



## REVIEW ARTICLE

### FACTORS INFLUENCING INDIAN MANUFACTURERS' IN PRODUCTION OF PATENT DRUGS IN CONNECTION WITH AYURVEDA TOURISM

**\*Vipin Benny**

Faculty of Research Department of Commerce and Management Studies,  
St. Thomas College Thrissur, Kerala-India

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#### ABSTRACT

Ayurvedic formulations have often been redesigned to address the biomedical disorders of a new global clientele. This has developed a holistic approach to the medical cultures and the creation of heterodox epistemologies, which have then allowed the creation of new "traditional" products that suit the demands of the market. In India, these new formulations fall under the category of "Ayurvedic Patent Medicines," which are distinct from classical and textual formulations already in the public domain. Patented medicines are the objects of specific systems of appropriation and protection that have not only gained central stage in the country but also have influenced international regulatory bodies. This study investigates the factors that have influenced the manufacturers to produce patent drugs for promoting Ayurveda tourism. The study based on 270 samples units of researchers and experts in the state of Kerala. The results obtained show that market factors, investment factors and economic factors have great influence on manufacturers in production of patent drugs.

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## INTRODUCTION

In Ayurveda, the Indian system of medicine, there is a belief that, through Ayurvedic protocol any substance can be changed into valuable medicines. Ayurveda is getting its due recognition as a rational system of medicine worldwide despite the fact that global medical and scientific fraternity has very strong opposition regarding safety and efficacy of Ayurvedic medicines. Meanwhile, provisions of Intellectual Property Rights under World Intellectual Property Organization (WIPO) and patents have attracted many individuals and organization to explore possibilities of commercial benefits with traditional Ayurvedic knowledge. Commercial correlation of patent and Ayurvedic medicinal patent provides opportunities of prosperity to patentees. Thus people of diverse surrounding are trying to create wealth through Ayurvedic traditional knowledge by claiming numerous patents on subject matters which are in domain of Ayurveda. In Ayurveda tourism, the patient/client has become the centre of treatment, therefore, it is clients who dictate the time and technique of treatment. Since market of Ayurvedic medicines has boomed all across the globe especially, in American and European countries, organizations as well as individuals are not leaving any stone unturned to have some patents related to medicinal plants of

Ayurveda to exploit multiple million benefits from these patents. With the upsurge in acceptance of traditional medicine among global public, there is unprecedented in applications to grant patent on many aspects of medicinal plants detailed in Ayurveda varying from process to product categories.

## LITERATURE REVIEW

In India, the existence of various differing innovation regimes reflects the existence of various types of medicine as well as of a hierarchy marked by the domination of biomedical knowledge that has prevailed since the colonial age (Pati and Harrison 2001). They have coined this expression to qualify contemporary manufacturing and production practices in this industry, as well as their central role in reshaping the way traditional knowledge-based pharmaceutical innovations are appropriated and protected by law. The reformulation regime therefore deeply questions the economic, epistemological, and regulatory context of pharmaceutical innovation. It is affected by fundamental tensions related not only to the epistemic status of the products and their problematic relationship with the ayurvedic texts and practices, but also to their exploitation conditions. The reformulation regime can only be understood by studying all the factors, market, investment and economic, converging to determine these new practices. To these ends, we examine the social dimensions of the drug-object in association with the technical dimensions of the drug-in-

**\*Corresponding author: Vipin Benny**

Faculty of Research Department of Commerce and Management Studies, St. Thomas College Thrissur, Kerala-India.

