Research Methodology
And
Intellectual Property Rights

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Chapter 1

INTRODUCTION

This chapter provides an in-depth exploration of fundamental concepts in engineering research. It covers the essence of basic research, its objectives, and the driving motivations within the engineering context. Various research types employed in engineering are also discussed, along with strategies for effective problem-solving. Furthermore, the chapter outlines the ethical principles that underlie engineering practice and delves into the intricate matters of authorship, shedding light on potential issues that may arise.

1.1 Meaning of Research

Research can be described as a meticulous and purposeful endeavor, characterized by a methodical pursuit of knowledge or the formulation of novel theories. This pursuit is driven by an innate curiosity to uncover the unknown and apply it meaningfully within a specific context, thus contributing to the expansion of the existing knowledge reservoir. Research entails the construction or redefinition of hypotheses, the proposition of solutions, meticulous data analysis, and the validation of conclusions against these hypotheses. At its core, research is a creative process, generating knowledge where none previously existed [1].

The research cycle initiates from a pragmatic problem space. It is imperative to have a clear understanding of the problem that necessitates resolution and the reasons behind its significance. This problem serves as the catalyst for the formulation of a research question, a crucial compass that guides one through the overwhelming sea of information. By anchoring the inquiry, this question aids in narrowing down the vast array of data to a manageable scope. This, in turn, lays the groundwork for a research projects—an assortment of activities leading towards a conclusive result or answer. Ultimately, this outcome feeds back into resolving the initial practical problem, as illustrated in Figure 1.1.

Constructing a research foundation involves honing the skill to interconnect diverse domains, aiming to mentally prime for active engagement rather than transforming into a mere repository or encyclopedia. Research transcends voluminous reading or amassing existing information; it thrives on introducing, even in modest and specialized ways, original contributions to the existing knowledge reservoir. Therefore, research centers on formulating questions relevant to our contemporary world and systematically seeking precise answers, all while maintaining a

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rigorous systematic approach. Striking a balance between attainable outcomes within a finite research scope and the potential contribution is paramount. An effective research program seeks to attain insights or solutions, fostering the iterative evolution of well-crafted research questions that remain open to modification. Through research, the goal is to cultivate novel knowledge about the world we inhabit, knowledge that can be transcribed or documented and subsequently accessed through these means. The avenues of knowledge development and accessibility encompass three overarching and interconnected categories:

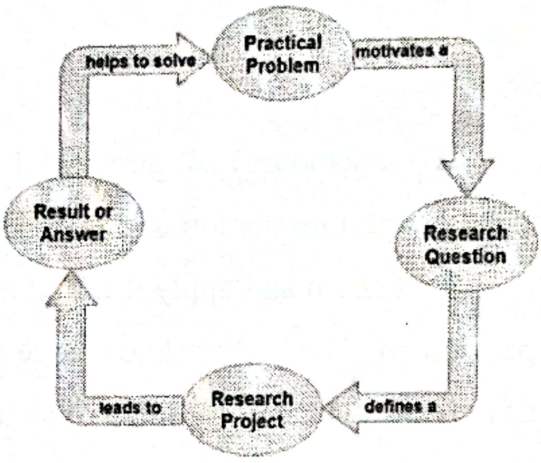


Fig. 1.1 The research flow diagram[1]

(i) The act of observation stands as the foundational method for acquiring information from a source. It can, on its own, hold significance, particularly when the subject under observation is peculiar, captivating, or challenging to discern. Observation manifests in various guises, spanning from precise measurements within a controlled environment to surveys conducted among specific cohorts, or even the duration taken for a firmware routine to execute. Often, the data derived from observations necessitates some form of processing, thereby ushering in the second knowledge category: the model.

(ii) Models serve as simplified, yet often accurate representations of intricate interactions. These representations can take the form of statistical correlations, graphical depictions, or sets of mathematical equations. For instance, a modeling equation encapsulates the abstract relationship between various attributes or the behavior of a device, facilitating comprehension of the observed phenomena [2].

(iii) The ultimate category involves orchestrating actions through processes, algorithms, procedures, configurations, or reference designs, all aimed at achieving a specific desired outcome.

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(iv)he classifications of information as specified above are displayed in Fig. 1.2. Great examination includes precise assortment and investigation of data and is trailed by an endeavor to gather a tad past the definitely known data in a manner that is a huge worth expansion. Ordinarily, designing exploration is an excursion that navigates from an examination region (example: Control Systems), to the topic (example: Control of Microbial Fuel Cells) and finally onto the problem (example: Adaptive Control of Single Chamber Microbial Fuel Cells) (Area → Topic → Problem). Getting a good problem to solve is more than half the work done. However, sometimes the journey can be reversing, for example, the traversal from (Problem → Topic → Area).

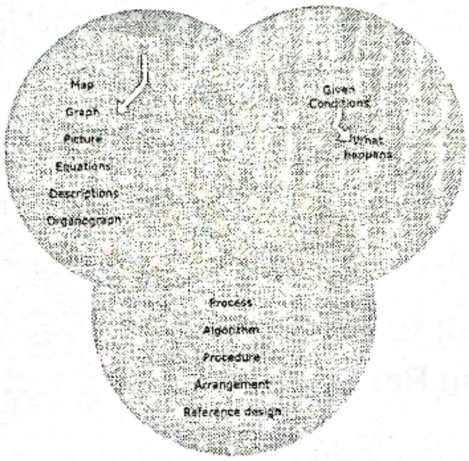


Fig. 1.2 The categories of knowledge in research [3]

This scenario often arises when a problem leads to another, structurally distinct issue. Engineering research involves cultivating perspectives and enhancing knowledge and skills to facilitate the identification, planning, design, and execution of investigations and innovations in various forms pertinent to engineering and technology. We can initiate by elucidating an existing concern or predicament in the world that warrants attention. This could involve a desired objective that currently remains elusive due to a lack of necessary knowledge. Alternatively, it might entail comprehending the workings of an already functional entity. Moreover, our motivations could also stem from a curiosity-driven desire to explore outcomes through action.

1.2.Objectives of Engineering Research

Proficiency in locating and accessing various information sources is pivotal for addressing engineering challenges, spanning both academic and professional trajectories. Neglecting to delve into engineering protocols, benchmarks, and optimal methods can lead to critical failures

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carrying significant consequences. For engineers, the skill to undertake meticulous and precise research, coupled with adept communication of findings, plays a crucial role in effective decision-making.

The primary objective of research is to employ scientific methodologies in pursuit of solutions to unresolved inquiries. While each research endeavor may align with a specific approach, the overarching categories of research studies include exploratory or formulative, descriptive, diagnostic, and hypothesis-testing investigations.

The essence of engineering research objectives lies in the creation of novel theoretical or practical insights, extending beyond the sole pursuit of achieving desired outcomes. These objectives ought to be structured in a manner that, even if the sought-after results remain elusive, they still enable a deeper comprehension of the underlying challenges—thus contributing to the ongoing efforts in resolving the issue. It's worth acknowledging that an alternative approach might emerge, introducing a new perspective wherein the sought-after objective becomes attainable..

1.3.Motivation in Engineering Research

The potential reasons for engagement can stem from one or a combination of the following aspirations

(i) Research indicates that intrinsic motivations such as interest, challenge, learning, meaning, and purpose correlate with elevated creative performance.

(ii) Extrinsic motivators like rewards for exemplary work, encompassing monetary gains, fame, awards, praise, and elevated status, wield considerable influence. However, they might potentially hinder creativity. For instance, the outcome of research might lead to a patent acquisition, promising wealth and renown.

(iii) External influences, including competition, collaboration, commitment, and encouragement, equally contribute to motivational dynamics. For example, being spurred by friends' involvement in research or striving to surpass a disliked individual's accomplishments.

(iv) Personal incentives, driven by the desire to solve unresolved problems, intellectual fulfillment, community service, and the pursuit of respectability, further fuel engagement.

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The ensuing factors embody a fusion of both extrinsic and intrinsic elements: (i) Aspiring to outperform existing global achievements, (ii) enhancing technological benchmarks, (iii) contributing to societal betterment, and (iv)upholding historical legacies within immediate sociocultural contexts. Additional motivating factors encompass governmental directives, opportunities for funding in specific domains, and terms of employment, all of which can inspire participation in engineering research.

1.4.Types of Engineering Research

- The spectrum of research types encompasses: (i) Descriptive vs. Analytical: Descriptive research encompasses methods like comparison, correlation, and fact-finding inquiries to succinctly portray the present state. The researcher lacks control over variables, simply reporting as observed. Analytical research leverages existing data for in-depth analysis and critical evaluation. Some studies may embody both descriptive and analytical elements.
- Applied vs. Fundamental: Research can take the form of applied research, addressing immediate organizational challenges, or fundamental (basic/pure) research focused on theory formulation and generalization. Fundamental research may delve into natural phenomena or pure mathematics, while applied research could uncover social or economic trends, or assess communication comprehension. Applied research primarily seeks immediate solutions, while basic research aims to gather information with broad applicability over the medium to long terml [3].
- Quantitative vs. Qualitative: Quantitative research employs statistical analysis across a representative case pool for conclusive outcomes. Conversely, qualitative research relies on a limited number of nonrepresentative cases or verbal narratives—such as investigating clustering effects in intersections within Transportation Engineering—to formulate assertions.
- Applied vs. Fundamental: Research bifurcates into applied research, dedicated to immediate organizational predicaments, and fundamental (basic or pure) research, which concentrates on formulating theories and generalizations. Fundamental research may pertain to natural phenomena or pure mathematics, while applied research could encompass studying social or economic trends or assessing communication effectiveness. Applied research is primarily geared towards addressing pressing practical problems,

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whereas basic research strives to amass information with potential broad applications over the medium to long term.

- Quantitative vs. Qualitative: Quantitative research entails statistically scrutinizing a sufficiently large representative sample to draw conclusions, while qualitative researchers draw insights from a limited number of non-representative instances or verbal narratives. In the context of behavioral studies, like investigating clustering effects in intersections within Transportation Engineering, qualitative approaches are utilized to assert propositions.

1.5.Finding and Solving a Worthwhile Problem

A researcher's journey often commences with research problems presented by a supervisor or unresolved queries posited by others. Alternatively, it might necessitate revisiting a foundational theory or piecing together insights from a collection of suggested papers. For research scholars, the initial challenge lies in identifying an apt problem to embark upon, a skill set crucial yet often untaught. This process entails a careful consideration of potential implications and appropriateness, which lays the foundation for subsequent steps, as elaborated in the following chapter, including literature review and technical exploration, to ascertain the problem's viability.

However, a preliminary spark often ignites before the commencement of literature survey. It can stem from oral presentations accompanied by inquisitive questioning or introspection, offering perspectives that reading papers might not provide. In certain cases, advancements in related subjects yield tools or outcomes with direct implications for the researcher's domain, leading to problem identification [4].

A meaningful research problem possesses distinct attributes. It might challenge intuition, even for experts in the field, fulfill long-awaited expectations within the research community, simplify a central theory aspect significantly, inaugurate new subjects or areas, enhance or introduce methods with practical applications, or present a result with the potential to halt further exploration in a domain. The researcher must be convinced of the problem's significance before embarking on its pursuit, as optimal efforts materialize when the endeavor holds genuine worth. Problems, regardless of size, effectively addressed, can contribute to notable advancements in certain cases.

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Certain problems are universally recognized as challenging and open-ended, encompassing deep implications and connections across concepts. However, it's realistic that most researchers might not grapple with such formidable challenges in their careers. Nonetheless, it is the very act of tackling arduous problems that eventually leads to their resolution. Researchers must grapple with the decision of investing time into such endeavors, recognizing that the likely outcome might be negative, making it a complex personal choice. Simultaneously, even if the primary formidable problem remains unsolved, there could be partial or peripheral outcomes that contribute to the immediate goal of generating results for the dissertation

George Pólya (1887–1985) proposed a 4-step framework for mathematical problem-solving, which holds relevance for engineering researchers as well. Recent research, including the work of [specific references], underscores the applicability of these guidelines [5], The prescribed steps to effectively address a research problem encompassGeorge Pólya (1887–1985) suggested a 4-step procedure for mathematical problem-solving, which is relevant to engineering researchers as well. Recent work such as suggest the relevance of these recommendations. The recommended steps to solve a research problem are [6 7]

- Grasping the problem, rephrasing it as if it were one's own, visually representing it with diagrams, and assessing the need for supplementary information.
- Initiating exploration systematically, aiming to uncover potential strategies to resolve the problem or a simplified iteration of it, all while identifying recurring patterns.
- Executing the devised plan to assess its efficacy, and if unsuccessful, reinitiating with an alternative approach. Multiple engagements with the problem, interspersed with breaks, could spark fresh insights or novel ideas.
- Reflecting on the journey and outcomes aids in comprehending and internalizing the chosen strategy, an investment that benefits future pursuits.

1.6.Ethics in Engineering Research

Ethics typically denotes a collection of regulations demarcating acceptable and unacceptable behavior, discerning between right and wrong actions, or embodying sagacious teachings akin to the wisdom of Chanakya. Many individuals internalize these principles during their formative years, yet moral progression endures across various phases of personal growth. While universal recognition of certain ethical norms exists, divergence in interpretation and application is evident. Ethical principles serve as tools for evaluating, proposing, or

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1. Fabrication (Inauthentic data generation): Fabrication involves contriving data or experiments based on presumed knowledge of the anticipated analysis or outcomes. This action may stem from time constraints imposed by supervisors or clients, compelling a premature conclusion without waiting for actual results.
2. Falsification (Improper data manipulation): Falsification encompasses misrepresenting, misconstruing, or illicitly modifying data or experimental results, even if only partially, to bolster a desired hypothesis, even in contrast to the true outcomes of experiments. Falsification, together with data fabrication, detrimentally affects engineering research, introduces erroneous empirical information into scholarly discourse, erodes trustworthiness of involved parties, escalates costs, impedes research advancement, and leads to unwarranted delays in technological progress. Misleading data may also arise from subpar experiment design or inaccurate measurement practices. The perception of engineering researchers as objective seekers of truth is often undermined by the exposure of data-related misconduct.Such misconduct can be thwarted by researchers by always trying to reproduce the results independently whenever they are interested to do further work in a published material which is likely to be part of their literature survey.
3. Plagiarism (Unattributed use of others' work): Plagiarism occurs when an individual employs or reuses elements of others' work—such as text, data, tables, figures, illustrations, or concepts—without proper acknowledgment, presenting it as their own creation. Verbatim replication or reuse of one's own previously published work is termed self-plagiarism, and it is similarly considered unacceptable within the realm of scholarly literature. The internet's proliferation of scientific content appears to, on one hand, contribute to instances of plagiarism, while on the other, it facilitates the detection of such misconduct through automated software tools

How do supervisors, reviewers, or editors become aware of plagiarism?

(i)The original author discovers the plagiarism and notifies all concerned parties.

(ii) Reviewers sometimes identify plagiarism during the review process.

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(iii) Readers who encounter the article/ book while conducting their research may also detect instances of plagiarism.

While numerous free and paid tools are at one's disposal, including those that can be obtained with an institutional license, they donot offer a definitive means of identifying plagiarism. Instead, they generate a similarity score—a metric quantifying the degree of resemblance between unpublished content and existing published material.

Nevertheless, a low similarity score does not provide a foolproof assurance of a plagiarism-free document. Determining whether content has been plagiarized necessitates the discerning eye of a human evaluator. Examining the individual similarity scores of distinct sources, rather than relying solely on the overall similarity index, holds paramount importance.

Merely setting a maximum allowable similarity index standard falls short of leveraging the tool effectively. Evaluating patchwork plagiarism presents a heightened level of complexity

Numerous ethical and straightforward methods are available to avoid a high similarity score in a manuscript that is about to be submitted. On occasion, certain published materials align seamlessly with one's research paper, enhancing connections or reinforcing arguments. This content is open for fair use, as researchers are not expected to conjure research outcomes from thin air. Instead, relevant information can be integrated by rephrasing it in one's own words, avoiding verbatim duplication. Another approach involves providing a concise summary of the relevant material, presented in one's own language. In all these cases, attributing the original source is indispensable. However, it's important to understand that referencing a source does not justify the direct replication of sentences (or paragraphs) from the original content. Researchers should refine their writing skills to effectively differentiate their own ideas or findings from those originating in other sources. This approach empowers readers to discern whether the researcher is overly reliant on existing literature or extensively drawing from it.Other Aspects of Research misconduct entails significant departures from established norms of behavior, potentially leading to accusations of fraud when deception and harm coincide. Ethical breaches are inevitably brought to light over time. Concurrently submitting the same article to two distinct journals also contravenes publication guidelines. Moreover, instances where errors are identified in an article or other published material often remain unreported for public access. unless a

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researcher is driven enough to build on that mistake and provide a correct version of the same which is not always the primary objective of the researcher.

1.9.Ethical Issues Related to Authorship.

The realm of academic authorship entails disseminating scholarly endeavors, staking claim to original discoveries, and cultivating a peer-recognized standing. This endeavor carries with it the inherent responsibility for the content of the work. It forms the cornerstone for assessing employment opportunities, promotions, and accolades.

Authorship of research papers in the context of engineering research presents a multitude of pivotal ethical considerations, as articulated by Newman and Jones. Their insights distil into three core avenues of attributing credit for research contributions: authorship (, citation, and written acknowledgment (). Authorship concurrently establishes accountability and accords rightful recognition. An individual is rightfully included as an author only when their role significantly extends to research design, data interpretation, or manuscript composition

Including individuals as 'guest' or 'gift' coauthors, who have made minimal or no genuine contributio to the work, diminishes the recognition due to those who actively contributed. This improper practice inaccurately inflates the credentials of listed authors and serves as an ethical warning sign signaling potential research misconduct. In some instances, the primary author dubiously extends co-authorship to junrio faculty or students to enhance their chances of employment/ promotion, a phenomenon termed 'Career-boost authorship.'

Another disheartening misuse of co-authorship, known as 'Career-preservation authorship,' involves adding department heads, deans, provosts, or other administrators as coauthors in exchange for a quid pro quo arrangement. This arrangement sees the primary author benefiting from a favorable rapport with higher-ups, while the administrator gains authorship without fulfilling the requisite work.

At times, a legitimate contributor refrains from being listed as an author due to undisclosed conflicts of interest within the organization. This type of co-authorship is often referred to as ghost co-authorship. It's vital to ensure complete transparency by disclosing all individuals engaged in the research. This disclosure permits assessment not only based on the findings but also considers potential influences stemming from conflicts of interest. Another form of

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questionable authorship involves researchers listing each other as coauthors in a reciprocating gesture, even if there is minimal collaboration, limited to superficial reading and editing, without conducting a thorough examination of the work.

Top of Form Some authors, in their pursuit of obtaining sole authorship, may downplay the significant contributions of others to the research work by acknowledging their efforts rather than listing them as authors. This misrepresentation obscures the actual contributions of those involved and leaves the 'unrecognized author' unavailable for further clarification.

All authors listed on a research article bear collective responsibility for its contents. Consequently, they should be informed by the corresponding author about the submission of the article to a journal. Obtaining their consent regarding the content and submission is imperative. When misconduct, such as inappropriate authorship, occurs, while the perpetrator may be easier to identify, the extent of appropriate accountability among coauthors is not always evident. Establishing a means to quantify contributions for accurate recognition and accountability allocation among coauthors is an appealing proposition.

Double submission stands as a noteworthy ethical concern in relation to authorship. It entails submitting a paper to two different forums simultaneously.This practice is often driven by the desire to increase the chances of publication and potentially expedite the publication timeline. Reputable journals prioritize original papers—those not previously published elsewhere—and strongly discourage the practice of double submission.

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Chapter 2

LITERATURE REVIEW AND TECHNICAL READING

The central objective of conducting a literature review is to gain insights into the utilization of concepts, ideas, and methodologies presented in existing literature. This aids in precisely delineating a problem that might have been vaguely perceived prior to the review, endorsing a particular approach for comprehending the issue, and evaluating the range of methods employed. Moreover, the literature review facilitates a researcher in recognizing with clarity that the proposed research will bring a fresh and inventive contribution. The effectiveness of this review hinges on assessing its comprehensive scope, profound analysis, lucidity, methodological rigor, coherence, and adept analytical scrutiny

2.1 New and Existing language

Fresh insights generated through research can only be comprehended within the framework of preexisting understanding; they are inherently reliant on the bedrock of established knowledge. In this chapter, our focus shifts to the meticulous construction of this knowledge foundation, a prerequisite for the substantiation of our novel contributions. The interpretation of these fresh insights can markedly vary, contingent upon the researcher's background and perspective, leading to a spectrum of responses from indifference to enthusiasm (and vice versa), dictated by the interplay with existing knowledge. The rationale for their significance typically hinges on the identification of an extant problem, discernible through a survey of the field's existing corpus. This existing knowledge is pivotal for establishing the case that a problem exists and holds significance. By delineating the realm of current knowledge and highlighting the absent fragments, the originality of our endeavor becomes evident, indicating the void we seek to fill. This endeavor necessitates, once again, a reliance on established knowledge: the contextual framework, the import, the uniqueness, and the tools at our disposal.

From whence does this existing knowledge emerge? Typically, this reservoir of knowledge is extracted through perusing and investigating the literature encompassing both the long-established foundations and the ever-evolving recent advancements in the field. With this bedrock established, the novelty we introduce becomes markedly more resilient to scrutiny, fortified by a robust framework upheld by a multitude of references.[8].

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Frequently, though not universally, conventional knowledge finds its place in textbooks, while the latest developments are encapsulated within research papers. Engaging with the relevant textbooks furnishes the groundwork and historical context required to engage with the more contemporary insights typically documented in research papers. Textbooks, often designed as pedagogical tools, facilitate comprehension by leading the reader through the fundamentals and progressively building up the understanding of the subject matter. However, this contrasts with research papers, whose aim is primarily to present discrete fragments of new knowledge. Unlike the well-established knowledge found in textbooks, the new knowledge in research papers has not yet undergone the same degree of temporal validation. Crafted for fellow researchers on the frontier of knowledge, research papers assume a substantial background understanding in the field. This often necessitates delving into other sources to interpret the content of a specific research paper. While challenging, this extensive reading and learning endeavor aims to amass the requisite knowledge for constructing the foundational understanding. [9].

The review process should explicitly outline how a research contribution builds upon preceding ones. This practice is essential as valuable research not only reveals the evolution of technical advancements but also facilitates readers' comprehension of the rationale behind the current investigation. A comprehensive literature survey not only furnishes a robust foundation for advancing knowledge but also catalyzes theoretical development, identifies unexplored territories, and unveils novel possibilities for further exploration. An effective literature review focuses on concepts rather than the authors .

