CRIPPLING EFFECT OF THE INADEQUACY OF PATENT LAW ON THE RISE OF THE INTERNET OF THINGS.

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INTRODUCTION

Imagine a situation wherein you could switch on the air conditioner before you could reach your house or turn off the lights even after you had left home or open the door for your companions even when you are not at home. [1] Now keep in mind another scenario, where your washing machine reminds you to purchase washing powder from the supermarket and along with this it also notifies your automobile's GPS system the directions to the grocery store, wouldn't that be something to ponder about? [2] This is what we call the Internet of Things (IOT).

The Internet of Things ensures the possibility of one object to connect with another via the internet. The European Research Cluster on the Internet of Things has defined the Internet of Things as "*a dynamic global network where in physical and virtual 'things' have identities, use intelligent interface, and are seamlessly integrated into the information network*". [3]

In an era of fast moving technology there seems to be a rapid movement towards innovation. Therefore, upgrading the logical and mechanical bases of developing nations requires the formulation of an administrative and legal policy framework adequately providing for incentives to foster innovation. Some consider Internet of things to be the next technological revolution, while others believe that it will lead us into a darker era of surveillance and security concerns. [4] This paper shall focus on the usage of IOT *vis-a-vis* patent law in India.

Patent is a right to exclusive manufacture, use or sale of invention and to use or sale a patented invention without the permission of the patentee is an infringement of the patent, regardless of whether the infringer copied the inventors ideas or discovered them

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[1] Andrew Meola, *The internet of things devices, applications and examples* (Dec. 19, 2016), available at http://www.businessinsider.com/internet-of-things-devices-applications-examples-2016-8?IR=T (Last visited on 12 March, 2017).
[2] Hyunjoo Jin and Paul Lienert, *Global Patents reflect advances in connected and self-driving cars* (Jan. 19, 2015), available at http://www.reuters.com/article/us-autos-patents-innovation-idUSKBN0KS1TU20150119 (Last visited on 16 February, 2017).
[3] *IERC European Research Cluster on the Internet of Things*, available at http://www.internet-of-things-research.eu/about_iot.htm (Last visited on 2 February, 2017).
[4] Greenberg, Andy, *Hackers Remotely Kill a Jeep on the Highway—With Me in It* (July 21, 2015), available at http://www.wired.com/2015/07/hackers-remotely-kill-jeep-highway/ (Last visited on 17 March, 2017).

independently.[5] Obtaining a patent right is difficult and in the IOT technology all the inventions would comprise of software and it would be far more difficult to obtain a patent in such a scenario, as **software is not patentable** *per se* in India.[6]

The second problem would be that of obtaining standard essential patents (SEP). For Internet of Things to work flawlessly, **interoperability** would be fundamental. If a standard is declared essential for a product, a barrier to entry into the Internet of Things would be created. If the owner of the standard refuses to offer a license, it may force third party users to either infringe upon such patents or pay exorbitant license fees as demanded by the patent holders. To avoid such a scenario the holders of S.E.P. would be obliged to provide a license of the patented technology on 'Fair, Reasonable, and Non-Discriminatory' terms. (F.R.A.N.D.) [7]

Part I of this paper describes the growing importance of Internet of Technology in the present era. Part II deals with the threshold that needs to be established for obtaining a patent. Part III is concerned with regulation of the patent once it has been granted. Part IV is the conclusion to the article.

GROWING IMPORTANCE OF INTERNET OF THINGS

The usage of network to connect an object/appliance at any place and time to another object/appliance is the Internet of Things. The attention to the concept of IOT is recent, however the term itself was first coined over 15 years ago.[8]

Artificial Intelligence has shifted from just being in science fiction to our daily use objects. An example of a smart IOT device would be the *Amazon Echo* speaker. Amazon launched a voice enabled speaker device which was capable of performing tasks other than just playing music. *Echo* is connected to a virtual voice service named *Alexa* which performs tasks

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[5] Alan N. Durham, *Patent Law Essentials*, 14 (3d ed., Oxford Press 2009).

