

## Continental Impact and Assorted Empirical Study of Intellectual Property Rights

Swarna Srivastava and Chetan<sup>†</sup>

ZTM & BPD Unit, ICAR-IARI, New Delhi -110012, India

*Received: 11 October 2017; accepted: 27 December 2018*

Intellectual property right (IPR) has grown itself into one of the world's biggest and fastest-growing fields thereby necessitating the demand for critical analysis of scenarios associated with them for improving the need of mankind. Therefore, in the present study, an attempt is made to investigate two aspects related with intellectual properties (IP) at global level. Firstly, the significant difference of average number of IP filings and IP in-force between continents, when these IP are considered individually, and secondly, when these IP are studied together in the form of a single vector.

**Keywords:** WIPO, MANOVA, patents, trademarks, industrial designs, standard errors

International intellectual property system appears like a cobweb formed by intersecting multilateral and bilateral agreements among countries; between countries and WIPO and their resulting affixation of national laws. IP growth has increased significantly with time and currently has become a frequently litigated area, particularly in the terms of patent, trademarks, and industrial designs. Therefore, for making unparalleled shadow in competitive world every country has their own intellectual property regime on these three major arenas. IP advocates believe that strengthening IP rights will induce more innovation in the country, thereby fostering more rapid global economic growth. Over the past fifteen years, there has been a global trend towards stronger IPRs. Therefore, there have been louder calls for the protection of patents, trademarks, copyrights, industrial designs, plant varieties and geographical indications. Many of the cutting edge intellectual property issues are envisaged on an international level through World Intellectual Property Organization (WIPO).

According to 'WIPO IP Facts and Figures 2016', global filing activities of patents, trademarks and industrial designs were increased in 2015 as compared with previous years. For patents and trademarks, 2015 represented the sixth consecutive year in which applications were increased, while applications for industrial designs returned to growth after declines in the previous year. In addition, among 50 million IP in-force around 36.5 million trademarks, 10.6 million

patents and 3.4 million industrial designs are currently in-force. Above facts show that these three IPRs constitute maximum contribution in IP protection system. Therefore, an attempt is made to investigate two aspects related with them i.e. the significant difference of average number of IP filings and IP in-force between continents, when these IPs are considered individually and when they are studied together in the form of a single vector.

### Methodology

The secondary data were collected and tabulated from WIPO Statistics database for last Ten years on around provided by 170 IP offices of the world. These offices were categorized with respect to their continents and it is found that these IP offices are spread over the six continents (except Arctic) out of seven. For the present investigation, the data were sub-categorized into two parts i.e. IP filed and IP in-force. These IPs include patents, trademarks and industrial designs. The following figures show the graphical representation of number of IP filings and IP in-force in ten years.

For achieving the first objective of the study, exact sampling  $t$  – distribution is used to investigate the significance difference of average number of IP filings and IP in-force between continents.

The above tables show that maximum combinations are not significant i.e. there is no significance difference of average number of IP filings and IP in-force between continents. For analyzing the combined effect of these IPRs together

