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Assessment of Implications of Intellectual Property Rights in Promoting Business Enterprises – Empirical Evidence from India

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Abstract

Intellectual Property Rights (IPRs) are a set of exclusive rights protected by law, which are accorded to creators or persons for their creations for a certain time period. An IP right holder can realise value from their intellectual assets through utilising it internally for its own processes or share it externally through provision of goods and services to customers. The latter can be achieved through legal mechanisms such as licensing or assignment. In today's globally competitive environment, intellectual property has placed itself on a pedestal in the context of promoting business as well as economic growth, and is becoming increasingly important. Intellectual Property (IP) is the fuel that powers the engine of prosperity, fostering invention and innovation. The increasing significance of intangible assets in the global economy is forcing business organisations to actively manage their IP as a key driver for building and sustaining their competitive advantage and achieving superior performance. IPRs are now being used not only as a tool to protect creativity and generate revenue, but also to build strategic alliances for socio-economic and technological growth. The rationale for the present research is to create awareness about the need of IPRs as a marketable financial asset and economic tool. Present research, however, is systematically designed to find out prime important areas of concern, such as why and how the entrepreneurs should acquire intellectual property rights. What challenges are they facing for its protection and how far are they successful? As a new entrepreneur, what is the duty regarding the protection of IP, with focus on trademark and its implication in business development, as well as in identifying the challenges faced by the business organisations and assessing the degree of its violation? Accordingly, in the present study, factor analysis and bivariate correlation were performed, to identify the factors responsible for the implementation of intellectual property rights, as well as to measure the relationship among the variables considered for the study. For the purpose of the study, ten factors, being primary in nature, had been selected as potential explanatory variables for explaining the variation in the credentials of IPR implementation among the entrepreneurs. The result of principal component analysis has revealed that significant features of IPR depend mostly on four factors – trust, acceptance, safety, and credibility. The empirical analysis explores that if there were any violation in the implementation of IPR by the entrepreneurs, it would significantly affect the business enterprises in terms of branding, promotion, as well as the quality of the product and services, besides the financial benefits.

Keywords: Innovations, Intellectual Property, Industrial Property, Trademark, Patent

Introduction

Inventions and creations are the two facets of human progress. Innovations are the main characteristics of a business organisation. Consumers want to buy products

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from companies they trust; suppliers want to form a business partnership with companies they can rely on. Keeping in mind the need for business development, protection of intellectual property (IP) should be given highest priority as it plays a pivotal role in brand valuation at the financial level. Brand value increases though innovations. Coming up with innovative ideas is the key aspect of a business. To encourage the innovators, a bundle of rights are given to them in the name of intellectual property, which refers to creations of the mind. Exclusive rights enable the innovators and entrepreneurs to appropriate the benefits of their inventions. The domain of intellectual property is vast. Awareness of IPR is necessary to appropriate the value of inventions. The exciting developments in scientific and technological activities are emerging day-to-day, with national and international dimensions.

To encourage the innovators, intangible property rights are given to them in the name of intellectual property, which refers to creations of the mind. Intellectual property is divided into two categories. Industrial property includes patents for inventions, trademarks, industrial designs, and geographical indications. The prime characteristic of intellectual property rights is the exclusive right granted to the creator. It is also regarded as a negative right, as it excludes others from its unauthorised use.

The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) in the World Trade Organisation enhanced the protection and enforcement of IPRs. Stronger entrepreneurship needs strong start-up policies, industrial policies, information technology and electronics policies, and several other policies. The National IPR Policy encourages creativity, innovation, competitiveness, and economic growth in India. The Department for Promotion of Industry and Internal Trade (DPIIT), responsible for enhancing the innovative tenacity of the innovators and handling matters related to the Protection of Intellectual Property Rights (IPR), provides the start-ups with legal support and fast-tracking patent examination at lower costs scheme for IPR protection (SIPP). This reduces the time taken in getting patents. For commercialisation of IPRs in an increasingly competitive global scenario, there is a need to create IP awareness among all sections of societies, as IP is a creation of the mind.

The present research focuses on a particular branch of intellectual property right, i.e., trademark, and its implication in business enterprises, especially to the new entrepreneurs. It also gives an international insight into intellectual property, managing and protecting it effectively, while at the same time analysing its limitations and major threats of violation.

Strategic Model for Business Development

Strategic model for sustainable business development and leveraging competitive advantages include enhanced investment in innovations and protection of innovations through Intellectual Property Rights (IPRs). Several models explaining business development and economic growth include investments in new processes and technology as causes, where they lead to increased factor productivity, which in turn pushes forward business and economic growth. Creation of new process and technology can be accelerated by protection of innovation through IPRs. Nordhaus (1969) found that the protection of intellectual property, which grants innovators temporary monopoly power, enhances incentives to allocate more efforts to Research and Development (R&D) and innovation activities. Lall (2003) stated that newly industrialised countries in Asia moved to a strong intellectual property rights regime after accumulating their innovation capabilities through imitation during the early stages of weak intellectual property rights. The study of Strathern et al. (2013) also highlighted IPR as a valuable property and its growing importance in business perspective. Lee (2017) reviewed recent econometric evidence on how changes in IPR policy impact industrial development and suggests that stronger IPR systems accelerate industrial development.