In essence, a well-executed literature survey is often the initial expectation of a supervisor from a research student, and its successful execution can showcase a comprehensive grasp of the field's state of the art. Essential guidelines for composing an impactful literature review have been proposed. A commendable literature review avoids hasty conclusions and scrutinizes individual references to uncover underlying causes, assumptions, and mechanisms, synthesizing available information in a more nuanced manner. It should succinctly summarize existing knowledge from the state of the art, expound on key concepts and pivotal factors, elucidate the interrelationships between them, present complementary existing approaches, pinpoint inconsistencies or deficiencies in prior works, identify inconclusive or conflicting results, and compellingly warrant further explorations in the field.

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A proficient literature survey generally follows a two-step process: (i) Identifying major topics, subtopics, or concepts pertinent to the subject matter. (ii) Categorizing relevant sources (articles, patents, websites, data, etc.) under the respective concept/topic/subtopic using appropriate markers.

While reading, one might chance upon a passage deemed pivotal for their work, a core principle, or an eloquent description that resonates profoundly. Such moments often evoke an urge to underline, highlight, or annotate, ensuring their significance isn't overlooked. This notational emphasis signifies the importance assigned to these sections.

After highlighting, it's advisable to set aside the paper or close the book. Subsequently, one should express the highlighted content in writing without verbatim copying. This process of articulating why a specific passage is crucial and what it entails inherently transforms it, aligning it with one's foundational understanding. This entails sculpting and refining the acquired knowledge to seamlessly integrate it into the existing framework. Constructing the knowledge foundation necessitates continuous reading and learning, but it equally demands articulating what has been read. [10,11]

A thorough literature survey systematically dissects and amalgamates quality archived work, establishes a robust underpinning for the topic of interest and the selection of appropriate research methodologies, and convincingly demonstrates that the proposed work will contribute in novel ways to the broader realm of research

2.2 Analysis and synthesis of prior Art bibliographic Databases

Once the researcher has compiled the selected sources, typically articles, for the literature review, they are prepared to dissect each article, extracting the pertinent information contained within. Subsequently, the researcher synthesizes this array of articles, amalgamating them to discern collective conclusions. Below, a literature survey grid featuring N topics and M sources is provided to facilitate the organization of information across different categories.

To effectively analyze the pertinent information presented in Table 2.1, researchers should engage in the following steps: (i) Grasping the underlying hypothesis, (ii) Comprehending the models and experimental parameters employed, (iii) Establishing connections between pieces of

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information, (iv) Contrasting and comparing the diverse strands of information, and (v) Identifying both strengths and weaknesses. [12].

It's prudent to maintain a healthy skepticism, particularly when evaluating claims within comprehensively reviewed sources, especially in instances of lofty assertions. Adopting a critical stance towards readily accepting information from the literature is crucial, as an uncritical approach may hinder one's capacity to delve deeper.

Table 2.1 Literature Survey Grid

	Source 1	Source 2	...	Source M
Topic 1		✓		
Topic 2	✓			✓
⋮				
⋮				
Topic N	✓	✓		

This oversight might extend to their own work, hindering meticulous analysis and potentially causing them to overlook subtle nuances in their own findings.

The primary aim of a literature survey is to unearth novel avenues for exploration by identifying unresolved challenges, pinpointing deficiencies in existing models or experimental frameworks, and proposing innovative concepts and recommendations.

Irrespective of the source of information, a researcher must adopt a critical perspective when evaluating each resource intended for citation. This methodological approach involves scrutinizing available materials to assess their suitability for the intended research. Relying on peer-reviewed articles published in reputable journals or granted patents can significantly streamline the research process. Several criteria can guide researchers in evaluating the materials under consideration:

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Authority: What credentials and affiliations does the author possess? Who is the publisher of the information?

Accuracy: In light of existing knowledge on the topic or insights from other sources, does the information appear credible? Does the author substantiate their claims by citing other references in a reference list or bibliography?

Scope: Does the source align with the appropriate level of comprehension or research for the topic?

Other considerations include currency, objectivity, and intent. Ensuring that the research question strikes a balance between being overly specific and overly broad is also of paramount importance

2.3 Web of science

"Bibliographic databases" encompass "abstracting and indexing services" that prove valuable in gathering citation-related details and potentially article abstracts from scholarly literature. These databases make this information accessible through searches. Employing simultaneous searches across these extensive databases can empower researchers to avoid undue reliance on any single database, thereby mitigating the limitations inherent in any individual database for producing high-quality research [13]. Researchers ought to swiftly identify the databases relevant to the concept or issue they intend to explore. In this section, we furnish specific information about several well-regarded bibliographic databases that hold high appeal among engineering researchers. However, our intention is not to provide exhaustive details.

2.4 Google and Google Scholar

Web of Science, formerly known as ISI or Thomson Reuters, encompasses multiple databases alongside specialized tools. It serves as a robust search resource for scholarly content, particularly beneficial for those with institutional licenses. Researchers can focus their inquiries on specific topics of interest by selecting fields from a dropdown menu, including title, topic, author, address, and more. Additionally, the tool supports sorting results by factors like the number of citations (from highest to lowest) and publication date [9].

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Employing quotation marks around phrases, adding more keywords, and utilizing the "Refine Results" panel on the left can help narrow down searches by factors such as keywords, phrases, material type (such as peer-reviewed journal articles), date, language, and more. To expand search outcomes, one can explore variations in word endings, break down search concepts, consider alternative search terms (including scientific names if relevant), connect them with logical "OR," and leverage the database's features to uncover additional references. The "Cited Reference Search" option empowers researchers to trace articles that have cited previously published papers. This functionality facilitates the exploration of how familiar ideas have been applied, refined, or extended over time.

Structured searches like these, which allow for narrowing and refining search criteria, prove effective in ensuring that retrieved results are pertinent sources. Investing time in studying these sources is likely to be fruitful. Depending on the researcher's requirements, search results can be expanded or narrowed using the built-in fields provided on the website. Upon clicking on any search result, the website presents crucial details such as the paper's title, authors, journal type, volume, issue number, publication year, abstract, keywords, and more. This comprehensive information equips researchers to determine the potential value of obtaining the full version of the paper.

2.5 Effective Search

Commencing a research journey on a topic often begins with Google, offering an excellent entry point. It proves valuable for locating readily accessible information, including reports from governmental bodies, organizations, corporations, and the like. Nevertheless, certain constraints come into play

(i) Operating as a "black box" of information, Google conducts a sweeping search across the Internet without implementing quality control, leaving the origins of results uncertain. (ii) The search capabilities and refinement options available on Google are notably limited. What about Google Scholar? Google Scholar confines searches to scholarly literature, yet it comes with limitations:

Some results may appear scholarly at first glance but prove inadequate upon closer examination.

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Its comprehensiveness is not guaranteed, as specific publishers withhold their content from Google Scholar's grasp.

Similar to regular Google, Google Scholar also offers restricted search capabilities and refinement options. Deploying search operators can aid in narrowing down outcomes, facilitating the discovery of pertinent and beneficial information sources. These operators can be combined within searches. Here are a few fundamental ones to consider: (i) OR—Broadens the search by encompassing synonyms or alternate spellings of a concept. For instance, using Synchronous OR asynchronous captures results with either term.

(ii) Brackets/Parentheses ( )—Group together OR'd synonyms while coupling them with another concept. For example, RAM (iii) Quotation marks " "—Refine the search by treating words as a phrase, rather than as separate entities. An illustration is RAM "Texas Instruments". (iv) Site—Restricts the search to results from a specific domain or website. This operator proves valuable when targeting particular sites like the BC government. Example: RAM "Texas Instruments" site: http://ieeexplore.ieee.org. (v) Filetype—Limits the search to results with a specific file extension. This can be useful for seeking PDFs, PPT, Excel spreadsheets, and more. Example: RAM "Texas Instruments" site: http://ieeexplore.ieee.org, filetype: pdf.

The "Search Tools" option at the top of Google's results offers various additional choices, such as result filtering by date. Google and-Google Scholar feature other operators and tools as well. Remember, Google serves as search tool among many available to researchers—it's not the sole option!

2.5.1 The Way-Forward1Introduction1to1Technical1Reading Conceptualizing Research

Scholarly publication comes into existence when researchers froma a specific field contribute to its creation. These works meticulously cite all source materials and typically undergo peer review to ensure precision and validity before being published. The target audience for such works comprises fellow experts and students within that field. Their content tends to be more intricate and advanced compared to what's commonly found in popular magazines. While engineering researchers primarily reference articles from scholarly journals, books, and peer-reviewed sources, there's also a wealth of valuable content within more widely circulated

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publications. These publications adopt a less formal tone, aiming to reach a broad readership that includes both experts and enthusiasts. However, their content focuses on news and trends in the field, rather than serving as the primary platform for sharing research findings. Researchers should utilize a variety of search tools to conduct a thorough search. No single location or source can provide all the necessary information; researchers often need to explore the diverse range of resources described in this chapter and beyond. Searching is a iterative process[10]:

- Experiment with different keywords and operators;
- Evaluate and assess results, utilizing filters;
- Modify the search as required
- When relevant articles are found, examine their citations and references.

Upon concluding the search, the researcher must undertake a thorough and critical reading, making note of key aspects from the sources and summarizing findings. A detailed comparison and contrast of these findings are also imperative. Often, this entire process necessitates repetition. The culmination of the literature survey includes summarizing the pertinent and noteworthy accomplishments, as well as identifying gaps and challenges in unresolved issues within the study's domain.

It's vital to understand that the literature survey is an ongoing and cyclical process, potentially demanding the researcher to continuously revisit and refine their approach until the research project's culmination. While not all researchers embark on their graduate journey equipped with the ability to swiftly comprehend complex mathematical articles, those who succeed in an engineering research career tend to develop this skill through attentive reading and active engagement with the content. Engaging in thorough reading, seeking clarification on intricate concepts, and progressing through relevant coursework all contribute to honing the skills and understanding required from the extensive array of papers. Maintaining a clear understanding of the purpose behind an exhaustive search or literature survey is of paramount importance. Although dedicating substantial time to these activities might create an impression of significant effort, genuine progress emerges from active interaction with the material and allocating ample time to develop personal insights that transcend existing literature.

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equips the engineering researcher to cultivate a robust comprehension of the problem the authors have endeavored to address[13].

Nevertheless, one might choose to skim through a technical segment if it appears to expound upon familiar concepts, if its complexity surpasses the current research scope requiring further study, or if its specialized nature seems unlikely to play a role in the ongoing research program, warranting a revisit at a later point. The process of translating a complex algorithm into programming languages like C, C++, or Java is predisposed to errors. Even if the researcher possesses confidence in the paper's content and believes the algorithm will function as anticipated, there remains a reasonable probability that it may not yield the expected outcome. Thus, there could be a desire to rapidly code it to verify its functionality.

2.5.5 Reading Datasheet

Researchers across diverse engineering fields will require specific types of documents for their work. For instance, mechanical and civil engineers may need to peruse drawings pertaining to mechanical components and structures, while those in electronics must engage with datasheets. There are instances where researchers from other domains may also need to utilize specific electronic parts, necessitating a meticulous examination of the corresponding datasheet. The same fundamental principles of preliminary skimming apply to determine whether further in-depth reading is warranted.

Datasheets function as instructional manuals for electronic components, outlining the component's functionality and how it can be utilized. They empower researchers and professionals alike to design circuits and troubleshoot circuits involving the given component. Usually, the opening page of a datasheet presents a summary of the part's function, features, basic specifications, and a functional block diagram illustrating its internal workings.

A pinout diagram illustrates the physical arrangement of a part's pins, often with a designated marking for pin 1 to ensure proper alignment when incorporating it into a circuit. Some datasheets include graphs depicting performance against variables like supply voltage and temperature, delineating a safe operational range that researchers should carefully review. Other essential elements include truth tables that detail input-output relationships and timing diagrams that illustrate data transmission and reception speeds[14].

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Datasheets commonly conclude with precise package dimensions, pertinent for printed circuit board (PCB) layout considerations. When engaging with a new component or making decisions about its incorporation in research work, a thorough study of the component's datasheet is advised. Such an investment can yield time-saving shortcuts down the line.

While specific branches of engineering necessitate domain-specific documents for reading, the authors' aim here is to use datasheets as an example to underscore the importance of mastering the art of comprehending such documents. Technical papers and books are not the sole contents demanding proficiency in reading for a researcher.

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Chapter 3

ATTRIBUTIONS AND CITATIONS

In this chapter, our focus is on the importance of broadening acknowledgments and attributions to encompass roles and responsibilities that extend beyond the primary authors of journal articles or the principal investigators of grant proposal documents. This becomes especially relevant in the context of scientific research projects that involve a diverse array of skill sets and expertise. Academic writing inherently adheres to specific rules and conventions, where citing, referencing, attributing, and acknowledging the work of others are among the most crucial aspects. This involves giving appropriate credit wherever it is due.

Citing entails integrating quotes and references to the works and ideas of other authors into our own text, ensuring clarity for readers regarding the context. On the other hand, referencing involves providing comprehensive publication details for the cited work, furnishing readers with background information. In research publications, acknowledgments highlight contributions to scientific endeavors. However, the applications of acknowledgment, attribution, and citation differ in their approaches. Acknowledgment carries a more personal and individualistic quality, encompassing expressions of appreciation and contribution. Throughout this chapter, we delve deeply into these intricacies while also addressing the legal implications that arise when attributions and citations are insufficient.

3.1 Giving Credit Wherever Due: Functions and Attributes

Citations, also known as references, not only acknowledge the contributions of others but also provide readers with a means to locate the source publication when necessary. In any new document, any part of someone else's work or ideas — be it text, images, sounds, or any form of written material — must be used with clear citation to its source. Failure to adhere to this practice may result in plagiarism, which will be thoroughly discussed in subsequent chapters of this book. Avert distress and potential embarrassment by grasping the principles of what requires citation. Depending on the nature of the material, a researcher may need to appropriately attribute the creator of the original source. [15]

The advancement of knowledge in any field, particularly in technology-related domains, unfolds incrementally. Researchers invariably build upon prior information as part of their natural

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progress. Established channels for disseminating and expanding knowledge include patents, papers (conference and peer-reviewed journal papers), articles, textbooks, and educational environments. While researchers must leverage existing knowledge within their research focus for further development, it's equally important to give due credit to the foundational knowledge.

When a researcher incorporates a bibliography of previously published patents or papers into new work, a link forms between the current and past endeavors. Based on contextual relevance, appropriate credit is extended through citations. Citations serve as guideposts for readers to evaluate the caliber and significance of new work, supporting the rationale behind findings. They convey that certain material in the researcher's current work derives from another source and, in line with ethical responsibility, proper acknowledgment is provided to the original author or creator. Materials open to citation encompass journal papers, conference proceedings, books, theses, newspaper articles, websites, online resources, and personal communications. Ideally, citations are positioned at the conclusion of sentences or paragraphs, as exemplified in this very paragraph. Each citation must furnish adequate details for readers to easily locate the referenced material.

Each source must be cited twice by a researcher: (i) through an in-text citation at the exact point where the source is quoted or paraphrased in the text of the article, and (ii) a second time in the references section, usually positioned at the end of a chapter, book, or research article. While most citation styles share similar elements, they differ in the arrangement and layout of those elements. Unless a specific journal or book demands otherwise, researchers can opt for any style as long as consistency is maintained.

Citation components vary, so the information to be recorded may differ across sources. It's also essential to include the publication date and, at times, the date of access by the researcher, particularly for web content.

LaTeX, a document preparation system frequently used by engineering researchers to automatically format documents according to standard requirements, proves highly effective for tracking and updating citations. Although LaTeX has a steep learning curve, it will recur throughout this book to address various aspects of technical writing, closely intertwined with the research processes of engineers.

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Citations serve three primary functions:

- Verification Function: Citations enable authors and readers to identify any intentional or unintentional distortion, misrepresentation, or inaccuracies within research. They offer readers the opportunity to validate the justification and proper depiction of assertions made in the present work .
- Acknowledgment Function: Researchers garner recognition for their contributions through citations, which significantly impact their career progression and job stability. Esteemed organizations and institutions often allocate research funding based on researchers' reputations. Citations enable researchers to bolster their standing and provide a comprehensive backdrop to their research endeavors[16] .
- Documentation Function: Citations contribute to documenting scientific concepts and the historical evolution of specific technologies over time [17].

Citations represent the currency authors accumulate, with the technical community acknowledging and crediting them for their contributions. Authors who make citations pay tribute to the pioneers of ideas. By identifying, assessing, and incorporating others' research, authors demonstrate their comprehension and craft their own ideas while appropriately crediting original sources through citations.

Authors should utilize citations to signify the significance of their work to readers. Relevant citations facilitate the development of a coherent argument, sparing readers the need to navigate through irrelevant material. Failure to cite appropriately encroaches upon the rights of the original researchers.

However, there are instances when references fail to serve the intended purpose of citations and acknowledgments, thus not benefiting the reader:

Spurious Citations: Including citations when unnecessary or when an appropriate one cannot be found constitutes spurious citations. These citations do not contribute to the reader's understanding and lead to wasted time searching for irrelevant papers. Proper credit through citation is vital, and inappropriate credits should be avoided to maintain the credibility of research work and the journals or conference proceedings where it's published.

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Biased Citations: Authors demonstrate bias when citing the work of friends or colleagues without a substantial connection between the two works. Similarly, neglecting to cite work of genuine significance due to personal reasons or withholding credit from certain individuals through citation qualifies as biased citations. Ignoring citations to prior work that contradicts the current research also falls under this category.

Self-Citations: Self-citation of previous papers is acceptable if relevant to the current work. This is common in ongoing research projects where the latest paper forms part of a broader study. Self-citations consolidate related works by the same author in one paper, potentially saving readers effort in seeking out full versions of those papers. However, this practice remains ethical and beneficial only if all the cited papers genuinely relate to the present work[18] .

Nonetheless, the journal itself and individual researchers can suffer adverse consequences due to inappropriate and irrelevant self-citations. Such self-citations may fall into the categories of spurious or biased, or even encompass both. Editors of journals who overlook such citation issues, whether through oversight or otherwise, and allow them to appear in published materials inadvertently impact the publications' impact factor, either directly or indirectly[19] .

Coercive Citations: Despite their limitations, impact factors continue to serve as a primary metric for quantifying research,. An unintended outcome is that it creates a situation where editors may resort to coercive tactics to secure citations for their journal. While not always explicitly stated, the implicit message is that authors should include citations or risk their submission being rejected. This form of pressure ultimately tarnishes the journal's reputation[18].

From the preceding discussions, it's evident that authors must strike a balance between too few and excessive citations. Simultaneously, authors must duly attribute credit whenever warranted, even if it pertains to their own work[20].

3.2 Impact of Title and Keywords on Citations

Various factors impact the citation rate of a research paper, including the significance and accessibility of the journal, the publication type, the research domain, and the importance of the research itself. Additional elements such as the length, type, and chosen keywords in the title also have an effect on the number of citations. The title stands as the primary attribute of any research paper, serving as a key indicator of the research area or subject matter and aiding

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researchers in their literature surveys. Beyond its informative role, the title also plays a crucial part in marketing and enhancing the traceability of research papers. An effective title goes beyond being informative; it accurately represents the paper to readers, capturing their attention. Some titles may be informative but fail to engage readers, while others could be attractive but lack the information relevant to readers' research areas . The number of downloads and citations a research paper receives can be influenced by its title. Title characteristics can be shaped by three key aspects[21]:

(i) the type of title,
(ii) the length of the title, and
(iii) the presence of specific markers.

An analysis by Stremersch et al.[22] focused on title characteristics of papers published between 1990 and 2002 in a specific research domain, establishing a connection between title characteristics and citations. The study concluded that longer titles positively correlate with a higher number of citations. In another study, conducted by Sagi and Yechiam , it was discovered that highly amusing titles exhibit fewer citations, whereas pleasant titles showed no significant correlation with citation counts. Jacques and Sebire delved into the titles of various papers, studying their citation rates among the 25 most-cited and 25 least-cited research and review papers in a specific genre of journals. This study revealed a strong correlation between title length and citation rates, with highly cited articles featuring titles that were more than twice as long as those of lower-cited papers.

Jamali and Nikzad conducted an analysis of various open-access papers, revealing that articles bearing question-type titles are downloaded more frequently but receive fewer citations compared to descriptive or declarative titles. Declarative titles, while downloaded and cited less frequently than descriptive titles, exhibit a marginal difference in this regard . According to Habibzadeh and Yadollahie's findings, longer titles display a strong association with higher citation rates. Longer titles often provide a more detailed account of the study methodology and results, which consequently piques greater interest and garners more citations[23] .

Generally, titles featuring question marks, colons, or references to specific geographical regions tend to be associated with lower citation rates. Moreover, titles that emphasize results usually garner more citations than those centered around methodologies. Notably, review articles and

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original research pieces typically receive more citations compared to shorter communication articles. Inclusion of at least two keywords in the title enhances the likelihood of the article being discovered, read, and subsequently cited[24].

Keywords stand as essential elements embodying the core content of an article, directly relevant to its research domain. Search engines, journals, digital libraries, and indexing services employ keywords for effective categorization of research topics, guiding the work to its appropriate audience. The presence of keywords is crucial for ensuring that readers are well-informed about research articles and their contents. Employing the maximum allowable number of keywords heightens the discoverability of the article and subsequently augments its likelihood of receiving citations. It's prudent to exercise caution when introducing new keywords, as such terms might not be widely recognized within the research community, potentially leading to reduced visibility of the article[25,26].

3.3 Knowledge Flow Through Citation

Knowledge dissemination occurs through various channels, including verbal exchanges, written materials, multimedia content such as videos, audios, and images. These mechanisms play a pivotal role within the research community by catalyzing the generation of new knowledge. In the realm of engineering research, the transmission of knowledge predominantly transpires through books, theses, articles, patents, and reports. The act of citing a source stands as a crucial conduit for the transfer of knowledge from prior works to innovative endeavors[27].

The production and circulation of knowledge can be intricately linked to the web of citations. Knowledge flows take shape through the interactions among co-authors engaged in collaborative research[28], the interplay of researchers within paper citation networks, and the connectivity between institutions, departments, research fields or topics, and various components of research. As depicted in Figure 3.1, there exists a symbiotic relationship between citations, the dissemination of knowledge, and entities such as researchers, research papers, journal publications, conferences, and institutions. When paper A is cited by paper B, a conduit of knowledge traverses the intricate network of citations, extending across institutional boundaries.