[6] The Patents Act, 1970 § 3(k).
[7]Jin, *supra* note 2.
[8] Alex Wood, *The Internet of Things is revolutionising our Lives, but Standards are a Must*, The Guardian, March 31, 2015.

ranging from playing music to switching off bathroom lights just at the sound of your voice. It is a multi-functional device which doesn't let you move a finger to control your house.[9]

Another example of a smart IOT device is *iBeacon*. It was an IOT platform launched by Apple. It allows the communication between sensors and a smart phone. For instance, an iBeacon sensor placed in front of a store, can give you a list of discount coupons available and the option of a desired item to the customer. [10]

Devised to change India into a worldwide manufacturing centre wherein innovation and up gradation in technology would run simultaneously, **Make in India** was embraced in 2014 to encourage development and innovation. [11] The existing IPR policy that is undertaken by the Government has yet not addressed longstanding hesitations over India's lack of effective IPR enforcement. However, there is a need for a more detailed analysis of the IPR policy in context of the upcoming innovations in technology.

USE OF PATENT SYSTEM IN INTERNET OF THINGS

SOFTWARE PATENTS

The Patent law was expected to apply to '*everything under the sun made by man.*'[12] For more than one century, patents have been granted to innovators as a reward for their investment in terms of capital, time et al. It began with Martin Goetz, a programmer and product manager at Applied Digital Research (ADR), a reputed software firm, which was awarded the first software patent ever. [13] 52 years have passed since the event of 1965, but software patenting is still surrounded with uncertainties. So, why did software patent become an exception to this?

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[9]   Jesus Rodriquez, *Is amazon Echo the next enterprise IOT platform?* available at http://www.cio.com/article/3047524/internet-of-things/is-amazon-echo-the-next-enterprise-iot-platform.html (Last visited on 29 March, 2017).

[10] Hari Gottipati, *WithiBeaacon Apple is going to dump on NFC and embrace the Internet of things,* https://gigaom.com/2013/09/10/with-ibeacon-apple-is-going-to-dump-on-nfc-and-embrace-the-internet-of-things/ (Last visited on 22nd March 2017).

[11]*Make in India* (2014), http://www.makeinindia.com/about (Last visited on 13 March, 2017).

[12] Senate Report No. 1979, *82d Congress2nd Session*, p. 5 (1952).

[13] Martin Goetz, *Do the Wright Brothers Deserve a Patent for their Flying Machine?*: *Why Eliminating Software Inventions from the Patent System Makes No Sense* (April 4, 2013), available at http://patentlyo.com/patent/2013/04/do-the-wright-brothers-deserve-a-patent-for-their-flying-machine-why-eliminating-software-inventions-from-the-patent-system.html (Last visited on 14 March, 2017).

The term *Computer Related Invention* (C.R.I.) has not been statutorily defined in any Indian, U.S. or European statute. The rules for Examination of Computer Related Inventions, Indian Patent Office, 28 June 2013 express that C.R.I. is: "*any creation which includes the utilization of a computer or a computer network or programmable apparatus and incorporates within such a creation the use of computer programme/s.*"[14]

There could be numerous possible definitions for software patents. One of them is: *"If in the disclosure of the invention, there is a description of a computer program (in whole, or in part) then the patent would be called 'software patent'."*[15]

This is one of the most debateable topics in patent law, since an unreasonably easy going approach in granting patent for these kinds of inventions may open the doors for a twofold protection[16]: copyright and patents.

A. Patentable subject matter

With the advent of the **Make in India** initiative there has been a rise in the small software developers and the 2015 guidelines[17] were an attempt to broaden the scope of patentability of software which proposed that a piece of software would be granted patent on the condition of possessing a '*technical contribution on a process which is carried on outside the computer*'[18]. This is significant as the same notion to allow patents for programs having technical application was unacceptable in 2005. These guidelines were held to be inconsistent with the provisions of the Patents Act.

On a demand made by numerous civil society organisations, the patent office had reviewed the 2015 Guidelines which were against the statutory arrangements bringing about a surge of patents being granted in the field of software and henceforth issued a new set of rules (2016 CRI rules) which were in consonance with the statutory provisions. These fresh guidelines

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[14] Guidelines for Examination of Computer Related Inventions, IPO, 2013.
[15] Innovation everywhere, *Make in India meet 5 promising start ups*, available at http://www.innovationiseverywhere.com/make-in-india-meet-5-promising-internet-things-startups-bangalore/ (Last visited on 12 March, 2017).
[16] Indian Copyright Act, 1957 § 2(ffc).
[17] Office of the Controller General of Patents, Designs and Trademarks (2013), *Guidelines for Examination of Computer Related Inventions (CRIs),* http://www.ipindia.nic.in/writereaddata/Portal/IPOGuidelinesManuals/1_36_1_2-draft-Guidelines-cris-28june2013.pdf (Last visited on 19 March, 2017).
[18] *Id.*

introduced the fact that software patent would not be granted if '*contribution lies only in the algorithm*' and the authorities should only proceed further with the application if the claim is a '*conjunction with a novel hardware*'.[19] In India, the criterion for awarding patent to software is possible only if it demonstrates a technical effect (similar to the European scenario).[20]