Research and Development (R&D) performed by business results in new goods and services, higher quality of output, and new production processes. Intellectual property rights have a significant impact on R&D (Kanwar & Evenson, 2003), and investment in R&D often have a positive effect on productivity at the firm level (Griliches & Mairesse, 1984). It has been established in a study conducted by Shapiro and Pham (2007) that America's most productive manufacturing industries, such as drugs and pharmaceuticals, were the ones that invested the most in R&D. They found a strong correlation between R&D expenditure and productivity

(value added per employee). Furthermore, Song and Shin (2006) showed that intellectual property rights are barriers for the growth of smaller firms, considering that relatively larger companies conduct collaborative R&D and this leads them to use Intellectual Property Rights (IPRs) effectively in their innovations (Park et al., 2012).

Vries et al. (2013) examined the determinants and the strategies of IPR policy used by the firms, specifically the service-based industries. By analysing a sample of 4,703 start-ups in the US, the research showed that as market competition intensifies, start-ups will be more likely to file initial IP in the form of a trademark and less likely in the form of a patent. Secondly, start-ups that serve end consumers are more likely to file for trademark protection, compared to start-ups that serve other businesses, which are more likely to file for patent protection. Thirdly, the involvement of an investor leads to a higher likelihood of filing initial IP in the form of trademark compared to a patent.

Spithoven et al. (2013) investigated how open innovation (OI) dimensions impact the innovative performance of small and medium enterprises (SMEs) in comparison to large companies. A review was done based on the theoretical aspect of OI, with the role of the size of the firm. The study further reveals the effect of OI practices on innovation performances in SMEs and large enterprises. They have advised large enterprises to use more OI practices than SMEs, as large enterprises have capabilities to use more external technologies compared to SMEs. Gaétan (2012) has also done analysis based on data from an international survey conducted by the European Patent Office, to analyse how SMEs can take advantage of their patents to mitigate the problems associated with financing R&D. The study revealed that half of the SMEs take patents for monetary benefits. Chun and Mun (2012) investigated the determinants of R&D cooperation in SMEs using firm-level data from the 2002 Korean Innovation Survey, and applying a probity model with sample selection. The study investigated whether SMEs are at a disadvantage in R&D cooperation because of their absolute size limitations and lack of absorptive capacity. The analysis indicated that SMEs with high absorptive capacity are more likely to engage in R&D cooperation.

The impact of IPR on business growth using dynamic panel data techniques and a sample of 103 countries (1970-2009) was assessed by Kashcheeva (2013). It was found that although FDI and IPR have positive effects on growth for most of the countries, stronger IPR mitigates the growth effect of FDI for developing countries. The study emphasised that IPR protection policy needs to be more evidentially based and systematised than it is at present.

The panel data analysis of Indian firms (1989-2005) were undertaken to ascertain whether the IPR reforms were successful in increasing innovation by firms in India and characterise industries according to their technological dependence on innovation, and find strong evidence that Indian firms in more innovation-intensive industries increased their R&D expenditure after TRIPs (Dutta & Sharma, 2008). The analysis revealed that patenting by India in the US increased after TRIPs, and to a greater extent in more innovation-intensive industries. Samuel et al. (2014) focused on agri-innovation, as agriculture is the main force for the growth of the Indian economy, and management of IPR as well as IPR awareness through educating various stakeholders like policymakers, farmers, industries, researchers, and consumers.

Materials and Methods

The present research conducted was based on primary as well as secondary data collected from the various sources. The primary data collection for the present research was undertaken with the help of a structured questionnaire developed for the purpose. A questionnaire containing primarily three attributes, viz. attitudes towards violation, levels of awareness development, and knowledge of intellectual property laws, was considered. Accordingly, the designed questionnaire was administered to get an insight into the following attributes regarding innovations and intellectual property rights of selected business entities.

- Driving factors which motivate the adoption of trademark to protect good will.
- Level of awareness on various intellectual property of organisations.
- Level of awareness on violation of various intellectual property of organisations.

- Problem in implementation of proper Trademark Protection.

An exploratory cross-sectional survey design was used. The secondary data was collected through various sources, including WIPO, Office of the Controller General of Patents, Designs, and Trademarks, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry, and the Government of India.

The sample selection technique applied in the present research includes convenience sampling, as the primary data collection were focused on selected industrial sectors, viz., pharmaceuticals, textile, IT, service, and so on, as well as intellectual property law firms that frequently deal with intellectual property, located in various parts of India.

The prime statistical tools used for present study include:

- *Descriptive Statistics* - For describing the basic features of data collected in the study, which will form the basis of virtually every quantitative analysis of primary as well as secondary data.
- *Cronbach's Alpha Test* - To test the internal consistency (reliability) of collected data.
- *KMO and Bartlett's Test of Sphericity* - To measure the sampling adequacy for examining the appropriateness of application of factor analysis.
- *Factor Analysis* - To reduce a large number of variables into a fewer number of factors by extracting maximum common variance from all variables and putting them into a common score.
- *Correlation Coefficient* - To measure the strength of the relationship between the relative movements of the two variables, which helps in predicting changes in one variable by using the other variable.

For the data analysis, initially, data derived from the questionnaire survey as well as data collected from secondary sources were screened and computerised. Then data reliability test was done using the Cronbach's alpha. Subsequently, the factor analysis and bivariate correlation were performed to identify the factors responsible for the implementation of intellectual property rights, as well as to measure the relationship among the variables considered for the study.