Given the intricate interdisciplinary nature of research, scholars are inclined to collaborate in order to harness the benefits of collective efforts, ultimately enhancing the quality of research

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outcomes. In a study conducted by Sooryamoorthy , the impact of citations stemming from South African publications was explored within diverse collaborative frameworks, disciplines, and sectors. The findings indicated that publications produced through collaborative efforts boasted higher citation rates compared to single-author papers. Moreover, a positive correlation was observed between the number of authors involved and the resulting citation count[29]

In Figure 3.2, a depiction of the interplay between co-authorship and various citation types is presented. Within this illustration, three articles (X, Y, and Z) and their respective references (X1, X2, X3, Y1, and Y2) are considered. Authors A, B, and C contribute to article X, while authors D, E, F, G, and A are associated with article Y. Article Z features authors H and E. Among the references, X1, X2, X3, Y1, and Y2 are linked to authors (A, P), (H, R), (D), (Q, B, F), and (R), respectively.

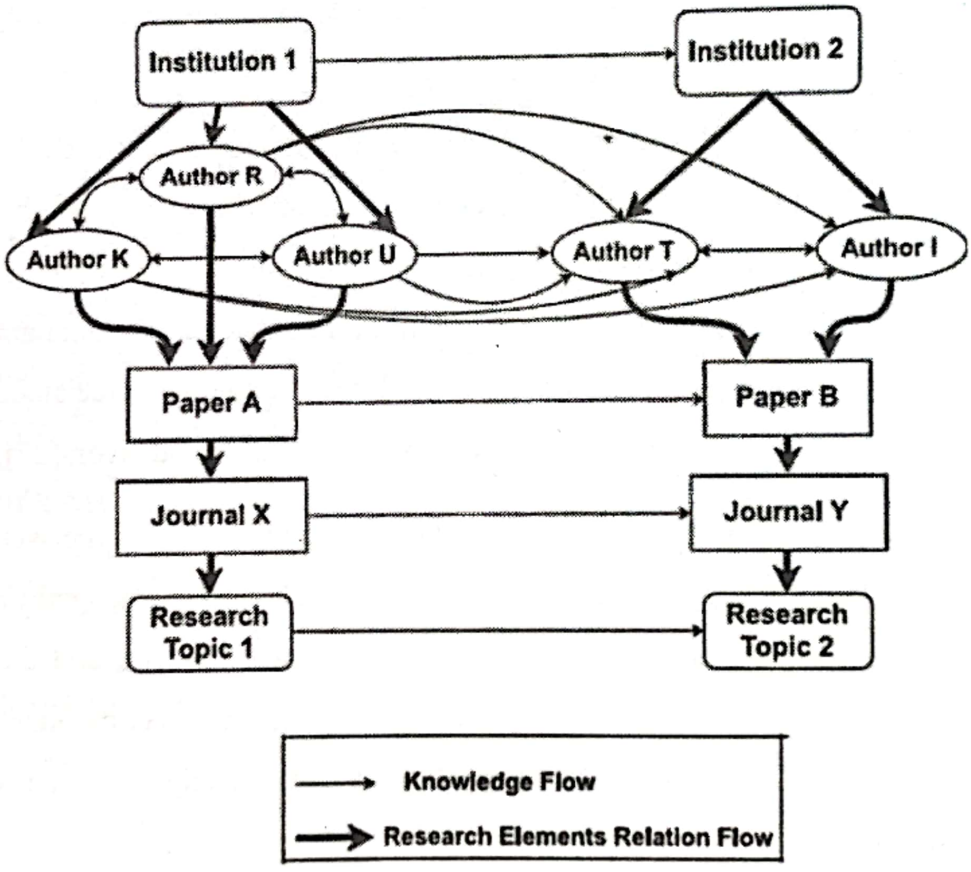


Fig 3.1: Citation BasedxKnowledge Flow[28]

Through the lens of the co-authorship citation network, certain patterns emerge. References X1 and Y1 are categorized as self-citations, denoting that they involve authors from the same paper. Reference X3 is classified as a level-1 co-author citation, as it pertains to a reference with an

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author from article Y, who is a direct collaborator of author A from article X. Similarly, reference X2 falls under the level-1 co-author network classification, as author A collaborates with author E, who in turn collaborates with author H. This network illustrates that papers which frequently cite collaborators often extend their citations to collaborators of those collaborators, thereby showcasing the cascading impact of collaboration on citation patterns. Evidently, collaborations play a significant role in influencing citation counts.

3.4 Citation Databases

The landscape of engineering research has swiftly evolved, now heavily reliant on data to substantiate assertions and furnish experimental evidence . Consequently, data citations must garner recognition akin to citations for other scholarly objects such as research articles[30]. It

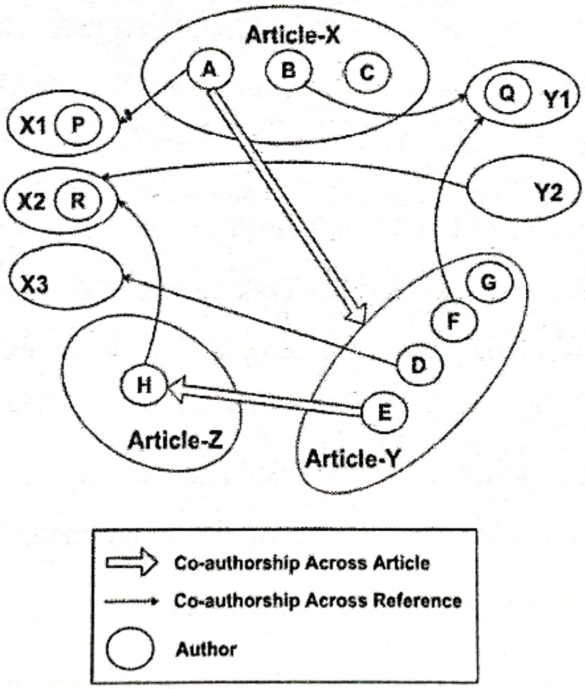


Fig 3.2: Citation Based Network[29]

becomes imperative that data citations confer rightful credit to the dataset creators, ensuring equitable acknowledgment and legal attribution to all contributors. This approach acknowledges the diverse nature of data and its varied styles that may not conform to a standardized format.

Establishing ownership of data can be intricate, particularly when dealing with voluminous datasets. Funding-related complexities further compound the matter. To navigate this landscape, researchers must diligently secure the requisite permissions for data usage from specific sources.

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Citations tied to datasets ought to encompass ample details, enabling a reader to relocate the same dataset in the future, even if the provided link ceases to be functional. Striking the right balance, a blend of comprehensive and precise information empowers readers to definitively identify the dataset they seek [31].

Examples:

1. **Historical Data, Sotavento (Wind Farm), Corunna, Spain (July 2016): [Accessed: 4 Oct, 2016] Retrieved from http://www.sotaventogalicia.com/en/real-time-data/historical**
2. **Deb, D (2016). [Personnel survey]. Unpublished raw data.**

3.5 Styles for Citations

Citation styles exhibit variations primarily in the sequence and syntax of reference information, reflecting differing emphasis on factors such as conciseness, clarity, dates, authors, and publications. Among engineers, several prevalent citation styles (as well as other components of technical writing) include:

1. ASCE style (American Society of Civil Engineers)

   (a) Bibliography or References section: This segment is intended to be included at the conclusion of the article or report. A template with an example for this purpose is provided below:

   (b) In-text citation for journals or books: The subsequent section is to be inserted immediately after referencing the source of the cited material.IEEE Style (Institute of Electrical and Electronics Engineers)

2. The IEEE style serves as the standard for all IEEE journals and magazines and is commonly employed for papers and articles in the domains of electrical engineering and computer science. Adhering to the IEEE style necessitates the use of endnotes and numerical citations for references within the text.

Authors submitting to an IEEE publication should consult the guidelines provided for the particular journal or magazine, and they can also make use of the comprehensive IEEE editorial style manual for reference. Below are some instances illustrating IEEE citation styles for various source types:

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Template for books:
Author Surname, Author Initial. (Year Published). Title. Publisher, City, Pages Used.

Example:
Wearstler, K., and Bogart, J. (2004). Modern glamour. Regan Books, NY.

Template for websites:
Author Credentials / Company Name (Year Published). 'Title'. http://Website URL (Oct. 10, 2013).

Example:
Blade cleaning services (2015): http://www.bladecleaning.com/problematica (29 Oct, 2016).

Template for journal publications:
Author Surname, Author Initial. (Year Published). 'Title'. Publication Title, Volume number(Issue number), Pages Used.

Example:
Johnston, L. (2014). "How an Inconvenient Truth Expanded The Climate Change Dialogue abd Reignited An Ethical Purpose in The United States". 1–160.

Template
(Author Surname/Website URL Year Published)

Examples:

i. Citation is a very important part of technical writing. (Deb 2016)
ii. Engineers create devices to monitor mountains so that nearby inhabitants can be warned of impending eruptions. (Teachengineering.org 2014)

Chapter in an edited book
[1] A. Rezi and M. Allam, "Techniques in array processing by means of transformations," in Control and Dynamic Systems, Vol. 69, Multidimensional Systems, C. T. Leondes, Ed. San Diego: Academic Press, 1995, pp. 133–180.

2. ASME style (The Association of Mechanical Engineers)

3.6 Acknowledgements and Attributions

The acknowledgment section serves as a platform to express brief gratitude for the contributions of individuals, organizations, or funding entities to the current work. When specific guidelines for the intended publication are absent, the acknowledgment can be incorporated at the conclusion of the text or presented as a footnote. Acknowledgment is a customary practice to

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honor the involvement of individuals or entities that have played a role, in some capacity, in the completion of a research output worthy of publication. It highlights the interconnectedness among individuals, institutions, agencies, and research endeavors. In certain instances, certain individuals might assist with the research without qualifying for authorship. Acknowledging such contributions is a gesture of appreciation.

Acknowledgments can be categorized into six distinct types: moral, financial, editorial, institutional or technical, and conceptual support.

Acknowledgments and attributions carry substantial significance in the context of journal or conference paper publications. It is paramount to appropriately acknowledge all contributions, irrespective of their scale, and avoid overlooking even minor contributions. A researcher is duty-bound to acknowledge the rightful intellectual and proprietary contributions of others. When feasible, authors should explicitly mention the individuals who, even if nominally, hold responsibility for designs, inventions, written content, or other achievements. The concept of authorship is also of great import due to the substantial value of published work. The reward triangle theory illustrates the interplay between citations, acknowledgments, and authorship.

In engineering research, acknowledgments serve as a way to recognize the involvement of technicians, students, funding agencies, grant numbers, institutions, or any other individuals who provided scientific insights, shared unpublished findings, offered equipment, or engaged in productive discussions.

3.7 What Should Be Acknowledged?

Every author should be well-versed in determining what merits acknowledgment and what does not. Authors should acknowledge various aspects, including quotations, ideas, facts, paraphrasing, funding organizations, oral discussions or support, laboratory and computer work.

(i) Quotations: In technical writing, particularly in engineering, direct quotations are infrequent. They fall into two categories: (a) Direct quotations involve using exact words or sentences in the original order. Proper acknowledgment with quotation marks is required. (b) Indirect quotations involve summarizing or paraphrasing the original quote. In these instances, proper acknowledgment with the name and date is essential[32].

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(ii) Authors must acknowledge individuals who contribute substantively to their research endeavors. Contributions beyond research-related activities are generally not acknowledged in scientific papers, although they may find mention in theses. Those deserving acknowledgment include individuals who provide scientific or technical guidance, engage in discussions, or share valuable information with the author. Assistants, students, or technicians who have aided in experimental and theoretical aspects of the research should also be acknowledged.

(iii) If the research project receives funding from an external agency, and if these funds were utilized for the reported work, the support must be duly acknowledged. Complete details of the funding program and grant number should be provided in the acknowledgment section.

Authors should also express gratitude for the use of services and facilities provided by centers or organizations they are not formally affiliated with. An example of acknowledging received grants is as follows:

Acknowledgments:
This research work was funded in part by the Extra Mural Research Funding 2014–17 (Individual Centric) of the Department of Science and Technology (DST), Govt. of India.

If there is a concern that providing acknowledgment information might compromise anonymity according to the peer review policy of a specific journal or conference proceedings, authors may choose to withhold such information until the final accepted manuscript submission. It's important to note that many technical journals discourage authors from expressing gratitude to reviewers within their article submissions, as this could be perceived as favoritism or an attempt to influence reviewers' decisions for reasons other than scientific merit.

(iv) Acknowledging previously presented results: When results have been presented as an abstract in a journal, appropriate citation should be provided. In cases where results were shared at a scientific meeting, symposium, or similar event, relevant details should be included. At a

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minimum, the name of the event and the year should be cited, along with additional information such as the location (city, state, or country) and the full date of the occasion.

By acknowledging all forms of assistance received during the research process, authors demonstrate their integrity as researchers, fostering continued collaboration with those who provided assistance. Proper acknowledgment also serves to enhance the careers of colleagues, as being credited in an acknowledgment section has become one of the ways researchers' professional impacts is assessed.

Acknowledgment has evolved beyond mere expressions of gratitude. Funding agencies now often require acknowledgment of their support, specifying the exact information to be included in case the research work leads to a publication. Grantees are responsible for ensuring that any publication, including websites, resulting from the funded project contains an acknowledgment of the support received. The necessary format for acknowledgment is often outlined explicitly in the terms and conditions of the provided grants. Acknowledgments are also relevant in technical presentations. Failure to acknowledge funding can lead to the cessation of current funding and potential ineligibility for future funding for a certain duration or indefinitely. 3.9

Unless information can be deemed "common knowledge," proper attribution of ideas, algorithms, computational methodologies, or experimental designs is essential, even if a journal employs double-blind review practices.

3.8 Acknowledgments in Books/Dissertations

In a thesis or dissertation, a section dedicated to acknowledgments is typically positioned right after the table of contents. Unlike the brief one or two sentence acknowledgments found in journal papers or conference proceedings, these acknowledgments are more extensive. This allows the researcher to offer gratitude to all those who contributed to the completion of the research work. Deliberate consideration is necessary when deciding whom to acknowledge and in what order. It's advisable to express appreciation succinctly and refrain from using overly emotional language. The following individuals or groups are often acknowledged in this type of section: primary supervisor, co-supervisor, lab peers, academic staff within the department, technical or support staff within the department, colleagues from other departments, external institutions or organizations, former students, family members, and friends.

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Sample Acknowledgement in Thesis:
I wish to express my sincere appreciation to my supervisor Prof. Gang Tao for the useful comments, remarks and encouragement throughout this thesis work. Furthermore, I wish to express my thanks to Prof. Jacob Hammer for introducing me to the topic and for the support along the way. Also, I like to thank my peers in the Adaptive Control Lab such as Yu Liu and Shanshan Li, who have shared their precious time during many lively technical discussions. I would like to thank my family members who have supported me throughout this journey in many different ways.

3.9 Dedication or Acknowledgments?

Dedications are seldom featured in journal papers, conference proceedings articles, or patents; rather, they are more commonly found in longer works such as books, theses, or dissertations. While acknowledgments are typically directed towards those who provided assistance in various aspects of the work (editing, support, etc.), dedications hold a special place and can be addressed to anyone the author chooses—be it a mother, a best friend, a beloved pet, or a higher power. It's entirely feasible to dedicate a work to someone while also mentioning them in the acknowledgments. For instance, a book could be dedicated to a spouse while acknowledging their unwavering moral support during times of stress.

The acknowledgments in technical books can sometimes be as concise as those in journal articles. In a technical report, the acknowledgment section may be longer than that of a journal paper but shorter than those in dissertations. Generally, the length of the acknowledgment section might exhibit a certain correlation with the overall length of the document.

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Chapter 4

INTRODUCTION TO INTELLECTUAL PROPERTY

Intellectual Property (IP) constitutes a unique class of property originating from human intellect across various domains like arts, literature, science, and trade. As a product of the mind's ingenuity, IP possesses intangible attributes, unlike tangible assets such as land, houses, gold, and cars that are more familiar to us. Intellectual Property Rights (IPR) represent the privileges granted to creators and inventors in accordance with legal frameworks. These rights are granted in exchange for sharing the creative or inventive process with the public. The inventor is vested with exclusive rights to utilize, vend, distribute, offer for sale, and restrict others from using the invention without prior consent. Notably, these rights pertain to the intangible creation itself and not to the physical embodiment (e.g., a book, computer, or mobile phone) that may carry it.

In a broader sense, IP encompasses two primary branches: 'Copyrights and Related Rights' and 'Industrial Property Rights.' 'Copyrights and Related Rights' encompass creative expressions within literature and art, encompassing works like books, publications, architecture, music, carvings, images, sculptures, films, and computer-based software/databases. On the other hand, 'Industrial Property Rights' encompass Patents, Trademarks, Trade Services, Industrial Designs, and Geographical Indications. The distinct characteristics of these categories are elaborated upon in the subsequent chapter

4.1. Role of IP in the Economic and Cultural Development of the Society

Given that creativity serves as the cornerstone of progress, it is imperative for any civilized society to actively foster this fundamental aspect. The advancement of a society's economic and social landscape is heavily reliant on the presence of creative endeavors. The safeguarding provided by Intellectual Property Rights (IPR) to creators and innovators serves as a mechanism for incentivizing greater creation and simultaneously motivates others to embark on novel ventures.

However, when IPR is strictly adhered to, it can potentially impede societal progress. A notable example is seen in the compliance with the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement, which has adversely impacted agricultural communities.

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These communities face challenges in storing seeds for subsequent crops, as multinational corporations control seed prices, rendering them unaffordable for most farmers.

To counterbalance the negative effects of IPR, specific legal measures, exceptions, and limitations have been instituted to maintain equilibrium between the interests of creators and inventors and those of the broader community. One instance is the Protection of Plant Varieties and Farmers' Rights (PVP&FR) Act of 2001, which grants farmers several privileges, including the right to save, use, share, exchange, or sell seeds to fellow farmers, as well as protection against infringement accusations stemming from unintentional violations due to their lack of legal awareness.

Certain uses of copyrighted material for educational and religious purposes are exempt from the restrictions imposed by the Copyright Act. Additionally, patents can be overridden in favor of compulsory licensing by the government during emergencies or natural disasters. Moreover, the government has the authority to withhold IP rights for inventions or creations that are not in the best interests of society. For instance, the cloning of human embryos and the development of highly dangerous microbial pathogens are barred from IP protection due to their potential risks.

Furthermore, India possesses an extensive wealth of biodiversity and genetic resources, collectively known as Traditional Knowledge (TK). These resources are not confined to local contexts and often underpin various innovations. Thus, the central concern revolves around safeguarding TK and genetic resources, which are increasingly subject to sometimes conflicting IPR policies. To harness these resources to their maximum potential, a robust legal framework and enforcement mechanisms are essential. Initiatives like 'Make in India,' 'Atmanirbhar Bharat,' and support for indigenous brands, alongside simplified and accessible patent and trademark registration processes, offer the potential to capitalize on our resources effectively.

4.2. IP Governance

Given that Intellectual Property (IP) stands as an intrinsic element of global society, each nation dedicates specific agencies to formulate guidelines, oversee implementation, and enforce matters related to IP. In India, a multitude of organizations and agencies address diverse aspects of IP. The management of all IP categories, excluding the Plant Variety and Farmers' Rights Act, is entrusted to the Department for Promotion of Industry & Internal Trade (DPIIT), operating

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under the Ministry of Commerce and Industry, Government of India. Additionally, several dedicated government-established entities work towards fostering a patent ecosystem in India, encompassing patent awareness, filing, and commercialization. Notable examples include the Technology Information Forecasting and Assessment Council (TIFAC), National Research Development Corporation (NRDC), and Cell for IPR Promotion and Management (CIPAM).

For the seamless facilitation of IP-related activities across nations, it becomes essential to establish baseline standards for rules and regulations encompassing all aspects of IP, including rights, empowerment, and exceptions. To fulfill this objective, the United Nations (UN) has established the World Intellectual Property Organization (WIPO). This organization plays a leading role in disseminating knowledge about IP and oversees the international filing and registration of IP through various conventions and treaties, such as the Paris Convention, Patent Cooperation Treaty (PCT), Rome Convention, and Berne Convention, among others.

4.3. IP as a Global Indicator of Innovation

IP, particularly patents, holds a significant role in evaluating a nation's innovation index. Global ranking entities consistently incorporate IP, or a subset thereof, as a fundamental criterion for comprehending and assessing a nation's Science, Technology, and Innovation (STI) landscape. To illustrate, the 2020 Scimago report, an online platform that ranks journals and countries using data from Scopus, positioned India in the 4th spot for the 'Research Publications' parameter and 50th for 'Intellectual Property Rights'. Enhancing global rankings entails raising awareness among educational and scientific communities regarding the significance of IP and establishing dedicated infrastructure for it within higher education institutions.

4.4. Origin of IP

Although there exists no official documentation regarding the inception of IP, it is widely believed that a primitive version of IP was being practiced around 500 Before the Common Era (BCE) in the Greek state of Sybaris. In this region, individuals were granted a year's safeguard to utilize their intellectual capacities in devising "any new improvement in luxury."

The groundwork for a practical and pragmatic framework for IP governance began to take form during medieval Europe. In 1623, Britain enacted Intellectual Property Legislation, enabling guilds (associations of artisans or merchants) to develop innovations and introduce them to the market for commercial purposes. Nonetheless, this legislation stirred significant

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public discontent and was subsequently substituted by the "Statute of Monopolies," which accorded the original creators or inventors with rights lasting 14 years.

Another pivotal legislation, the "Statute of Anne," was ratified by the British parliament in 1710. This enactment sought to reinforce copyright protections by bestowing authors with rights to reproduce and circulate their works. These rights could also be renewed for an additional 14 years. As the 18th century neared its conclusion and the 19th century commenced, virtually every nation initiated the formulation of IP laws to shield their pioneering inventions and creations.

4.5. History of IP in India

4.5.1. Patents

The roots of the Indian patent system can be traced to the pre-independence period under British rule. The initial patent-oriented legislation in India was introduced through Act VI of 1856, which was modeled after the British Patent Law of 1852. This legislative initiative aimed to foster the development of novel and beneficial manufacturing innovations. The entitlements granted to inventors were referred to as 'Exclusive Privileges.' In 1859, amendments were implemented to this Act, including:

- Grant of exclusive privileges to useful inventions.
- Increase of priority time from 6 months to 12 months.
- Exclusion of importers from the definition of the inventor

Subsequently, it became evident that 'Designs' could potentially meet the criteria of innovation and thus warranted inclusion in the Patent Act. The revised legislation was then retitled as the "Patterns and Designs Protection Act" under Act XIII of 1872. This Act underwent further revisions in 1883 (XVI of 1883), introducing provisions for safeguarding 'Novelty' within the realm of invention.

At the outset of the 20th century, the preexisting Acts concerning inventions and designs were replaced with the introduction of the "Indian Patents and Designs Act, 1911" (Act II of 1911). This Act placed patent governance under the jurisdiction of the Controller of Patents. In the subsequent thirty years, multiple amendments were introduced to establish reciprocal agreements with other nations for securing priority dates. These amendments encompassed topics such as:

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- Use of invention by the government.
- Patent of Addition.
- Enhancing the term of the patent from 14 years to 16 years.
- Filing of _Provisional Application' and submission of _Complete Application' within 9 months from the date of filing the application.

