



## International Journal of Current Research and Academic Review

ISSN: 2347-3215 Volume 3 Number 2 (February-2015) pp. 110-118

[www.ijcrar.com](http://www.ijcrar.com)



### Growth of Indian Automobile Industry

M. Krishnaveni\* and R. Vidya

Department of Commerce, L.R.G. Government Arts College for Women, Tirupur (Dt.),  
Tamilnadu, India

*\*Corresponding author*

#### KEYWORDS

Indian automobile  
Industry,  
Sports utility vehicles

#### A B S T R A C T

The present paper revises the category wise production, sales and exports of Automobiles in India. In recent years India has been developing as a market potential for automobiles due to rise in demand and as a result there is an increased production to tap the growing demand both at home and in the foreign markets. This is reflected in the production figures of the industry especially remarkable in the passenger vehicle and three wheeler divisions, where production raised from 1,209,876 vehicles in the year 2004–2005 to 3,072,651 vehicles in the year 2013–2014. The sales figure of the industry states that sales of commercial vehicles have decreased. The analysis of the ten year data of the industry indicates that the sale of the industry is quite satisfactory. The exports of made in India rose by 31% in financial year 2004–2005 as passenger cars, two and three wheelers, commercial and multi utility vehicles continue to charm overseas buyers. A total of 1.2 million units were shipped during financial year 2007–2008 over 1 million units exported in the financial year 2006–2007. This paper focuses on SWOT analysis and vision of Indian Automobile Industry.

### Introduction

The Indian automotive industry has emerged as a 'sunrise sector' in the Indian economy. India is emerging as one of the world's fastest growing passenger car markets and second largest two wheeler manufacturer. It is also home for the largest motor cycle manufacturer and fifth largest commercial vehicle manufacturer. India is emerging as an export hub for sports utility vehicles

(SUVs). The global automobile majors are looking to leverage India's cost-competitive manufacturing practices and are assessing opportunities to export SUVs to Europe, South Africa and Southeast Asia. India can emerge as a supply hub to feed the world demand for SUVs.

India also has the largest base to export compact cars to Europe. Moreover, hybrid

and electronic vehicles are new developments on the automobile canvas and India is one of the key markets for them. Global and Indian manufacturers are focussing their efforts to develop innovative products, technologies and supply chains. The automotive plants of global automakers in India rank among the top across the world in terms of the productivity and quality. Top auto multinational companies (MNCs) like Hyundai, Toyota and Suzuki rank their Indian production facilities right on top of their global pecking order.

### **History of The Indian Automobile Industry**

The Indian automobile industry can be viewed in terms of the pre-1991 (before liberalization) and post-1991 (after liberalization) phase.

#### **Before Liberalization (Before 1991)**

##### **1880**

About hundred years ago the first motorcar was imported and Import duty on vehicles was introduced. Indian Great Royal Road (Predecessor of the Grand Trunk Road) was conceived. First car brought in India by a princely ruler in 1898. Simpson & Co established in 1840. They were the first to build a steam car and a steam bus, to attempt motorcar manufacture, to build and operate petrol driven passenger service and to import American Chassis in India. Railways first came to India in 1850's. In 1865 Col. Rookes Crompton introduced public transport wagons strapped to and pulled by imported steam road rollers called streamers. The maximum speed of these buses was 33kms/hr.

##### **1920 to 1950**

In 1919 at the end of the war, a large number of military vehicles came on the

roads. In 1928 assembly of CKD trucks and cars was started by the wholly owned Indian subsidiary of American General Motors in Bombay and in 1930-31 by Canadian Ford Motors in Madras, Bombay and Calcutta. In 1935 the proposals of Sir M Visvesvaraya to set up an Automobile Industry were disallowed. 1942 Hindustan Motors Ltd. incorporated and the first vehicle was made in 1950. In 1944 Premier Automobiles Ltd. incorporated and in 1947 the first vehicle was produced. In 1947 the Government of Bombay accepted a scheme of Bajaj Auto to replace the cycle rickshaw by the auto and assembly started in a couple of years under a license from Piaggio. Manufacturing Program for the auto and scooter was submitted in 1953 to the Tariff Commission and approved by the Government in 1959. In 1953 the Government decreed that only firms having a manufacturing program should be allowed to operate and mere assemblers of imported CKD units be asked to terminate operations in three years.