society and use reformulation practices as a prism to do so. For instance, raising the technical threshold for patenting in India, which makes it more complicated for Ayurvedic pharmaceutical companies to file patents (Mueller, 2007), is part of the political and economic strategy of the country, which is keen to harmonize its proceedings so it is able to comply with the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) and the international harmonization of intellectual property rights, while at the same time claiming to protect traditional knowledge against "biopiracy." Even if local patenting practices are still more "open" than those of European or American patent offices, Indian companies producing plant-based preparations are part of a globalized system that is centred on the development of new markets expressed through the global regulations of therapeutic agents and that also seeks responses to the crisis of drug innovation and to mounting critiques of its operations. Indian companies are also trying to expand their domestic market, which is targeted to the country's urban populations, by exporting products or drugs to the United States, Australia, the Middle East, Central Asia, Japan, and a number of European countries. These products are now part of the fuzzy array of "alternative therapies and supplements." International marketing and diffusion of ayurvedic drugs are leading to a deep reconfiguration of the "traditional" recipes and remedies produced by the industry.

Economic reasoning plays an essential role in the realm of pharmacy, including "indigenous pharmacy" (Leslie, 1989), but does not explain all the changes engendered by pharmaceutical globalization. Understood less restrictively as a twofold movement to extend circulation (of commodities, persons, or knowledge) and to set up procedures to govern it globalization has reconfigured "relations between the singular and the collective, deeply affecting ways of thinking and of acting in all corners of the world" (Abe'le's, 2008). In pharmaceutical globalization, interconnections reach beyond just market trading. Changes in the world of pharmacy in fact are not only related to trade and intellectual property but also have to do with standardizing research and production practices, with the nature of products judged to be useful and useable, and with their use. The extension of circulation thus modified pharmaceutical practices by imposing, for instance, the requirement to adapt products originating in Asian medicine to the regulatory frameworks of certain European and North American countries and to the expectations of consumers in those parts of the world. It is revealed that a number of studies were conducted in the area of Ayurveda and Intellectual Property Rights all over the world. In fact no studies have been conducted in world related to Ayurveda Tourism through patent drugs. In this context, it is highly imperative to have an in depth study regarding the factors forced to manufacture to produce patent drugs in connection with Ayurveda tourism.

### Statement of the Problem

A patent refers to a temporary property right on an invention. The patent provides a right – but not a guarantee -- to exclude others from making, using or selling the patented property. During the last two decades, patent has been dramatically transforming the Ayurvedic activities in India. It extends greater convenience and multiple options for consumers, especially, for international tourists; therefore the firms dealing with products are concentrating on patents. The patent drugs

are always helps to manufacturer to promote Ayurveda tourism and also improve their brand name. So it is essential to study what factors influence the manufacturers to produce patent drugs in Indian markets in connection with promotion of Ayurveda tourism. The study is undertaken with the following objectives.

### Objectives of the study

To determine if the identified factors influence manufacturers to produce patent drugs for attracting tourists.

To identify the ranking of the factors influences manufacturers making process of patent drugs in connection with tourism promotion.

## MATERIALS AND METHODS

This is a basic research descriptive in nature undertaken in Kerala state, the leading ayurveda manufacturing state in India. The primary data was collected through a questionnaire among the researchers and experts in different firms. The questions which is to be answered in a five point Likert scale that was designed such as the more the score, the highest the factors influence significantly. The factors which have influenced to produce patent drugs were measured using response scale of 5 (very high) to 1 (Very low). SPSS 16.0 was used for calculating the statistical measures and presenting the tables. Perception of respondents about particular factor was derived from calculating the mean scores of all the respondents' related to that particular attributes and corresponding standard deviation represent the comparative variation in the response of the interviewees.

### Determination of Sample size

In this study sample size is determined on the basis of the following equation:

$$n = z^2 \sigma^2 / e^2. \text{ (General statistical formulae)}$$

Here, n = size of sample. Z = the value of standard Normal Variable at a given confidence level (It is 1.96 for 95% significance level),  $\sigma$  = standard deviation of the population (Here standard deviation of the variable which has the greatest variance has been taken- based on pilot study), e = acceptable error (it is assumed as 0.14)

$$n = (1.96)^2 (1.17)^2 / (0.14)^2 = 268.30.$$

Therefore sample size is 270.

