

Empirical Evidence on Hold-Up in India: An Analysis of ICT Sector

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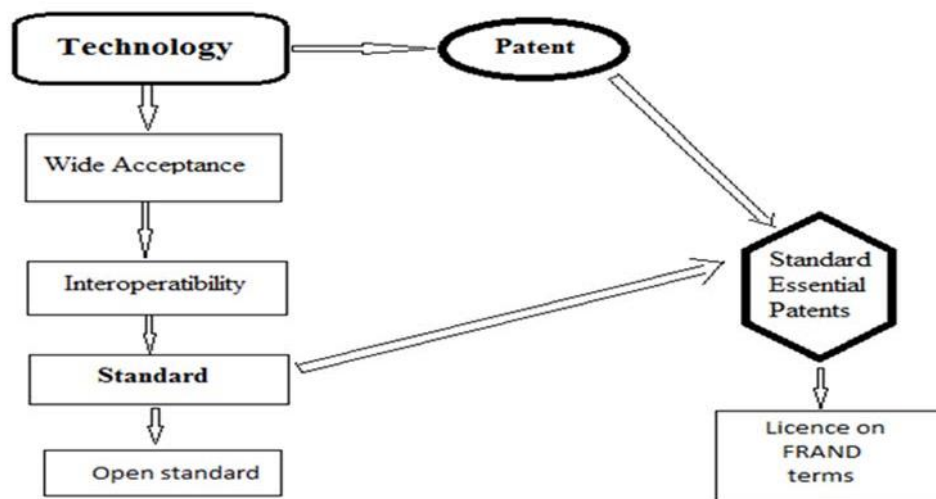
ABSTRACT

The present paper seeks to analyze whether hold-up as a phenomenon exists in the Indian ICT sector. An analysis with respect to the empirical evidence pertaining to presence of hold-up in the Indian ICT sector on the basis of certain factors which have been elucidated in a lot of scholarly works. It was found that there is a clear absence of hold-up in the Indian ICT sector. On an analysis of all the factors through empirical data, it was found that there is a presence of Indian manufacturers at around the years 2012-16, although they had perished in terms of lower sales in the face of stiff competition from foreign manufacturers. If there would be presence of hold-up, then one of the factors which would have shown up would have been lesser number of players entering the Indian ICT market. Statistics have shown that till the year 2019 there were a considerable number of manufacturers entering the Indian ICT sector (mobile manufacturing sector). These manufacturers have also brought along with them a considerable range of newer products which have appealed the domestic consumers in India. This shows that the phenomenon of patent hold-up is absent in Indian ICT sector. The statistics show that from the year 2012-2019 onwards there has also been large increase in the sales of mobile phones which negates the presence of hold-up. The data showcases that all the major holders of the patents are non-Indian companies in the Indian ICT sector. Further the data also shows that the average cost of mobile phones have been constant for a considerable period of time. This shows that despite large number of foreign companies having a substantial number of patents, the average cost of handsets have not risen. Thus, the impact of hold-up as a phenomenon has not shown up in the Indian ICT sector. It was also found that domestic companies in India have negligible R&D investments which can be said to cause low or negligible patent portfolios which lead to poor indigenous innovation on the part of domestic manufacturers which is also not attributable to the phenomenon of patent hold-up in India. Thus it can be clearly absent in the Indian ICT sector.

Keywords: Hold-up, Information and Communications technology, Patents, Standards.

I. INTRODUCTION:

The scope of Intellectual Property has widened in today's scientific and technical age and increasingly the importance of standardization has been felt. It is this standardization that allows the devices to inter-operate i.e. it allows the devices to perform with each other. A standard being those sets of technical specifications which lay down rules, guidelines or characteristics for a product or process. In order to perform with each other comfortably the devices need the standards. Interoperability i.e. the ability of the devices to function with each other is one of the key features of standards. India has also benefitted from the standardization process and it has also followed the global standards through launching of its own Standards Development Organization (SDO) which manages the standards in India by the name of Telecom Standards Development Institute of India (TSDSI) in 2013. The following chart shows the process through which standardization is done through to grant a patent on FRAND (Fair, Reasonable and Non-discriminatory) terms.