Analysis and Findings

Status of Filing and Grant of IPRs

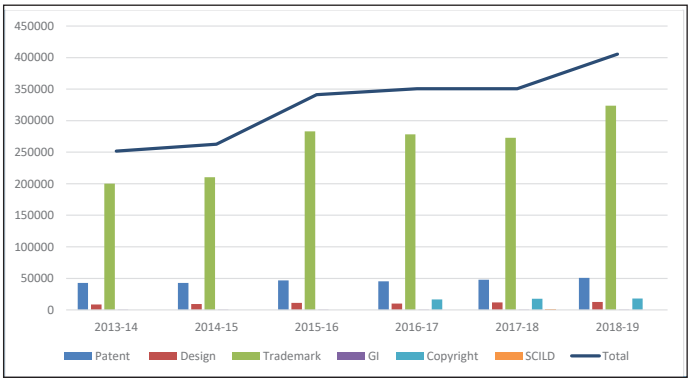
In 2019, patent filings worldwide fell for the first time since the 2009 financial crisis, declining by 3%. In contrast, trademark and industrial design filing activity grew by 5.9% and 1.3%, respectively. In terms of volume, patent filings around the world numbered 3.2 million, trademark filing activity reached 15.2 million, and industrial design filing activity totaled 1.4 million (Fig. 1). Applications for utility models – a special form of patent right – grew by 9.1%, to reach 2.3 million applications.

Fig. 1: Worldwide Status of Filing of IPRs

The improvement in IP administration during the recent past, along with amendments of Patents and Trademarks Rules, digital reforms, and reengineering of IP procedures has resulted in improved performance, decreased pendency, and higher rates of disposal of IP applications. The trend of overall filing of applications for various

IPRs in the recent past has increased significantly, as it is evident from the analysis that during 2018-19 there was an increase of 15% over the previous year (DPIIT, MoCI, GoI, 2019). The increasing trend in filing of applications for patents, designs, trademarks, and copyright has been observed, except for geographical indications, where there is a slight decrease compared to 2017-18.

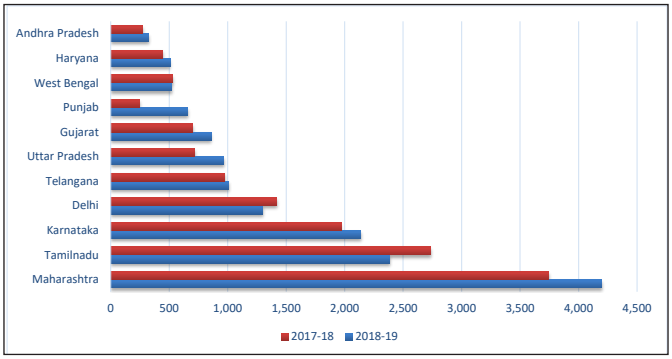
Filing of patent application has increased to 5.9% in 2018-19, from 5.3% in 2017-18, while domestic filing has increased to 33.6% from 32.5% in 2017-18 (Fig. 2). Number of patent applications examined also increased considerably (41.6% increase over previous year). Grant of patents increased by 17.2% and disposal of applications increased by 6.69%. Performance in copyright has also improved during the year, because of computerisation and reengineering of registration processes. Filing of applications has increased by 2.29% in 2018-19. However, there has been remarkable progress in copyright registrations, which increased by 45.6%, whereas final disposal of applications increased by 63.1% in 2017-18.



Source: DPIIT, MoCI, GoI (2019), Annual Report 2018-19.

Fig. 2: Status of Growth of Filing of Applications for IPR in India

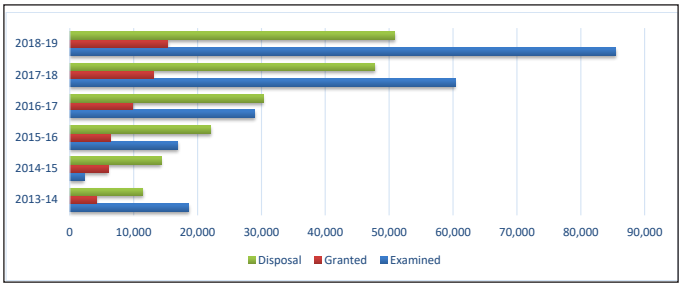
Regarding state-wise filing of applications by Indian applicants, in 2018-19, Maharashtra continued to occupy the first position, with a 12.1% increase over its own filing in 2017-18 (Fig. 3), while Tamil Nadu continued to have second position, followed by Delhi, Telangana, Uttar Pradesh, Gujarat, Punjab, and West Bengal, which showed modest to high growth in filing compared to their last year's filing. Top filing states/union territories are Maharashtra (4,197), Tamil Nadu (2,382), Karnataka (2,138), Delhi (1,300), Telangana (1,011), Uttar Pradesh (967), Gujarat (858), Punjab (660), West Bengal (522), Haryana (507), Andhra Pradesh (321), Rajasthan (305), Kerala (272), Madhya Pradesh (194), Himachal Pradesh (193), Orissa (164), Jharkhand (158), Uttarakhand (154), and Assam (109).



Source: DPIIT, MoCI, GoI (2019), Annual Report 2018-19.

Fig. 3: State-Wise Status of Filling IPRs Applications in India

The number of applications for patents filed in 2018-19 was 50,659, showing an increase of 5.9% in overall filing, which was 47,854 in 2017-18 (Fig. 4). In 2018-19, filing of applications has shown a modest to high growth in almost every field of technology, except in the fields of computer/electronics, general engineering, polymer science and technology, and metallurgy and material science, which witnessed a marginal decrease in filing compared to last year.



Source: DPIIT, MoCI, GoI (2019), Annual Report 2018-19.