### Sample design

In first stage the manufacturer's nature of ownership were analyzed. In Kerala 1121 ayurveda manufacturing units were performed, but it's dominated by the private sector. There are many private sector firms and only two public sectors in state. Therefore from the private sector eight firms i.e. Arya Vaidya Sala, Nagarjuna Herbals, SD Pharmacy, Pankajakassturi, Arya Vaidya Pharmacy, Kerala Ayurveda Pharmacy, Dhanwatari Oushadha shala and Vaidyaratnam were selected. From public sector one firm was selected. The selections were done through simple random sampling. In second stage, the 30 researchers from each firm were selected through convenience sampling techniques.

## Kaiser- -Meyer-Olkin Test

**Table 1. KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.839
Bartlett's Test of Sphericity	Approx. Chi-Square
	Df
	Sig.
	2694.64
	78
	.000

Source: Primary data

The result obtained from 270 respondents had been thoroughly analyzed and the outputs of the result had been clearly explained in this section. To analyze the strength of association among variables the Kaiser- -Meyer-Olkin measure of sampling adequacy was computed to determine the suitability of using factor analysis. It certifies whether data are suitable to perform factor analysis. KMO score .839 (greater than .7) indicates adequacy for testing.

## Reliability Statistics

**Table 2. Reliability Analysis of Questionnaire**

Cronbach's Alpha	No of Items
0.919	13

Source: Primary data

The cronbach's alpha is most widely used index for determining internal consistency (Kerlinger 1986). In order to check the internal consistency of the scaled statements, reliability analysis using Cronbach's Alpha Reliability Test was done. Cronbach's Alpha for different scaled statements was .919 which is higher than the standard Cronbach's Alpha of 0.7. Hence it is proved that internal consistency of the scale as a whole is high and the questionnaire can be considered as highly reliable.

## Data Analysis

Among total 270 respondents, 60% are male and 40% are females. Majority of the opinions comes from the male researchers from different firms except Nagarjuna Herbals and SD Pharmacy.

## Descriptive statistics of Variables

Here, Table 4 consists of mean and standard deviation of prescribed factors, Improve firm's capacity, Improvement in

research and development and International & national markets have greater mean values. It means that most of the respondents have given higher weight on these factors.

**Table 3. Frequency of Respondents**

Ayurveda Firms	Researchers and Experts	
	Male	Female
Arya Vaidya Pharmacy	16	14
Arya Vaidya Sala	22	8
Dhanwantari Oushadha Shala	17	13
Kerala Ayurveda Pharmacy	24	6
Nagarjuna Herbals	11	19
Oushadhi	19	11
Pankajakasturi	21	9
SD Pharmacy	12	18
Vaidyaratnam Oushadha Shala	20	10
Totals	162	108

Source: Primary data

**Table 4. Descriptive Statistics**

Relevant Factors (Variables)	Mean	Std. Deviation
Consumer Attractiveness	3.5481	1.45678
Historical Tradition	3.437	1.39626
International and national markets	3.6963	1.35116
Foreign Investment	3.1889	1.32374
Investment for Industry	3.2296	1.44768
Improve firm's Capacity	3.7074	1.33286
Improvement In Research & Development	3.7037	1.28517
Capacity to face Competition	3.4481	1.47441
Sales Growth	3.7593	1.38144
Market strength of the Firm	3.4926	1.49533
Improvement in Domestic investment	3.4407	1.41231
Government Supports and Social consideration	3.5778	1.42452
Supporting Innovation	3.3815	1.56603

Source: Primary data

## Extraction Method: Principal Component Analysis.

Applying SPSS, the principal component analysis (PCA) was carried out to explore the underlying factors associated with 13 factors. The above table show that 71.734% of the influence level comes from the first three factors. This study has identified three important factors those have been named on the variables clustered under a particular factor. The first component based factor is named as Market factor. This factor explains the highest percentage of total variance which is 93.639 percent. The manufactures makes patent products by considering Historical tradition, International and national markets, Improve firm's Capacity, Improvement In Research & Development, Capacity to face Competition, Sales Growth, Market strength of the Firm and Supporting innovations.