The Indian ICT sector has seen the participation of several multinational companies like Ericsson, Samsung, Nokia and domestic mobile manufacturing companies like Lava, Intex, Micromax etc who use these standardized technologies. A Smartphone can consist over two million patents which are patented by few technology companies in these standardized technologies. Several data figures also show that the patent portfolios of largely the multinational companies are there within the standardized technologies. These companies declare voluntarily the patents which they believe to be essential and make these available to potential licensees on FRAND (Fair, Reasonable and Non-discriminatory) terms during the standardization process before the Standard Setting/Development Organization.

There are industry reports which have studied the number of patents granted in the Europe and the US standing at a staggering seven million patents. In India, for the year 2019-20, the Indian Patent Office received Five thousand four hundred forty five (5445) patent applications from Huawei, Qualcomm, Samsung, Oppo and Ericsson cumulatively in the area of Information and Communication Technology (ICT) out of total of twenty eight thousand

applications for patents received at the Patent Office. A majority of the patents filed and being granted are to these foreign mobile manufacturers in contrast to the local handset manufacturers. As a result, a lot of litigation has arisen of late in India wherein it has been alleged on the part of domestic Smartphone manufacturers that multinational companies who own a large number of patents of the likes of Ericsson, Qualcomm are making them pay an unreasonable amount of royalty for each and every patented component inside the Smartphone as a phenomenon also known as royalty stacking. India may have become the second largest market for selling of smart phones in India yet, the manufacturing in this sector in India comprises of imports of components greater than 50% as in the year 2018. Indian handset manufacturers mostly import handsets and handsets are only assembled here.

There are a large number of handset manufacturers in India and across the world who are getting the benefit of such standardized technologies which enable them to make massive profits. As per the report of Investment Banking Company Credit Suisse, the operating profits increased three times between 2013 and 2017, reaching unto five billion US Dollars. There is a direct impact of these standard essential patents as they are used by the implementers or licensees of these patented technologies which are being developed by standard essential patent holders. The IPR policy in India needs to balance the seemingly diverging interests of these Standard Essential Patent holders and the licensees or implementers of these patents.

II. HOLD-UP OR HOLD-OUT: THE TRUTH IN THE INDIAN ICT SECTOR?

A pertinent concern regarding the use of these patented technologies is how these technologies are allowed to be used by the patentees and how is it being utilized by the licensees. That is where the question of hold-up has been labelled by economists which is defined as *the ability of a holder of a SEP to demand more than its patented technology* and also as *“when the holder of a SEP demands excessive royalties after companies are locked into using a standard”* arises. On the other hand, we also have the issue of hold-out or “reverse hold-up” coined by some other economists refers generally to the *“practice of firms on a regular basis ignoring patents and resisting patent demands as the likelihood of getting caught is negligible”*.

The potential conflict situation arises when firms engaging in bona fide negotiations and try to enter into delaying tactics successfully thus gaining profit from the weak or loose IPR protection, which are the cases where there is nil chances of patent holders getting injunctions or exclusion orders against a patent implementer even in the scenario wherein the latter has chosen to reject the FRAND (Fair, reasonable and non-discriminatory terms) offer, thus creating a situation of hold-out problem.

Now these are the concerns which have been voiced by the economists and these practices especially pertaining to hold-up remain to be empirically examined in the Indian Information and Communication technology sector scenario. Whether it is a commonly used practice or it remains as a myth will be examined within the scope of this paper through data.

III. CHECKING THE EXISTENCE OF HOLD-UP: ANALYSIS OF FACTORS AND DATA

A. ANALYSIS OF FACTORS:

Several scholars working in the area of hold-up have proposed a set of factors that can be verified to look into the issue of whether the hold-up is increasing or decreasing hold-up across information and communication technology sector. If within certain sector, there is a potential hold up situation if there will be; i) a rise in consumer prices pertaining to mobile handsets if it is the area of ,

ii) The rate of competition or innovation with respect to newer technologies will be low as large number of companies will be looking to exit production chain,

iii) The rate at which new products will be offered in a particular market will be low

iv) The number of patents being registered would be low.