<sup>†</sup>Corresponding author: Email: vermachetan.1988@gmail.com

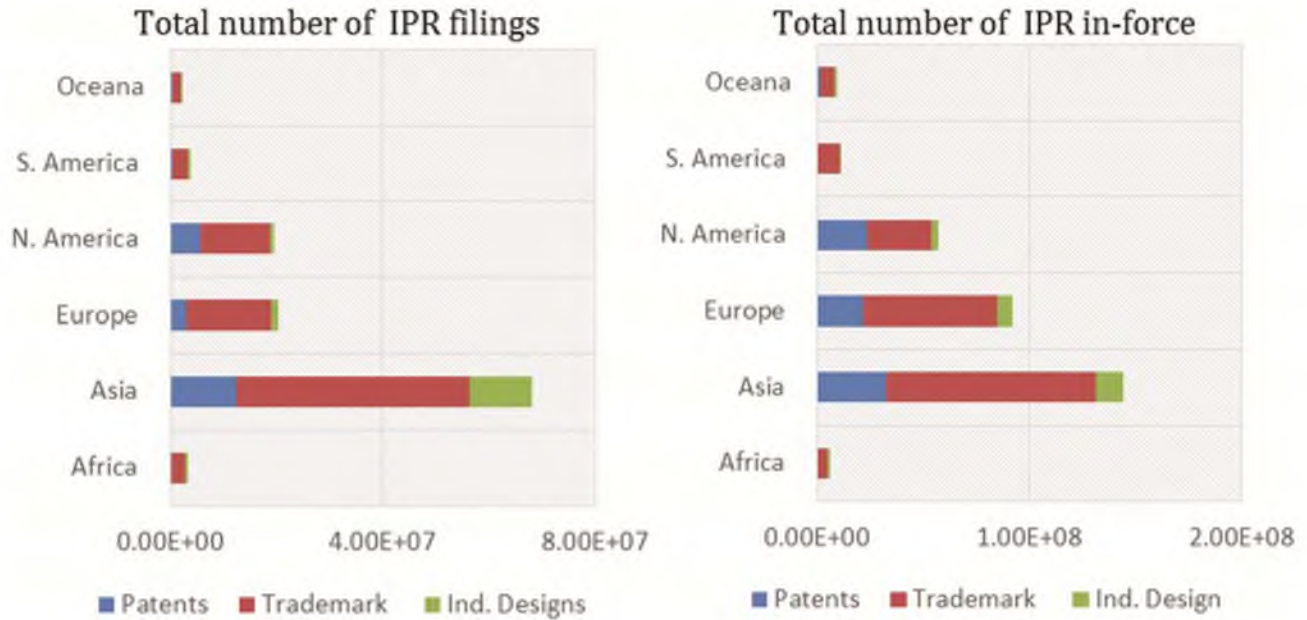


Table — 1: Paired t- statistic in case of IPR filing

Possible combination	Patents		Trademarks		Industrial Designs	
	Std. Error	Mean  t	Std. Error	Mean  t	Std. Error	Mean  t
Africa - Asia	100139.94	12.30	394904.65	10.45	110638.72	10.54
Africa - Europe	2482.00	110.24	83432.67	16.29	2272.85	47.29
Africa - N.America	18220.29	29.77	18255.66	57.84	3650.88	20.27
Africa - S.America	959.55	19.44	35635.52	1.22*	360.11	19.84
Africa - Oceania	667.61	19.73	31781.85	3.11*	452.68	2.96*
Asia - Europe	98691.55	9.71	434402.12	6.37	109212.16	9.69
Asia - N.America	82303.93	8.38	388028.68	7.91	107440.67	10.17
Asia - S.America	99233.03	12.23	401200.70	10.18	110365.03	10.63
Asia - Oceania	99885.58	12.20	399884.29	10.57	110320.78	10.58
Europe - N.America	17002.41	15.81	74546.79	4.07	2031.11	16.48
Europe - S.America	2095.67	121.66	114739.29	11.47	2168.10	52.88
Europe - Oceania	2103.32	123.83	111184.81	13.11	1927.02	56.48
N.America - S.America	17339.27	30.21	50389.68	20.09	3403.28	23.85
N.America - Oceania	18030.30	29.35	47055.09	24.54	3245.98	23.21
S.America - Oceania	1028.28	5.34	8386.87	16.96	304.35	19.08

\* Significant at 0.01% level of significance

(for two different cases i.e. IP filings and IP in-force) Multivariate Analysis of Variance (MANOVA) is used. For this, observations are summarized in such a way that MANOVA will be conducted on these IPRs for six continents. For the comparison point of view Wilk’s lambda is calculated which has the virtue of being convenient and related to the likelihood ratio criterion [Johnson and Wichern, 2013]. Bartlett (1938) has shown that if null hypothesis is true and  $n$  is large then

$$-\left(n - 1 - \frac{(p+g)}{2}\right) \ln \Lambda^* = -\left(n - 1 - \frac{(p+g)}{2}\right) \ln \left(\frac{|W|}{|B+W|}\right)$$

has approximation a chi-square distribution with  $p(g - 1)$  where  $p = 3, g = 6$  and  $n = 60$  d.f.

Consequently, for large  $n$ , the test criteria for rejecting null hypothesis is

$$-\left(n - 1 - \frac{(p+g)}{2}\right) \ln \left(\frac{|W|}{|B+W|}\right) > \chi_{p(g-1)}^2(\alpha)$$

where  $W$  is the matrix of sum of square due to residual i.e.

$$W = \sum_{l=1}^g \sum_{j=1}^{n_l} (\mathbf{x}_{lj} - \bar{\mathbf{x}}_l)(\mathbf{x}_{lj} - \bar{\mathbf{x}}_l)'$$

and  $B$  is the matrix of sum of square due to treatments (different continents)

$$B = \sum_{l=1}^g n_l (\mathbf{x}_l - \bar{\mathbf{x}})(\mathbf{x}_l - \bar{\mathbf{x}})'$$

Therefore, for large  $n$ , the left-hand side value of test statistics for two different cases are