**Table 5. Total Variance Explained**

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.693	51.488	51.488	6.693	51.488	51.488	4.695	36.117	36.117
2	1.374	10.569	62.058	1.374	10.569	62.058	2.51	19.307	55.425
3	1.258	9.677	71.734	1.258	9.677	71.734	2.12	16.31	71.734
4	0.800	6.156	77.89						
5	0.660	5.076	82.967						
6	0.597	4.590	87.556						
7	0.433	3.330	90.886						
8	0.366	2.812	93.698						
9	0.279	2.145	95.843						
10	0.190	1.465	97.308						
11	0.166	1.280	98.588						
12	0.127	0.976	99.564						
13	0.057	0.436	100						

Source: Primary data

Table 6. Component Matrix <sup>a</sup>

	Component 1	Component 2	Component 3
Historical Tradition	0.708		
International and national markets	0.721		
Foreign Investment	0.740		
Improve firm's Capacity	0.777		
Improvement In Research & Development	0.658		
Capacity to face Competition	0.782		
Sales Growth	0.826		
Market strength of the Firm	0.821		
Improvement in Domestic investment	0.806		
Supporting innovations	0.662		
Consumer Attractiveness		0.714	
Government Supports and Social consideration		0.741	
Investment for Industry			0.682
Extraction Method: Principal Component Analysis. a. 3 components extracted.			
Source: Primary data			

Table 7. Rotated Component Matrix <sup>a</sup>

	Component 1	Component 2	Component 3
Historical Tradition	0.637		
International and national markets	0.778		
Improve firm's Capacity	0.773		
Improvement In Research & Development	0.611		
Capacity to face Competition	0.780		
Sales Growth	0.884		
Market strength of the Firm	0.628		
Supporting innovations	0.591		
Foreign Investment		0.862	
Investment for Industry		0.883	
Improvement in Domestic investment		0.575	
Consumer Attractiveness			0.925
Government Supports and Social consideration			0.943
Extraction Method: Principal Component Analysis.			
Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 6 iterations.			
Source: Primary data			

Table 8. Ranking of Factors

Factor no	Name of the factors	Variable	Rank	Factor Loading
F1	Market Factors	Sales Growth	1	0.884
		Capacity to face Competition	2	0.780
		International and national markets	3	0.778
		Improve firm's Capacity	4	0.773
		Historical Tradition	5	0.637
		Market strength of the Firm	6	0.628
		Improvement In Research & Development	7	0.611
		Supporting innovations	8	0.591
F2	Investment Factors	Investment for Industry	1	0.883
		Foreign Investment	2	0.862
		Improvement in Domestic investment	3	0.575
F3	Economic Factors	Government Supports and Social consideration	1	0.943
		Consumer Attractiveness	2	0.925

Source: Primary data

Secondly, Foreign Investment, Investment for Industry and Improvement in Domestic investment, these three items can be named as Investment factors which consist of 4.89 percent of total variance. And finally the rest 1.412 percent of total variance is named as Economic Factors which consist of Consumer Attractiveness and Government Supports and Social consideration.

## Conclusion

The objective of the research was to find out the underlying factors influence manufacturer to produce patent drugs for attracting tourists. There are various factors those influence manufacturers from different aspects. Some of these factors greatly influence manufacturer to produce patent drugs for attracting tourists.

This research has identified several factors influence manufacturer to produce patent drugs, Not necessarily that all the variables will influence the manufacturer in the same way and same extent. By considering market factors, the most influence factor is sales growth, investment factors point of view i.e. investment for industry and considering economic factors it is government supports & social consideration were greatly influenced over the production of patent drugs.

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