'*Patentability*' and '*invention*' are two different criteria's and for a patent to be granted both of these tests should be fulfilled. [21] In deciding whether a patent can be granted or not, Section 2(j) and Section 2(ja) have to be read with Section 3(k). [22] This basically states that for an 'invention' three essentials are needed –

1. It must be new, i.e., not having been anticipated.
2. It must be capable of industrial application. {Section 2(1)(ac)}
3. It must involve an inventive step, which means that it must have technical advance over existing knowledge and has been non obvious to a person skilled in art.

Along with this it must not fall under Section 3, Indian Patent Act, 1970. If these criteria's are satisfied then a patent can be granted. But as per the Act **Section 3 of Indian Patent Act, 1970** gives an exclusive definition of what is not patentable with respect to software programme. It states:

"*3.   What   are **not** inventions: k)   a mathematical   or business method or **a   computer programme per se** or **algorithms**;*"

Even as per Article 27.1 of TRIPS patents can be granted for any invention, in all fields of innovations provided they are new, non-obvious and have industrial application.[23]

In determining why software is not just an abstract idea the life cycle of software development has been emphasized upon - **(a)** definition stage in which the products usefulness and functionality, its specification, nature in which it works and its working attributes are portrayed; **(b)** design stage in which it is created and each interface is characterized and its functionality is separated into modules; **(c)** execution stage in which the

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[19] Office of the Controller General of Patents, Designs and Trademarks, *Guidelines for Examination of Computer   Related   Inventions   (CRIs)*   (Feb.   19   2016), http://www.dpahuja.com/pdf/CRI_Guidelines_21August2015.pdf (Last visited on 30 March, 2017).
[20] Swaraj Paul Barooah, *A look at Software Patents – I* (Feb. 28, 2014), https://spicyip.com/2014/02/guest-post-a-look-at-software-patents-i.html (Last visited on 17 March, 2017).
[21] *Novartis v. Union of India*, (2016) 6 S.C.C. 1.
[22] *Id.*
[23] The Agreement on Trade-Related Aspects of Intellectual Property Rights, Art. 21 cl 1.

item is debugged, tested and experiences quality affirmation; **(d)** delivery stage in which there is some testing, documentation and installation done along with training; **(e)** maintenance stage in which the company checks its defects and errors; lastly **(f)** improvement stage in which the product is improved, redesigned and new models are declared in market.[24]

In summary, software and hardware are exchangeable.[25] So why completely dispose of software from getting patent on assuming it to be just an abstract idea and nothing more than that? Has there ever been a debate about the patentability of an invention with hardware circuit? That is dubitable, keeping in mind that both hardware circuits and software are very much alike if reduced into a mathematical algorithm.[26]

B. Software patent in other jurisdictions

Article 52(2) (c) and (3) of the **European Patent Convention** does not recognise granting of patent protection to computer programs claimed '*as such*'. A Computer Invented Implementation (CII) patent may be granted if the program solves a technical problem in a novel and non-obvious manner. Emphasis has always been placed on the fact that for patent protection in Europe, inventions must have a technical character associated with it.

In particular, the model of acceptable set of claims is as follows: (1) method claim (2) apparatus/device/system claim (3) computer program (product) claim (4) computer-readable medium/data carrier claim.[27].

In *Re Vicom*[28] the Court held that cases applying for a patent right with the claim being in terms of a calculation would not be unpatentable if, helped in establishing a technical effect.

On the other hand, **U.S. statute** doesn't set out a thorough rundown of patented inventions that would be rejected unlike the European statute.

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[24] Martin Goenz, *Should software be patentable? That's the wrong question to ask* (Oct. 29, 2011), http://www.zdnet.com/article/should-software-be-patentable-thats-the-wrong-question-to-ask (Last visited on 16 February, 2017).

[25] U.S. Patent and Trademark Office, *Examination Guidelines for Computer-Related Inventions*, 1996.

[26] Goenz, *supra* note 27.

[27] European Patent Office, *Guidelines for Examination in the European Patent Office* (November, 2016), para.3.9.1, http://www.epo.org/law-practice/legal-texts/html/guidelines/e/index.htm (Last visited on 13March 2017).