Fig. 4: Status of Grant and Disposal of Application of Patent

Top five patent applicants in the field of IT are presented in Table 1.

Table 1: Major Patent Applicants in the Field of IT

Sr. No.	Name of Companies	Applications Filed
1.	Wipro Ltd.	125
2.	Tata Consultancy Services Ltd.	90
3.	Hike Ltd.	66
4.	Dr. Kanapathy Gopalakrishnan	36
5.	HCL Technologies Ltd.	32
6.	SRM University	32

Source: DPIIT, MoCI, GoI (2019), Annual Report 2018-19.

Top ten Indian applicants for patents from scientific and research and development organisations are presented in Table 2.

Table 2: Major Indian Applicants for Patents from Scientific and Research & Development Organisations

Sr. No.	Name of Scientific and R&D Organisations	Applications Filed
1	Council of Scientific and Industrial Research	176
2	Defence Research and Development Organisation	126
3	G. H. R Labs and Research Centre	57
4	Indian Council for Agricultural Research	37
5	L&T Technology Services Limited	19
6	Cognizant Technology Solutions India Pvt. Ltd.	16
7	Indian Space Research Organisation	14
7	Marine Life Sciences Pvt. Ltd.	14
8	Allinnov Research and Development Pvt. Ltd.	13
8	S. N. Bose National Centre for Basic Sciences	13
9	India Forge Pvt. Ltd.	10
10	GSP Crop Science Pvt. Ltd.	9

Source: DPIIT, MoCI, GoI (2019), Annual Report 2018-19.

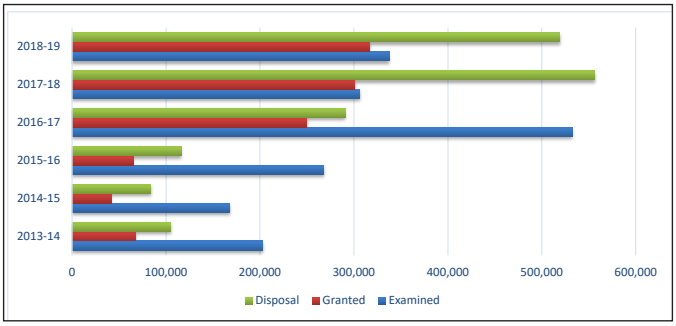
Top ten foreign resident applicants are presented in Table 3.

Table 3: Major Foreign Resident Applicants

Sr. No.	Name of Organisation	Applications
1	Qualcomm Incorporated	750
2	Koninklijke Philips N. V.	520
3	Philips Lighting Holding B. V.	217
4	Google LLC	184
5	Mitsubishi Electric Corporation	176
6	General Electric Company	142
7	Daimler AG	134
8	Telefonaktiebolaget LM Ericsson (Publ.)	128
8	ABB Schweiz AG	128
9	Huawei Technologies Co. Ltd.	120
10	Honda Motor Co. Ltd.	110

Source: DPIIT, MoCI, GoI (2019), Annual Report 2018-19.

Out of the total number of trademark applications filed by Indian applicants in 2017-18, Maharashtra occupied the first position, with 63,070 applications. Delhi with 51,563 applications stood at second position, while the third position was occupied by Gujarat, with 24,208 applications. Out of the total 2,72,974 applications filed, the number of applications filed by foreign applicants in 2017-18 was 25,307. Fig. 5 presents the status of grant and disposal of applications of Trademarks.

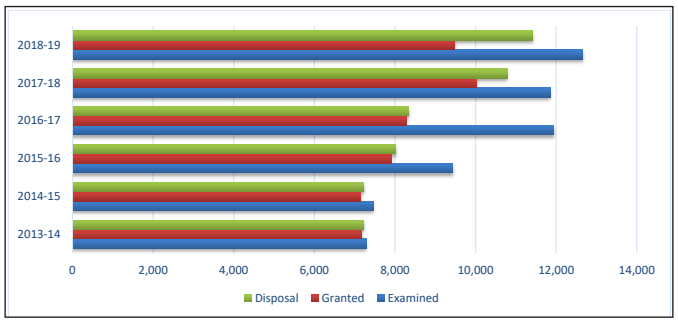


Source: DPIIT, MoCI, GoI (2019), Annual Report 2018-19.

Fig. 5: Status of Grant and Disposal of Application of Trademark

In 2017-18, 11,838 applications were filed for registration of designs, whereas 10,012 applications were registered. A total of 8,224 applications originated from India, while 3,614 were of foreign origin. The number of applications

originating from India was about 70% of the total filings. Fig. 6 presents the status of grant and disposal of application of Design.



Source: DPIIT, MoCI, GoI (2019), Annual Report 2018-19.

Fig. 6: Status of Grant & Disposal of Application of Design

Start-ups are eligible for 80% rebate in patent filing fees and 50% rebate in trademark filing fees. According to the SIPP scheme, 902 facilitators have been empanelled to facilitate the process of filing and acquisition. The facilitators provide legal guidance and handholding through the entire patent acquisition process free of cost. In November 2020, 5,020 patent applications have been granted 80% rebate on filing fee and 1,170 applications were granted expedited examination, out of which 459 patents were granted. Around 12,264 trademark applications have been filed for 50% rebate on filing fee.

