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The Patent Thicket Threat to Innovation: The Role of Skilled Patent Examination in Patent Grants

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ABSTRACT

The study analyzes intellectual property laws and their impact on innovation, focusing on the consequences of excessive patenting or "patent thickets," where multiple overlapping patents complicate research and innovation. It reviews the criteria for patent grants, and assesses how skilled patent examinations may contribute to a balanced patent system that fosters competition and technological advancement. This was with a view to providing critical policy intelligence for the prevention of unnecessary patent proliferation, thus ensuring that only genuine innovations receive protection. The study used a content analysis methodology. Findings show that while intellectual property rights incentivizes innovation, an excessive number of patents in a field can create legal and financial barriers, discouraging further research, increase litigation risks and hinder market competition. However, a well-implemented patent examination process helps filter out non-innovative patents, reduces unnecessary complexities and supports genuine innovation. The article argued that an effective patent system relies on skilled examiners to ensure that intellectual property rights serve as a catalyst for technological progress rather than an obstacle, and concluded that strengthening patent examination processes can prevent the over-proliferation of patents, maintain fair competition, and promote sustainable innovation in research and product development.

Keywords: Patents, Patent Examination, Patent thickets, Innovation

INTRODUCTION

Patents are granted in respect of inventions i.e. technological improvements, great and small which contain at least some element of inventiveness over what was previously known (Cornish *et al.*, 2013). They are issued from a State or regional patent office after a substantial examination of their validity. Patents last for a maximum of twenty years from application and require that the invention must be publicly described in the patent specification. This description must give technical details and not be merely stated in general terms that may allow the patentee to claim any other invention falling under it to be an infringement. A patent is a legal monopoly which is granted for a limited time to the owner of a new invention which is capable of industrial application. This monopoly right has the effect of preventing all others from using the invention for the duration of the patent (Cornish *et al.*, 2013). The right to take action against any person exploiting the patented invention in the country without his agreement constitutes the patent owner's most important right, since it permits him to derive the material benefits to which he is entitled as a reward for his intellectual effort and work, and compensation for the expenses which his research and experimentation leading to the invention have entailed. It should be emphasized, however, that while the State may grant patent rights, it does not automatically enforce them, and it is up to the owner of a patent to bring an action, usually under civil law, for any infringement of his patent rights (WIPO, 2004).

In essence, a patent is concerned with new technology in the form of novel machines, processes and substances (Hodkinson, 1987). Patent law concerns new industrially applicable inventions. The grant of a patent effectively gives the inventor, or more commonly his employer, a monopoly to work the invention to the exclusion of others for a period of time not exceeding 20 years. The invention might concern a new or an improved product [Patent and Designs Act, S. 1 (1)(b)]. Alternatively, the invention may concern some industrial process such as a new method of making an existing product (Bainbridge, 1999). Innovation has been described as the specific material or intellectual expression of a subject or concept which has not previously existed (WIPO, 2003). An innovation is transformative of an invention and has the quality of satisfying a specific need. It is an improvement of what exists and has the capacity to revolutionize or open up new markets and sectors.

The idea that patents are a necessary policy tool to ensure the continuous development of new products has come under heavy criticism as the new development of products is usually a continuation of former research and the existence of a strong patent system may discourage the incremental development of further inventions (Ohlhausen, 2016). The patent system has been criticized for allowing for the creation of too many patents and by so doing has slowed down innovation by enabling the existence of patent thickets. Patent thickets describe a situation where key patents in a particular industry are widely held creating a "dense web of overlapping intellectual property rights that a company must hack its way through in order to actually commercialize new technology" (Sharpiro, 2001). These rights are owned by one or more patent owners, which create a potential high cost in commercializing a new technology. Patent thickets result from the combination of complex technology in relation to an industry and high-volume patenting carried out in that field (Graevenitz *et al.,* 2011). A different patent may have the effect of blocking another where the owner of one patent cannot work or improve on his product without a licence from a different but related patent. Where these overlapping rights cover the production procedure over a particular product, the intending user needs a whole complement of licences covering that product if the production of the product is to be commercialized (Clarkson, 2017).