The data obtained from licensing agreements to show very high royalty rates can also be a good factor to decide on existence or non-existence of hold-up.

Further, there are other factors which can be used for determining the existence of royalty-stacking in India, there can be an existence of royalty stacking if:

- a) Number of devices sold each year has fallen over a period of time;
- b) Average selling price for each device has risen over a period of time;
- c) Number of handset device manufacturing firms have decreased over a period of time;

If the average gross profit margins for the implementers of these standard essential patents have decreased or remained low, then it can also be a factor in assessing the presence or absence of hold-up respectively.

B. EMPIRICAL EVIDENCE ON THE FACTORS:

The researcher has during the course of his research identified the factors as provided earlier and has provided empirical data with regards to the factors.

I. Consumption of Telecom Equipments and Handsets devices:

The demand with respect to telecom-equipments is expected to grow upto two hundred million shipments in the year 2022. It has increased at a whopping rate of one-hundred twenty nine percent (129%) . Even during the covid-19 pandemic, this particular sector has shown resilience and the demand for these handsets was consistently high.As of the year 2013-14, the import of telecom equipments had stood at Rs.685,093 trillion, while importing Rs 195792 trillion of equipments, being just merely 28.6% of annual imports. India's imports have grown at the rate of 16.3% annually with 90% if the imports from China, Europe and USA.

With respect to handsets demand in India, it is strongly being driven by consumers. Most of these handsets don't have a long shelf-life (2-3 years) and require comparatively less amount of maintenance with respect to telecom equipment, this in turn incentivizes more handset manufacturers to enter the market. As a consequence of which, there are about more than hundred handset brands selling products through both online and offline mediums.

The following figures represent the increasing demand of consumers for handsets from the year 2012-2019, as visible from the figures there is a constant increase in the number of manufacturers and the presence of a large number of handset manufacturers as well.