Prospects and Implications of IPRs in Business Development

The data for the present study was collected through administering a structured questionnaire to selected industrial sectors, along with other key stakeholders. Each question has a five-point Likert item, from 'strongly disagree' to 'strongly agree'. To test the reliability of the data collected, Cronbach's alpha was calculated. The calculated Cronbach's alpha is presented in Table 4. The calculated value of the alpha coefficient for the selected ten variables is 0.600, suggesting that the items have satisfactory internal consistency. In addition to computing the alpha coefficient of reliability, an investigation was done for the dimensionality of the scale; factor command was used.

Table 4: Reliability Test –Value of Cronbach's Alpha

a. Case Processing Summary			
		N	%
Cases	Valid	217	100.0
	Excluded[a]	0	.0
	Total	217	100.0
b. Reliability Statistics			
Cronbach's Alpha		**N of Items**	
.600		**10**	
c. Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
36.6774	11.108	3.33293	10

The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) test was performed to test whether the responses collected are valid and suitable. The calculated value of KMO is presented in Table 5. The analysis revealed that as the calculated value of KMO is 0.6, it implies that the study is significant, and thereby shows that the responses collected are valid and suitable to the problem being addressed through the study; in addition, the responses collected are adequate to conduct factor analysis. This leads to principal component analysis. Bartlett's test of sphericity is significant at the 95% level of significance. This tests the null hypothesis that the correlation matrix is an identity matrix. Here, we reject this null hypothesis. Together, these tests provide a minimum standard by which we can do the principal component analysis (or factor analysis).

Table 5: KMO and Bartlett's Test of Sampling Adequacy and Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.600
Bartlett's Test of Sphericity	Approx. Chi-Square	726.224
	Df	45
	Sig.	.000

Significant at 0.05 level (one-tailed).

Principal component analysis is used to determine factors like brand value, goodwill, quality, and so on, that have a significant influence on the implementation of IPR by the entrepreneurs, as well as to measure the relationship among the variables. At the time of performing principal

component analysis, the values of all the variables are analysed, taking the data of all responses collected.

Communalities are the proportion of each variable's variance that can be explained by the principal components (e.g., the underlying latent continua). The initial value of the communality in a principal component analysis is 1. The values in the extraction column indicate the proportion of each variable's variance that can be explained by the principal components. Variables with high values are well represented in the common factor space, while variables with low values are not well represented. Table 6 provides for the communalities among the selected variables. The analysis revealed that the variable 'value' has the highest value, i.e. 0.816, and is well represented. In this analysis, we do not have any particularly low values.

Table 6: Communalities among the Selected Variables

Variables	*Initial*	*Extraction*
Awareness	1.000	.766
Knowledge	1.000	.624
Violation	1.000	.733
Brand	1.000	.678
Quality	1.000	.740
Value	1.000	.816
Promotion	1.000	.807
Variables	*Initial*	*Extraction*
Goodwill	1.000	.699
Ignorance	1.000	.638
Reliability	1.000	.702

Extraction Method: Principal Component Analysis.

The analysis of total variance explains total variance, percentage variance, and cumulative percentage for both rotated components and un-rotated components. The estimated total variance for the present study is presented in Table 7.

Component: There are as many components (Table 7) extracted during a principal component analysis, as there are variables that are put into it. In the present study, we used ten variables, therefore we have ten components.

Initial Eigenvalues: Eigenvalues are the variances of the principal components. Here, each variable has a variance of 1, and the total variance is equal to the number of variables used in the analysis, in this case, ten.

Total: This column shows the eigenvalues. The first component indicates the most variance with the highest eigenvalue, and the next component will account for as much of the leftover variance as it can, and so on. Hence, each successive component will account for less and less variance, from eigenvalue 3.005 to 0.151.

% of Variance: This column contains the percentage of variance accounted for by each principal component. The first component explains variance of 30.054%.

Cumulative %: This column contains the cumulative percentage of variance accounted for by the current and all preceding principal components. Here, the first four rows show a value of 72.038. This means that the first four components account for 72.038% of the total variance.

Extraction Sums of Squared Loadings: There were four factors extracted in the extraction sum of squared loadings, wherein eigenvalues greater than 1 are retained, and they cumulatively account for 72.038 of the total variance; the cumulative percentage of variance of un-rotated and rotated is also the same.

Table 7: Total Variance Explained

Component	*Initial Eigenvalues*			*Extraction Sums of Squared Loadings*			*Rotation Sums of Squared Loadings*		
	Total	*% of Variance*	*Cumulative %*	*Total*	*% of Variance*	*Cumulative %*	*Total*	*% of Variance*	*Cumulative %*
1	3.005	30.054	30.054	3.005	30.054	30.054	2.939	29.387	29.387
2	1.726	17.256	47.311	1.726	17.256	47.311	1.598	15.978	45.365
3	1.288	12.882	60.193	1.288	12.882	60.193	1.345	13.454	58.819
4	1.185	11.845	72.038	1.185	11.845	72.038	1.322	13.219	72.038
5	.869	8.692	80.730						
6	.636	6.357	87.088						

Component	*Initial Eigenvalues*			*Extraction Sums of Squared Loadings*			*Rotation Sums of Squared Loadings*		
	Total	*% of Variance*	*Cumulative %*	*Total*	*% of Variance*	*Cumulative %*	*Total*	*% of Variance*	*Cumulative %*
7	.476	4.761	91.848						
8	.416	4.164	96.012						
9	.248	2.477	98.489						
10	.151	1.511	100.000						

Extraction Method: Principal Component Analysis.

Component Matrix: The component matrix explains the Pearson correlation between each of the variables and the component, wherein the sum of squared correlations is equal to the eigenvalues of that component. Tables 8 to 10 present component loadings, which are the correlations between the variable and the component. Because these are correlations, possible values range from −1 to +1.