The problem of patent thickets has been exacerbated by a number factors such as the expansion of patent rights across the globe; the cumulative nature of knowledge and the increasing complexity in many areas of technology; the growth of trade in technology-based products creating an increase in demand for patents; and inadequate resources in national patent offices which creates difficulties in adequately dealing with patent applications and examinations (Hall *et al.,* 2013).

The existence of a patent thicket may create a variety of problems that militate against innovation such as requiring the intending patent user to seek permission from several right holders to commercialize a single product and making the user the victim of royalty stacking. Royalty stacking describes the situation where in order to

produce a particular product, access to various patents is needed. Therefore, the manufacturer must pay all the holders of the various patent inputs. The royalty fees may seem reasonable where only patent is considered but where the patent user has to pay for all the patents needed, the cost may make production economically unjustifiable thus, hindering innovation and commercialization. (Karbowski, 2015).

A patent essentially grants a monopoly to the owner of the patent thereby giving him the right to exclude all others from making or using a patented invention and also dictate the price of the invention. The existence of a patent on an invention makes it mandatory for innovators in a particular field to ensure that the intellectual property of others is not infringed. Therefore, the refusal to sell or license an essential patent at a reasonable price to an intending user has the effect of raising the cost of production thereby making it unprofitable to introduce and commercialize a product which is not offered by the patent holder or access the technology necessary to produce a new innovation (Turner, 2018). The ability to obtain licences over existing patents has been found to contribute to the diffusion of technology and can affect the innovation of new products. When patent rights are fragmented in a sector as in a patent thicket, it creates complexities that result in higher transaction costs, delays and a higher risk of transaction failures that could result in hindering innovation (Galasso *et al.*, 2008). The unwanted effect of a patent thicket where there are multiple blocking patents is to stifle innovation which is contrary to the main purpose of the government granting the monopoly of a patent. That is, encouraging creators to expend the time and resources taken to invent a product, disclose its workings to the public and commercialize it, thereby improving the wellbeing of the entire society (Cockburn *et al.,* 2008).

The patent thicket problem is highlighted in certain industries such as the semiconductor industry and the biopharmaceutical industry where innovations could easily infringe on an existing patent as innovation would entail inputs from various different firms (Wu *et al.*, 2020). Patent thickets threaten incremental innovations because the existence of prior patents acts a barrier to new entrants who need to use the existing technologies. The number of patents that exist could make it impracticable to examine all relevant patents, assess their claims, evaluate infringement risk and the need for the obtaining of a licence (Wu *et al.*, 2020).

This study therefore aims to provide critical policy intelligence for the prevention of unnecessary patent proliferation, thus ensuring that only genuine innovations receive protection. It reviews the criteria for patent grants, and assesses how skilled patent examinations may contribute to a balanced patent system that fosters competition and technological advancement.

Patent Examination

Patent examinations are carried out by the national patent office on patent applications before the grant of a patent. Patent offices are administrative institutions that administer patent standards as defined by law, the judiciary, and bilateral or multilateral treaties that have been entered into by the executive (Drahos, 2008). Patent offices and examiners are critical in ensuring that the delicate balance needed in maintaining the patent system is kept. They need to ensure that inventions are properly protected in order to create incentives for R&D and innovation and at the same time protecting the public's right of access to intellectual property, further innovation and overall societal development (Reilly, 2020).

In order for a patent to be granted, the inventor must submit an application for the grant of a patent to the patent office in the country where the patent is sought. This application will be subjected to an examination on set criteria. The patent examiners are to conduct a thorough examination of each patent application to make sure that it meets the legal requirements of patentable subject matter, industrial applicability, novelty and inventive step. The decision to grant a patent in each particular case should be based on full compliance with the law. The patent examiner is thus at the frontline to ensure that applications that do not meet the standards of patentability are not granted (Waziri *et al.*, 2021).

It is possible for countries to have different standards to be applied to the various criteria that are used to judge patentability. This would depend on the particular policy goals that the country is trying to achieve through its patent system. Such policy could be in place to favour particular areas of industry and areas that need to be developed in the country and should also allow for an examination to be carried out with a view towards encouraging further innovation by applying

standards that guard against the grant of patents that may have the effect of stifling competition (Correa *et al.*, 2022).