Market share of mobile phone manufacturers in India in 2012

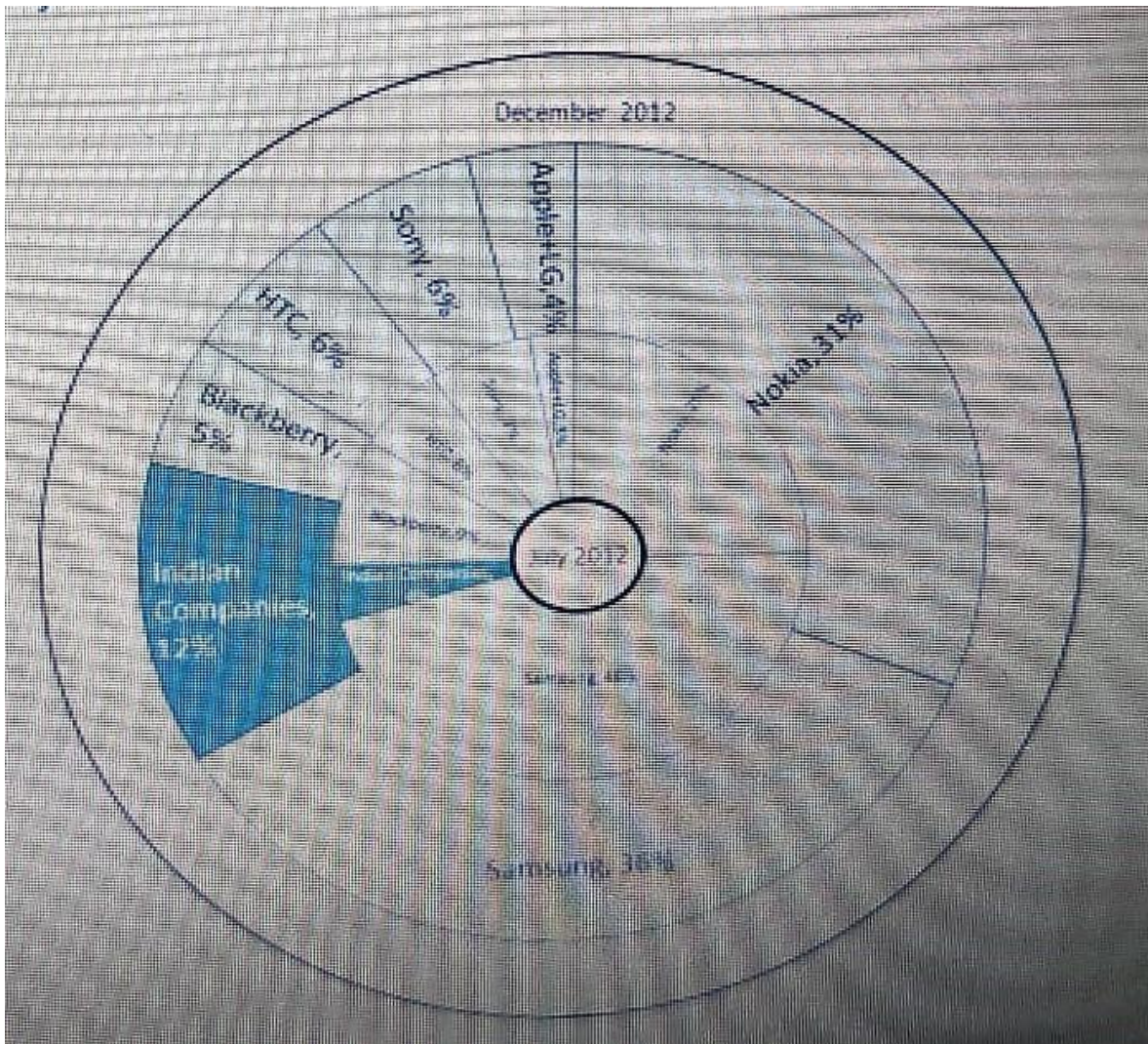


Figure.1

Source: IPSOS Business Consulting 2013

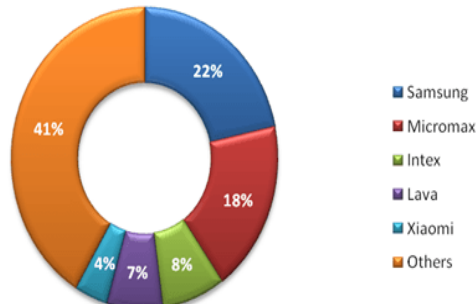


Figure.2

Figure.3

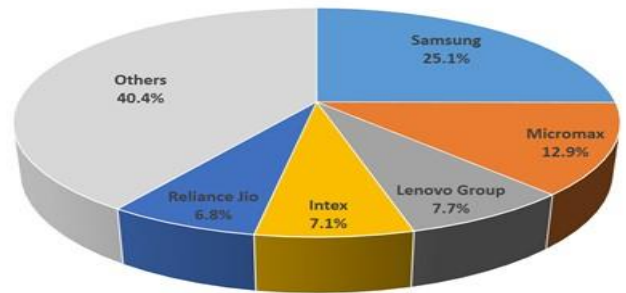
Figure.4

Smartphone Vendor Share in India Q4 2014



Source: IDC Asia Pacific Quarterly Mobile Phone Tracker, Q4 2014

Indian Smartphone Market Share by Vendor, Q2 2016

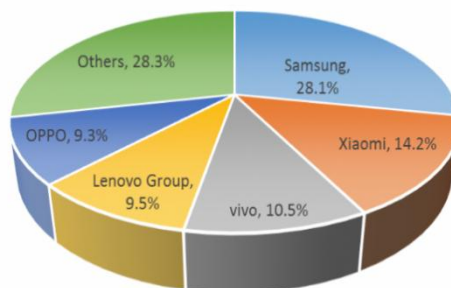


Source: IDC Asia/Pacific Quarterly Mobile Phone Tracker Q2 2016

Note – Lenovo Group includes Lenovo and Motorola



Top Five Smartphone Companies in India Market Share, Q12017



Source: IDC Quarterly Mobile Phone Tracker, May 16, 2017

Notes:

- The "Company" represents the current parent company (or holding company) for all brands owned and operated as subsidiary.
- Lenovo Group includes all three brands, namely Lenovo, Motorola and ZUK

Figure.5

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Xiaomi, Hui, Oppo, Vivo & OnePlus were the fastest growing smartphone brands during Q3

India Smartphone Shipments Market Share (%)	2016Q1	2016Q2	2016Q3	2016Q4	2017Q1	2017Q2
Samsung	29%	26%	22%	24%	27%	23%
Xiaomi	4%	4%	6%	9%	13%	16%
vivo	1%	4%	5%	10%	12%	13%
Oppo	2%	3%	4%	8%	10%	10%
Micromax	17%	14%	10%	5%	5%	5%
Motorola	2%	2%	3%	3%	3%	4%
others	45%	47%	50%	41%	29%	29%

Table.1

Source: Counterpoint-India Smartphone Share: 2016 Q1 – 2017 Q3



India Smartphone Market, Top 5 Companies, Shipment in Millions, Market Share, Year-on-Year Growth, 4Q19

Company	4Q19 Shipment Volumes	4Q19 Market Share	4Q18 Shipment Volumes	4Q18 Market Share	Year-Over-Year Unit Change (4Q19 over 4Q18)
1. Xiaomi	10.7	29.0%	9.3	26.4%	15.9%
2. vivo	6.9	18.8%	3.5	10.1%	96.5%
3. Samsung	5.7	15.5%	6.8	19.3%	-15.4%
4. OPPO	4.8	13.0%	2.6	7.3%	88.4%
5. realme	4.7	12.8%	2.7	7.8%	74.1%
Others	4.1	10.9%	10.1	29.1%	-60.7%
Total	36.9	100.0%	35.0	100.0%	5.5%

Table.2

Source: India smartphone market saw 152million shipped units in 2019: IDC

Over a period of time from 2012-2019, the researcher found that the following:

- a) There is a presence of Indian manufacturers at around 12%, 30%,56% respectively in the years 2012,2013 and 2014.Subsequently it decreased to 19% in the year 2016, and constituted a mere 6% in the year 2017.In the year 2019, it was at a negligible percentage. The loss of market percentage was attributable to low cost, better feature loaded smart phones especially by Chinese mobile manufacturers.The domestic

- manufacturers clearly perished in the presence of strong competition of foreign handset makers that being a clear sign of competitive forces at play in the ICT market.
- b) If there would be presence of hold-up, then one of the factors which would have shown-up would have been lesser number of players entering the Indian ICT market. Statistics have shown that till the year 2019 there were a considerable number of manufacturers entering the Indian ICT sector (mobile manufacturing sector). These manufacturers have also brought along with them a considerable range of newer products which have appealed the domestic consumers in India. This shows that the phenomenon of patent hold-up is absent in Indian ICT sector.
- c) If there would be presence of hold-up, then the factor of decrease in the sales of handsets in the domestic ICT sector. The statistics show that from the year 2012-2019 onwards there has also been large increase in the sales of mobile phones being sold in Indian ICT sector. This shows that the phenomenon of patent hold-up is absent in Indian ICT sector.

II. Total number of Patents granted to mobile handset manufacturers

Indian Patents and Applications in Telecommunications: Top Assignees (2000-2022)

The data available is till the 1st of January 2022.

ASSIGNEE	NATIONALITY	TOTAL PUBLISHED INDIAN APPLICATIONS AND ISSUED PATENTS
Qualcomm	United States	16,138
Ericsson	Sweden	7,349
Nokia	Finland	3,107
Huawei	Chinese	6,733
Microsoft	United States	5,227
Lava	Indian	0
Intex	Indian	1
Karbonn	Indian	0
Micromax	Indian	0
Spice	Indian	0
Samsung	South Korean	9,442
Oppo	Chinese	2,430
Vivo	Chinese	316

Table.3

Source: ipindiaservices.gov.in

- i) The findings of this research are consistently showcase dismal number of patents granted to domestic firms. As of 2021, a total of 13 handset manufacturers had

applied and got patented 50,443 patents out of which Indian manufacturers just had 1 patent.