Component: The columns under this heading are the principal components that have been extracted. Principal component analysis is a method of data reduction. In this case, four components were extracted (the four components that had an eigenvalue greater than 1). The rotated component matrix reveals that all the variables having large factor loadings for the given component, define the component.

Table 8: Component Matrix Analysis

Variables	*Component*			
	1	*2*	*3*	*4*
Awareness	.833	−.115	−.212	−.116
Knowledge	.754	−.207	.108	.033
Violation	.168	.319	−.717	.298
Brand	.623	−.531	.043	−.080
Quality	.719	.403	−.223	−.106
Value	.819	.314	.193	−.092
Promotion	.231	.541	.677	−.054
Goodwill	−.067	.711	.121	.418
Ignorance	.134	−.456	.393	.508
Reliability	.249	−.138	−.039	.787

Extraction Method: Principal Component Analysis[a]

[a]4 components extracted.

In Tables 9-10, the four rotated factors are just as good as the initial factors in explaining and reproducing the observed correlation matrix. In the rotated factors, awareness, value, knowledge, quality, and brand have high positive loadings on the first factor (and low loadings on the second, third, and fourth); promotion and goodwill have high positive loadings on the second factor (and low loadings on the rest); violation has high positive loadings on the third factor (and low loadings on the rest); and reliability and ignorance have high positive loadings on the second factor (and low loadings on the rest).

Table 9: Rotated Component Matrix Analysis[b]

Variables	*Component*			
	1	*2*	*3*	*4*
Awareness	.843	−.169	.164	.026
Knowledge	.740	−.060	−.090	.255
Violation	.098	.006	.850	−.009
Brand	.641	−.400	−.209	.251
Quality	.714	.254	.358	−.193
Value	.813	.391	−.012	−.033
Promotion	.224	.783	−.373	−.070
Goodwill	−.165	.751	.313	.097
Ignorance	.048	−.059	−.295	.738
Reliability	.098	.075	.302	.771

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation[b].
[b]Rotation converged in nine iterations

Table 10: Component Transformation Matrix Analysis

Component	*1*	*2*	*3*	*4*
1	.981	.070	.086	.157
2	−.028	.838	.369	−.401
3	.002	.483	−.844	.233
4	−.190	.244	.380	.872

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.

Naming the Factors: It seems reasonable to tentatively identify the first rotated factor as 'trust', as awareness, value, knowledge, quality, and brand all have high

loadings on it. The second rotated factor looks rather like 'acceptance', as promotion and goodwill both have high loadings on it. The third rotated factors is 'safety', as violation has high loadings on it. The fourth rotated factor looks like 'credibility', as reliability and ignorance both have high loadings on it. The factors are named based on eigenvalues more than 1.

Scree plot is a decreasing function showing the variance explained by each factor in a factor analysis. A scree plot shows the eigenvalues on the y-axis and the number of factors on the x-axis. All components with > 1 can be restored. Accordingly, the analysis of the scree plot (Fig. 7) suggests that the optimal number of components is four.

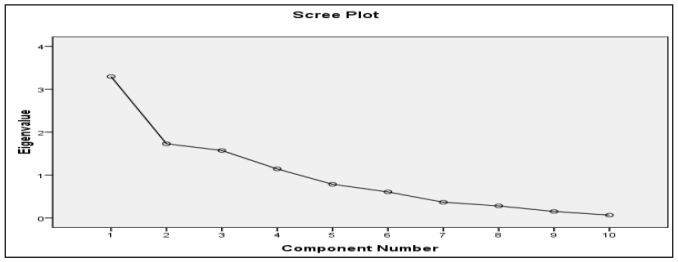


Fig. 7: Scree Plot

Research Hypotheses

In this section, an attempt has been made to formulate hypothesis based on factors of sustainable business development and IPRs. Table 11 depicts the results of chi-square testing.

Aim(1): To test the relationship between business development and awareness and knowledge of IPRs.

Aim(2): To test the relationship between business development and violation and ignorance of IPRs.

Aim(3): To test the relationship between intellectual property and brand and goodwill of company.

Aim(4): To test the relationship between intellectual property and promotion and value of company.

Aim(5): To test the relationship between intellectual property and quality and reliability of product of company.

H_{01}: $\mu_j = \mu$ and j = 1, …, 5. i.e. There is not a statistically significant relationship between business development and awareness and knowledge of IPRs.

Alternative hypothesis H_1: $\mu_j \neq \mu$, i.e. There is a statistically significant relationship between business development and awareness and knowledge of IPRs.

H_{02}: $\mu_j = \mu$ and j = 1, …, 5, i.e. There is not a statistically significant relationship between business development and violation and ignorance of IPRs.

Alternative hypothesis H_2: $\mu_j \neq \mu$, i.e. There is a statistically significant relationship between business development and violation and ignorance of IPRs.

H_{03}: $\mu_j = \mu$ and j = 1, …, 5, i.e. There is not a statistically significant relationship between intellectual property and brand and goodwill of company.

Alternative hypothesis H_3: $\mu_j \neq \mu$, i.e. There is a statistically significant relationship between intellectual property and brand and goodwill of company.

H_{04}: $\mu_j = \mu$ and j = 1, …, 5, i.e. There is not a statistically significant relationship between intellectual property and promotion and value of company.

Alternative hypothesis H_4: $\mu_j \neq \mu$, i.e. There is a statistically significant relationship between intellectual property and promotion and value of company.

