry.

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