- ii) Qualcomm Inc. based out of United States of America had the highest percentage of patents granted in its favour standing at 32% of the total successful patents granted. It was followed by Samsung at 18.71% of the successful patents granted. Ericsson and Nokia had 14.5% and 6.1% of the successful patents granted. The Chinese Manufacturers consisting of Huawei, Oppo and Vivo had a total consolidated 18.71% of total successful patents granted.
- iii) These statistics showcase that the all the major holders of the patents are non-Indian companies in the Indian ICT sector. The patents that have been granted are widely dispersed amongst all the 9 major non-Indian companies.

III. Average price of each handset:

The average value of each handset in India stands at roughly \$186(Rs. 14,068) for a period of ten years from 2010-2021. Other set of data also points out that the average cost of mobile handsets in India stands at roughly \$159(Rs. 11,263) to \$186(Rs. 14,068).

These statistics show that the average cost of mobile phones have been constant for a considerable period of time. This shows that despite large number of foreign companies having a substantial number of patents, the average cost of handsets have not risen. Thus, the impact of holdup as a phenomenon has not shown up in the Indian ICT sector.

METHODOLOGY: The methodology that was employed during the course of this research to assess the patent landscape of Indian ICT sector, the research conducted a search strategy of the Indian Patent Office (IPO) which has its data base online at <https://ipindiaservices.gov.in/PublicSearch/PublicationSearch/Search> with regards to the total number of patent applications which have been received and granted.

IV. Excessive Royalty fees paid on an average

The research conducted with respect to the royalty payments made by the users of FRAND based licensing of key patented technologies in manufacturing of telecom equipments. Annual reports filed by domestic telecom manufacturers at the Ministry of Corporate Affairs(MCA) website have shown that from the year 2010-2020 , there has been no substantial payment made for royalty fees payment. The MCA filings for 14 major telecom companies out of 17 telecom companies have not made any royalty fee payment at all. The annual submissions made to the MCA reveal that only a few companies have made low royalty payments .For instance, Tejas Networks which had secured a license for use of optical technologies from CDOT by paying Rs.0.15 crores (0.036% of the total revenue in the year 2013-14) and Rs.0.09 crores (0.022% of the total revenue in the year 2014-15). Nelco, another user of the patented technologies paid Rs.1153 lakhs to CDOT (8.3% of the total revenue for the year 2015-16).

Questionnaires sent to pertinent handset manufacturers in the Indian ICT sector remained unanswered as they were unwilling to divulge specific details owing to non-disclosure agreements which remain an integral part to FRAND licensing procedure, although the Competition Commission of India (CCI) had previously declared that use of non-disclosure agreements was an anti-competitive practice as per the Indian Competition Act, 2002.

Several global research reports show that aggregate royalty rates paid by users of patented technologies has been reasonable. Globally, there has been competition in the mobile phone market with more than a hundred different mobile brands who have been selling their mobile phones through online and offline modes. The standard royalty rates globally did not exceed 5% of the mobile handset revenues. Prof. Stephen Haber, working in the area of Standard Essential Patents in his research papers found that global payments on royalty fees have been less than 3.5%. A look at the balance sheets of active licensors shows that the global average of licenses granted and payments received in lieu of that have been less than 3.5% of the gross revenues.

Thus on the basis of the facts elucidated above, the researcher argues that the licensees do not pay any excessive or exorbitant royalty fees and thus it constitutes an absence of hold-up in the Indian ICT sector.

C. ANALYSIS OF EMPIRICAL DATA:

There is a disparity in patent portfolios and holdings as between Indian companies and non-Indian (foreign) companies. There are lot of firms which operate which operate in the Indian ICT sector. Indian ICT sector has heavy patent portfolios which belong to foreign companies, whereas Indian companies have almost nil patents.