H_{05}: $\mu_j = \mu$ and j = 1, …, 5, i.e. There is not a statistically significant relationship between intellectual property and quality and reliability of product of company.

Alternative hypothesis H_5: $\mu_j \neq \mu$, i.e. There is a statistically significant relationship between intellectual property and quality and reliability of product of company.

Table 11: Brief Results of χ^2 Testing

Sr. No.	*Null Hypotheses*	*Alternative Hypotheses*	*Observed χ^2 Value*	*Tabulated χ^2 Value*	*Decision*
1	H_{01}: $\mu_j = e_j$	H_1: $\mu_j \neq e_j$	33.425	9.49*	Reject H_{01} and accept H_1 at 1% significance level**
2	H_{02}: $\mu_j = e_j$	H_2: $\mu_j \neq e_j$	46.210	13.3*	Reject H_{02} and accept H_2 at 1% significance level**
3	H_{03}: $\mu_j = e_j$	H_3: $\mu_j \neq e_j$	42.291	9.49*	Reject H_{03} and accept H_3 at 1% significance level**
4	H_{04}: $\mu_j = e_j$	H_4: $\mu_j \neq e_j$	49.236	13.3*	Reject H_{04} and accept H_4 at 1% significance level**
5	H_{05}: $\mu_j = e_j$	H_5: $\mu_j \neq e_j$	41.526	13.3*	Reject H_{05} and accept H_5 at 1% significance level**

j = 1, …, 5

*At 1% level of significance

**Based on the chi-square value (Table 11), the null hypothesis is rejected (as P < 0.05) and the alternative hypothesis is accepted.

Table 12: Correlation Coefficient among the Selected Variables

		Awareness	*Knowledge*	*Violation*	*Brand*	*Quality*	*Value*	*Promotion*	*Goodwill*	*Ignorance*	*Reliability*
Awareness	Pearson Correlation	1	.162*	−.287**	.420**	.076	.127	−.165*	.019	.004	−.111
	Sig. (2-tailed)		.017	.000	.000	.267	.063	.015	.777	.956	.104
	N	215	215	215	215	215	215	215	215	215	215
Knowledge	Pearson Correlation	.162*	1	−.412**	−.078	.449**	.095	.460**	−.244**	−.483**	−.250**
	Sig. (2-tailed)	.017		.000	.257	.000	.165	.000	.000	.000	.000
	N	215	215	215	215	215	215	215	215	215	215
Violation	Pearson Correlation	−.287**	−.412**	1	.391**	−.465**	−.043	−.489**	.159*	.193**	.505**
	Sig. (2-tailed)	.000	.000		.000	.000	.531	.000	.020	.005	.000
	N	215	215	215	215	215	215	215	215	215	215
Brand	Pearson Correlation	.420**	−.078	.391**	1	−.021	.466**	−.047	−.060	.237**	−.197**
	Sig. (2-tailed)	.000	.257	.000		.756	.000	.491	.379	.000	.004
	N	215	215	215	215	215	215	215	215	215	215
Quality	Pearson Correlation	.076	.449**	−.465**	−.021	1	−.017	.144*	−.570**	−.340**	−.632**
	Sig. (2-tailed)	.267	.000	.000	.756		.804	.035	.000	.000	.000
	N	215	215	215	215	215	215	215	215	215	215
Value	Pearson Correlation	.127	.095	−.043	.466**	−.017	1	.567**	.216**	.255**	−.224**
	Sig. (2-tailed)	.063	.165	.531	.000	.804		.000	.001	.000	.001
	N	215	215	215	215	215	215	215	215	215	215
Promotion	Pearson Correlation	−.165*	.460**	−.489**	−.047	.144*	.567**	1	.009	−.044	−.327**
	Sig. (2-tailed)	.015	.000	.000	.491	.035	.000		.896	.520	.000
	N	215	215	215	215	215	215	215	215	215	215
Goodwill	Pearson Correlation	.019	−.244**	.159*	−.060	−.570**	.216**	.009	1	.544**	.332**
	Sig. (2-tailed)	.777	.000	.020	.379	.000	.001	.896		.000	.000
	N	215	215	215	215	215	215	215	215	215	215
Ignorance	Pearson Correlation	.004	−.483**	.193**	.237**	−.340**	.255**	−.044	.544**	1	.139*
	Sig. (2-tailed)	.956	.000	.005	.000	.000	.000	.520	.000		.042
	N	215	215	215	215	215	215	215	215	215	215
Reliability	Pearson Correlation	−.111	−.250**	.505**	−.197**	−.632**	−.224**	−.327**	.332**	.139*	1
	Sig. (2-tailed)	.104	.000	.000	.004	.000	.001	.000	.000	.042	
	N	215	215	215	215	215	215	215	215	215	215

**Correlation is significant at the 0.01 level (1-tailed).

*Correlation is significant at the 0.05 level (1-tailed).

Comparing observed values of χ^2 with the tabulated values of χ^2 (refer to Table 11), the following conclusions can be drawn.

- There is a statistically significant relationship between business development and awareness and knowledge of IPRs at the 0.01 significance level.
- There is a statistically significant relationship between business development and violation and ignorance of IPRs at the 0.01 significance level.
- There is a statistically significant relationship between intellectual property and brand and goodwill of company at the 0.01 significance level.
- There is a statistically significant relationship between intellectual property and promotion and value of company at the 0.01 significance level.
- There is a statistically significant relationship between intellectual property and quality and reliability of product of company at the 0.01 significance level.