Following India's attainment of independence in 1947, a consensus emerged among patent experts that a comprehensive assessment of the Indian Patents and Designs Act, 1911 was necessary, with a focus on national interests, both economic and political. To undertake this task, a dedicated committee was formed in 1949, with distinguished Justice Bakshi Tek Chand, a retired Judge of the Lahore High Court, serving as its chairperson. This committee presented a multitude of recommendations, including:

- Misuse of patents rights needs to be prevented.
- There must be a clear indication in the Act that food, medicine and surgical and curative devices should be made available to the masses at the cheapest rate by giving reasonable compensation to the owner of the patent.
- Amendments in Sections 22, 23 and 23A of the Patent and Design Act, 1911 on the lines of the UK Patent Act.

These recommendations found incorporation in the Act XXXII of 1950. Just two years later, another amendment (Act LXX of 1952) was enacted, compelling the compulsory licensing of patents associated with food, drugs, and chemicals designed to eliminate insects and microbes. Building upon these amendments, a bill was presented in parliament in 1953 but faced rejection. In 1957, the central government established yet another influential committee, chaired by Justice N. Rajagopala Ayyangar, to solicit input for further fortifying Indian Patent Law.

The committee submitted its report to the government in 1959, comprising two sections addressing a) general facets of patent laws, and b) the previously rejected 1953 bill. The revised patent legislation was introduced to the Lok Sabha in 1965. After numerous deliberations, clarifications, and modifications, the Patents Act of 1970 (http://www.ipindia.nic.in/writereaddata/Portal/IPOAct/1_31_1_patent-act-1970-11march2015.pdf) was enacted, superseding all prior laws related to patents. Nonetheless, the Indian Patents and Designs Act of 1911 continued to apply exclusively to designs until 1994. In

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1995, India signed the TRIPS Agreement and secured a transitional period of 10 years (1995-2005) to align domestic legislation with the international treaty. In 1999, The Patents (Amendment) Act, 1999 was introduced, enabling the filing of applications for 'Product Patents' in the domains of drugs, pharmaceuticals, and agrochemicals. Previously, only 'processes' were protected under the Patent Act.

The new Patent Act also incorporated provisions for granting Exclusive Market Rights (EMRs) for the distribution and sale of pharmaceutical products under certain conditions. The second amendment to the 1970 Act came through the Patents (Amendment) Act, 2002 (Act 38 of 2002). This Act introduced the new Patent Rules, 2003, thus replacing the earlier Patents Rules of 1972. The key amendments included:

- The protection term of 20 years for all inventions from the date of filing.
- Scope of non-patentable inventions including Traditional Knowledge expanded.
- Disclosure of source and geographical origin of biological material made compulsory.
- Provisions concerning convention countries simplified.
- Establishment of Appellate Board.
- Compulsory license provisions strengthened.
- Simplification of procedures.
- Harmonization with Patent Cooperation Treaty (PCT) provisions. With the rapidly changing scenario of IPR at a global level, a need was felt to further amend the Patent Act, 1970. The highlight of the Patents (Amendments) Act 2005 were:
- Product patent for inventions in all fields of technology.
- New forms of known substances excluded to prevent evergreening of the patent.
- Rationalization of the opposition procedure.
- Introduction of pre-grant opposition by representation.
- Introduction of post-grant opposition.
- Compulsory license for export purposes.
- Compulsory license for manufacture.
- Extension of grace period from 6 months to 12 months for filing a patent, if published in government exhibition.

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India actively participates in all major Conventions and Treaties that foster international filing for inventors and ensure global protection of their rights. Noteworthy among the international accords to which India is a signatory include the TRIPS Agreement (1995), Paris Convention (1883), PCT (1970), Budapest Treaty (1977), and various others.

4.5.2. Copyrights and Related Rights

The origin of copyrights dates back to the 15th century; however, the necessity for copyright laws emerged with the advent of printers and copiers. Prior to the printing press, written material could only be created once, a laborious process fraught with the risk of errors when copied by scribes. During the 15th and 16th centuries, the printing press gained prominence in Europe, with the printing of Bibles being among the earliest works. Initially, governmental documents were printed without constraints, leading to the wide dissemination of government information. As a result, licenses for printing were later instituted by the government.

The evolution of copyright law in India transpired over three distinct phases. The first two phases unfolded during British rule. The initial phase, during the East India Company's regime in 1847, introduced the concept of copyrights. Copyright terms spanned the author's lifetime plus an additional seven years after death. Unlike today, copyright protection was not automatic; registration was mandatory for rights enforcement.

In cases where the copyright owner refused publication after the author's death, the government could grant a compulsory license for publishing a book. In the second phase, under British rule, the Indian legislature introduced the Copyright Act of 1914, modeled after the UK's Imperial Copyright Act (1911).

This phase brought about criminal sanctions for copyright infringement. The third phase of copyright regulation unfolded post-independence, culminating in the enactment of the Copyright Act of 1957. This act replaced the Indian Copyright Act of 1914 to align with the provisions of the Berne Convention (1886). The Copyright Act of 1957 has since undergone six amendments (in 1983, 1984, 1992, 1994, 1999, and 2012) to comply with the WIPO Copyright Treaty (WCT) and WIPO Performances and Phonograms Treaty (WPPT) of 1996.

Most of the amendments to copyright laws were directed towards the digital environment, encompassing penalties for circumventing technological protection measures,

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rights concerning management information, liability of internet service providers, introduction of statutory licenses for cover versions and broadcasting organizations, ensuring royalty rights for authors and music composers, granting exclusive economic and moral rights to performers, equal membership rights in copyright societies, and exceptions for physically disabled individuals to access copyrighted works. India actively participates in numerous international Conventions and Treaties related to Copyright Law, including the Berne Convention as modified in Paris in 1971, the Universal Copyright Convention (1951), the Rome Convention (1961), WCT, WPPT, and TRIPS (1995).

4.5.3. Trademarks

The inaugural legal statute concerning Trademarks (TM) in India was the Trade Marks Act of 1940, which was derived from the UK's Trade Marks Act of 1938. This was followed by the integration of TM provisions within the Indian Penal Code, Criminal Procedure Code, and the Sea Customs Act. Subsequently, the Trade Marks Act of 1940 was renamed as the Trade and Merchandise Marks Act of 1958. After nearly four decades, this legislation was replaced by the Trade Marks Act of 1999, driven by the necessity to align with the stipulations of the TRIPS Agreement. This Act currently stands as the governing law pertaining to registered trademarks

4.5.4. Geographical Indications

As a participant in the World Trade Organization (WTO), India introduced the Geographical Indications of Goods (Registration and Protection) Act in 1999. This legislation was officially enforced on the 15th of September, 2003. The concept of Geographical Indicators is elucidated within Article 22(1) of the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).

4.5.5. Trade Secrets

While India lacks dedicated Trade Secrets Laws, Indian courts have recognized and upheld the safeguarding of trade secrets through diverse legal frameworks, encompassing contract law, Copyright law, principles of equity, and the application of common law principles related to breach of confidence, effectively addressing breaches of contractual obligations.

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4.5.6. Semiconductor Integrated Circuits and Layout Designs

In the 21st century, the Information Technology (IT) sector has orchestrated a transformative influence on the global economy's progress and societal advancements. Swift and remarkable scientific progress in IT has engendered the emergence of a novel category of Intellectual Property known as Layout-Design of Semiconductor Integrated Circuits (SICLD). Various entities, including the World Trade Organization (WTO) and the TRIPS Agreement, have established guidelines for safeguarding Semiconductor Integrated Circuits and Layout Designs. India, as a WTO member, has also enacted the SICLD Act in 2000. This legislation aligns with TRIPS provisions and adequately meets the stipulations of the TRIPS agreement (Articles 35 to 38) concerning the protection of SICLD.

4.5.7. Plant Varieties

Until the 1970s, there was relatively little emphasis on patentable subject matter derived from animals and plants. However, microorganisms and related products or processes were considered patentable. Recognizing the need to encompass all types of biological materials within patent laws, a decision was made to introduce a fresh sui generis law in accordance with the International Convention for the Protection of New Varieties of Plants (UPOV) of 1978 and UPOV of 1991. These steps were undertaken to address both environmental considerations and the interests of the public.

The Indian Patents Act of 1970 excludes "plants and animals in whole or any part thereof other than microorganisms" from the scope of patentability. To fulfill the requirements of Article 27.3 (b) of the TRIPS Agreement, India introduced the Protection of Plant Varieties and Farmers' Rights Act (PPV&FR Act) in 2001 as a sui generis framework. This legislation not only safeguards new plant varieties but also upholds the rights of farmers.

4.5.8. Traditional Knowledge

Traditional Knowledge (TK) refers to the ancient and indigenous knowledge held by communities or groups. In earlier times, this knowledge was transmitted solely through oral tradition and lacked written documentation. As a result, TK was orally transmitted to successive generations. Its scope isn't confined to a specific domain but extends across a diverse spectrum, encompassing the utilization of plants or their extracts for medicinal purposes, traditional dance

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forms, hunting techniques, craftsmanship expertise, and more. While official records may be lacking, traces of TK often emerge in cultural elements like stories, legends, folklore, rituals, and songs.

In the past, mechanisms for protecting TK were absent. However, with its recognition as Intellectual Property (IP) under the TRIPS Agreement, a means of safeguarding TK has emerged. The Government of India has established the Traditional Knowledge Digital Library (TKDL), a digital repository containing 250,000 formulations from various Indian medical systems.

4.5.9. Industrial Designs

A design represents a creation of human ingenuity, captivating the senses and drawing the gaze of observers. The imperative to safeguard Industrial Designs (ID) was acknowledged as early as the 18th century, prompting the enactment of the inaugural "Patterns and Designs Act" in India in 1872. This legislation aimed to secure the rights of creators over their innovative designs and unique patterns. In due course, this Act was succeeded by the British Patents and Designs Act of 1907, which eventually formed the foundation for the Indian Patents and Designs Act of 1911. Notably, a distinct patent law, the Patent Act of 1970, was introduced in 1970

Throughout these developments, the Indian Patents and Designs Act of 1911 persisted as the governing law solely for designs. Ultimately, a dedicated Act for Industrial Designs was introduced in the year 2000, officially taking effect in 2001.

4.5.10. Biodiversity Conservation

Biodiversity stands as an integral component of human sustenance, and the notion of safeguarding it finds its roots even in historical periods like those of Chandragupta and Ashoka. During those times, classifications for trees and forests, including reserved categories, were established. The year 1927 saw the enactment of the "Indian Forest Act," followed by the "Wildlife Protection Act, 1972," which granted legal protection to biodiversity. In 1988, the introduction of the "National Forest Policy" brought transformative shifts in the conservation and management of biodiversity.

Currently, an array of Acts and policies work to ensure the safeguarding of the environment and biodiversity in India. These encompass the Mining and Mineral Development

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Regulation Act of 1957, the Water (Prevention and Control of Pollution) Act of 1974, the Forest Conservation Act of 1980, the Biological Diversity Act of 2002, the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Rights) Act of 2006, the National Biodiversity Action Plan of 2009, the National Environment Policy of 2006, and several others.

4.6. Major Amendments in IP Laws and Acts in India

To address the existing voids within the framework of IP Laws and Acts and to align with contemporary socio-political contexts, nations continually revise their respective IP regulations and legislations. Below are notable amendments introduced in Indian IPR laws and acts:

Table 4.1: History of Laws and Acts pertaining to intellectualproperty in India.

.No.	Year	Historical Proceedings
		Patents
1.	1856	The Act VI of 1856 on the protection ofinventions based on the British Patent Law of 1852.
2.	1859	➢ Rights renamed as _Exclusive Privileges‘. ➢ Time for the priority increased from6 months to 12 months.
3.	1883	➢ The Patterns and Designs Protection Act ➢ Introduction of novelty in the invention. ➢ A grace period of 6 months for the disclosureof the invention.
4.	1911	➢ Renamed as _The Indian Patent and Design Act‘ and brought under the management of Controller of Patents‘.
5.	1930	➢ Introduction of Patent of Addition. ➢ Government can use the invention if required. ➢ The term of patent protection increased from14 to 16 years.
6.	1945	➢ Filing of the provisional specification tosecure the priority date. ➢ Provision of submitting completespecifications within 9 months.
7.	1949	➢ Dedicated Committee formed under the leadership of Justice Bakshi Tek Chand for reviewing patent system as per the national environment.

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8.	1950	➢ A working statement needs to be submitted at the Patent Office. ➢ Endorsement of the Patents with the words License of Right' on the application made by the government so that the Controller could grant the license.
9.	1952	➢ Provision of _Compulsory License' in the areas of food, medicine and insecticide germicide. ➢ Process for producing substance or any invention relating to surgical or curative devices.
10.	1965	➢ After incorporation of the recommendation submitted by the committee formed in 1949, a new bill was introduced in Lok Sabha but was not cleared.
11.	1967	➢ Again submitted to Parliamentary Committee. ➢ 1911 Act remained applicable for Designs.
12.	1970	➢ The Patent Act, 1970 passed by the Parliament Committee.
13.	1972	➢ The Patent Act, 1970 came into force with the introduction of patent rules.
14.	1995	➢ TRIPS Agreement was signed by India and got transition period 1995-2005 to make domestic laws compatible with TRIPS.
15.	1999	➢ Introducing the provisions for receiving the applications for the product patent in the field of pharmaceuticals and agro-chemicals (mail box)*. ➢ Provisions for the grant of EMRs for distribution and sale of pharma products on fulfilment of certain conditions. ➢ Grant of EMR subject to certain conditions. * after the amendments (1999) the product
		➢ patents related to the pharmaceuticals and agro- chemicals were kept on hold for examination till 2005. It is called a mailbox or black box.
16.	2002	➢ The uniform 20-year term of the patent for all inventions. ➢ Disclosure of source and geographical origin of biological material made compulsory. ➢ Establishment of Appellate Board. ➢ Compulsory License provisions strengthened.
17.	2003	➢ The Patents Rules, 2003 were introduced.

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18.	2005	➢ Product patent for inventions in all fields of technology including food, drug, chemicals and microorganisms. ➢ New forms of known substances excluded in order to prevent the ever-greening of the patent. ➢ Introduction of the pre-grant opposition. ➢ Introduction of post-grant opposition. ➢ Extension of grace period to 12 months.
Copyrights and Related Rights		
19.	1847	➢ The concept of Copyrights in India wasintroduced. ➢ Validity - Lifetime+7 years but not more than 42 years in total.
20.	1914	➢ Copyright Act, 1914 was introduced based on theImperial Copyright Act, 1911 of UK.
21.	1957	➢ Copyright Act, 1914 was replaced with Copyright Act, 1957 with minor modifications.
22.	1984	➢ Penalty on second and subsequent conviction.
23.	1994	➢ Registration of Copyright Societymademandatory.
24.	2012	➢ To comply with international Treaties for copyrights protection in the digital environment. ➢ Right to receive royalties for authors and music composers. ➢ Exception of copyrights for physically
		➢ To comply with international Treaties for copyrights protection in the digital environment. ➢ Right to receive royalties for authors and music composers. Exception of copyrights for physically disabled persons to access any work.
25.	2013	Copyrights Rules, 2013 introduced.
Trademarks		
26.	1940	➢ Trademarks Registry established in India.
27.	1958	➢ The Trade and Merchandise Marks Act, 1958enacted as per TRIPS Agreement.
28.	1999	➢ Amended to avoid duplicity and ensure securing proprietors' trade and

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		goodwill.
29.	2002	➢ Trademarks Rules introduced.
30.	2010	➢ Amended to comply with Madrid Protocol forinternational filing. ➢ Provision for filing opposition of theregistration within 4 months.
31.	2013	➢ Trademarks Rules introduced.
Geographical Indications		
32.	1999	➢ Being a member of the World Trade Organization (TRIPS), GI of goods (Registration and Protection) Act was introduced.
33.	2002	➢ The Geographical Indications of Goods (Registration and Protection) Rules, 2002 was introduced.
34.	2003	➢ The Geographical Indications of Goods (Registration & Protection) Act came into force.
Designs		
35.	1872	➢ Patterns and Designs Protection Act introduced for the protection of new patterns and designs.
36.	1888	➢ Amended as Invention and Design Act, 1988 for the protection of new inventions and designs.
37.	1911	➢ Renamed as The Indian Patent and Design Act.
38.	2000	➢ Design Act, 2000 was introduced; separated fromthe Indian Patent and Design Act.
39.	2001	➢ Design Rules, 2001 introduced.
Semiconductor Integrated Circuits Layout Design (SICLD)		
40.	2000	➢ Semiconductor Integrated Circuits Layout Design ➢ (SICLD) Act 2000 introduced as a signatory ofWTO.
41.	2001	➢ SICLD Rules introduced.
Protection of Plant Varieties and Farmers' Rights (PPV&FR)		
42.	1970	➢ The Patent Act, 1970 excluded plants andanimals in whole or in any part from patentability (in 1999 amendments).

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43.	1991	➢ Enactment of protection of new varieties ofplants on *sui generis* basis on the lines of UPOV.
44.	2001	➢ In line with TRIPS Agreement enactment ofPPV&FR Act was introduced.
Biological Diversity		
45.	2002	➢ The Biological Diversity Act, 2002 introduced on the lines of the Convention on BiologicalDiversity (CBD, 1992).
46.	2003	➢ Establishment of National BiodiversityAuthority. ➢ Designation of repositories under theBiological Diversity Act.
47.	2004	➢ Biological Diversity Rules introduced.

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Chapter 5

PATENTS

The realm of Intellectual Property (IP) encompasses a broad spectrum, spanning from technology-driven innovations and the creations of skilled artisans to fresh industrial designs, distinct commercial brands, and the enduring application of Traditional Knowledge for producing goods like textiles, carpets, and food items. To grasp the expanse of this field, it has been segmented into diverse categories. Within the Indian context, these categories encompass Patents, Copyright and Related Rights, Trademarks, Trade Secrets, Industrial Designs, Geographical Indications, and Semiconductor Integrated Circuits Layout Designs. The subsequent sections delve into the details of each of these categories.

5.1 Conditions for Obtaining a Patent Protection

A patent constitutes a unique privilege bestowed upon an innovation, typically offering a fresh approach to accomplishing tasks or presenting novel technical resolutions to challenges. This exclusive entitlement legally safeguards the invention, preventing its replication or reproduction by external parties. In exchange, the invention must be openly disclosed in an application, with a level of clarity and comprehensiveness that permits replication by someone possessing an ordinary proficiency in the pertinent domain.

There is a set criterion, as provided in Section 2(1)(j) of the Patents Act, 1970, which must be fulfilled for a product or a processto qualify for the grant of a patent. The criterion encompasses:

- **Novelty** - *Not part of 'State of the Art'*. The innovation claimed in the patent application is new and not known to anybody in the world. In other words, the innovation is a) not in the knowledge of the public, b) not published anywhere through any means of publication and c) not be claimed in any other specification by any other applicant.
- **Inventive step** - *Not obvious to the person (s) skilled in the art*. The innovation is a) a technical advancement over the existing knowledge, b) possesses economic significance and, c) not obvious to a person skilled in the concerned subject.
- **Capable of industrial application** - *For the benefit of society*. The invention is capable of being made or used in any industry.

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5.2. To Patent or Not to Patent an Invention

Upon the development of an invention, the inventor faces the decision of either exploiting it for personal gain according to the country's legal provisions or making it publicly available. Generally, the former option is favored by inventors, while a very small proportion of inventions are offered to the public domain without seeking benefits. In the latter scenario, any individual can utilize the innovation for societal or commercial advantage without compensating the inventor.

For an inventor aiming for financial rewards, two paths exist: patenting or maintaining the invention as a Trade Secret. Opting for the 'Trade Secret' approach is suitable when the inventor is highly confident in sustaining the invention's secrecy for an extended duration (possibly over 100 years) and the likelihood of reverse engineering the technology is extremely low or nonexistent. Conversely, if the invention's lifespan is brief or its confidentiality can only be upheld for a limited period (a few years), or if the chances of reverse engineering are significant once the invention becomes public knowledge, then the 'patent' route is preferable.

5.3. Rights Associated with Patents

As per legal rulings, a patent holder possesses the authority to determine the individuals who can or cannot utilize the patented innovation. In simpler terms, the legal safeguard of patent protection stipulates that the invention cannot be manufactured, employed, circulated, imported, or vended by third parties without the explicit consent of the patent holder. The patent holder has the option to grant authorization for others to utilize the invention based on mutually agreed-upon conditions. In essence, patent rights assume a negative character, signifying that the owner is restricting external use of the patent without prior consent. The patent possessor may opt to take legal action against those infringing on the patent to halt unauthorized usage and may also demand recompense for the unsanctioned utilization.

5.4. Enforcement of Patent Rights

Enforcement involves ensuring adherence to laws, regulations, rules, standards, and societal norms. Typically, patent rights are upheld through legal channels, with judicial courts holding the power to halt instances of patent infringement. Nonetheless, the primary duty of overseeing, detecting, and initiating measures against patent infringers rests with the patent holder

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5.5. Inventions Eligible for Patenting

Patents can be granted for innovations or technologies spanning various domains, encompassing everything from commonplace items like paper clips or ballpoint pens to advanced creations like nanotechnology chips or genetically modified organisms such as the Harvard mouse with cancer genes.

Contrary to a widespread notion, patents are not exclusively bestowed upon groundbreaking scientific discoveries. In fact, a significant portion of patents is conferred on inventions that present enhancements over existing counterparts. For instance, patents are often granted for individual molecules like penicillins—an antibiotic with the ability to combat microbes—and their modified versions. By making subtle structural adjustments to penicillin, novel properties such as acid or temperature stability or broader antimicrobial effects are achieved, leading to the creation of derivatives like second, third, or fourth generation penicillins, all eligible for patenting.

In our day-to-day lives, numerous patented products are in use, including toothbrushes, toothpaste, shoes, pens, eyeglasses, textiles, mobile phones, wristwatches, bicycles, scooters, cars, televisions, cold drinks, and more. It's not uncommon for many items to embody several patented innovations; for instance, a laptop computer integrates numerous patented elements operating in tandem. Similarly, automobiles, mobile phones, and televisions consist of various patented components.

5.6. Non-Patentable Matters

The _Patent Act, 1970 includes certain exclusions (both for products and processes) that are ineligible for patent protection, encompassing:

- Inventions contrary to public morality, such as methods for human cloning or gambling.
- Pure discoveries, like identifying a novel microorganism present naturally or uncovering laws of gravity.
- Mere discoveries of new forms of known substances, for instance, using aspirin for heart treatment. Aspirin was initially patented for reducing fever and mild pain.
- Frivolous inventions, including dough infused with herbs to alter its taste, a 100-year calendar, or a bus timetable.