Only seven firms namely Hindustan Motors Limited, Automobile Products of India Limited, Ashok Leyland Limited, Standard Motors Products of India Limited, Premier Automobiles Limited, Mahindra & Mahindra and TELCO received approval. M&M was manufacturing jeeps. Few more companies came up later. Government continued with its protectionism policies towards the industry.

Automobile Products of India (API) and Enfield India had already commenced the manufacture of scooters, motorcycles, mopeds and autos from 1955. In 1956, Bajaj Tempo Ltd. entered the Indian market with a program of manufacturing Commercial Vehicles, and Simpson for making engines. AIA & AIA (association of the component manufacturers) came into being in 1959 and Government approved Bajaj Auto Ltd's plans for domestic manufacture of Vespa

scooters and granted permission to produce 6000 units annually.

### **1960**

In sixties 2 and 3 Wheeler segment established a foothold in the industry. Escorts and Ideal Jawa entered the field in the beginning of sixties. Association of Indian Automobile Manufacturers formally established in 1960. Between 1955 and 1960 only API was producing Mopeds. During the first half of the sixties three companies namely Mopeds India Ltd. (1965), SZUL Gwalior (1964) and Pearl Scooters Ltd. (1962) entered the arena. Standard Motors Products of India Ltd. moved over to the manufacture of Light Commercial Vehicles in 1965. Escorts and Enfield closed their scooter division and continued only with Motorcycle manufacturing. Entire scooter market was occupied by Bajaj Auto Ltd. and API in the sixties.

### **1970**

Major factors affecting the industry's structure were the implementation of MRTP Act, FERA and Oil Shocks of 1973 and 1979. Unlike Motorcycle and Scooter segments the Mopeds segment grew rapidly. In the late seventies there were many entries in the Moped Industry. Only two firms namely, Majestic Auto Ltd. and Sundaram Clayton managed to survive after 1980. During the seventies the economy was in bad shape. This and many specific problems affected the Automobile Industry adversely.

### **1980**

The period of liberalized policy and intense competition Since the 80s, the Indian car Industry has seen a major resurgence with the opening up of Indian shores to foreign manufacturers and collaborators. First phase

of liberalization announced and unfair practices of monopoly, oligopoly, slowly disappeared. It was beginning of Liberalization of the protectionism policies of the Government. Lots of new Foreign Collaborations came up in the eighties. Many companies went in for Japanese collaborations. Andhra Pradesh Scooters entered into collaboration with Piaggio for manufacture of Vespa model. Hindustan Motors Ltd. in collaboration with Isuzu of Japan introduced the Isuzu truck in early eighties. ALL entered into collaboration with Leyland Vehicles Ltd. for development of integral buses and with Hino Motors of Japan for the manufacture of W Series of Engines. Telco after the expiry of its contract with Daimler Benz indigenously improved the same Benz model and introduced it in the market. Government approved four new firms in the LCV market, namely, DCM, Eicher, Swaraj and Allwyn. They had collaborations with Japanese companies namely, Toyota, Mitsubishi, Mazda and Nissan respectively. The Two Wheeler market increased. Since 1982 the Government had permitted foreign collaborations for the manufacturing of Two Wheelers up to 100 cc engine capacity. Foreign Equity up to 40% was also allowed.

In 1983 Maruti Udyog Ltd. was started in collaboration with Suzuki, a Japanese firm. Other three Car manufacturers namely, Hindustan Motors Ltd., Premier Automobiles Ltd., Standard Motor Production of India Ltd. also introduced new models in the market. At the time there were five Passenger Car manufacturers in India - Maruti Udyog Ltd., Hindustan Motors Ltd., Premier Automobiles Ltd., Standard Motor Production of India Ltd., and Sipani Automobiles. Ashok Leyland Ltd. and Telco were strong players in the Commercial Vehicles sector. In 1983-84 Bajaj Tempo Ltd. entered into collaboration with

Daimler-Benz of Germany for manufacture of LCVs. Important policy changes like relaxation in MRTP and FERA, delicensing of some ancillary products, broad banding of the products, modifications in licensing policy, concessions to private sector (both Indian and Foreign) and foreign collaboration policy etc. resulted in higher growth / better performance of the industry than in the earlier decades.