[28] *In re Vicom*, 1987 E.P.O.R. 74.

Under **35 U.S.C. 101**, software is patentable in the United States only if it's unique, is attached to a machine (hardware) and encourages an arrangement of functionalities. [29] It is similar to the position in India where software '*per se*' is not patentable. However, in ***Diamond v. Diehr***[30] the rigid position of not giving a patent was made flexible, as it was held that the methodology to evaluate the temperature was patentable as a result of its **non-obviousness**, in spite of the fact that the claim required a computer to run a logical and scientific equation.

It can be broadly categorized that the U.S. Patent office and Europe Patent Office (E.P.O), both have different principles for protection of software. U.S. has an extensively more liberal approach and expresses that innovations in association with software are patentable just on the off chance that it is fit for changing the contribution to some valuable output. The E.P.O. awards patents to software; however, has a significantly more stringent approach i.e., if it is 'non-obvious' to a person skilled in the applicable field of innovation and furthermore has a 'technical effect'.

In India, the tussle has been continuing for quite a while now and the strategy that has been debated on has led to many high and low points with respect to software protection. The purpose behind giving the patent software in India is not the Computer program *'as such'* yet rather a technical outcome that the procedure can accomplish.

C. <u>Software patents in India</u>

In 2004 the Patents (Amendment) Ordinance was promulgated.[31] The ordinance divided the sub-section 3k into two sub-sections 3k and 3(ka). Section 3(ka) read as '*A mathematical method or a business method or algorithms*' and the amended section 3(k) read as '*Computer programme per se other than its technical application to industry or a combination with hardware.*'

The object was to create a balance between the contentions for and against the software patents. It was an attempt to broaden the scope of patentability of software. But inferable

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[29]35 U.S. Code, §101.
[30]*Diamond v. Diehr*, 450 U.S. 175 (1981).
[31] The Patents (Amendment) Ordinance, 2004 Ord. No. 7.

from the abundant challenges posed by the free software movement proponents[32], the statute was dismissed by the Parliament and henceforth replaced by the Patent (Amendment) Act, 2005.

Although, software is copyrightable in India but is that protection robust enough when **Section 52, Copyright Act, 1957** with wide exceptions to the non-use of the copyrighted work exists, whittling down the very protection?

Both elements of authorship and invention exist in computer programs. The Copyright Act, 1957 awards protection to unique expression with sufficient effort to make it original and computer programming is granted protection as a copyright unless it prompts a technical impact and is not a computer program *per se*. The software product business can come to an end if copyright protection is offered as patent law offers more protection to a software program than copyright. [33]

The meaning of '*inventions*' under the Patent Act because of rushed legislative procedures endures infirmity.[34] Section 2(j), Patent Act, 1970 characterizes an innovation as "*a new product or process involving an inventive step and capable of industrial application*"[35]. Shouldn't software with its capability to be applied industrially be rendered patentable? The reason to add '*per se*' to software program as stated by the Joint Parliamentary Committee while presenting Patents (Amendments) Act, 2002 was as follows:

"*A computer program usually incorporates certain other components, ancillary thereto or developed thereon (something that is needed to give effect to the program to achieve certain technical effect). Hence, software in itself can't be given protection.*"[36]

In a paper authored by *Bessen*, a negative relationship was established between increment in a firm's software patent and their R&D force, suggesting that such firms are substituting software patents for their R&D.[37] This movement leads to the fact that if accessibility to software patents is made easier, it will automatically lead to an increment in investment in R&D thereby resulting in profitable innovations having in its realm added gene sequences,

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[32] Free Software Foundation, *Representation Made by the Free Software Foundation of India to the Government of India to Immediately Withdraw the Patents (Amendment) Ordinance* (2004), http://fsf.org.in/representation/representation.html (Last visited on 17 March, 2017).
[33] Kahin, *The Software Patent Crisis*, Tech. Rev., 52 (1990).
[34] Shamnad Basheer, *India's Tryst with Trips: The Patents (Amendment) Act, 2005*, I.J.L.T. 1 (2005).
[35] Indian Patents Act, 1970 § 2(j).
[36] *Id*.
[37] Bessen James & Hunt Robert, *The Software Patent Experiment* (2004), http://www.researchoninnovation.org/softpat.pdf (Last visited on 16 February, 2017).

computer programs and methods.[38] In countries, like UK and India, software program has come under copyright protection, and in other jurisdictions, like the U.S.A. and Japan, it's ensured under both copyright and patent laws. [39]

The only problem that exists is to figure out which kind of approach is more plausible, given the potential conflict of interests of clients and providers. Although, protection that is awarded for a long period of time may in itself constitute a monopoly.