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- Arrangements or rearrangements, exemplified by an umbrella equipped with a fan or a torch affixed to a bucket.
- Inventions falling under Section 20(1) of the Atomic Energy Act, 1962—related to compounds like Uranium, Beryllium, Thorium, Plutonium, Radium, Graphite, Lithium, and more as notified by the Central Government.
- Literary, dramatic, musical, or artistic works—books, sculptures, drawings, paintings, computer programs, mathematical calculations, online chatting methods, teaching methods, and language learning methods—which fall under the jurisdiction of the Copyright Act, 1957.
- Topography of integrated circuits—protection for layout designs of integrated circuits is offered independently under the Semiconductor Integrated Circuit Layout Designs Act, 2000.
- Plants and animals—in entirety or part, including seeds, varieties, species, and essentially biological processes for producing or propagating them—are excluded from patent protection.
- Traditional knowledge—any invention considered traditional knowledge or one that duplicates known properties of traditionally known components is also excluded.

5.7. Patent Infringements

Once the patent is granted to the applicant, he owns the right to use or exploit the invention in any capacity. If anyone uses the invention without the prior permission of the owner, that act will be considered an infringement of the invention. Infringements can be classified into two categories:

1. Direct Infringement - when a product is substantially close to any patented product or In a case where the marketing or commercial use of the invention is carried out without the permission of the owner of the invention.
2. Indirect Infringement - When some amount of deceit or accidental infringement happens without any intention of infringement. If such an unlawful act has been committed, the patentee holds the right to sue the infringer through judicial intervention. Every country has certain laws to deal with such unlawful acts. Following reliefs are made available to the patentee:

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- Interlocutory/interim injunction.
- Damages or accounts of profits.
- Permanent injunction.

It is pertinent to mention that the Central government always holds the rights (Section 100 of the Patent Act, 1970, Rule 32 of the Patent Rules, 2003) to use the invention in the case of national emergency or other circumstances of extreme urgency after notifying the owner.

5.8. Avoid Public Disclosure of an Invention before Patenting

In general, an invention that has been made public through publication or display cannot be patented, as it would no longer meet the requirement of being novel. However, the Patents Act includes provisions for specific situations, allowing a grace period of 12 months to file a patent application after the invention has been published in a journal, presented in a reputable scientific society, or exhibited.

There are instances where disclosing an invention before filing a patent application becomes necessary, such as when selling the invention to a potential investor or business partner who requires detailed information to assess its commercial viability. In such scenarios, it is recommended to establish safeguards for your interests by signing a Non-Disclosure Agreement (NDA) or a similar confidential agreement.

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Chapter 6

PROCESS OF PATENTING

In India, obtaining a patent is a time-consuming process that can span over a period of 3-4 years or even longer. The key stages of this procedure are outlined in figure 6.1.

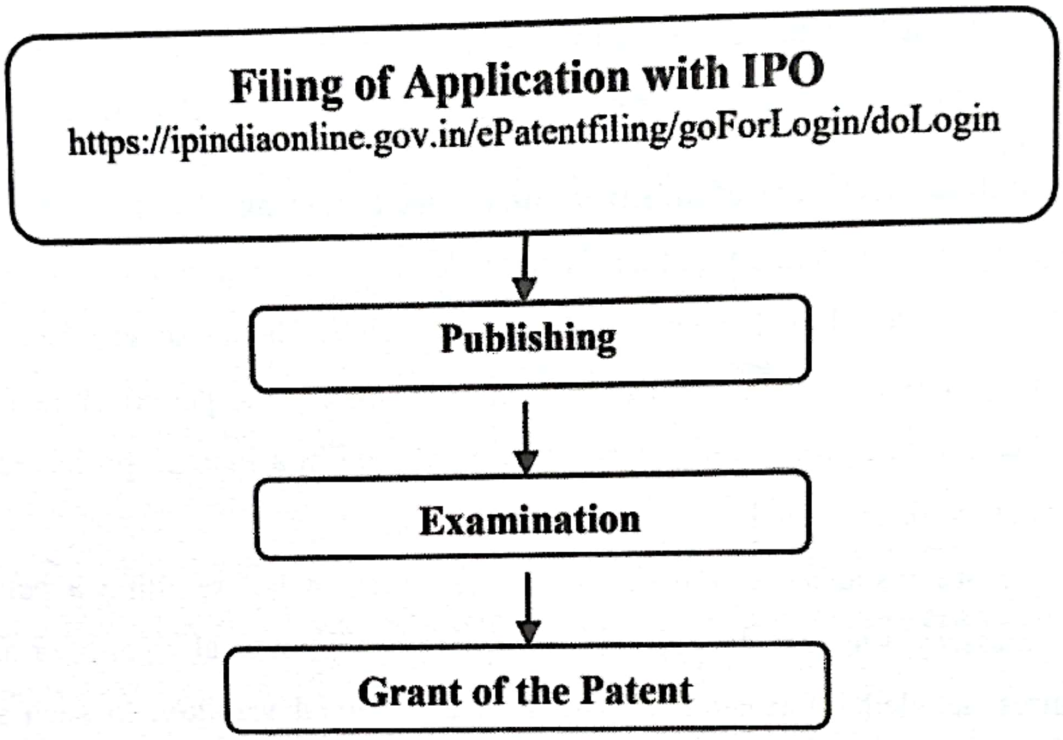


Figure 6.1: Flow chart of major steps involved in the grant of a patent

6.1 Prior Art Search

Preceding Research Investigation: Prior to initiating the patent filing procedure, an inventor must ensure the uniqueness of their invention in accordance with the patent eligibility criteria. To achieve this, they need to ascertain whether their invention already exists in the public domain. To accomplish this, an exploration of patent documents and Non-Patent Literature (NPL), encompassing scientific journals, reports, and magazines, is required. Any information accessible to the public domain, whether prior to the patent application submission or its priority date, is recognized as Prior Art.

Conducting a comprehensive prior art search prior to patent filing offers several advantages, including the prevention of infringement, tracking of research and development, and access to in-depth knowledge about the invention. The prior art search evaluates aspects such as novelty, patentability, the current state of the field, potential infringement, validity, and freedom to

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operate. This search is typically performed utilizing two types of databases: Patents Databases and NPL.

Patent Databases

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- Indian Patent Advanced Search System (InPASS) available at http://ipindiaservices.gov.in/publicsearch/
- Patentscope by WIPO accessible at https://www.wipo.int/patentscope/en/
- Espacenet provided by the EU, found at https://worldwide.espacenet.com/patent/
- USPTO of the USA, accessible via https://www.uspto.gov/
- Google Patents Advanced Search accessible at https://patents.google.com/advanced

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- Orbit Intelligence available at https://www.questel.com/business-intelligence-software/orbit-intelligence/
- Derwent Innovation provided by Clarivate, available at https://clarivate.com/derwent/solutions/derwent-innovation/
- PROQUEST search at https://about.proquest.com/search/?searchKeyword=patent+

Non-Patent Literature (NPL)

- Scholarly publications including handbooks, textbooks, withdrawn patents, encyclopedias, journals (such as IEEE, Research Gate, Springer, Wiley Online Library, etc.), dissertations, NCBI's PubMed, conference proceedings, technical reports, and public conferences.
- Industry/trade publications encompassing industry reviews, public disclosures (found on social media, YouTube, books, magazines, datasheets, blueprints, etc.).
- Other sources like newspapers, websites, technology blogs, researchers' websites, etc. While much of the NPL data is accessible freely on public platforms, certain journals may require payment for access due to subscription models. Notably, major patent offices like the United States Patent and Trademark Office (USPTO), European Patent Office (EPO), Japan Patent Office (JPO), etc., maintain their own in-house NPL databases to enhance the efficiency of patent examination.

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6.2 Choice of Application to be Filed

After deciding to patent the invention, the subsequent consideration is the type of application to be filed, either a provisional patent application or a complete (final) patent application. In most cases, opting for a provisional patent application is recommended due to the following reasons:

Opting for a provisional patent application is advantageous due to several reasons:

- It is a cost-effective option that saves money, involves fewer formalities, and requires less time.
- The provisional application enables the inclusion of any subsequent improvements made to the invention when filing the final application. This flexibility allows for incomplete specifications at the provisional stage, accommodating pending experimental data collection.
- By filing a provisional application, you establish a priority date for your patent application. However, it's crucial to note that a complete patent application must be submitted within one year of the provisional application filing to avoid rejection.

6.3 Patent Application Forms

According to the provisions outlined in the Patent Act of 1970 (Section 39) and the Patents Rules of 2003 (Rule 7, 54, 135, and sub-rule (1) of rule 20), the patent application submission involves utilizing Form-1 (see Figure 6.1) and Form-2 (see Figure 6.2). Form-1 solicits general information such as the Application Title, Names of Applicant(s) and Inventor(s), and the Type of Application (Ordinary, Convention, PCT-NP (PCT- National Phase), Divisional, Patent of Addition, etc.). In contrast, Form-2 gathers technical details and the applicant's choice between filing a provisional or complete application.

For a 'Provisional Application,' only the 'Description of the Invention' and the 'Abstract' are required. In the case of a 'Complete Application,' additional components include the 'Claims' and the manner in which the invention is executed.

The 'Claims' section within a patent is of utmost significance as it demarcates the precise scope of the invention. These 'Claims' delineate what the invention seeks to protect and elucidate its boundaries. This section articulates the patent's coverage in legal and technical terms, typically encompassing two types: a) Independent Claims (self-contained claim) and b) Dependent Claims

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(relating to independent claims). The meticulous drafting of Claims is crucial to both securing patent protection and safeguarding the invention against potential infringements.

Two critical forms, Form-1 and Form-2, are fundamental to the patent application process (availableat:http://www.ipindia.nic.in/writereaddata/Portal/IPORule/1_10_1_patents-amendments-rules-2005.pdf). Form-1 captures general information, while Form-2 gathers the technical specifics required for filing the patent application.

Figure 6.2: Form-1 (application for the grant of a patent).

"FORM 1 THE PATENTS ACT 1970 (39 of 1970) and THE PATENTS RULES, 2003 **APPLICATION FOR GRANT OF PATENT** (See section 7, 54 and 135 and sub-rule (1) of rule 20)	(FOR OFFICE USE ONLY)	
	Application No.	
	Filing date:	
	Amountof Feepaid:	
	CBR No:	
	Signature:	
1. APPLICANT'S REFERENCE / IDENTIFICATION NO. (AS ALLOTTED BY OFFICE)		

2. TYPE OF APPLICATION [Please tick (1) at the appropriate category]

Ordinary ( )		Convention ( )		PCT-NP ( )	
Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )

3A APPLICANT(S)

Name in Full	Nationality	Countryof Residence	Address of the Applicant	
			House No.	
			Street	
			City	
			State	
			Country	
			Pin code	

3B CATEGORY OF APPLICANT [Please tick ( ) at the appropriate category]

Natural Person ( )	Other than Natural Person		
	Small Entity ( )	Start-up ( )	Others ( )

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4. INVENTOR(S) [Please tick (1) at the appropriate category]		
Are all the inventor(s) same as the applicant(s) named above?	Yes ( )	No ( )
If "No", furnish the details of the inventor(s)		

Name in Full	Nationality	Country of Residence	Address of the Inventor	
			House No.	
			Street	
			City	
			State	
			Country	
			Pin code	

5. TITLE OF THE INVENTION		
6. AUTHORISED REGISTERED PATENT AGENT(S)	IN/PA No.	
	Name	
	Mobile No.	
7. ADDRESS FOR SERVICE OF APPLICANT IN INDIA	Name	
	Postal Address	
	Telephone No.	
	Mobile No.	
	Fax No.	
	E-mail ID	

8. IN CASE OF APPLICATION CLAIMLNG PRIORITY OF APPLICATION FILED IN CONVENTION COUNTRY, PARTICULARS OF CONVENTION APPLICATION

Country	Application number	Filing date	Name of the applicant	Title of the invention	IPC (as classified in the convention country)

9. IN CASE OF PCT NATIONAL PHASE APPLICATION, PARTICULARS OF INTERNATIONAL APPLICATION FILED UNDER PATENT CO-OPERATION TREATY (PCT)

International application number	International filing date

10. IN CASE OF DIVISIONAL APPLICATION FILED UNDER SECTION 16, PARTICULARS OF ORIGINAL (FIRST) APPLICATION

Original (first) application No.	Date of filing of original (first) application

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11. IN CASE OF PATENT OF ADDITION FILED UNDER SECTION 54, PARTICULARS OF MAIN APPLICATION OR PATENT	
Main application/patent No.	Date of filing of main application
12. DECLARATIONS	
(i) Declaration by the inventor(s) (a) (If the applicant is an assignee: the inventors) can affix their signatures below, or the applicant can choose to upload or enclose the assignment with this patent application, or alternatively, send the assignment via post or electronic transmission, duly authenticated within the specified timeframe). I/We, the inventor(s) named above, confirm that we are the bona fide and original inventor(s) of this Invention, and state that the applicant(s) mentioned here are either our assignee(s) or legal representative(s). (a) Date (b) Signature(s) (c) Name(s)	
(ii) Declaration by the applicant(s) in the convention country ((If the applicant in India differs from the applicant in the convention country: the applicant in the convention country can provide their signature below, or the applicant in India can opt to upload the assignment from the applicant in the convention country, or include the assignment with this patent application, or send the assignment via post/electronic transmission, duly authenticated within the stipulated timeframe). I/we, the applicant(s) in the convention country, affirm that the applicant(s) mentioned here are either our assignee(s) or legal representative(s). (a) Date (b) Signature(s) (c) Name(s) of the signatory	

Source: http://www.ipindia.nic.in

Figure 6.3: Form-2 (provisional/complete specifications).

FORM 2 **THE PATENT ACT 1970** **(39 of 1970)** **&** **The Patents Rules, 2003** **PROVISIONAL/COMPLETE SPECIFICATION** **(See section 10 and rule 13)**	
1. TITLE OF THE INVENTION	
2. APPLICANT(S) (a) NAME: (b) NATIONALITY: (c) ADDRESS:	
3. PREAMBLE TO THE DESCRIPTION	
PROVISIONAL The following specification describes the invention.	**COMPLETE** The following specification particularly describes the invention and the manner in which it is to be performed.

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4. DESCRIPTION (Description shall start from next page)
5. CLAIMS (not applicable for provisional specification. Claims should start with the preamble — _I/we claim' on separate page)
6. DATE AND SIGNATURE (to be given at the end of last page of specification)
7. ABSTRACT OF THE INVENTION (to be given along with complete specification on separate page)
Note: - Repeat boxes in case of more than one entry. To be signed by the applicant(s) or by authorized registered patent agent. Name of the applicant should be given in full, family name in the beginning. Complete address of the applicant should be given stating the postal index no. /code, state and country. Strike out the column which is/are not applicable

Source: http://www.ipindia.nic.in

6.4 Jurisdiction of Filing Patent Application

India maintains four patent filing offices (Table 2.1), where patent applications can be submitted. The choice of filing location is contingent upon the applicant's residence, domicile, place of business, or the origin of the invention. These designated offices are referred to as patent filing jurisdictions.

Table 6.1: Jurisdiction to file a patent in India.

Region	States	Address
Northern	Haryana, Himachal Pradesh, Punjab, Rajasthan, Uttar Pradesh, Uttarakhand, Delhi and the Union Territory of Chandigarh, Jammu and Kashmir and Ladakh.	Intellectual Property Office Building Plot No. 32, Sector 14, Dwarka, New Delhi-110078 **Phone:** 011-28032491 **Fax:** 011-28034301 **Email:** delhi-patent@nic.in
Southern	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana and the Union Territories of Pondicherry and Lakshadweep	patent Office Intellectual Property Building G.S.T. Road, Guindy, Chennai-600032 **Phone:** 044-22505242 **Fax:** 044-22502066 **Email:** chennaipatent@nic.in

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Western	Maharashtra, Gujarat, Madhya Pradesh, Goa and Chhattisgarh and the Union Territories of Daman and Diu & Dadra and Nagar Haveli	BoudhikSampada Bhawan, Antop Hill,S. M. Road, Mumbai - 400 037. **Phone:** 022- 24153651, 24148165 **Fax:** 022-24130387 **Email:** mumbaipatent@nic.in
Rest of India	Remaining States	Intellectual Property Office Building, CP-2 Sector V, Salt Lake City Kolkata-700091 **Phone:** 033-23679101, 033-23671987 **Fax:** 033-23671988 **Email:** kolkatapatent@nic.in

Source: http://www.ipindia.nic.in/jurisdiction-of-patent-offices.htm

For foreign applicants, the suitable Patent Office for filing a patent application is determined by the address for service in India or the location of their patent agent's place of business. In the instance of joint applications, all applicants hold equal rights and are treated with equitable consideration.

6.5 Publication

After submission to the Regional Patent Office, the patent application remains confidential within the Patent Office for a period of 18 months. Following this duration (counted from the application filing date or the earliest priority claimed date, as applicable), the application is unveiled through publication in the Official Journal of the Patent Office (http://www.ipindia.nic.in/journal-patents.htm). The aim behind this publication is to provide the public with information about the invention. The act of publishing the application serves as a compulsory procedure.

6.6 Pre-grant Opposition

In the event that anyone raises an objection to the invention as described in the patent application, they have the option to contest the application by presenting their challenge to the Controller of Patents within a span of 6 months following the date of publication. This process is referred to as Pre-grant Opposition. The subsequent course of action, whether the patent

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application is denied or endorsed for further evaluation, particularly patent examination, hinges on the resolution of this matter.

While the standard practice entails maintaining the patent application's confidentiality for 18 months, there are situations where this duration can be shortened, especially when the patentee or applicant intends to sell, license, or attract an investor for the patent. In such cases, the applicant can request a reduction in this period by completing a Form-9 and submitting it to the Controller General.

PATENTEE: A person/ Organization who owns the patent (granted)

6.7 Examination

Patent examination plays a pivotal role in the patent granting process. Skilled professionals meticulously assess all vital criteria, including novelty and inventive step, in alignment with the invention's content. Typically, the examiner presents certain inquiries or uncertainties that require responses from the inventors. Upon the examiner's satisfaction with the answers provided by the inventors, the application is endorsed for patent approval.

It's worth noting that a patent application does not undergo automatic examination following the publication phase. Instead, the applicant or their representative must initiate the examination process by submitting a request using Form-18A. This request should be submitted within 48 months from the date of the initial application filing.

6.8 Grant of Patent

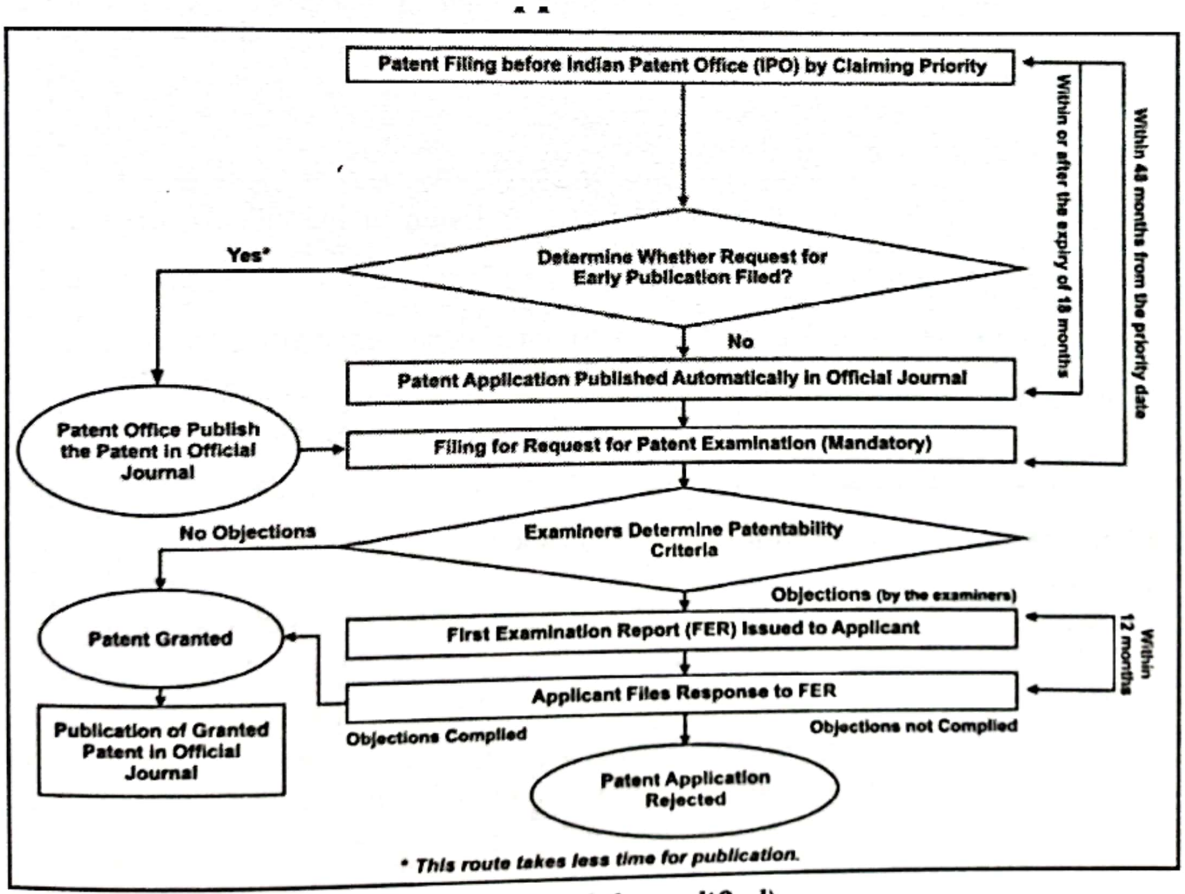
Once all the prerequisites for obtaining a patent, including addressing objections and queries from both the Patent Examiner and the general public, have been satisfactorily met, the patent is awarded to the applicant. The granted patent is then published in the Official Journal of the Patent Office. This journal is released every Friday and encompasses details concerning patent applications published under section 11A, post-grant publication, patent restoration, notifications, the roster of non-operational patents, and public notices disseminated by the Patent Office.

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6.9 Validity of Patent Protection

The grant of patent protection is typically conferred upon an applicant for a limited duration, often spanning 20 years, starting from the application's filing date. Following the successful granting of a patent for an invention in India, the subsequent crucial step is to ensure its annual renewal by paying the prescribed Patent Renewal Fee as outlined in Section 53 and Rule 80 of the Indian Patents Act, maintaining this process until the patent's designated expiration. Failure to make the required Patent Renewal Fee payments may lead to the revocation of the patent.