Under Article 27 of the WTO-TRIPS Agreement, the exclusion of whole sectors or categories of products from patent protection is not permitted. All WTO Members, of which Nigeria is one, are obligated to grant patent protection to all inventions in all fields of technology some flexibility in the implementation on the criteria of novelty, inventiveness and industrial application are within the discretion of the granting patent office. They are at liberty to determine how these criteria should be interpreted and applied in line with their national policies. Patent offices can interpret and apply national patentability requirements on a case-by-case basis within the applicable legal framework and could provide strict patent examination guidelines to ensure that the patent system as a whole, functions as a public interest policy tool (WTO *et al.,* 2012).

In essence, the aim of carrying out a proper patent examination is to ensure that only genuine inventions are granted patents. The national patent office has the duty to apply standards that are in line with their developmental goals in defining the patentability criteria. The patent office should ensure that their patentability standards are not too lax taking into consideration the way it defines the terms "novelty", "inventive step" and "patentable subject matter" by interpreting it strictly to avoid too many secondary patents being granted. This should enable them avoid granting patents on minor modifications on inventions and extending the monopoly given by the grant of a patent (Musungu and Oh, 2006).

Patentable Subject Matter

For a patent to be granted, the subject matter must be patentable and must come under the definition of an "invention". There is no internationally agreed definition of 'invention' or 'patentable subject matter' so countries are at liberty to define these terms in line with their national policy. An invention is considered to be relevant to any kind of industrial application if it can be utilized in any industry or enterprise including agriculture. Things that may not be considered patentable subject matter may be general things such as such as mere discoveries, scientific principles or abstract ideas. In *Reynolds v Herbert Smith & Co Ltd*, (1903) 20 RPC 123 Buckley J. explained the difference between a discovery and an invention in this manner.

"Discovery adds to the amount of human knowledge, but does so only by disclosing something … Invention also adds to human knowledge, but not merely by disclosing something. Invention necessarily involves also suggestions of an act to be done, and it must be an act which results in a new product, a new result, or a new process, or a new combination for producing an old product of an old result."

Even if a patentable subject matter that does not align with the above categories, it may be excluded on other grounds, if for instance inventions that if exploited would be contrary to public order or morality [Patents and Designs Act, S. 1 (4)(b)]. What may be classified as patentable subject matter is dictated by statute, and is mostly defined with reference to the exceptions to patentability, the established standard being that patent protection must be made obtainable for inventions in every field of technology (TRIPS Agreement Article 27.1). The Patents and Designs Act, exempts some subject matter from patentability. These include plant or animal varieties, or essentially biological processes for the production of plants or animals and inventions the publication or exploitation of which would be contrary to public order or morality [Patents and Designs Act, S. 1 (4)(a)-(b)]. The TRIPS Agreement also exempts discoveries of materials or things already existing in nature; scientific theories or mathematical methods; schemes, rules or methods. For example, methods of carrying on business, methods of accomplishing purely mental acts or playing games; means to treat humans or animals, or diagnostic methods practiced on humans or animals. It should be noted that the products used in diagnosing or treatment ailments are not included in the exemptions from patentability.

For an invention to be patentable, it must be the sort that may be utilised for practical purposes and should not be totally theoretical. If the invention is to work as a product or part of a product, it should be capable of being made, and if the invention is to function as a process or part of a process of achieving something in any industry, it should be possible to carry that process out or "use" it as intended (WIPO, 2004). The concept of invention has a technical element and any patent application that is not considered an invention should not be granted and strict compliance with the provisions

of the Patent and Designs Act should be followed. In Nigeria, an invention fulfils this criterion if it is can be manufactured or used in any kind of industry, including agriculture [Patents and Designs Act, S. 1 (2)(c)].

Novelty

Novelty is an essential criterion in any examination as to the substance of a patent and is seen as a basic condition of patentability in any country. It must be stated, however, that novelty is not a state that can be proven. Any decision as to the status of the novelty of a product will have to be based on its absence. The criterion of novelty is essential because of the need to only grant patents to technologies that are not already in the public domain. (WTO *et al.,* 2012).