D. Software patent and the Internet of Things

Internet of things will provoke an increment in the applications for software patents and if appropriate rules are not laid down it could prove as a hindrance for the development of this sector. It is necessary to mention the patentability of simulations, given the developing significance of virtual reality, holographic projections, and enlarged reality.

In *Schaltkreissimulation Infineon Technologies*[40] simulations whose intention was to replace physical entities with virtual ones of a characterized class of technical items could be a utilitarian technical component and thus were covered under technical processes. Before this judgment the same was not covered in the meaning of technical process.

The IOT patents can be evaluated based on the fact that it actuates a reconstruction of ideas of novelty and inventiveness, majorly in two attributes: (1) arrangement of a structure: the way in which different gadgets operate and communicate could be an innovative method eligible for patentability; (2) the composite structure of devices: novelty may originate from the way the parts of a gadget relate. [41]

It is imperative to know that the **European Patent Office** acknowledged a situation, wherein the invention was admitted to be in a distributed computing environment, to some degree, similar to the Internet of things; making it non-excludable from patentability. [42] Doubtlessly it could be harder to document an application for an IOT patent, in correlation with a normal

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[38] *Id.*

[39] Vikrant Narayan Vasudeva, *Copyright-patent dichotomy in context of Computer Programs*, P.L. (2008).

[40] *Schaltkreissimulation Infineon Technologies* of 13 December 2006, EP:BA:2006:T122705.20061213 https://www.epo.org/law-practice/case-law-appeals/recent/t051227ep1.html (Last visited on 13 February, 2017).

[41] Guido Noto La Diega, *Software patents and the internet of things in Europe, the United States, and India*, EUROPEAN INTELLECTUAL PROPERTY REVIEW (2017).

[42] *Id.*

C.I.I. application, since IOT incorporates numerous technological aspects because of which covering all the components while filling for a patent application may get precarious.

However, it is emphasized that an invention should not be neglected essentially as a result of it being a computer program. Intellectual property must be protected unless it is just an abstraction. Furthermore, the individuals who wish to dispense with such patent would reject all robotic or medical gadget developments, for example, an innovation of a simulated retina which offers fractional vision for the visually impaired, where the disclosure includes a computer program.[43]

INTEROPERABILITY

In a market where the compilation of product A needs the technology patented by Company B for it to interoperable, the Internet of things will suffer. In the absence of interoperability the consumers would not prefer buying product A. At the moment firms are developing devices with IOT facilities that are limited to only interaction with different products of their own brand line, referred to as a *walled garden*.

Interoperability guarantees that products produced by various organizations and manufacturers are in a perfect synchrony with each other and can likewise lessen organizations' expenses of generation by making it less costly for them to obtain specialized data.[44] From the perspective of the consumers, interoperability amongst products will ensure them with a variety of products which in turn will help in realisation of the network effects.[45] The absence of a common platform will impede level interoperability (horizontal), that is, it will keep the application creators from using existing IOT foundation to make new applications for end clients.[46]

As per the McKinsey Report on '*The Internet of Things: Mapping the value beyond the hype*'[47] interoperability serves to be one of the essential components in the advancement of

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[43] Senate Report No. 1979, *82d Congress 2nd Session*, p. 5 (1952).
[44] Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting,* Innovation policy and Economy 119, 138 (Adam B. Jaffe, Josh Lerner & Scott Stern eds., 2001).
[45]*Id.*
[46] Swaroop Poudel, *Internet of Things: Underlying Technologies, Interoperability and threats of privacy and security,* Berkley Technology Law Journal, 31 (2) (2016).
[47] McKinsey Global Institute Report, *Unlocking the Potential of the Internet of Things* (June 2015), http://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/the-internet-of-things-the-value-of-digitizing-the-physical-world (Last visited on 20 February, 2017).

IOT. Of the aggregate potential esteem that can be attainted using IOT, 40% of this value, on average, requires various IOT frameworks to interoperate.[48]

The IOT market platform is fragmented and an example of this can be seen in organizations like Nest and I.B.M. coming up with innovative enhanced products to gain dominance in the market.[49] The problem with these enterprises is their greed for earning more profits and attaining dominance in the existing platform.