In certain jurisdictions, patent protection may be extended beyond the standard 20-year period. This extension is designed to compensate for the time taken by administrative approval processes before products can be introduced to the market. Due to the duration of this procedure, patent owners might not be able to fully exercise their rights for a significant period after the patent's initial grant.



Source: https://www.invntree.com/ *(slightly modified)*

Figure 6.4: Flowchart for the process of filing a patent application

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6.10 Post-grant Opposition

After a patent has been granted by the Patent Office, it remains open to challenges from anyone within a one-year period starting from the date of the patent grant's publication. This granted patent can be contested through either the Patent Office or through legal proceedings in a Court of Law. If successfully challenged by an interested party, these entities have the authority to invalidate or revoke the patent based on the following grounds:

- The patent applicant wrongfully obtained the invention or any portion of it.
- The claimed invention has been published prior to the priority date.
- The claimed invention was publicly known or used before the priority date.
- The claimed invention is obvious and lacks an inventive step.
- The subject of the patent claim is not eligible for patent protection according to Chapter II of the Patent Act, 1970.
- The details and specifications of the invention do not sufficiently and clearly describe the invention.

6.11 Commercialization of a Patent

The owner of a patent has the authority to grant permission to individuals, organizations, or industries to utilize, produce, and sell the patented invention. This permission is granted based on mutually agreed-upon terms and conditions between the parties involved. There are various reasons why a patent owner might choose to license the patent to a third party:

The patent owner might be occupied with other responsibilities, such as being a university professor, and may not wish to exploit the patent personally.

The patent owner might lack the necessary manufacturing facilities.

The existing manufacturing facility might be incapable of meeting market demands.

The patent owner might want to focus on a specific geographic market and choose to license the patent rights for other regions.

Upon the grant of a patent, the patent holder (the person holding the patent rights) gains exclusive rights to utilize the patented invention. Only the patent holder has the authority to license or engage in transactions involving the patent. While the granted patent's validity is for

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20 years (starting from the patent application filing date), the patent holder is required to submit information (Form-27) annually regarding the commercialization or sale of the patent. This process is known as "Working/Licensing of the Patent."

Patent licensing can take two forms: exclusive or non-exclusive. An Exclusive License entails selling the patent rights to a single individual, organization, or entity for a specific duration. During this period, no other party can utilize the associated intellectual property except for the named licensee. In a Non-Exclusive License, the patent holder can sell patent rights to multiple individuals or parties.

If the patent holder is unable to commercialize the patent within three years from the patent's grant date, any individual can apply to the Controller of Patents for Compulsory Licensing of the patent, provided certain conditions are met:

- The public's reasonable requirements for the patented invention have not been met.
- The patented invention is not available to the public at a reasonable price.
- The patented invention is not being utilized within the territory of India.

6.12 Need for a Patent Attorney/Agent

Usually, applicants have the option to independently draft and submit their patent applications without the aid of a patent attorney. Nevertheless, considering the intricate nature of patent documents, it is recommended to seek legal guidance from a qualified patent attorney or agent while preparing a patent application. Additionally, the regulations in numerous countries stipulate that an applicant whose primary residence or primary business location is outside the country must be represented by a legal attorney or agent who is duly qualified in that specific country. This often requires engaging an attorney or agent who is both located in and practices law within that country.

6.13 Can a Worldwide Patent be Obtained

The terms "Universal Patent," "World Patent," or "International Patent" do not exist in the realm of patents, as patent rights are confined to specific territories. To obtain patent protection, one must file a patent application with the relevant Patent Office of the desired country.

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However, pursuing patent protection across multiple countries through individual applications can be arduous, time-consuming, and costly. To address this challenge, various Regional Offices have been established to facilitate patent applications on behalf of groups of nations. For instance, entities like the European Patent Office and the African Regional Intellectual Property Organization allow a single application to cover multiple member nations within a specific region.

Alternatively, for those seeking patent protection in numerous countries globally, opting for an international patent application under the Patent Cooperation Treaty (PCT) is advisable. This option requires the applicant's home country to be a member of the PCT. Notably, India, among more than 190 nations, is a participant in the PCT.

6.14 Do I Need First to File a Patent in India

Certainly, as a general rule, Indian residents are typically required to initiate the patent application process in India initially. Following that, they may pursue patent protection in other countries. However, this course of action necessitates prior approval from the Patent Office. Nonetheless, certain circumstances could lead to the exemption of this requirement:

If the applicant is not a resident of India.

If a period of six weeks has elapsed since the filing of the patent application in India by an Indian resident.

When multiple inventors, including one who is an Indian resident, collaborate on an invention in a foreign country. If the invention lacks potential market prospects in India and the decision is not to pursue patent protection within India, the Indian resident must obtain Foreign Filing Permission (FFP) from the Indian Patent Office.

In instances of international collaboration, if a segment of the invention originated in India and an Indian resident is among the inventors, seeking permission to file the patent application outside of India is necessary.

If the invention pertains to defense, atomic energy, or utility models, the inventor(s) must seek permission from the Indian Patent Office. This is because inventions connected to these domains are not within the scope of patentability in India.

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6.15 Patent Related Forms

There exists a collection of more than 30 forms associated with patents. A selection of these forms is provided below.

Table 6.2 : List of important patent application forms.

Form No.	Title of Form
1	Application for a grant of a patent
2	Provisional/Complete specifications
7	Notice of opposition on grant of a patent
7A	For filing a representation opposing grant of a patent
17	Application for compulsory license
18	Request for examination of the application for patent
21	Request for termination of compulsory license
22	Application for registration of patent agent
27	Statement regarding the working of the patented invention on a commercial scale in India
30	Miscellaneous form to be used when no other form is prescribed

Source: http://www.ipindia.nic.in/writereaddata/Portal/IPORule/1_70_1_The-Patents-Rules-2003-Updated-till-23-June-2017.pdf

6.16 Fee Structure

In accordance with the Patent Act of 1970 and The Patents Rules of 1972, the prescribed fees are determined based on the specific form(s) to be submitted to the Office (as listed in Table 6.16). Applications submitted electronically have a 10% lower fee compared to physical filings.

6.17 Types of Patent Applications

Here are different types of patent applications explained:

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Provisional Application: This type of patent application is filed when the invention is still undergoing experimentation and not fully finalized. It allows obtaining a priority date for the invention.

Table 6.3 Fee for obtaining a patent via electronic filing.

Item	Natural person/ startup (₹)	Small entity alone or with a natural person /startup (₹)	Others alone or with natural person/ startup/ small entity (₹)
Provisional/Complete Specifications	1,600	4,000	8,000
Request for Early Publication	2,500	6,250	12,500
Request for Examination	4,000	10,000	20,000
Express Request For Examination	5,600	14,000	28,000
Renewal Fees (Annually)			
3rd to 6th Year	800	2,000	4,000
6th to 10th Year	2,400	6,000	12,000
11th to 15th Year	4,800	12,000	24,000
16th to 20th year	8,000	20,000	40,000

Source: http://www.ipindia.nic.in/writereaddata/Portal/IPOFormUpload/ 1_11_1/ Fees.pdf

Ordinary Application: An ordinary patent application is filed with complete specifications and claims but without claiming any priority date.

PCT Application: An international application filed according to the Patent Cooperation Treaty (PCT). It enables filing a single application to seek patent protection and claim priority across all member countries of the PCT.

Divisional Application: When an application claims multiple inventions, the applicant can choose to divide the application into two or more separate applications to address official objections or for other reasons. These separate applications are known as Divisional Applications, and they share the same priority date as the parent application.

Patent of Addition Application: If an invention is a minor modification of a previously applied for or granted patent, the applicant can file a "Patent of Addition" application, provided the

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modification is new. This type of patent expires along with the main patent and doesn't require a separate renewal fee.

Convention Application: When a patent application has been filed in the Indian Patent Office, and the applicant intends to file the same invention in one or more Convention countries (e.g., under the Paris Convention) while claiming the same priority date as the Indian filing, it's termed a Convention Application. This application must be filed within 12 months from the filing date in India to maintain the same priority date.

6.18 Commonly Used Terms in Patenting

Table 6.18: Commonly used terms in the domain of patenting.

S. No.	Term	Definition
1.	Inventor	Creator of an invention
2.	Applicant	Organization/individual/industry that files a patent application or applies for a patent
3.	Patentee	A person/organization who owns the patent (granted)
4.	Licensee	Organization/individual/industry which obtains a license of the patent from the Patentee for commercialization purpose
5.	Assignee	A person in whose name patent has been assigned legally
6.	In force	The applicant is paying the annuity (renewal fee) for the patent to keep it alive (Active Patent)
7.	Working of a Patent	The selling of a patent to an individual/party for commercial exploitation is called as working of a patent
8.	Patent Specification	Patent specification is a written description of the invention and the way of representation and process of making and using the same
9.	Priority Right	A _Priority Right' or _Right of Priority' is a time-limited right, activated by the first filing of an application for a patent
10.	Priority Date	The claimed date on which the first application for the invention is filed

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11.	Patent Claims	Claims can be defined as the scope of the protection conferred by a patent, or the protection sought in a patent application. The purpose of the claims is to define which subject matter is protected by the patent
12.	National Phase Application	An application filed to obtain patents in different countries simultaneously based on a single International/PCT application
13.	Patent Revocation	The revocation means cancellation of the patent due to certain reasons, such as lack of patentability or wrongfully obtaining a patent
14.	Restoration of Patent	Once a patent has been ceased (e.g. due to non-payment of the fee) it can be restored within a permitted period by paying the requisite fee

6.19 National Bodies Dealing with Patent Affairs

Several departments, organizations, and bodies are involved in different aspects of patents, including the Indian Patent Office (IPO), Department for Promotion of Industry and Internal Trade (DPIIT), Technology Information, Forecasting and Assessment Council (TIFAC), and National Research Development Corporation (NRDC).

6.20 Utility Models

In numerous instances, a new invention may entail a minor enhancement over existing products, which might not meet the stringent criteria of "Novelty" and "Non-obviousness" required for patent grant. However, some countries offer legal protection for such incremental innovations, often referred to as 'Utility Models,' 'Petty Patents,' or 'Innovation Patents.' In such cases, the standards of "Novelty" and "Non-obviousness" are relaxed or adjusted, while the requirement for industrial application or utility remains the same as that for regular patents.

Utility Models serve as a beneficial tool for Micro, Small, and Medium Enterprises (MSMEs), as the process of obtaining a 'Utility Model' grant is usually less rigorous and involves lower costs. MSMEs often lack extensive resources for extensive research and development, which is often necessary for patent grants. Nevertheless, their innovations can still lead to product/process improvements and financial gains. Such innovations may meet the criteria for Utility Models but

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not for full-fledged patents. The duration of protection for Utility Models is usually shorter than that of patents, varying from 7 to 15 years across different countries.

Approximately 80 countries, including France, Germany, Japan, South Korea, China, Finland, the Russian Federation, and Spain, incorporate provisions for protecting Utility Models within their intellectual property rights (IPR) frameworks. As of now, India does not formally acknowledge utility patents. If these smaller-scale patents were to be recognized and protected under Indian IP laws, it could significantly increase the number of annual patent filings and grants

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Chapter 7

COPYRIGHTS AND RELATED RIGHTS

'Copyrights' encompass the legal rights granted by law to the original creators of works in fields like literature and computer software. 'Related Rights,' on the other hand, extend to the creative endeavors of authors in areas such as drama, sound recordings, films/videos, paintings, and architecture. Copyrights and Related Rights constitute a significant category of intellectual property, governed by India's Copyright Act of 1957. This legislation outlines rights pertaining to reproduction, communication to the public, adaptation, and translation of these works.

In the context of Copyrights, it's essential to comprehend the terms 'author' and 'work.' An 'author' is an individual responsible for creating the content within a work. This can include writers (for literary works), computer programmers (for software), composers (for musical works), producers (for cinema films and sound recordings), and photographers (for photos). The term 'work' pertains to the creative output produced in realms such as literature, drama, music, art, cinematograph films, and sound recordings.

7.1 Classes of Copyrights

In India, the following categories of Copyrights are recognized:

- Literary Works: Books, essays, research articles, speeches, lectures, compilations, computer programs, software, databases.
- Dramatic Works: Screenplays, dramas.
- Sound Recordings: Recordings of sounds, irrespective of the medium, such as phonograms and CD-ROMs.
- Artistic Works: Drawings, paintings, logos, maps, charts, photographs, architectural works, engravings, and craftsmanship.
- Musical Works: Musical notations, excluding lyrics or actions meant to be sung, spoken, or performed alongside the music. Musical compositions do not need to be written down to enjoy Copyright protection.
- Cinematograph Films: A 'cinematograph film' is a visual recording created through any medium and process, including sound recordings. This encompasses motion pictures, TV programs, visual recordings, sound recordings, and more.

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7.2 Criteria for Copyright

In order to be eligible for Copyright protection, a work must be present in a tangible physical form. The duration of this physical existence can range from a brief period to many years. Virtually any form of expression that can be perceived or heard is eligible for Copyright protection. Even hastily jotted notes for an impromptu speech can be considered copyrightable material.

The Copyrighted work must be an embodiment of the creator's thought process. In other words, the work must be original, emerging from independent thinking without replication. Such work is referred to as an Original Work of Authorship (OWA). While it might resemble existing works, it must not be identical. The original work may lack qualities like quantity, aesthetic value, or both, yet it will meet the criteria for copyright protection.

Beyond originality, Copyright protection also demands a certain degree of creative effort from the author. There isn't a specific threshold for the extent of creativity required; it's a subjective matter. The level of creativity essential for Copyright protection is evaluated by the Registrar of Copyrights. For instance, simply altering the dimensions of a book wouldn't warrant Copyright protection. Similarly, an address book containing alphabetically arranged phone numbers wouldn't qualify for Copyright protection, as it involves a straightforward alphabetical listing rather than a creatively curated selection of entries.

7.3 Ownership of Copyright

Copyright laws provide clear guidelines regarding ownership of Copyright:

- The individual who created the work is recognized as the original holder (owner) of the Copyright.
- If the author is an employee and the work was commissioned by an entity (company, firm, society, organization, etc.), the entity is considered the Copyright owner.
- In the absence of any specific arrangement, government work is primarily owned by the government.
- The person delivering a speech is initially the Copyright owner. To obtain permission to use copyrighted material, one must request it from the legal owner of the copyrighted material. This owner could be the original author, the legal heir (if the author has passed away), a publisher, etc. The request should include the

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following details:

- Title, author and/or editor, and edition.
- Specific material to be used.
- Number of copies.
- Purpose of usage (e.g., educational, research, etc.).
- Distribution format (e.g., hard copy for classroom use, online posting).
- Intent to sell the material (e.g., as part of a course pack).

7.4 Copyrights of the Author

The Copyrights granted to creators/authors are legally safeguarded by Section 14 of the Copyright Act, 1957. No individual can utilize or publish the content (work) created by the author without obtaining the author's consent. Copyrights grant the author exclusive control over areas such as publication, distribution, and usage. Copyright owners possess two distinct types of rights: Economic Rights (or Proprietary Rights) and Moral Rights (or Personal Rights). economic Rights are tied to the financial benefits arising from copyright sales. According to the Act, Copyright owners can either permit or prohibit:

- Reproduction of the work in any form, including printed materials or sound recordings.
- Distribution of copies of the work.
- Public performance of the work.
- Broadcasting or communicating the work to the public.
- Translation of the work into other languages.
- Adaptation of the work, such as converting a novel into a screenplay.

Moral Rights encompass the 'Right of Paternity' and the 'Right of Integrity'. The 'Right of Paternity' allows the original author to claim authorship, even if the Copyright has been licensed to another party. The author's name remains associated with the work, even after Copyrights have been transferred, such as to a book publisher. The 'Right of Integrity' grants the original author the authority to prevent any misuse of the work, which includes alterations, additions, or deletions that misrepresent the work or harm the author's reputation.

It's important to note that a work can have multiple rights holders. For example, a musical sound recording may have numerous rights holders, including the lyricist, music composer, singer, musicians, and sound recorders.

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7.5 Copyright Infringements

According to the Copyright Act of 1957, the following actions are considered to be Copyright infringements:

- Producing copies for sale or hire, or selling or renting them for hire without proper authorization.
- Allowing any venue for the public performance of a copyrighted work in a manner that infringes on the Copyright. Distributing copies that infringe on the Copyright for trade purposes, or to an extent that negatively impacts the Copyright owner's interests.
- Publicly displaying infringing copies for the purpose of trade.
- Importing copies that infringe on the Copyright.
- Translating a work without obtaining permission from the rightful owner.

7.6 Liability of Owner of an Auditorium/Hall

The proprietor of a venue such as an auditorium or hall can face legal consequences if they knowingly permit their premises to be utilized for public dissemination of copyrighted content (such as songs, music, dramas, etc.) without proper authorization. If an individual allows, for monetary gain, a location to be used for sharing the work with the public in a way that constitutes Copyright infringement, unless they were unaware of and had no reasonable basis to believe that such public communication would infringe on Copyright, they will be considered to have committed an offense under the Copyright Act.

7.7 Copyright Infringement is a Criminal Offence

Under Section 63 of the Copyright Act, 1957, engaging in Copyright infringement knowingly is deemed a criminal offense. The penalty for such infringement entails a prison term of six months, along with a minimum fine of ₹ 50,000. In the event of a second or subsequent conviction, the minimum punishment escalates to a one-year imprisonment and a fine of ₹ 1,00,000. A specialized Intellectual Property division is responsible for handling Copyright-related cases, and additionally, a Copyright Board established by the Central Government in 1958 addresses specific claims related to Copyright matters.

7.8 Copyright Infringement is a Cognizable Offence

A police officer with the rank of sub-inspector or higher holds the authority to seize the infringing Copyright material without requiring a warrant and subsequently present it in a court of law.

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7.9 Fair Use Doctrine

Any individual lacking a valid license from the Copyright owner is not authorized to exploit the mentioned work. However, exceptions to Copyright infringement are provided by Section 52 of the Copyright Act, 1957. As per legal norms, Copyrighted content cannot be utilized without proper consent from the rightful Copyright holders. Nevertheless, limited use of Copyrighted material for educational and research purposes is legally allowed through the principle of 'Fair Use Doctrine.' This doctrine is governed by a four-part test:

- The nature of use - the work is used for educational, non-profit, and personal purposes.
- The nature of the work - the work is factual rather than imaginative.
- The amount of material used - using a small portion of Copyright-protected content may not require permission, although this aspect is subject to debate.
- The impact on the value of the Copyrighted material - if a small portion of the work is used without affecting the author's economic and moral rights, it may be exempt from infringement.

For detailed examples of the Fair Use Doctrine, refer to the official website (http://copyright.gov.in/exceptions.aspx). A few instances are as follows:

- Personal use of Copyrighted work for study or research.
- Quoting from a Copyrighted work.
- Reporting current events in media, such as newspapers, magazines, radio, or television.
- Teachers and scientific researchers reproducing works.
- Government officials 'performing their duties by reproducing works for judicial proceedings or reports.
- Use of works prepared by the Secretariat of a Legislature.
- Use of work in compliance with prevailing laws for certified copies.
- Making three or fewer copies of a book, pamphlet, sheet of music, map, chart, or plan.
- Bona fide religious ceremonies, including marriage functions.

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7.10 Copyrights and Internet

The rapid transmission of copyrighted data over the internet has prompted revisions to existing Copyright laws. Caution should be exercised with respect to Copyright and fair use principles when downloading materials from the internet. There's a growing concern about the ease of extracting copyrighted content from the internet without proper authorization. It's worth noting that materials might have been posted on the internet without the author's consent.

Typically, when a Copyright owner posts material on the internet, it grants users the right to use that material for personal purposes, but not for commercial gain. Distributing copyrighted work electronically should include a statement indicating that "This work is protected by Copyright laws and is provided for educational instruction only. Any unauthorized use may result in disciplinary action and/or legal consequences as per the law."

As per Section 2(o) of the Copyright Act, 1957, 'Literary Work' encompasses computer programmes, tables, compilations, and computer databases. When applying for Copyright registration, it's mandatory to provide both the 'Source Code' and the 'Object Code'.

7.11 Non-Copyright Work

The scope of works not covered by Copyright includes:

- Ideas, concepts, and principles themselves are not eligible for Copyright protection. Only the expression or form in which they are presented can be copyrighted.
- Facts, such as scientific or historical discoveries, are not subject to Copyright protection. Any factual information discovered during research cannot be Copyrighted. For instance, if an author spends years gathering materials for a book on 'Buddhism' and publishes it, others can use the underlying facts, as long as they express the information in their own way.
- Copyright does not extend to titles, names, slogans, short phrases, brief word combinations, methods, or factual data.
- Certificates lack the creative scope required for Copyright protection.
- Digitally created works and Copyrighted works converted to digital format and placed on the internet enjoy Copyright protection.
- Entire website Copyright registration is not feasible, but various elements of a website can be registered, such as computer programs/software, compilations (including

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computer databases), photographs, artwork, diagrams, maps, charts, plans, and musical works. Separate applications are necessary for each component.

- Copyright registration is applicable to computer or mobile apps. An app is a self-contained computer program designed for a specific task, often with dynamic content and user interaction, for use in computers or electronic devices.
- Using someone else's picture, song, or video from the internet without permission constitutes Copyright infringement. Similarly, using someone else's material for your own purposes is also considered an infringement.

7.12Copyright Registration

Registering a work is not obligatory to assert Copyright. Once a work is created using any medium, it automatically gains Copyright protection. This means there's no need to formally submit a request to the Copyright office to obtain Copyright. Copyright registration doesn't grant new rights; it acts as initial evidence of the work's entry in the Copyright register maintained by the Registrar of Copyrights. The registration certificate serves as prima facie evidence in court during disputes over ownership, creation, financial matters, rights transfer, etc. It's advisable for authors to register their works for enhanced legal protection. In India, Copyright matters, including registration, fall under the purview of the Copyright Act, 1957, and Copyright Rules, 2013. Below are notable forms for copyright registration (https://copyright.gov.in/).

7.13 Judicial Powers of the Registrar of Copyrights

The Registrar of Copyrights possesses the authority of a civil court while adjudicating a suit under the Code of Civil Procedure regarding the following matters:

- Summoning and compelling the attendance of individuals and examining them under oath.
- Demanding the discovery and presentation of any document.
- Accepting evidence through affidavits.
- Issuing commissions for the examination of witnesses or documents.
- Requisitioning any public record or its copy from any court or office.
- Any other matters that may be stipulated.