It is imperative to understand why the domestic companies fail to gather patents in comparison to foreign companies. The domestic companies need to be less import-reliant in creating newer products and start manufacturing their own products through research and innovation (R&D) over which they would be able to obtain their patents over which and also thus be able to contribute to the standardization process.

During the course of research the data over the top seventeen manufacturing companies based on market capitalization for the year of 2015-2016 shows that companies on an average spend 2 % of total expenditure on R&D and 1.9% of the total sales revenue on R&D. On the other hand, foreign companies like Ericsson spend about 15% of the total revenue on R&D. The table below illustrates the figure for the same.

It is attributable that these companies have negligible R&D investments which can be said to cause low or negligible patent portfolios and poor indigenous innovation of domestic manufacturers.

Percentage of revenue spent on R & D by major licensees in India

r	Name of the company	Revenue RS millions	Total Expenditure RS millions	R & D Expenditure RS millions	% of R&D Expenditure to total Expenditure %	% of R&D Expenditure to total sales revenue %
1	Bharti Infratel limited	62345	42502	0	0	0
2	Honeywell Automation India Limited	22109.5	19893.1	0	0	0
3	Nelco	1385.3	1385.5	0	0	0
4	Spice Mobility	1672.42	1717	0	0	0
5	Astra Microwaves Products Limited	4279.6	3566.2	311.6	8.74	7.28
6	MiC Electronics Limited	2210.2	1816.81	6.22	0.34	0.28
7	Valiant Communications Limited	142.57	135.48	14.58	10.45	10.23
	Aishwarya Technologies and Telecom					
8	Limited	473.8	319.85	0	0	0
9	GTI Infrastructure Limited	6314.46	10722.4	0	0	0
10	Aplab Limited	718.5	894.3	6.42	0.72	0.89
11	ITI Limited	16745.1	15328.7	336.1	2.19	2.01
12	GTI Limited	12812.9	19017.4	66.5	0.35	0.52
13	Punjab Communications Limited	294.5	305.6	0	0	0
14	ADC India Communications Limited	606.8	551.4	0	0	0
15	Precision Electronics Limited	260.08	285.11	0	0	0
16	HFCL	25914.8	23625.1	0	0	0
17	Tejas Networks	6290.1	6019.9	681.2	11.32	10.83
					34.10904304	32.03796007
					2.006414796	1.864585687
				17 companies		
				7 companies	4.872720434	4.576851439

Source: Annual Reports of 2015-16 of the respective companies

Table.4

D. Effect of standardization:

Standardization and its benefits: Standard Essential Patents are those patents which claim those technologies that are required to operate a technical standard, the use of which has been approved widely in a particular industry. It becomes mandatory to use the patent in order to access the technical standard. In order to implement the use of a standard, the Standard Setting Organizations will require the members of that organization to reveal any known as well patented technologies which they have got with respect to that technical standard. They will also mandate the patentee to agree to license on certain terms known as FRAND (Fair, Reasonable and Non-discriminatory) terms to the potential licensees or implementers of the patented technical standard. This is done to ensure that the technology does not remain locked-up (monopoly) and remains widely available to all those who would want to use the technology. Courts have decided that FRAND terms cannot be cast in stone and they remain subject to the terms and conditions in each and every case.

The potential and perennial conflict which remains is the terms and the price at which the patentee would want to make the patented technical standard available to the implementers and also whether the implementers would want to use them taking the consent of the patentees at the said terms and price.

There is also a larger question which remains are that does standardization actually lower or increase the cost of patented devices?

Several research studies have pointed to the fact that the companies which contribute to the standard specifications and thereafter make the technologies actually offer a good opportunity to the implementers in achieving their business objectives in a particular sector. The standard development process remains very open as all the details regarding the meetings, minutes of it, delegates' details and specifications remain openly accessible.