Table — 2: Paired t- statistic in case of IPR in force

Possible combination	Patents		Trademarks		Industrial Designs	
	Std. Error Mean	t	Std. Error Mean	t	Std. Error Mean	t
Africa - Asia	308216.01	10.57	1571599.27	5.96	176065.74	6.91
Africa - Europe	82915.72	25.71	140981.64	41.55	94562.33	6.59
Africa - N.America	102489.53	22.70	167540.30	15.27	7860.18	30.22
Africa - S.America	9255.57	2.29	117062.49	4.45	16335.46	3.07*
Africa - Oceana	6521.72	17.89	38698.82	5.87	11123.15	1.30*
Asia - Europe	248001.99	4.55	1600282.88	2.19*	253319.13	2.34*
Asia - N.America	207318.08	4.50	1429841.16	4.76	176485.01	5.55
Asia - S.America	313745.74	10.32	1593222.66	5.55	190558.10	6.65
Asia - Oceana	313500.63	10.02	1604844.91	5.69	186055.70	6.61
Europe - N.America	68550.94	2.85*	212246.85	15.54	96878.20	3.98*
Europe - S.America	84583.36	24.95	199702.59	26.72	80881.43	8.32
Europe - Oceana	86826.46	23.21	134034.28	42.00	86590.32	7.36
N.America - S.America	108467.94	21.26	219063.51	9.30	18728.76	15.36
N.America - Oceana	107886.75	20.49	195561.59	11.92	11637.99	21.65
S.America - Oceana	5177.85	18.44	115724.66	2.54*	7691.03	4.64

\* Significant at 0.01% level of significance

In cases of IP filing

$$-54.5 \ln \left[ \frac{1.7421 \times 10^{36}}{1.9667 \times 10^{41}} \right] = 11.6342$$

Similarly, in case of IP in force

$$-54.5 \ln \left[ \frac{7.3812 \times 10^{39}}{7.8895 \times 10^{42}} \right] = 6.9744$$

The tabulated value of  $\chi^2$  at 0.01% level of significance for  $p(g-1) = 15$  d.f. is 30.578. The estimated values are less than the tabulated value, in both cases, therefore the null hypothesis is accepted. Hence, there is no significance difference of the average number of IP filings and IP in-force between continents, when three IPRs are considering together.

### Conclusion

Intellectual property has increasingly assumed a vital role with the rapid pace of technological and scientific innovations that human is witnessing today. Furthermore, changes in the global economy have been influenced by the development of industrial models where IPRs are some central elements establishing value and potential growth. Therefore, demand for critical analysis of the scenarios associated with IPRs is essential for improving the need of mankind. In the present study, the secondary data were collected and tabulated for analysis purpose. For achieving the objectives of the study, exact sampling  $t$  – distribution and MANOVA were used for analyzing the significant difference between the continents for IP filings and IP in-force. It is found that, around 0.04 million patents, 1.3 million trademarks and 0.02 million industrial designs have

been filed in six continents for concern years. On the other hand, around 1.3 million patents, 3.5 million trademarks and 0.4 million industrial designs are active in these six continents. It is also estimated that, in maximum cases there is no significant difference of IP filings and IP in-force between the continents [Table 1 & 2], when these IPs are considered individually. Furthermore, when these IPs are examined together in the form of single vector, there is no significance difference of the average number of IPs filings and IP in-force between continents. Hence it is observed that, although the different countries have their own IP regime; the analysis of the final outcomes of their IP filings and IP in-force in terms of patents, trademarks and industrial designs at world level, reveals that every continent taken under study is dynamic at same level in terms of protection of their IP.

### References

- 1 Controller General of Patents, Designs and Trademarks, <http://www.ipindia.nic.in/patents.htm>.
- 2 Intellectual Property India, <http://www.ipindia.nic.in/>.
- 3 Intellectual Property India, Trademarks Search, <http://www.ipindia.nic.in/trade-marks.htm>.
- 4 Intellectual Property Statistics, WIPO, <http://www.wipo.int/ipstats/en/>.
- 5 The International Design System, WIPO, <http://www.wipo.int/hague/en/>.
- 6 The International Patent System, WIPO, <http://www.wipo.int/pct/en/>.
- 7 The International Trademark System, WIPO, <http://www.wipo.int/madrid/en/>.
- 8 WIPO IP Facts and Figures, 2016, <http://www.wipo.int/publications/en/details.jsp?id=4157&plang=EN>.

- 9 WIPO IP Facts and Figures, 2016, <http://www.wipo.int/publications/en/details.jsp?id=4014&plang=EN>.
- 10 World Intellectual Property Organization, <http://www.wipo.int/portal/en/index.html>.
- 11 Johnson, Richard A & Wichern D W, *Applied Multivariate Statistical Analysis* (6<sup>th</sup> ed.), Pearson, 2015, 296-308, ISBN: 978-93-325-4955-5.
- 12 Bartlett M S, *Further Aspects of the Theory of Multiple Regression*, Proceeding of the Cambridge Philosophical Society, 1938, 34, 33-40.
- 13 Gun A M, Gupta M K & Dasgupta B, *An Outline of Statistical Theory* (4<sup>th</sup> ed.), World Press India, 2003, 368-369, ISBN: 81-87567-34-1.