An invention is said to be new if it is not envisioned by the prior art. "Prior art" is comprised of all the knowledge that has existed before to the relevant filing or priority date of a patent application, whether such knowledge has existed in written form or has been disclosed orally. This is the sum and total of human knowledge which has at any time been made available to the public anywhere in the world by any means. The question of what should be considered "prior art" within a particular period has been heavily debated but it has been settled that if it seems the invention is obviously already part of the state of the art or if it is not possible to make the inference that it is not part of the state of the art, [1] the invention cannot be categorized as novel (Phillips *et al.*, 1995). An invention may be disclosed so it is considered as being already part of the prior art. This disclosure may take place in a number of ways - by a description of the invention in writing made available to the public; and by describing or illustrating the invention using spoken words in public, for example making oral disclosure in lectures and broadcasts; using the invention in a public place or allowing members of the public to see and use the invention. That is, disclosure by use.[2]

The country issuing the patent may choose to base the prior art against a background of what is known only in the protecting country as against printed publications and other disclosures such as oral disclosures where such publications or disclosures occurred in a foreign country. This would have effect of excluding knowledge from other countries, if it was not imported into the country before the making of the invention, even if that knowledge was available abroad before the date of the making of the invention (WIPO, 2004).

Publication of an invention in writing necessitates that it should be able to be discerned and retrieved in from of some sort of storage material. Also, the document must have been made accessible to the public, for instance by sale, or kept in a place where it may be easily retrieved by members of the public, such as in a library. Publication in tangible form would include patents already issued, photographs, recordings, blueprints and drawings and publications on the internet.

For a document to compromise the novelty of any invention, the substance of the invention must be explicitly described in the document. The substance of the claim in an application under examination is contrasted on a point-by-point basis with the content of the revealing document or publication. Pucchas, L. J. in *Gerenctech Inc.'s Patent*,[3] stated that in making a decision on the novelty of an invention under section 1 (1)(a), one must look solely at any matter which has been made accessible to the public. It is an objective question of fact and has nothing to do with the subjective qualities of knowledge of anyone. Pucchas, L. J. also stated "the answer to the question of what is public would appear in a case such as this to be that a community of research workers skilled in the art in general; but not I would think, merely known to one or two individuals research workers pursuing their own experiments in private".

Similarly, in Decision T300/86 RCA/TV Receiver, (1994) EPOR, 339, the EPO Technical Board of Appeal held that a report bearing the note "this report is the property of RCA Corporation and is loaned to its licensees for their confidential use with the understanding that it will not be distributed or disclosed to third parties or published in any manner…" which was distributed to a large number of major TV manufacturers who were licensees of

[1] *Mollins v Industrial Machinery Co Ltd* (1938) 55 RPC 31

[2] Art 54 (2) European Patents Convention (EPC) and s. 2(2) 1977 Act in England both specify that the state of the art may be made available to the public by written or oral descriptions, by use or in any other way. In *Humphersen v. Syer* (1887) RPC 414, a patent is invalid if some people "under no obligation of secrecy arising from confidence, or good faith towards the patentee, knew of the invention at the date of the patent.

[3] [1989] RPC 198

RCA was not made available to the public, which included researchers or other manufacturers.
A decision of lack of novelty can only be made if the publication exclusively contains all the characteristics of that claim under assessment. That is, if it envisions the essential aspects of the claim.

Inventive Step

When examining the criteria of inventive step (sometimes termed "non-obviousness"), the issue to be resolved is whether or not the invention "would have been obvious to a person having ordinary skill in the art". This is considered as a complicated requirement to ascertain in a patent examination. The invention must not only be new and not previously in existence, but must also come from the utilization of the human intellect and be the product of a creative thought-process (Phillips *et al.*, 1995). It must not be easily perceived to be the outcome from knowledge of the existing "state of the art" in any way such as it relates to the method or application of methods, or to the product to which it concerns, or as to the eventual result that is developed.
Lord Hoffman, in *Biogen Inc. v Medeva plc*,[4] said

"Sometimes, it is the idea of using established techniques to do something which no one had previously thought of doing. In that case, the inventive step will be doing the new thing. Sometimes, it is finding a way of doing something which people had wanted to do but could not think how. The inventive idea would be a way of achieving the goal. In yet other cases, many people may have a general idea if how they might achieve a goal but not how to solve a particular problem which stands in their way. If someone devises a way to solve the problem, his inventive step will be that solution but not the goal itself or the general method of achieving it."