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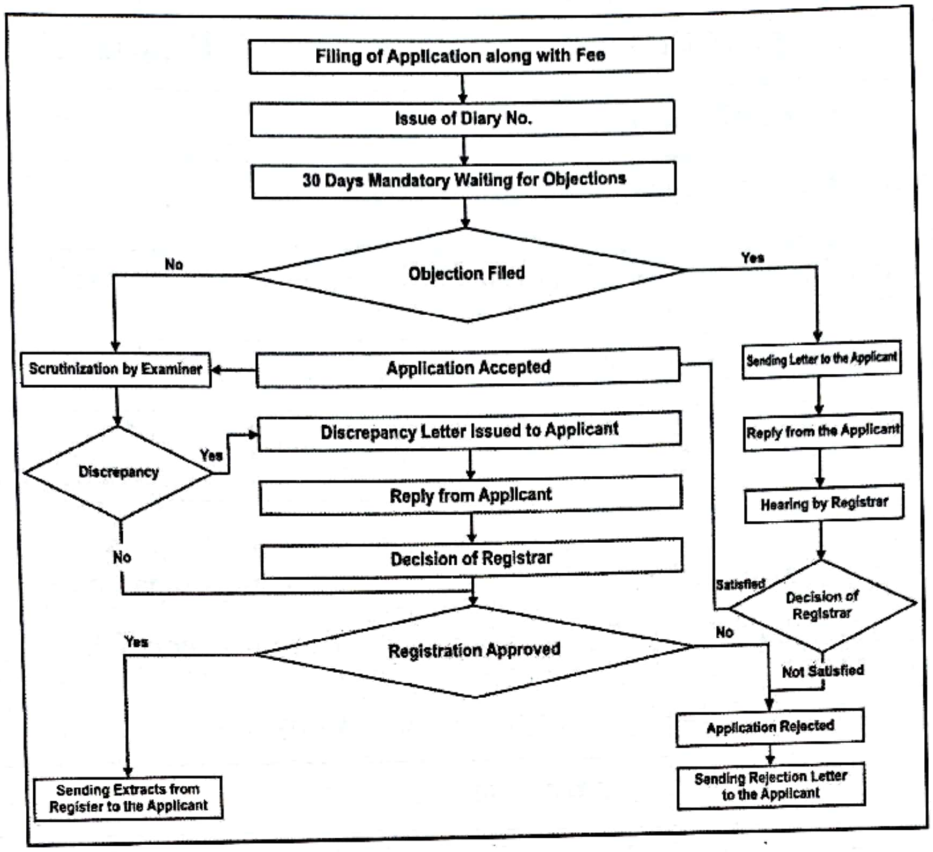


Figure 7.1: Flow chart for the process of Copyright registration.

To apply for Copyright, a completed application (Form XIV) is submitted to the Copyright Office at the address: The Registrar of Copyright, Plot no. 32, Boudhik Sampada Bhawan, Sector 14, Dwarka, New Delhi - 110075. The application can be submitted via mail or through the online registration process using the 'E-filing facility' (www.copyright.gov.in). Any individual who is either the author or assignee of the work in question can file for Copyright. Typically, the Copyright Office takes around 2-3 months to complete the registration process. Following the application submission, a mandatory waiting period of 30 days ensues. If anyone has objections to the claims presented in the application, they can contact the Registrar of Copyrights. After giving both parties an opportunity to be heard, the Registrar may render a decision in favor of or against the work's author. Once any objections are addressed, if applicable, examiners evaluate the application. If queries arise, the applicant is granted a suitable period (about 45 days) to address these concerns. The components of Copyright filing for approval are illustrated in the figure 7.1

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Table 7.1: Important forms pertaining to Copyrights.

S. No.	Name of Form	Form No.
1.	Application form for registration ofCopyright	Form-XIV
2.	Application form for registration ofchanges in particulars of Copyright	Form-XV
3.	Registration of a Copyright Society	Form-VIII
4.	Application form for the relinquishmentof Copyright	Form-I

7.14 Fee Structure

A distinct application form must be submitted for each work, accompanied by the appropriate fee. The fee is non-refundable even if the registration application is declined.

Table 7.2: Fee structure for Copyrights

Attribute	Fee (₹)
For an application for registration or CopyrightLiterary, Dramatic, Musical or Artistic work	500/- per work
For an application for registration of Copyright ina Cinematograph Film	5,000/-
For an application for registration of Copyright ina Sound Recording	2,000/-
Provided that in respect of a Literary or Artistic work which is used or is capable of being used inrelation to any goods or services	2,000/-
Making any change in Literary, Dramatic,Musical or Artistic work	200/-
Provided that in respect of a Literary or Artistic work which is used or is capable of being used inrelation to any goods or services	1,000/-
For an application for registration of change in particulars of Copyright entered in the Register of Copyrights in respect of Cinematograph Film	2,000/-
For an application for registration of changes in particulars of Copyright entered in the Register of Copyrights in respect of Sound Recording	1,000/-
For an application for prevention of importation of infringing copies per place of entry	**1,200/-**

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7.15 Copyright Symbol

While it's not obligatory, including the Copyright symbol © along with your name and the 'year created' near your published or printed materials can make it easier to prove Copyright infringement in court. The following are the key aspects that can serve as Copyright indicators on a creation:

- The Copyright symbol © (the letter C in a circle), or the word 'Copyright', or the abbreviation 'Copr.'
- In the case of compilations or derivative works incorporating previously published material, the year and date of the first publication of the compilation or derivative work should be provided. The year date might be excluded for certain categories such as pictorial, graphic, sculptural work, greeting cards, postcards, stationery, jewelry, dolls, and toys.
- The name or its recognizable abbreviation of the Copyright owner, or a well-known alternative designation of the owner.
- For sound recordings, the same three elements are generally required, except the symbol ℗ (the letter P in a circle) is used instead.

7.16 Validity of Copyright

Typically, Copyright remains valid for a span of 60 years. This duration commences either from the year subsequent to the author's demise (for literature, dramatic, musical, and artistic works) or from the work's publication date (for cinematograph films, sound recordings, photographs, posthumous publications, works of government, and works of international organizations).

7.17 Copyright Profile of India

A comparative analysis spanning five years (2015-20) revealed a gradual rise in the count of Copyright applications during the initial four years of the study, reaching its pinnacle at 21,905 applications in the 2019-20 period (Fig. 2.7). The highest number of applications examined occurred in 2017-18 at 34,388. However, these numbers gradually declined to 22,658 in 2018-19 and further to 19,460 in 2019-20. A similar pattern was noted in the volume of Copyright registrations, peaking at 19,997 in 2017-18.

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Source: Annual Reports, Office of CGPDTM, Mumbai (2011-20) (https://dipp.gov.in/sites/default/files/annualReport-English2020-21.pdf)

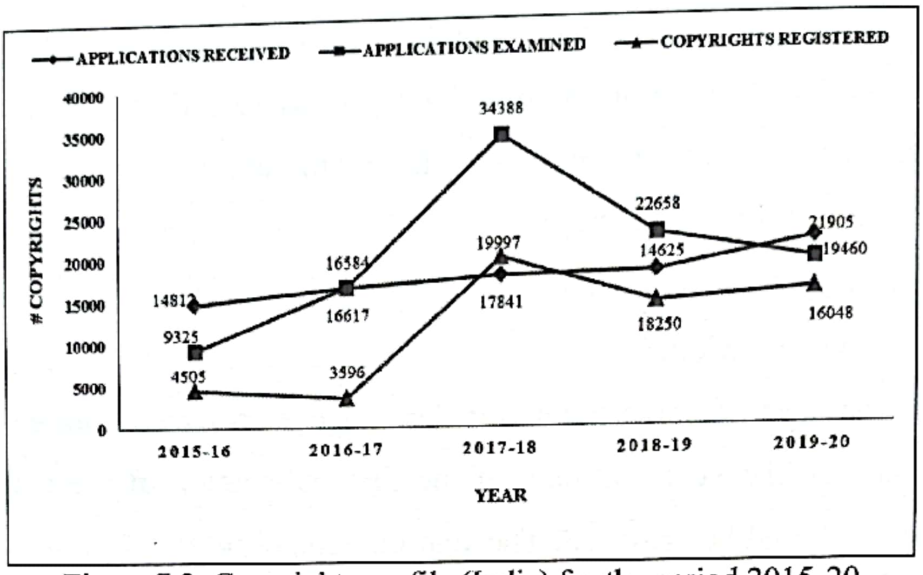


Figure 7.2: Copyrights profile (India) for the period 2015-20.

7.18 Copyright and the word 'Publish'

Work is deemed published when it becomes publicly accessible without any restrictions. For instance, if an individual creates an article titled "Life in Himalayas" and shares it with a limited group of people or entities, imposing a condition of confidentiality, the article is not considered "published" in terms of Copyright. However, if the author removes the non-disclosure condition or makes the article available on the internet (thus making it public domain), it would then be regarded as published. It's important to emphasize that both published and unpublished works are eligible for Copyright registration.

7.19 Transfer of Copyrights to a Publisher

The original creators of Copyrighted works might lack the means to widely promote their creations. Often, they transfer their rights to publishers for financial gain, which can take the form of a lump sum payment, royalties, or a combination of both. However, completely surrendering Copyright to publishers (or any other party) may have consequences for the Copyright owner. Publishers could limit authors from displaying their content on institutional websites or prevent revisions to the work. They might also print a limited number of hard copies and not make the digital version available online. Therefore, caution should be exercised when entering agreements with publishers.

Authors need not relinquish all legal rights as creators. Agreements can be crafted to allow publishers to print and sell hard copies while preserving digital rights. Authors can also

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establish time limits for the printing and sale of their work. In the digital age, authors have gained more control over disseminating their creations, reducing dependence on publishers. However, those already bound by publishing contracts may not fully enjoy this freedom.

Even when a work is exclusively licensed, the Copyright Act includes a provision for "termination of transfer," allowing authors to reclaim Copyright. This right can be exercised after 35 years of the agreement, regardless of its inclusion in the contract. Authors are strongly advised to carefully consider Copyright agreements before signing them.

7.20 Copyrights and the Word 'Adaptation'

In the realm of Copyright, the term "Adaptation" refers to the development of a new work derived from an existing one. The Copyright Act outlines the following actions as constituting adaptations

a) Converting a dramatic work into a non-dramatic work.

b) Transforming a literary or artistic work into a drama.

c) Rearranging a literary or dramatic work.

d) Representing a literary or dramatic work through images.

e) Creating a cinematograph film based on a literary, dramatic, or musical work.

7.21 Copyrights and the Word 'Indian Work'

The term "Indian work" refers to a literary, dramatic, or musical work under the following conditions:

- The author of the work holds Indian citizenship.
- The work is initially published in India.
- For unpublished works, the author was an Indian citizen at the time of creating the work.

7.22 Joint Authorship

"Work of Joint Authorship" refers to a creation resulting from the collaborative efforts of two or more authors, where the contributions of each author are not distinguishable from those of the other author or authors.

7.23 Copyright Society

Authors and other holders of Copyright frequently face difficulties in monitoring and overseeing the diverse applications of their creations, encompassing tasks like collecting royalties and addressing instances of infringement. To tackle these hurdles, Copyright

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Societies have come into existence. As stipulated by Section 33 of the Copyright Act, 1957, a Copyright Society is a formally registered collective administrative body formed by authors and other Copyright owners. These societies perform a range of functions, including:

- Monitoring rights and identifying infringements on behalf of their clients.
- Issuing licenses for the rights managed by the society.
- Collecting fees associated with these licenses.
- Distributing collected fees among the Copyright owners after deducting administrative costs.

A Copyright Society can be established by a collective of seven or more Copyright holders. The registration of such a Copyright Society remains valid for a duration of five years. Prominent Copyright Societies registered in India encompass the Society for Copyright Regulation of Indian Producers for Film and Television (SCRIPT), located at 135 Continental Building, Dr. A.B. Road, Worli, Mumbai 400 018, which focuses on cinematograph and television filmsThe Indian Performing Right Society Limited (IPRSL) at 208, Golden Chambers, 2nd Floor, New Andheri Link Road, Andheri (W), Mumbai-400 058 (for musical works).

- Phonographic Performance Limited (PPL) at Flame Proof Equipment Building, B.39, Off New Link Road, Andheri (West), Mumbai 400 053 (for sound recordings).

7.24 Copyright Board

The Copyright Board, established by the government, serves as a regulatory entity responsible for undertaking judicial functions in accordance with the Copyright Act of India. Comprising a Chairman and members (ranging from 2 to 14), the Board is entrusted with arbitrating Copyright-related matters. The Chairman holds a status equivalent to that of a High Court judge. Under the provisions of the Act, the Copyright Board is vested with the authority to:

- Adjudicate appeals against decisions made by the Registrar of Copyrights.
- Consider applications for the rectification of entries in the Register of Copyrights.
- Settle disputes pertaining to the assignment of Copyrights.
- Issue compulsory licenses for the publication or republication of works under specific circumstances.
- Provide compulsory licenses for the creation and publication of translations of literary

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or dramatic works in any language after a period of seven years from the initial publication.

- Resolve conflicts regarding the publication status, publication date, or Copyright term of a work in another country.
- Determine royalty rates for sound recordings under the cover-version provision.
- Determine the resale share right applicable to original copies of paintings, sculptures, drawings, as well as original manuscripts of literary, dramatic, or musical works.

7.25 Copyright Enforcement Advisory Council (CEAC)

In 1991, the Government established a Copyright Enforcement Advisory Committee (CEAC) to regularly assess the implementation of the Copyright Act and provide recommendations to enhance its enforcement. The CEAC's tenure spans three years, and it undergoes periodic reconstitution after each term concludes.

7.26 International Copyright Agreements, Conventions and Treaties

Automatic worldwide protection and enforcement of creative works does not occur due to the territorial nature of Copyright laws. These laws hold validity exclusively within the country of their creation. To ensure safeguarding of Indian works in foreign jurisdictions, authors must individually apply to each country or leverage dedicated international agreements known as 'Conventions on Copyright and Neighbouring Rights', provided the country is a participant in such agreements. India is a signatory to the following Conventions:

- Berne Convention for the Protection of Literary and Artistic Works, 1886.
- Universal Copyright Convention, 1952.
- Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations, 1961.
- Multilateral Convention for the Avoidance of Double Taxation of Copyright Royalties, 1979.
- Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement, 1995.

For foreign authors whose countries are members of the Berne Convention, Universal Copyright Convention, and the TRIPS Agreement, their Copyrights are protected in India through the International Copyright Order.

7.27 Interesting Copyrights Cases

"David vs. Macaques, Indonesia, 2011 - In 2011, a UK-based photographer named

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David Slater set up his camera on a tripod within a wildlife sanctuary to capture photographs of Macaques monkeys. The curious Macaques found the camera equipment intriguing, particularly the flashlight. One of the monkeys managed to take a selfie photograph, which gained significant fame and became the subject of a legal Copyright dispute. Theoretically, the monkey was the creator of the image and thus the potential Copyright holder. However, in practice, David Slater claimed Copyright ownership. The disagreement led to a legal battle between People for the Ethical Treatment of Animals (PETA) and David Slater. Eventually, a settlement was reached. Photographer David Slater retained Copyright over the picture due to his significant contribution, but he agreed to pay 25% of the royalty share to the wildlife sanctuary where the monkey resides (source: https://www.wipo.int/wipo_magazine/en/2018/01/article_0007.html).

'Happy birthday to you' case law - According to the Guinness World Records of 1998, 'Happy Birthday to You' is recognized as the most widely known song in the English language. The melody of this song originated from 'Good Morning to All', a tune traditionally attributed to American sisters Patty Smith Hill and Mildred J. Hill, composed in 1893 to engage children. In 1935, the Summy Company registered the Copyright for the piano arrangement of the song. In 1999, Warner/Chappell acquired the company and began charging royalties for the use of the happy birthday song, amassing significant earnings. Following a legal process involving the Federal court, Warner Music, represented by its subsidiary Warner/Chappell, agreed to a settlement with a group of 'thousands of people and entities' who had paid licensing fees to use the song since 1949. This settlement was reached as only the melody was registered and not the lyrics. Consequently, the song is now in the public domain.

Amitabh Bachchan to Lose Copyrights over His Father's Works in 2063 - Harivansh Rai Bachchan, the father of renowned actor Mr. Amitabh Bachchan, was a notable poet and Hindi writer. His most famous work, Madhushaala (1935), earned him the Sahitya Akademi award and the Padma Bhushan. He also provided Hindi translations for Shakespeare's plays Macbeth and Othello. He passed away on January 18, 2003, at the age of 95. As per the Copyright Act of 1957, the rights to his works will expire in the year 2063 (Copyright protection lasts for the author's lifetime plus 60 years)."

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Chapter 8

TRADEMARKS

In straightforward terms, a Trademark (or Trade Mark) is a distinctive symbol that can effectively recognize and distinguish the products or services of one company from those offered by others. The term 'Mark' refers to a sign, design, phrase, slogan, symbol, name, numeral, device, or a blend of these elements. Fundamentally, a Trademark encompasses anything that connects a brand to the general public.

8.1 Eligibility Criteria

In order for goods/services to qualify as a Trademark under legal classification, they must fulfill the following conditions:

• Distinctiveness - The goods and services seeking protection must possess sufficient uniqueness to distinguish them as a Trademark. They should be capable of identifying the origin of goods or services in the relevant market.

• Non-Descriptiveness - The Trademark should not merely describe the characteristics of the relevant goods or services. Descriptive marks are unlikely to receive protection under Trademark law. However, descriptive terms can be registered if they acquire a "secondary meaning," like the brand name 'Apple' used by a USA-based multinational company manufacturing electronic devices.

• Dissimilarity from existing marks - The mark should be distinctive and should not bear similarity to existing marks.

8.2 Who can apply for trademark?

Any individual who owns the Trademark has the right to apply for its registration. The application can also be jointly filed by multiple applicants, requiring the submission of supporting documents. An organization or association is eligible to apply for a collective mark, which can then be used by its members. An illustrative instance of such a mark is the 'Reliance' symbol, representing all products associated with the organization.

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8.3 Acts and Laws

In India, the regulations concerning Trademarks are outlined in The Trademarks Act, 1999 (http://www.ipindia.nic.in/writereaddata/Portal/IPOAct/1_43_1_trad e-marks-act.pdf). The guidelines for Trademarks are established by the Trademarks Rules, 2002 (http://www.ipindia.nic.in/writeread data/Portal/IPO Rule/1_56_1_1_59_1_tmr_rules_2002_1_.pdf). These Acts and Rules have undergone revisions over time, with the most recent changes occurring in 2010 for the Trademarks Act and in 2017 for Trademarks Rules. The management of Trademark-related matters is overseen by the Office of CGDPDTM, GoI.

8.4 Designation of Trademark symbols

TM Indicates that the Trademark is not registered. This symbol can be employed to promote the company's products.

SM Denotes an unregistered Trademark. This designation is suitable for endorsing brand services.

R Signifies a registered Trademark/Service. The holder of the registered Trademark holds legal ownership.

8.5 Classification of Trademarks

The categorization of Goods and Services for Trademarks adheres to the guidelines set by the 'Nice Agreement' (1957), overseen by WIPO. This system is adopted by a total of 149 countries, including 84 state parties that are signatories to the Agreement and 65 additional states that use this classification for Trademarks, as well as organizations like the African Intellectual Property Organization, African Regional IP Organization, and the Trademark Office of the European Union.

The Trademark classification encompasses 45 classes, with 34 classes designated for goods and 11 classes for services. (Source: http://euipo.europa.eu/ec2/static/html/nice-general-remarks-en.html;jsessionid=8FBC790A663FAC9092ACCDD9ED1AC65E.ec2t1). Here are two illustrative examples of these classes:

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Class 1:pertains to Chemicals utilized in industry, science, photography, agriculture, horticulture, and forestry; Unprocessed artificial resins, unprocessed plastics; Compositions for fire extinguishing and fire prevention; Tempering and soldering preparations; Substances for tanning animal skins and hides; Industrial adhesives; Paste fillers and putties; Compost, manures, and fertilizers; Biological preparations for industrial and scientific applications.

Class 45 encompasses legal services; Security services for safeguarding tangible property and individuals; Personal and social services provided by others to fulfill individual needs.

The Vienna codification established through the Vienna Agreement (1973) serves as an international classification system for the figurative components of marks. The corresponding Vienna code class can be accessed via the following link: https://www.wipo.int/classifications/nivilo/vienna/index.htm?lang=EN#.

This classification is employed to categorize all figurative elements into groups (ranging from 1 to 29), divisions (ranging from 1 to 19), and sections (ranging from 1 to 30). For instance, the depiction of "a little girl eating" falls within Category 2 (Human beings), Division 5 (Children), Main Section 3 (Girls). If auxiliary sections are used, the figurative element can be further identified with Auxiliary Section 18 (Children drinking or eating, Code A 2.5.18). The codification for this example would then be denoted as 2.5.3, 18 (main and auxiliary sections).

8.6 Registrations of a Trademark is Not Compulsory

While registration of a Trademark is not mandatory, opting for registration offers several advantages to the Trademark proprietor, including:

Legal Protection: It prevents unauthorized exploitation of the registered Trademark by other entities, individuals, or organizations. A registered Trademark can serve as crucial evidence of lawful ownership in legal disputes.

Exclusive Rights: The Trademark owner gains exclusive rights to use it in lawful ways to promote their business.

Brand Recognition: Logos associated with products or services create brand value over time, attracting new customers and strengthening loyalty among existing ones. Registering a Trademark early and using it builds goodwill and enhances business prospects.

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Asset Creation: A registered Trademark becomes an intangible asset of the organization. It enhances business prospects, draws new clients, and retains existing ones through brand identification.

For more information on Registered Trademarks in India, refer to http://www.ipindia.nic.in/writereaddata/Portal/Images/pdf/well-known-trademarks-updated-newone.pdf.

It's important to note that legal action cannot be pursued against the unauthorized use of an unregistered Trademark. In cases of unregistered marks (also known as "Common Law Trademarks"), which are essentially rights enforceable without formal registration, actions can be taken against any party engaging in the passing off of goods or services as those provided by another entity. In such situations, unregistered Trademarks need to establish a connection with the goods or services and prove their established goodwill or reputation.

8.7 Validity of Trademark

In India, a registered Trademark remains valid for a duration of 10 years. This validity can be extended indefinitely in successive 10-year periods. According to the Indian Trademarks Act, the application for renewal, denoted by the form "TM-R," needs to be submitted within one year preceding the expiration of the last registration of the mark.