Due to standardization, India became the second largest in the world in mobile telephone market and fourth largest in Asian market in mobile infrastructure. In India there have been one billion subscriptions due to the robust demand from the standardized technologies and these devices. ICT Industry has got to the potential to bring changes in the society. ICT Industry has the potential to create jobs in the economy. A study according to British Standards says that standards contribute on an average from 0.3-0.9% to the GDP.

Standardization and competition: There are several statistics available which show that the patent portfolios of companies which are associated with the standardization. These patentees are voluntarily agreeing to declare their patents which they believe to be essential to a standard and making them available to implementers on FRAND terms.

A number of companies invest huge funds towards R&D in creating standards. A standard when created provides potential opportunities to numerous firms to manufacture standardized devices which in turn lead to a larger public demand. Towards the end of 90's roughly eighty five (85%) percent of the GSM market (which majorly formed the basis for connectivity) belonged dominantly to four major companies namely Ericsson, Nokia, Siemens, Motorola and Alcatel.¹ Today, globally there are more than 300 handset manufacturers who are benefitting from standardized technologies enabling their businesses to make huge profits. According to Credit Suisse, handset manufacturer operating profits tripled, between 2007 and 2013, reaching U.S. \$51 billion.

The value of essential patents directly flows to the implementers/manufacturers as they are able to use the technologies, developed by essential patent holders, which drives the consumer demand for their devices. Improvements on existing standards are important to further the objectives of "Digital India" and "Make in India" programme enabling SME and Start Up Sector to make use of such technological revolution.

IV. CONCLUSION:

This research paper tried to analyze the empirical evidence pertaining to presence of hold-up in the Indian ICT sector on the basis of certain factors which have been elucidated in a lot of scholarly works. It was found that there is a clear absence of hold-up in the Indian ICT sector. These factors are enlisted as; if within a certain sector that there is a potential hold up situation if i) There is a rise in consumer prices pertaining to mobile handsets, ii) The rate of competition or innovation with respect to newer technologies will be low as large number of companies will be looking to exit production chain, iii) The rate at which new products will

¹Bekkers R, Duysters G and Verspagen B, Intellectual property rights, strategic technology agreements and market structure. The case of GSM, Research Policy, September 2002, 3, p. 1146.

be offered in a particular market will be low and iv) The number of patents being registered would be low.

Other factors which have been highlighted are v) data obtained from licensing agreements to show very high royalty rates in deciding on existence or non-existence of hold-up and vi) number of devices sold each year has fallen over a period of time; vii) average selling price for each device has risen over a period of time and viii) number of handset device manufacturing firms have decreased over a period of time.

On an analysis of all the factors through empirical data, it was found that there is a presence of Indian manufacturers at around the years 2012-16, although they had perished in terms of lower sales in the face of stiff competition from foreign manufacturers. If there would be presence of hold-up, then one of the factors which would have shown-up would have been lesser number of players entering the Indian ICT market. Statistics have shown that till the year 2019 there were a considerable number of manufacturers entering the Indian ICT sector (mobile manufacturing sector). These manufacturers have also brought along with them a considerable range of newer products which have appealed the domestic consumers in India. This shows that the phenomenon of patent hold-up is absent in Indian ICT sector.

The statistics show that from the year 2012-2019 onwards there has also been large increase in the sales of mobile phones which negatives the presence of hold-up.

The data showcases that the all the major holders of the patents are non-Indian companies in the Indian ICT sector. The patents that have been granted are widely dispersed amongst the entire 9 major non-Indian companies; this clearly negatives the presence of hold-up in Indian ICT sector.

Further the data also shows that the average cost of mobile phones have been constant for a considerable period of time. This shows that despite large number of foreign companies having a substantial number of patents, the average cost of handsets have not risen. Thus, the impact of holdup as a phenomenon has not shown up in the Indian ICT sector.

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It was also found that domestic companies in India have negligible R&D investments which can be said to cause low or negligible patent portfolios which lead to poor indigenous innovation on the part of domestic manufacturers which is also not attributable to the phenomenon of patent hold-up in India. Thus it can be clearly inferred that patent hold-up is absent in Indian ICT sector.

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