### **After Liberalization (After 1991)**

The government of India has made some radical changes in its policies bearing on trade, foreign investment, exchange rate, industry, fiscal affairs and so on. Mass Emission Norms were introduced for in 1991 for Petrol Vehicles and in 1992 for Diesel Vehicles. In 1991 new Industrial Policy was announced. It was the death of the License Raj and the Automobile Industry was allowed to expand. Further tightening of Emission norms was done in 1996. In 1997 National Highway Policy has been announced which will have a positive impact on the Automobile Industry. The Indian Automobile market in general and Passenger Cars in particular have witnessed liberalization. Many multinationals like Daewoo, Peugeot, General Motors, Mercedes-Benz, Honda, Hyundai, Toyota, Mitsubishi, Suzuki, Volvo, Ford and Fiat entered the market. Various companies are coming up with state-of-art models of vehicles. TELCO has diversified in Passenger Car segment with Indica. Despite the adverse trend in the growth of the industry, it is resolutely trying to meet the challenges. Various issues of critical importance to the industry are being dealt with forcefully.

In 1999 The Hon'ble Supreme Court passed an order directing all car manufacturers to comply with Euro I emission norms (India

2000 norms) by the 1st of May 1999 in National Capital Region (NCR) of Delhi. The deadline was later extended to 1st June 1999. The 90s have become the melting point for the car industry in India. The consumer is king. He is being constantly wooed by both the Indian and foreign manufacturers. Though sales had taken a dip in the first few months of 1999, it is back to boom time. New models like Maruti's Classic, Alto, Station Wagon, Ford's Ikon and the new look Mitsubishi Lancer have all been launched with an eye on the emerging market.

### **Emerging Trends In Indian Automobile Sector**

Globalization is pushing auto majors to consolidate, to upgrade technology, enlarge product range, access new markets and cut costs. They have resorted to common platforms, modular assemblies and systems integration of component suppliers and e-commerce. The component industry is undergoing vertical integration resulting into emergence of 'systems and assembly suppliers' rather than individual component suppliers. Thus, while most component suppliers are integrating into tier 2 and tier 3 suppliers, larger manufacturers and multinational corporations (MNCs) are being transformed into tier 1 companies. Environmental and safety concerns are leading to higher safety and emission norms in the country. India has already charted out a road-map for reaching EURO-II norms across the country by the year 2005. Seven metropolitan cities of India would simultaneously move to EURO-III norms in 2005. Most vehicle manufacturers are already producing EURO-II compliant vehicles in the country to meet special requirements of capital city of New Delhi where the Supreme Court verdict has already necessitated this.

To meet the concomitant testing and certification activities relating to higher safety and emission norms, testing infrastructure in the country is being overhauled. A substantive state funding is being planned in upgrading the testing infrastructure with participation of industry. Environmental pollution and the need to conserve existing supply of fossil fuels have led to search for alternative fuels. In addition to supporting Greenfield research in this area, an ambitious phased programme to upgrade carbon fuel quality commensurate with higher emission norms is also being undertaken. Foreign direct investment norms have already been considerably relaxed. Unhindered import of automobiles, including new and second hand vehicles, has also been permitted. Most non-tariff barriers have also been relaxed or removed. The Government has moderated and lowered taxes and duties on automobiles, including customs duty. Value Added Tax (VAT) is also proposed to be introduced across the country from 1 April 2001. The Government has also allowed private sector participation in the insurance sector. Norms guiding external commercial borrowings (ECBs) have been liberalized and lending rates within the country have also been reduced further strengthening the environment of investment. An ambitious programme to upgrade the quadrilateral of highways in the

country, the Government is laying an eight-lane expressway linking all metropolitan and several important capital towns across the country paving the way for movement of heavier haulage vehicles.

### **Government Initiatives**

The Government of India allows 100 per cent FDI in the automotive industry through automatic route. Some of the highlights of the Union Budget 2012-13:

- The auto industry is encouraged by 5 years extension of 200 per cent weighted deduction of R&D expenditure under Income Tax Act and also introduced the weighted deduction of 150 per cent for expenditure on skills development. These measures will help the industry improve its products and performance
- The increase in customs duty on cars and multi-utility vehicles (MUVs) valued above US\$ 40,000 from 60 per cent to 75 per cent seems to be a step to encourage local manufacturing, value addition and employment
- Also, the concessional import duty on specified parts of hybrid vehicles has been extended to lithium ion batteries and other parts of Hybrid vehicles. This will help the industry to achieve better cost efficiency.