In many jurisdictions, copyright law fosters interoperability, either by allowing for a specific reverse engineering exception to owners' exclusive rights or by giving wide fair-dealing measures. [50] As the reverse engineering exception commonly operates, firm A may design a new product compatible with an existing product controlled by software owned by B, by first copying B's program in object or machine code form in order to understand how it works and what is required for it to interact with other software. A will then not infringe B's copyright provided no substantial amount of B's program is copied. However, this reverse engineering in copyright law may **not go very far** to promote interoperability. Firstly, some computer programs might enjoy protection under patent law as well. Secondly, some IP holders use technological protection measures to lock up their programs so that they cannot be lawfully reverse engineered without breaking the lock access to them. [51] Thirdly, would-be second-comers sometimes require access to more information that just the object code owned by the first owner in order to design an interoperable software product.

A. <u>Standard Essential Patents</u>

Standard setting organizations (SSO) are groups that set standards in a significant number of technologies. The main task of SSO's is to create standards that help in establishing an '*interface*' amongst products of different manufacturers. At times, Standard Setting

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[48] *Id.*

[49] Jennifer Booton, *I.B.M. Launches Internet of Things Division* (Sept. 14, 2015), available at http://www.marketwatch.com/story/ ibm-launches-internet-of-things-division-2015-09 [https://perma.cc/5ZWG-XXCV].

[50] E.U. Members States must comply with the Directive on the Legal Protection of Computer programs 91/250/E.E.C. of 14 May 1991, [1991] O.J.L. 122 in this regard.

[51] IAN EAGLES & LOUISE LONGDIN, REFUSALS TO LICENSE INTELLECTUAL PROPERTY – TESTING THE LIMITS OF LAW AND ECONOMICS, 76 (2011).

Organisations face allegations made by companies wherein they claim the laid down standard to be their creation, i.e., ownership over the industry standard.

In a market where innovators compete with each other to gain dominance in the market, technology that is essential to the development of the product, will create barriers in the development of the IOT sector. Intellectual property owners and their proponents have by far been able to prove the present lack of protection for new products and processes against various forms of imitation and free riding, describing it to be a problem that needs to be solved. New technologies lock up information and ideas which previously existed in the public domain. Technological locks then require to be backed by legislative measures that seek to prevent their unpicking. [52] With technologies being *declared essential* the concept of Standard essential patent (SEP) and Fair, Reasonable, and Non-Discriminatory (FRAND) comes into picture.

A patent that protects technology that is essential to a standard and a product's compilation is a S.E.P. [53] The Washington District Court in ***Microsoft Corp. v. Motorola Mobility, Inc***. [54] characterized S.E.P. as, *" A S.E.P. is a patent that is awarded to a standard which is the basic underlying technology for any other product even after there being alternative standards available and if such a standard is used without consent it will ultimately lead to infringement of the patent."*

Such standards are available to other innovators when the standards are set as standard essential patents by the Standard Setting Organisations. [55] SSO's have their own IPR policies which requires them to license their essential technology to licensees based on F.R.A.N.D. terms.[56] The underlying rationale behind FRAND is a check on the establishment of a dominant position of the SEP holder which it can gain from widespread usage of the patented standard.

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[52] Eagles and Logdin, *supra* note 91.

[53] Competition occasional discussion papers by the Competition Directorate–General of the European commission (European commission), *Standard essential patents and competition policy brief* (June 2014), available at http://ec.europa.eu/competition/publications/cpb/2014/008_en.pdf.
[54] *Microsoft Corp. v. Motorola Mobility, Inc., Instrument Corp*., 104 U.S. P.Q. 2d. 2000.
[55] Durham, *supra* note 6.
[56] Mark A. Lemley, *Intellectual Property Rights and Standard Setting Organisations,* 90(6) C.L. Rev. (2002).

B.   Emerging jurisprudence of SEP in India

In United States and European Union, there are many S.E.P. and F.R.A.N.D. cases that have already been decided**.** Indian jurisprudence on FRAND licensing practices for standard-essential patents is at a nascent stage. [57]

India patents are governed by the Indian Patents Act, 1970. There is no particular provision in the Indian law that specifically talks about essential patents but Section 83[58] and Section 84 [59] together of the aforementioned Act have the potential to talk about SEP. Section 83 lays down the guiding principles for the working of patented inventions . Clause (a), (b), (c) (f) and (g) of Section 83 set down certain principles which are similar to the basic jurisprudence of SEP and FRAND. But Section 83 lays down general principles and doesn't talk about standard essential patents *per se.* Section 83, Patents Act, 1970 lays down a set of guiding principles and not rules by mandate. Section 84 on the other hand solidifies the compulsory licensing policy in India under specific conditions.