In this section, an attempt has been made to identify ten determinants, explaining their influence on the implementation of IPR by the entrepreneurs. Accordingly, bivariate Pearson correlation measures the strength and direction of the linear relationship between pairs of continuous variables. Correlation coefficient expresses the strength of linkage or occurrence between two variables in a single value between +1 & −1. Perfect linear relationship is denoted by +1 and −1 denotes a perfect negative linear relationship. Positive coefficient indicates a direct relationship. Negative coefficient indicates an indirect relationship. In the present study, ten variables have been chosen to test the correlation; these are awareness, knowledge, violation, brand, quality, value, promotion, goodwill, ignorance, and reliability. The correlation coefficient among these variables is presented in Table 12.

The analysis of correlation coefficient reveals the following:

- Awareness has a significant positive relationship with knowledge (0.162) and brand (0.420), whereas it has a significant negative correlation with promotion (−0.167) and violation (−0.287).
- Knowledge is significantly positively correlated with awareness (0.162), quality (0.449), and promotion (0.460), whereas it is significantly negatively correlated with violation (−0.412), goodwill (−0.244), ignorance (−0.483), and reliability (−0.250).
- Violation has a significant negative correlation with awareness (−0.287), knowledge (−0.412), quality (−0.465), and promotion (−0.489), whereas it has a significant positive relationship with brand (0.391), goodwill (0.159), ignorance (0.193), and reliability (0.505).
- Brand has a significant positive correlation with awareness (0.420), violation (0.391), value (0.466), and ignorance (0.237), and a significant negative correlation with reliability (−0.197).
- Quality is significantly positively correlated with knowledge (0.449) and promotion (0.144), whereas it is significantly negatively correlated with violation (−0.465), goodwill (−0.570), ignorance (−0.340), and reliability (−0.632).
- Value is significantly positively correlated with brand (0.466), promotion (0.567), goodwill (0.216), and ignorance (0.255), and significantly negatively correlated with reliability (−0.224).
- Promotion is significantly negatively correlated with awareness (−0.165), violation (−0.489), and reliability (−0.327), and significantly positively related to knowledge (0.460), quality (0.144), and value (0.567).
- Goodwill is significantly positively correlated with violation (0.159), value (0.216), ignorance (0.544), and reliability (0.322), and significantly negatively correlated with quality (−0.570) and knowledge (−0.244).
- Ignorance is significantly positively correlated with violation (0.193), brand (0.237), value (0.255), goodwill (0.544), and reliability (0.139), and significantly negatively correlated with knowledge (−0.483) and quality (−0.340).
- Reliability is significantly positively correlated with violation (0.505), goodwill (0.332), and ignorance (0.139), whereas it is significantly negatively correlated with knowledge (−0.250), brand (−0.197), quality (−0.632), value (−0.224), and promotion (−0.327).

From the above analysis, it is clear that violation has a significant correlation with most of the variables, which

implementation of IPR by the entrepreneurs, it would significantly affect the business enterprises in terms of branding, promotion, as well as quality of the product and services, besides the financial benefits.

Conclusions and Recommendations

To encourage innovators, intangible property rights are given to them in the name of intellectual property, which refers to creations of the mind. Intellectual property is divided into two categories. Industrial property includes patents for inventions, trademarks, industrial designs, and geographical indications. The prime characteristic of intellectual property rights is the exclusive right granted to the creator. It is also regarded as a negative right, as it excludes others from unauthorised use.

The present research focuses on a particular branch of intellectual property right, i.e., trademarks, and its implication in business enterprises, especially to the new entrepreneurs. It gives an international insight into intellectual property, managing and protecting it effectively, and at the same time it analyses its limitations and major threats of violation. In the present study, factor analysis and bivariate correlation were performed to identify the factors responsible for the implementation of Intellectual Property Rights, as well as to measure the relationship among the variables considered for the study. For the purpose of the study, ten factors, being primary in nature, had been selected as potential explanatory variables for explaining the variation in the credentials of IPR implementation among the entrepreneurs. The result of principal component analysis has revealed that significant features of IPR depend mostly on four factors – trust, acceptance, safety, and credibility. The empirical analysis explores that if there were any violations in the implementation of IPR by the entrepreneurs, it would significantly affect the business enterprises in terms of branding, promotion, as well as quality of the product and services, besides the financial benefits.

This is too early to conclude anything, as this research is in progress. However, some observations are necessary. The study reveals how intellectual property rights can be used by the innovators for wise application conservation technologies to achieve the goal of sustainable development. Innovations produce new markets and business opportunities. Such an innovation is also described as a radical or disruptive innovation; however, implementation of intellectual property rights totally depend on the market strategies and policy making of each country.

The prime limitation of the present study was the limited data access in the short span of time. Various other tools/ techniques of data collection could have increased the scope and depth of the analysis in the present research. With the progress of the study, the scope and depth of discussions will be refined and it would be more focused on the objectives of the study. Moreover, some of the respondents answered casually, which has a direct effect on the study.

Present research, however, was systematically designed to find out prime important areas of concerns, such as why and how the entrepreneurs should acquire intellectual property rights. What challenges are they facing in its protection and how far are they successful? As a new entrepreneur, what is their duty regarding the protection of IP, as well as in identifying the challenges faced by the business organisations and assessing the degree of its violation? In the present research, due to time constraints Trademarks Protection and its implication were emphasised. In future, the whole range of Industrial Property Rights can be studied, to evaluate the prospects and implications of the same on business enterprises.

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