**Table.1** Category-Wise Production of Automobiles In India (No. of Vehicles)

Type of Vehicle	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
<b>Passenger Vehicles</b>	1,209,876	1,309,300	1,545,223	1,777,583	1,838,697	2,357,411	2,982,772	3,123,528	3,233,561	3,072,651
<b>Commercial Vehicles</b>	353,703	391,083	519,982	549,006	417,126	567,556	760,735	911,574	831,744	698,864
<b>Three Wheelers</b>	374,445	434,423	556,126	500,660	501,030	619,194	799,553	877,711	839,742	830,120
<b>Two Wheelers</b>	6,529,829	7,608,697	8,466,666	8,026,681	8,418,626	512,903	13,349,349	15,453,619	15,721,180	16,879,891
<b>Total</b>	<b>8,467,853</b>	<b>9,743,503</b>	<b>11,087,997</b>	<b>10,853,930</b>	<b>11,175,479</b>	<b>14,057,064</b>	<b>17,892,409</b>	<b>20,366,432</b>	<b>20,626,227</b>	<b>21,481,526</b>

Source: Society of Indian Automotive Manufacturing (SIAM)

- Table 1 shows that during 2004-2005 8,467,853 vehicles were produced in the automobile industry. The production has increased almost 21,481,227 vehicles. In recent years India had an upgrade market potential for automobiles due to a rise in demand. As a result there is an increased production to tap the growing demand both at home and in the foreign markets.

There is an enormous production of passenger vehicle and two wheeler in the said period. The production of passenger vehicles almost increased from the year 2004–2005 to 2012–2013. Overall, the production of automobile industry has increased quite significantly during this period.

**Table.2** Category-wise sales of automobiles in India (No. of Vehicles)

Type of Vehicle	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Passenger Vehicles	1,061,572	1,143,076	1,379,979	1,549,882	1,551,880	1,951,333	2,501,542	2,618,072	2,686,429	2,503,685
Commercial Vehicles	318,430	351,041	467,765	490,494	384,122	532,721	684,905	809,532	793,150	632,738
Three Wheelers	307,862	359,920	403,910	364,781	349,719	440,392	526,024	513,251	538,291	479,634
Two Wheelers	6,209,765	7,052,391	7,872,334	7,249,278	7,437,670	9,370,951	11,768,910	13,435,769	13,797,748	14,805,481
<b>Total</b>	<b>7,897,629</b>	<b>8,906,428</b>	<b>10,123,988</b>	<b>9,654,435</b>	<b>9,723,391</b>	<b>12,295,397</b>	<b>15,481,381</b>	<b>17,376,624</b>	<b>17,815,618</b>	<b>18,421,538</b>

Source: Society of Indian Automotive Manufacturing (SIAM)

Table 2 depicts that overall sales of automobile has been increased. The sale of passenger vehicle has been increased 1,061,572 vehicles to 2,503,685 vehicles for the year 2004-2005 to 2013-2014. There is

an enormous sale of passenger vehicle and two wheelers in the said period. The sale of passenger vehicles almost increased from the year 2004-2005 to 2012-2013.

**Table.3** Category-wise exports of automobiles in India (No. of Vehicles)

Type of Vehicle	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Passenger Vehicles	166,402	175,572	198,452	218,401	335,739	446,145	444,326	507,318	554,686	593,507
Commercial Vehicles	29,940	40,600	49,537	58,994	42,673	45,009	74,043	92,663	79,944	77,056
Three Wheelers	66,795	76,881	143,896	141,225	148,074	173,214	269,968	362,876	303,088	353,392
Two Wheelers	366,407	513,169	619,644	819,713	1,004,174	1,140,058	1,531,619	1,947,198	1,960,941	2,083,938
<b>Total</b>	<b>629,544</b>	<b>806,222</b>	<b>1,011,529</b>	<b>1,238,333</b>	<b>1,530,660</b>	<b>1,804,426</b>	<b>2,319,956</b>	<b>2,910,055</b>	<b>2,898,659</b>	<b>3,107,893</b>

Source: Society of Indian Automotive Manufacturing (SIAM)

- Export performance of the Indian Automobile Industry has also

exhibited steady growth for the period 2004-2005 to 2011-2012.