Even if the Patents Act has the potential to lay down a valid SEP policy, it is much more feasible if every SSO has an independent IPR policy. [60] The heterogeneous nature of SSO IPR policy ensures that contracts adapt to changing social and competitive conditions and to the particular needs of each SSO to incorporate rights that yield the best standard for the organization. [61]

The IPR policy of various Standard Setting Organizations lays down a broad framework to incorporate the rules and regulations that would ensure the licensing of the standard based on FRAND terms. But those IPR policies, for example, that of the Global ICT Standardization Forum for India (GISFI), which has been currently developing standards of **internet of**

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[57]*Telefonaktiebolaget L.M. Ericsson v. Intex Techs. (India) Ltd.,* I.A. No. 6735/2014 in C.S. (O.S.) No.1045/ 2014.
[58] The Patents Act, 1970 § 83.
[59] The Patents Act, 1970 § 84.
[60] Joanna Tsai & Joshua D. Wright, *Standard Setting, Intellectual Property Rights and the role of Antitrust in regulating incomplete contracts*, available at https://www.crai.com/sites/default/files/publications/Standard-setting-intellectual-property-rights-and-the-role-of-antitrust-in-regulating-incomplete-contracts.pdf.
[61]*Id.*

things, [62] does not lay down the rule in case a SEP holder refuses to license the essential patent for which no other optional technology is accessible [63] and if a holder misleadingly professes to hold a standard basic patent, then how such issue would be dealt with has not been included in the IPR policy. [64] A lack of a robust IPR policy will lead to impediments in the growth of the IOT sector in future.

C. The issue of royalty

When a SEP holder agrees to license its patent to a licensee, he charges a consideration for the same, which is called the *royalty payment*. There is no hard and fast rule that is laid down by the courts in the determination of royalty rates. There have been numerous cases in which patentees have demanded for a high royalty and the licensees have been demotivated from procuring the required technology. [65]

In a number of cases, the licensee obtaining for a license is perhaps a start-up or a MSME, which is in no position to keep up a suit. ***Digital India*** must endeavour to encourage local businesses to begin the production of low cost high–end products in India. This highlights the requirement for the Government to set down a minimum limit so that businesses of all sizes don't misuse FRAND licenses to execute the standard with the objective to interoperate.

The lack of standard in the IOT sector remains a huge obstacle in opening significant economic value in IOT.[66] End users defer speculations –despite the fact that they see an incentive in utilizing IOT – in light of the fact that they fear loss of money in case the standard opts out.[67] An IOT developer who would want to invest in a technology would be willing to pay royalty up to a certain extent, if the SEP license is determined at a high rate, it will indulge in non-usage of the SEP technology or the exploitation of the licensees. If various standards are developed and not licensed, there might be no inter-connectivity

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[62] RavikantBharadwaj, *Standard Setting in India: Competition Law and IP Issues*, 5 I.M.J. 1, 2 (2013).

[63] Centre for Internet and society, India, *Comments on the D.I.P.P. discussion paper on standard essential patents and their availability on FRAND terms*, available at http://cis-india.org/a2k/blogs/dipp-comments.pdf.

[64] Ot van Daalen, *Proposal for Software Patents*, COM (02) 92 Final, http://merlin.obs.coe.int/iris/2002/3/article9.en.html.

[65] *Telefonaktiebolaget L.M. Ericsson v. C.C.I.,* W.P. (C) 464/2014 & C.M. Nos. 911/2014 & 915/2014.

[66] Sir Mark Walport, *The Internet of Things: Making the Most of the Second Digital Revolution* (Dec. 2014), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/409774/   14-1230-internet-of-things-review.pdf [https://perma.cc/LW7G-AM5X] (Last visited on 19 March, 2017).

[67]*When the fridge is locked out of the smart home,* available at http://www.freshfields.com/en/global/digital/competition_law_thoughts_on_the_Internet_of_Things/?LangType =2057 (Last visited 15 February, 2017).

amongst products of different firms. In a case where a fridge, car and other smart products from other manufacturers are not able *to talk to each* other, a lock-out of these devices might take place. [68] To avoid lock ups, royalty rates should be determined at a rate which is reasonable. But what do you mean by '*reasonable*' in the term Fair, Reasonable and non-discriminatory (FRAND)?