This requirement is included under patent law because it is believed that patent protection should not be granted to a product that is already in part of the prior art, or to any other product that anyone with ordinary skill could easily come up with the same product as a natural outcome using his knowledge of the field.
The measure to be applied is "ordinary skill" and not the most skilled or best expert that is available in a particular field. It is expected that the comparison should be a person having the acceptable level of skill required in the field within the country concerned. This "man skilled in the art" will be taken to be conversant with the ordinary available knowledge of his art at the relevant time and secondly, whatever knowledge he could have acquired from the existing literature when investigating the solution to the current problem. (Cornish and Llewelyn, 2013). If he comes to the same conclusion as that contained in the patent description, then it would be considered 'obvious' and should not therefore earn monopoly protection (Phillips *et al.*, 1995).
Novelty and inventive step are different standards (Bainbridge, 1999). Novelty would be accorded if there is a distinction between the invention and the prior art or knowledge in the public domain. An examination into whether there is an inventive step only becomes necessary if novelty is confirmed. The term "inventive step" gives the impression that it is not only necessary that the claimed invention is new and not what already exists in the state of the art, but that this difference must have two attributes. Firstly, it must be as a consequence of an innovative idea and should be easily discernible. One must be able to identify the difference between the state of the art and the claimed invention. It should be a marked progress over the "prior art" [5] No consideration is made as to whether the inventor assumed he made a new product or whether he worked independently of what others already have knowledge.[6]
Secondly, it is essential that this step or improvement is consequential and necessary to the invention. The invention should show technological improvement over the prior art, that is it should in measurable and pragmatic, an improvement over the old way of getting things done (Cornish *et al.*, 2013).
For an accurate measure to be made of the nature of the improvements over the prior art that would constitute an inventive step, consideration has to be

[4] [1997] R.P.C. 1 at 34
[5] It is not an inquiry into how easy or difficult it was for him to personally take the step. The patent system makes no attempt to exclude protection for accidental, lucky or sudden inventions. *Crane v Price* (1842) W.P.C. 393 at 411
[6] *British United Shoe Manufacturers v Fussel* (1908) 25 R.P.C. 631 at 652

given to the prior art as a whole.[7] Thus, in contrast with an examination of novelty where the current invention is compared with particular publications or disclosures separately, rather it is compared with them as a whole or in combinations whether the invention is not obvious to any person having ordinary skill and knowledge in the field. The assessment may be made against the whole of the subject matter in relation to the particular invention under examination.

Before the inventive step is deemed absent, it should be judged that the not only the invention in its entirety but the choice of the combined elements is obvious to someone skilled in the art. It is the totality of the differences seen that should be measured with the prior art and judged as to the obviousness and not individual elements except where the elements are not linked technically.

Inventive step may be assessed using three parameters, namely:

a) the problem the invention intends to resolve;
b) the method used to resolve the problem; and
c) the beneficial aspects of the invention assessed with regard to the prior art.

If the issue to be resolved is well known, the assessment should be pertinent to the originality of the solution put forth. If no inventive step is found in the solution, the consideration should be whether or not the solution is obvious or if it is uncommon by its character or reach. If an ordinarily skilled person in the field could have come to the same solution to the posed problem then the criteria of inventive step has not been met (WIPO, 2004). The patent offices should define inventive step in a way that puts extra burden on the inventor by making sure that the invention must involve a "technical advancement," "economic significance," or both, in such a way that the claimed invention is not obvious to someone with comparable skill as the inventor (Ho, 2011). This may make patentability more difficult to achieve and weed out applications that may cause a patent thicket by preventing the double patenting of a single invention or the overlapping of patents (Wu *et al.*, 2020).

Promoting Technological Progress through Skilled Patent Examination

The grant of patent rights to an individual is the government's way of balancing conflicting interests. The individual's right to earn a just reward from his intellectual property is assured while the society's interests to have access to the invention, benefit from it and further develop it is also protected. Therefore, inventions that are not new, do not contain an inventive step and are not industrially applicable, should not be granted patents to avoid blocking all avenues by which innovation may take place in relation to the particular field. The conduct of skilled patent examination guarantees that only inventions that fulfill all the criteria are granted a patent that would effectively confer a monopoly status on the invention. The conferment of a monopoly status on an invention because a patent was erroneously granted may be the source of a setback in that field of technology effectively creating a barrier to genuine inventions coming from that field.