Exports of commercial vehicles and three wheelers have declined the exports during the period 2012-2013. The Government has decided to implement the National Automobile Testing and Research and Development infrastructure project to improve the export potential (Table 3).

and decrepit, and can barely keep pace with the auto industry's rapid growth. Most roads are single-lane roads built in the 1950's and 60's, and are crowded with two-wheelers, bullock carts, and even pedestrian humans and cows. Traffic laws are not well enforced leading to one of the highest per-capita accident rates in the world. It is to be expected that the introduction of bigger and more powerful vehicles will only worsen the situation. Upgrading the existing highway system is itself expected to cost \$30 billion

**SWOT analysis of the Indian automotive industry**

<p style="text-align: center;"><b>STRENGTHS</b></p> <ul style="list-style-type: none"> <li>•Investments by foreign car manufacturers</li> <li>•Increase in the export levels</li> <li>•Low cost and cheap labour</li> <li>•Rise in the working and middle class income</li> <li>•Increasing demand for European quality</li> <li>•Expert skills in producing small cars – good for environment</li> <li>•Large pool of engineers</li> </ul>	<p style="text-align: center;"><b>OPPORTUNITIES</b></p> <ul style="list-style-type: none"> <li>•Growth in population in the country</li> <li>•Problem from the government privatizing road infrastructure by having private firms build and operate toll roads. However, it is unclear if this income will be able to solve this infrastructure problem</li> <li>•Rising income levels which can severely bottleneck the growth thus significant (about 50%)</li> <li>•Worries driven over increased products and components combined with the vagaries of currency exchange</li> </ul>
<p style="text-align: center;"><b>WEAKNESS</b></p> <ul style="list-style-type: none"> <li>•Low quality compared to other automotive countries</li> <li>•Low labour productivity</li> <li>•High interest rate and overhead level</li> <li>•Production cost are generally higher than some other Asian states, such as China</li> <li>•Low investment in R&amp;D area</li> <li>•Local demand is still towards low cost vehicles, due to low income levels</li> </ul>	<p style="text-align: center;"><b>THREATS</b></p> <ul style="list-style-type: none"> <li>•Less skilled labour</li> <li>•Lack of technology for major firms to realize rapidly in the challenge of and technology cost.</li> <li>•Imports of components from the Chinese market and sophisticated.</li> <li>•Smaller players that do not fulfil international standards</li> </ul> <p><b>2. Sustaining the growth rate:</b> There is a potential for much higher growth rate in the domestic market due to the fact that current penetration level in India is just 7 cars per thousand persons. The increase in purchasing power in top stratum of about 300 million people of the country where the per capita income of the country is above USD 1000 implies that passenger car growth in the domestic market is on the verge of a major and sustained boom. It is expected that passenger car market which was 1 million in 2003-04 can easily cross the 3 million mark during 2015. This can lead to</p>

**Indian automobile industry - key challenges ahead**

**1. Poor road infrastructure:** Amongst the many issues facing the Indian automotive industry, the biggest by far is the poor road infrastructure. India's road network, comprising of a modest national highway system (that is only 2% or less of the total roadway length) is unhappily insufficient

an increase in the size of domestic auto component market from the current level of USD 9.8 billion in 2005-06 to a least USD 15 billion in 2015.

**3. Need for innovation:** The competitiveness in the sector will largely depend on the capacities of the industries to innovate and upgrade. The industry will definitely be benefited if it has strong domestic competition, home based suppliers and demanding local customers. It is a crucial fact that labour cost, duties, interest rate and economies of scale are the most important determinants of competitiveness. But the productivity and capacity utilization are the prime determinants of the competitiveness and influence the national per capita income. The globally successful auto makers will make their base in places which are high on productivity factor and capacity utilization and where essential competitive advantages of the business can be created and sustained. It would also involve core products and process technology creation apart from maintaining productive human resource and reward for advanced skill. The auto makers will look for the policies of the state which will stimulates innovation new technologies. Another major uncertainty facing the Indian market is the government's policies toward foreign investments and joint ventures. Governments play a key role in shaping the growth of the automobile industry in emerging economies (as compared with developed countries). The following are other challenges faced by Indian automobile industry.