Another problem that is associated with FRAND is the lack of a definition of the word '*reasonable*'. A royalty is usually FRAND if it doesn't deny the licensee access to the standard and is similar for all other licensees. But is this criterion definite? There is no exact definition of what *reasonable* means. [69] It was argued by *Motorola*[70] that the contracts it enters into with a standard setting organisation is not specific as it doesn't lay down any definition of what FRAND means and no legit framework of appropriate licensing terms. [71] To avoid disputes regarding the royalty rate, *ex ante* i.e., competition in advance of standard selection determination of royalty seems to be more feasible as determining the rate before the technology is licensed, helps in reducing suits to a large extent. [72] The license negotiation is meant to cover forthcoming and on-going use of the IP. [73] It is the expected benefit from the use of IP that will form the basis for the licensee's payment of an access fee.

Higher royalty rates are associated with property having higher protection. Regardless, of any other characteristic and benefit of an invention, if patent protection is considered weak the royalty rate cannot be high. [74] Licensing executives will pay more for significant enhancements over other technology than they will for minor enhancements. The more unique a technology is, the higher the royalty rate. But this royalty rate cannot be used to abuse the dominant position of a company. [75]

Skipping a few years into the IOT technology, the IOT market may encounter further platform fragmentation. This may end up becoming inconvenient to use the full capability of

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[68] *Id.*

[69] Einer Elhauge, *Do patent holdup and royalty stacking lead to systematically excessive royalties?,*4(3) J.C.L.E.(2008).

[70]*Apple, Inc. v. Motorola Mobility, Inc.,* No. 12-1548 (Fed. Cir. 2014).

[71] Stanley M. Besen, *Why royalties for standard essential patents should not be set by the courts?*,http://studentorgs.kentlaw.iit.edu/ckjip/wp-content/uploads/sites/4/2016/01/2-Besen-FINAL.pdf.

[72] D.G. Swanson & W.J. Baumol, *Reasonable and Non-discriminatory (RAND) Royalties, Standards Selection, and Control of Market Power,* 73 ANTITRUST L.J. 1, 10–11 (2005); J. Farrell, J. Hayes, C. Shapiro, & T. Sullivan, *Standard Setting, Patents and Hold-Up*, 74 ANTITRUST L.J. 603, 637 (2007).

[73]*Hanson v. Alpine Valley Ski Area, Inc.,* 718 F. 2d 1075 (Fed. Cir. 1983).

[74] *Id.*

[75] *Huawei v. ZTC*, (Case C-170/13), Court of Justice of the European Union held that a SEP holder's refusal to license on FRAND terms may, in principle, be an abuse of dominance in violation of Article 102 T.F.E.U.

IOT.[76] Along these lines, the best way ahead may be to empower investment between adversaries in making distinctive standards. After some time, when the plan of action of different IOT innovators takes shape the industry may witness a sweeping regulation attempt wherein a *hyper-connected world* would exist.

CONCLUSION

Without there being any development in the above mentioned areas, the Internet of Things might turn into an *internet of broken things*.

The choice to implement a technical idea in hardware or software or both should not be taken into account when awarding patentability. The criteria should be of the innovative character embedded in a work and not the frame in which it exists. The policy makers while legislating or in laying down the law should take into account the opinion of all the stakeholders concerned with the implementation of law regarding software patent.[77] Additionally, an absence of interoperability may hamper IOT sector's growth. However, mandating interoperability in every sector may seem to be burdensome upon the patent holders. The problem of interoperability can be solved when there is a development of horizontal platform for inter-connectivity instead of a vertical platform, like oneM2M. [78]

Besides, if IOT innovation will become popular as it is evaluated, there might be chances of the IOT innovation impacting the patent law. India's IP strategy should concentrate on IPR *as a tool* for development in context of India and to not blindly apt standards set by countries whose IPR regime may exist in a different context. Due to the future changes, it is imperative that we discuss about the patentable subject matter and the best method to overcome these challenges.

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[76] Robert S. Sutor, *Open Source v. Open Standards*, available at http://www.sutor.com/c/ essays/osvsos (Last visited on 14 March, 2017).

[77] Software Freedom Law Centre, *Software patents – Putting the genie back in bottle,* available at http://sflc.in/software-patents-putting-the-genie-back-in-the-bottle/.

[78] *OneM2M: Standards for M2M and the Internet of things,* available at http://www.onem2m.org/about-onem2m/why-onem2m (Last visited 12 March, 2017).