Continental Impact and Assorted Empirical Study of Intellectual Property Rights

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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 Artic) out of seven. For the present investigation, the data were sub-categorised 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
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

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

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

\[ -\left( n - 1 - \frac{(p+g)}{2} \right) \ln \Lambda^* > x^2_{p(g-1)}(\alpha) \]

where \( W \) is the matrix of sum of square due to residual i.e.

\[ W = \sum_{i=1}^{g} \sum_{j=1}^{n_i} (x_{ij} - \bar{x}_i)(x_{ij} - \bar{x}_i) \]

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

\[ B = \sum_{i=1}^{n} n_i (x_i - \bar{x})(x_i - \bar{x})' \]

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

<table>
<thead>
<tr>
<th>Possible combination</th>
<th>Patents Std. Error Mean</th>
<th>t</th>
<th>Trademarks Std. Error Mean</th>
<th>t</th>
<th>Industrial Designs Std. Error Mean</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa - Asia</td>
<td>100139.94</td>
<td>12.30</td>
<td>394904.65</td>
<td>10.45</td>
<td>110638.72</td>
<td>10.54</td>
</tr>
<tr>
<td>Africa - Europe</td>
<td>2482.00</td>
<td>110.24</td>
<td>83432.67</td>
<td>62.97</td>
<td>2272.85</td>
<td>47.29</td>
</tr>
<tr>
<td>Africa - N.America</td>
<td>18220.29</td>
<td>29.77</td>
<td>18255.66</td>
<td>57.84</td>
<td>3650.88</td>
<td>20.27</td>
</tr>
<tr>
<td>Africa - S.America</td>
<td>959.55</td>
<td>19.44</td>
<td>35635.52</td>
<td>1.22*</td>
<td>360.11</td>
<td>19.84</td>
</tr>
<tr>
<td>Africa - Oceana</td>
<td>667.61</td>
<td>19.73</td>
<td>31781.85</td>
<td>3.11*</td>
<td>452.68</td>
<td>2.96*</td>
</tr>
<tr>
<td>Asia - Europe</td>
<td>98691.55</td>
<td>9.71</td>
<td>434402.12</td>
<td>6.37</td>
<td>109212.16</td>
<td>9.69</td>
</tr>
<tr>
<td>Asia - N.America</td>
<td>82303.93</td>
<td>8.38</td>
<td>388028.68</td>
<td>7.91</td>
<td>107440.67</td>
<td>10.17</td>
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<tr>
<td>Asia - S.America</td>
<td>99233.03</td>
<td>12.23</td>
<td>401200.70</td>
<td>10.18</td>
<td>110365.03</td>
<td>10.63</td>
</tr>
<tr>
<td>Asia - Oceana</td>
<td>99885.58</td>
<td>12.20</td>
<td>399884.29</td>
<td>10.57</td>
<td>110320.78</td>
<td>10.58</td>
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<tr>
<td>Europe - N.America</td>
<td>17002.41</td>
<td>15.81</td>
<td>74546.79</td>
<td>4.07</td>
<td>2031.11</td>
<td>16.48</td>
</tr>
<tr>
<td>Europe - S.America</td>
<td>2095.67</td>
<td>121.66</td>
<td>114739.29</td>
<td>11.47</td>
<td>2168.10</td>
<td>52.88</td>
</tr>
<tr>
<td>Europe - Oceana</td>
<td>2103.32</td>
<td>123.83</td>
<td>111184.81</td>
<td>13.11</td>
<td>1927.02</td>
<td>56.48</td>
</tr>
<tr>
<td>N.America - S.America</td>
<td>17339.27</td>
<td>30.21</td>
<td>50398.69</td>
<td>20.09</td>
<td>3403.28</td>
<td>23.85</td>
</tr>
<tr>
<td>N.America - Oceana</td>
<td>18030.30</td>
<td>29.35</td>
<td>47055.09</td>
<td>24.54</td>
<td>3245.98</td>
<td>23.21</td>
</tr>
<tr>
<td>S.America - Oceana</td>
<td>1028.28</td>
<td>5.34</td>
<td>8386.87</td>
<td>16.96</td>
<td>304.35</td>
<td>19.08</td>
</tr>
</tbody>
</table>

* Significant at 0.01% level of significance
In cases of IP filing

\[-54.5 \ln \frac{1.7421 \times 10^{56}}{1.9667 \times 10^{41}} = 11.6342\]

Similarly, in case of IP in force

\[-54.5 \ln \frac{7.3812 \times 10^{59}}{7.8895 \times 10^{42}} = 6.9744\]

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**