The existence of a patent thicket in a particular field may make it difficult for genuine inventions to navigate the complex web of intellectual property rights in that sector in order to commercialize new technology and would force all competitors to a settlement with the owners of the patents. Also, the costs that may be anticipated for the payment of licensing fees and royalties may be prohibitive and thus hinder innovation and commercialization in that area (Wu *et al*, 2020). The lack of proper patent examination may ease the process of obtaining patents but will make it ultimately more difficult to challenge when their validity is questioned and also make any planned litigation unpredictable (Musungu and Oh, 2006; Wu *et al.*, 2020).

Skilled patent examination is essential in developing country industries where the goal should be to improve technological sectors. The grant of a patent is national and an invention from another country would require a patent examination from the national patent office in order to be granted a patent within that national territory. In effect, a country is at liberty to apply the standards of patentability within their national borders in such a way as to create a vehicle for achieving the policy goals of developing chosen sectors of their economy. The fact that a patent has been granted on the invention in question by another country should not pressure the national patent office into granting a patent in that country if it does not meet the patentability standard as dictated by the national policy goals and objectives. Patent offices in developing countries generally have limited

[7] *Martin v Millwood* [1956] R.P.C. 125 at 133-134

capacity with regard to patent infrastructure and expertise and may experience technical problems in conducting patent examinations and administration. In many cases, these patent offices do not carry out substantive examinations themselves but rely on whether the European, United States and Japanese Patent Offices have granted patents on the invention and may in fact have a cooperation agreement with more advanced patent offices (Drahos, 2008). This makes them essentially act as de-facto registration centres for patents filed and granted in more industrialised countries. It is therefore imperative for patent examination to be done locally by skilled professionals in order to foster local innovation.

CONCLUSION

Certain industries could be vulnerable to patent thickets where several patents could be held by a single owner surrounding a single invention making it difficult for innovation to be carried out in respect of the product. This phenomenon also effectively bars competition as the existence of a several patents surrounding a single product prolongs patent protection and delays the entry of other market players. The criteria that an invention must fulfill to be granted patent protection has been established and is uniform across most countries. The paper found that the national patent offices have the liberty to define their patentability standards and ensure that in applying them they are not too lax by taking into consideration the way it defines the terms “novelty”, “inventive step” and “patentable subject matter”. It may be beneficial to interpret the criteria strictly to avoid too many secondary patents being granted. This should enable them avoid granting patents on minor modifications on inventions and extending the monopoly given by the grant of a patent (Musungu and Oh, 2006).

RECOMMENDATIONS

To conduct adequately skilled patent examinations, the patent office must conduct a prior art search and substantive examination in order to ascertain whether the conditions for patentability – patentable subject matter, novelty and inventive step – meet the prescribed legal requirements. In order to do this, the patent office must maintain a current, up-to-date documentation of its prior art. This is difficult for many developing countries as it requires an extensive amount of human and financial resources (WIPO, 2011).

Therefore, the importance of employing highly skilled personnel who are conversant with the state of the art in each field of technology to conduct patent examinations is vital. Also, there should be the possibility of consulting highly skilled individuals outside the national patent office in respect of specific applications if there is no qualified person within the patent office to conduct the examination.

Protection of new uses, particularly second medical indications used for anti-competitive purposes, mainly for extending the patent protection period and blocking generic entry. In the patent laws of many developing countries, it does not state specifically that patents would not be granted for new uses of an invention. It is therefore imperative that the process of patent examination be highly regulated and the role that the patent office plays in balancing the intellectual property system emphasized. The operation of the patent offices should be conducted to achieve the developmental objectives of the country and foster innovation. This may be achieved by drawing out an effective policy that would strengthen the administrative capability if the patent office.

To achieve the goal of industrial development it is essential that national patent offices do not leave room for granting patents that would in effect delay innovation. They should avoid granting or extending the patents to products or processes that are already patented and included in the state of the art even though it claimed that the new patent or extention is sought because the product may be put to a different use distinct from that from which it was originally granted.

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