- Increasing Competition & WTO Regime
- Cyclicity of businesses
- Increasing Customisation & Application Proliferation
- Accelerated Infrastructure development

- Stiff Emission & Other Regulatory changes
- Operating Cost Pressures
- Increased Customer awareness
- Accelerated Technology up gradation requirements & other Change needs
- Competition from alternative modes.

**4. Consumer sentiment index:** Customer Sentiment Index, 12 month rolling average of the Index; historical and forecast data and analysis. The end customers are very important to ensure the survival of the Motor Vehicle Manufacturing industry. Economic downturns and other events can affect the expenditure decision of households. When customers are not happy or optimistic about the future of the economy, they will tend to postpone expenditure until times are better.

**5. Domestic goods price metal/ iron and steel:** Steel is a major input used when manufacturing a motor vehicle. Rises in the price of steel puts cost pressures on manufacturers, which often leads to a fall in profitability. Over the past five years, the price of steel has been rising rapidly. These rises in price eventually pass from the manufacturers to the end customers'.

**6. Import and export taxes (duties) / motor vehicle tariffs:** Tariff rates applicable to the industry: High taffies may restrict flow of trade but may attract investment if domestic market is big enough and growing. Over the last few years India's tariff policies and conditions of import of vehicles have served the purpose of attracting investments. Industry is keen that the existing tariff structure roadmap and conditions of import of vehicles are retained without any modifications because of certain systematic deficiencies which make manufacturing less cost competitive in India as compared to some of the neighbouring



countries like China, Thailand, Indonesia, etc.

**7. World price energy/ crude oil:** The hike or the effect of increasing prices of crude oil at world level per barrel will affect the market scenario of the Automobile industry adversely. The price of oil and petrol affect the driving habits of consumers and the type of car they buy. Over the past five years, the price of petrol has been influenced the buying decision of motorists, who are switching more to fuel efficient options. These include cars that run on liquefied petroleum gas (LPG), CNG etc., diesel and small cars that achieve better mileage. The trucking sector has also been struggling with the rise in the price of fuel, which has put enormous pressures on their costs.

#### **Vision of Indian automobile industry**

“To emerge as the destination of choice in the world for design and manufacture of automobiles and auto components with output reaching a level of US dollar 145 billion accounting for more than 10% of the GDP and providing additional employment to 25 million people by 2016.”

#### **Conclusion**

Easier and faster mobility of people and goods across the regions, countries and continents is a cherished yearning of mankind. The automobile industry's potential for facilitating this mobility is enormous. Wheels of development across the globe would have to be powered by this industry. However, a seamless development of this industry across countries and continents alone will help in realization of this objective. For such seamless and barrier-free development of the sector, countries will have to come together and develop better understanding. Industry

across countries will have to meet challenges of newer technologies, alternative fuels and affordability of automobiles by people at large through constructive cooperation. The industry has recorded phenomenal growth during the last decade. A market trend is growing at a faster rate. The opening of the Indian automobile market for foreign companies the competition is expected to enhance further. The opportunities can be grabbed through the diversification of export basket in untapped foreign destinations. Thus strict quality standards, services and use of latest technology can provide an edge over competitors across the globe.

#### **References**

1. Prof. Sarbapriya Ray Assistant Professor, Department of Commerce, Shyampur Siddheswari Mahavidyalaya, Calcutta University, West Bengal, India Business Intelligence Journal, January 2012, Vol.5 No.1.
2. Prof. B.L. Dhabhai and Dr. J.L. Sehgal, Automobile Industry Vision - 2025, International Journal of Latest Trends in Engineering and Technology (IJLTET), Vol. 1 Issue 4 November 2012, ISSN: 2278-621X.
3. Dr. Govind P. Shinde and Dr. Manisha Dubey, Asian Journal of Technology and Management Research, Vol.01, Issue.02, July-December 2011.
4. Automobile industry, ISSN:2278-621X
5. Media Reports, Press Releases, Department of Industrial Policy and Promotion(DIPP)