8.8 Types of Trademark Registered in India

When choosing a Trademark, it is of utmost importance to select a word that is easy to pronounce, memorable, and distinct. It is strongly recommended to opt for unique and creative words or geographical names. It is advisable to avoid common geographical or personal names, as well as praise-related terms like "best," "perfect," "super," that describe the product's quality. To ensure these qualities in a Trademark, conducting a market survey to identify any existing similar marks is highly recommended. Here are some examples of eligible Trademarks: • Any name, including the applicant's or predecessor's personal or surname, or a person's signature; for instance, the Trademark "BAJAJ" is named after the industrialist Mr. Jamnalal Bajaj. • A word unrelated to the product or service; for instance, the Trademark "INDIA GATE" is used for food grains and related products. • Combination of letters or numerals, such as "YAHOO," which represents "Yet Another Hierarchical Officious Oracle" and has gained global recognition

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Table 8.1: Some of the famous examples of Trademarks.

S. No.	Type of the Mark	Mark	Company/Firm
1.	Distinctive General Word	‗Apple'	IT Company
2.	Fanciful Designation	‗Kodak'	Photograph Film
3.	Distinctive PersonalNames	‗Ford'	Automotive
4.	Device	‗Udhaar'	Financial Technology
5.	Number	‗4711'	Perfume
6.	Picture	Allegator	Knitwear Manufacturing
7.	Slogan	Drink it tobelieve it	Soft Drinks

Note: The Trademark Registry will raise objections to a Trademark that has not yet been registered if it bears resemblance in appearance or sound to those already registered. For example, a term like "Ford" could have similar-sounding variations such as "Foard," "Phord," "Fordd," "Forrd." If you intend to conduct a search for identical or similar marks, you can utilize the free government portal at http://ipindiaservices.gov.in/tmrpublicsearch/frmmain.aspx.

8.9 Trademark Registry

Table 8.2: Territorial jurisdiction of Trademarkregistration offices.

S. No.	Office Location	States
1.	Mumbai	Maharashtra, Madhya Pradesh, Chhattisgarhand Goa.
2.	Ahmedabad	Gujarat and Rajasthan and Union Territoriesof Daman, Diu, Dadra and Nagar Haveli.
3.	Kolkata	Arunachal Pradesh, Assam, Bihar, Orissa, West Bengal, Manipur, Mizoram, Meghalaya, Sikkim, Tripura, Jharkhand andUnion Territories of Nagaland, Andaman &Nicobar Islands.
4.	New Delhi	Jammu & Kashmir, Punjab, Haryana, UttarPradesh, Himachal Pradesh, Uttarakhand, Delhi and Union Territory of Chandigarh.

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5.	Chennai	Andhra Pradesh, Telangana, Kerala, Tamilnadu, Karnataka and Union Territories of Pondicherry and Lakshadweep Island.

8.10 Process for Trademarks registration

In order to apply for Trademark registration, the Trademark owner needs to complete an application. Optionally, the owner can engage an agent to handle the application process on their behalf. Prior to submitting the application, it's essential for the applicant to conduct a prior art search to confirm compliance with the registration criteria.

8.11. Prior Art Search

Before initiating the process of Trademark registration, it is advisable to verify whether the desired Trademark is already registered and if it bears no similarity to existing ones. Various online platforms can be utilized for this purpose, including:

- CGPDTM's Public Trademark Search (https://ipindiaservices.gov.in/tmrpublicsearch/frmmain.aspx).
- WIPO's Global Brand Database (https://www3.wipo.int/branddb/en/).
- Trademark Electronic Search System (TESS) (http://tmsearch.uspto.gov/bin/gate.exe?f=tess&state=4805:za847u.1.1).
- MARKARIA Trademark Search Engine (https://trademark-search.marcaria.com/en/asia/india-trademark-search).
- VAKIL Search (https://vakilsearch.com/trademark-search/trademarks?search=bajaj).

Upon completing the "prior art search" and confirming the distinctiveness of the intended Trademark, the applicant can proceed to fill out the registration application form (TM-A). The application is submitted to the appropriate Trademarks Office based on the applicant's jurisdiction. The registration process involves the following steps:

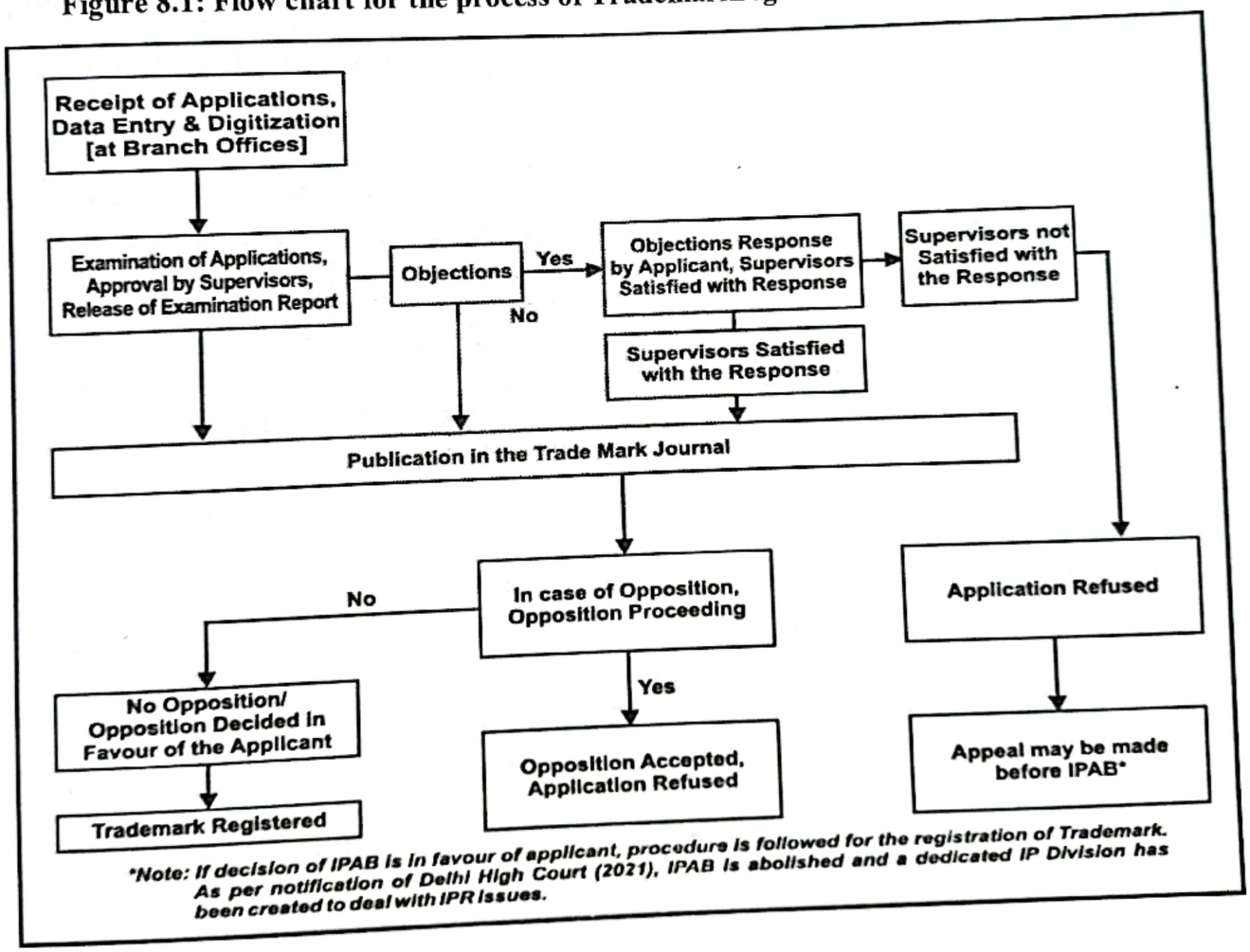
- After the prior art search, the applicant can independently apply for registration or enlist the assistance of an authorized agent.
- An application number is assigned to the application within a few days, which can be tracked online at https://ipindiaonline.gov.in/tmrpublicsearch/frmmain.aspx.
- The application is reviewed by a professional examiner. If all requirements are met, the application details are published in the official Trademark journal

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(http://www.ipindia.nic.in/journal-tm.htm). If there are any issues, objections are raised for the applicant to address. Upon satisfactory responses, the examiner recommends publication in the journal. If the application is rejected, the applicant can challenge the rejection through the Intellectual Property Division.

- Once the Trademark is published in the journal, the public has 90 days to file objections, if any. After hearing both parties, the officer decides whether to proceed with Trademark granting or disallow it. In the case of an unfavorable outcome, the applicant can appeal the decision before the IPAB (Intellectual Property Appellate Board)
- Once the application has fulfilled all necessary requirements, a Trademark registration certificate is issued under the name of the applicant.

Figure 8.1: Flow chart for the process of Trademarkregistration.



8.12 Famous case law: coca-cola company vs. Bisleri International Pvt ltd

Coca-Cola Company vs. Bisleri International Pvt. Ltd. The registered Trademark 'MAAZA,' associated with a popular mango fruit drink in India, is owned by Bisleri International Pvt. Ltd.,

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an Indian company. This company transferred the rights, including formulation, intellectual property rights, and goodwill, to Coca-Cola, a beverage company, for use within India. However, in 2008, Bisleri Company applied for Trademark registration of 'Maaza' in Turkey and began exporting the product using the 'MAAZA' mark. This action was contested by Coca-Cola, which filed a petition seeking permanent injunction, damages for passing-off, and Trademark infringement.

The argument presented on behalf of the Plaintiff (Coca-Cola Company) was that since the 'Maaza' Trademark for the Indian market had been assigned to Coca-Cola, manufacturing products with this mark, whether for sale within India or for export, would be considered an infringement. After considering the arguments of both parties, the court ultimately granted an interim injunction against the defendant (Bisleri), restraining them from using the Trademark 'MAAZA' in both the Indian market and for export. This was deemed to be a violation of Trademark rights

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Chapter 9

INDUSTRIAL DESIGNS

The term "Design" encompasses the distinctive features related to the shape, arrangement, pattern, ornament, or composition of lines and colors applied to any object. These features can manifest in one, two, or three dimensions, or a combination thereof. Moreover, a Design can be created through various industrial processes or methods, whether manual, mechanical, or chemical, either separately or in combination. Ultimately, the aesthetic appeal of the finished article is the sole criterion, as judged by visual perception. However, it's important to note that "Design" doesn't encompass construction methods or principles, nor anything that predominantly constitutes a mechanical device.

The primary objective behind registering industrial Designs is to safeguard and encourage the original creativity of the creator. This process aims to foster innovation and inspire others to contribute to the realm of artistic ingenuity.

9.1 Eligibility Criteria

The Design under consideration for protection must be novel and unique. It should not have been previously disclosed to the public through prior publication, usage, or any other means. Furthermore, the Design should exhibit substantial distinctiveness from any pre-existing registered Designs that are already available in the public domain.

9.2. Acts and Laws to Govern Industrial Designs

In India, the regulations concerning Industrial Designs are governed by the "The Designs Act" of 2000 (http://www.ipindia.nic.in/acts-designs.htm) and the "Design Rules" of 2001 (http://www.ipindia.nic.in/rules-designs.htm), which have been amended multiple times in 2008, 2013, 2014, and 2019. The key characteristics that an Industrial Design should possess are as follows:

- It must exhibit novelty and originality.
- It should be applicable to a functional article.
- The Design should be visibly present on the finished article.
- No prior publication or disclosure of the Design should have occurred.

An assortment of notable Industrial Designs can be explored at https://www.creativebloq.com/product-design/examples-industrialdesign-12121488. Below are a few renowned Industrial Designs:

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- Coca-Cola Bottle: The distinctively contoured glass bottle of the Coca-Cola Company, created in 1915, is an enduring emblem of exceptional industrial design.
- Piaggio Vespa: This Italian company is renowned for its Vespa scooters, which have been globally popular since the 1940s. The design integrates a pleasing structure, with a painted steel body concealing the engine, a spacious flat floorboard for the driver's feet, and well-designed handlebars providing both grip and wind protection.
- iPhone: The iconic mobile phone from Apple Inc. is admired for its sleek rectangular form, smooth rounded corners, and user-friendly features.
- Mini Cooper: A compact car manufactured by the British Motor Corporation, Mini Cooper's unique design maximizes passenger seating and luggage storage while maintaining a small car size.
- Rocking Wheel Chair: This circular-shaped chair offers a comfortable and smooth rocking motion, featuring a built-in headlight in its upper part.
- Juicy Salif: An iconic citrus juice squeezer, the alumina-based body of Juicy Salif is designed in the shape of a squid, making it an emblematic piece of structural design.

9.3. Design Rights

The registration of a Design also grants the proprietor an exclusive right, allowing them to lawfully prevent others from reproducing, producing, selling, or engaging with the registered Design without obtaining prior consent. This registration proves especially advantageous for entities that place aesthetic significance on the shape of their products. Such entities seek exclusivity over the unique and original Design that adorns their product(s) or article(s).

9.4. Enforcement of Design Rights

After acquiring rights to a specific Design, the applicant possesses the authority to initiate legal proceedings against any individual or entity using pirated products featuring their registered Design. In such cases, they can file an infringement lawsuit in a court (not lower than the District Court) to halt such unauthorized use and seek compensation for any damages to which the registered proprietor is entitled. The court's initial task is to verify whether the Design of the implicated product is duly registered under the Designs Act, 2000. If the Design is not registered as per the Act, legal action cannot be pursued against the infringing party. However, if the infringer is proven guilty of piracy or infringement, the court can order them to pay damages (₹ 50,000/-) for the infringement of a single registered Design

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9.5. Non-Protectable Industrial Designs India

Industrial Designs conflicting with public moral values

- Industrial Designs incorporating flags, emblems, or symbols of any nation.
- Industrial Designs associated with integrated circuits.
- Designs revealing the process of creating an article.
- Industrial Designs for items like books, calendars, certificates, forms, and other documents, dressmaking patterns, greeting cards, leaflets, maps and plan cards, postcards, stamps, and medals.
- Artistic works as defined under Section 2(c) of the Copyright Act, 1957, including paintings, sculptures, drawings (including diagrams, maps, charts, or plans), photographs, architectural works, and other forms of artistic craftsmanship.
- Industrial Designs do not encompass any trademarks (The Designs Act, 2000).

9.6. Protection Term

The external "Shape or Design" of a product enhances its attractiveness and serves as a value-enhancing element for the product. Hence, safeguarding one's creation from unauthorized use by third parties is essential. Registered Designs in India are safeguarded for a span of 10 years and can be extended by an additional 5 years through a renewal application.

9.7 Procedure for Registration of Industrial Designs

9.7.1 Prior Art Search

Conducting a "Prior Art Search" is a wise step before submitting an application for the registration of Industrial Designs to ensure that the proposed design is not already registered or similar to existing designs. This search can be conducted using various search engines, including:

Design Search Utility by CGPDTM (https://ipindiaservices.gov.in/designsearch/)

Global Design Database by WIPO (https://www3.wipo.int/designdb/en/index.jsp)

Hague Express Database by WIPO (https://www3.wipo.int/designdb/hague/en/#)

Design View by EUIPO (https://www.tmdn.org/tmdsview-web/welcome#/dsview)

9.7.2 Application for Registration

Application for Design Registration - Once the applicant is content that their Design is both novel and distinct from other Designs, they can proceed to initiate the process of filing a Design registration application. The application for Design registration is open to individuals, small

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entities, institutions, organizations, and industries. The filing of this application can be facilitated through a professional patent agent or legal practitioner. For applicants residing outside of India, it is mandatory to engage an agent residing in India for this purpose. The applicant submits the registration application to the Deputy Controller of Patents & Designs at the Design Office, located at the Intellectual Property Office Building, CP-2 Sector V, Salt Lake City, Kolkata-700091.

Once the application is submitted, an examiner assesses the application to determine its conformity with the minimum eligibility criteria for registration. In the event of any queries or concerns, the applicant is notified, and they are required to respond within 6 months from the date of objection. Upon resolution of the objections, the application is deemed suitable for registration. The application's details, along with a depiction of the designed article, are subsequently published in the Official Journal of the Patent Office (http://www.ipindia.nic.in/journal-patents.htm). Should no objections arise from the public, the Design is officially registered.

With the Design now registered, the applicant assumes the role of the Design's proprietor and is endowed with the exclusive privilege of applying that Design to articles falling within the class for which it was registered. Subsequently, the applicant requests the issuance of a registration certificate for the Industrial Design. The entire process of registration is visualized through the following flowchart:

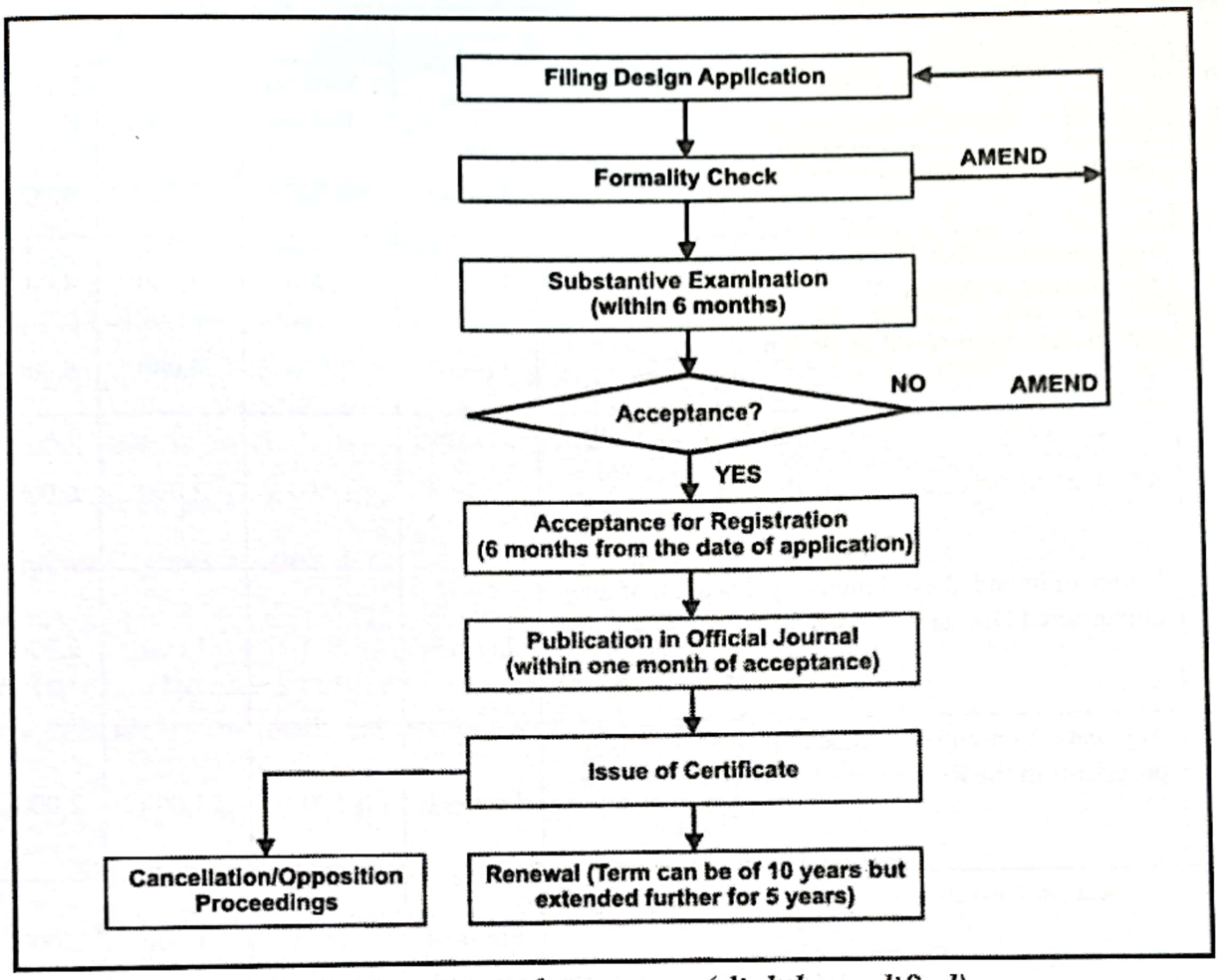
9.10 Duration of the Registration of a Design

Initially, the validity of Design registration spans ten years from the moment of registration itself. However, if a priority date has been asserted, the registration's duration commences from that priority date. Subsequently, the registration period can be extended by an additional five years. To facilitate this extension, an application in the form of Form-3, along with the requisite fees, must be submitted to the Controller General before the initial ten-year period concludes

9. 11 Importance of Design Registration

The registration of a Design guarantees the applicant's exclusive rights over the Design. This empowers the owner to thwart piracy and counterfeiting of products featuring the registered Design. Consequently, the owner can enhance product sales and cultivate a positive reputation within the market.

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Source: https://allthingspatent.wordpress.com *(slightly modified)*

Figure 9.1: Flowchart for the process of Design registration.

9.12. Cancellation of the Registered Design

The registration of a Design may be cancelled at any time. The petition has to be filed in Form-8 with prescribed fee to the Controller of Designs. The application can be made on the following grounds:

- Design has already been registered.
- Design has been published in India or elsewhere before the date of registration.
- Design is not novel and original.
- It is not a Design under Clause (d) of Section 2.

9.13 Application Forms

A comprehensive set of 24 forms is associated with Industrial Designs. Here is an outline of significant forms:

Table 9.1: Key Forms Pertaining to Industrial Designs

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S. No	Name of the Form	Form No.	Fee (₹)		
			Natural Person	Small Entity	Large Entity
1.	Application for registration of Design.	Form-1	1,000	2,000	4,000
2.	Application for the Restoration of Design.	Form-4	1,000	2,000	4,000
3.	Application for renewal of Design.	Form-3	2,000	4,000	8,000
4.	Petition for cancellation for registration of a Design.	Form-8	1,500	3,000	6,000
5.	Notice of intended exhibition or publication of unregistered Design.	Form-9	500	1,000	2,000
6.	Application for entry of name of proprietor or part proprietor in the Register.	Form-11	500	1,000	2,000
7.	Request for correction of clerical error.	Form-14	500	1,000	2,000
8.	Request for certified copy.	Form-15	500	1,000	2,000
9.	Application for rectification of Register.	Form-17	500	1,000	2,000
10.	Notice of opposition.	Form-19	100	200	400

9.14 Classification of Industrial Designs

Designs are categorized into distinct classes based on the Locarno Agreement of 1968 (https://www.wipo.int/classifications/locarno/locpub/en/fr/). This classification system is employed to organize goods for the registration of Industrial Designs and for conducting Design searches. Signatory nations are required to indicate these classes in official documents. The classification comprises a comprehensive list of classes and subclasses, each accompanied by a roster of goods encompassing Industrial Designs. With 32 classes and 237 subclasses available for search in both English and French languages.

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For instance, Class 1 encompasses food products for humans, animal feed, and dietary foods. However, packaging falls under Class 9 (Bottles, Flasks, Pots, Carboys, Demijohns, and Pressurized Containers). Meanwhile, Class 32 caters to the Design of graphic symbols, logos, surface patterns, and ornamentation.

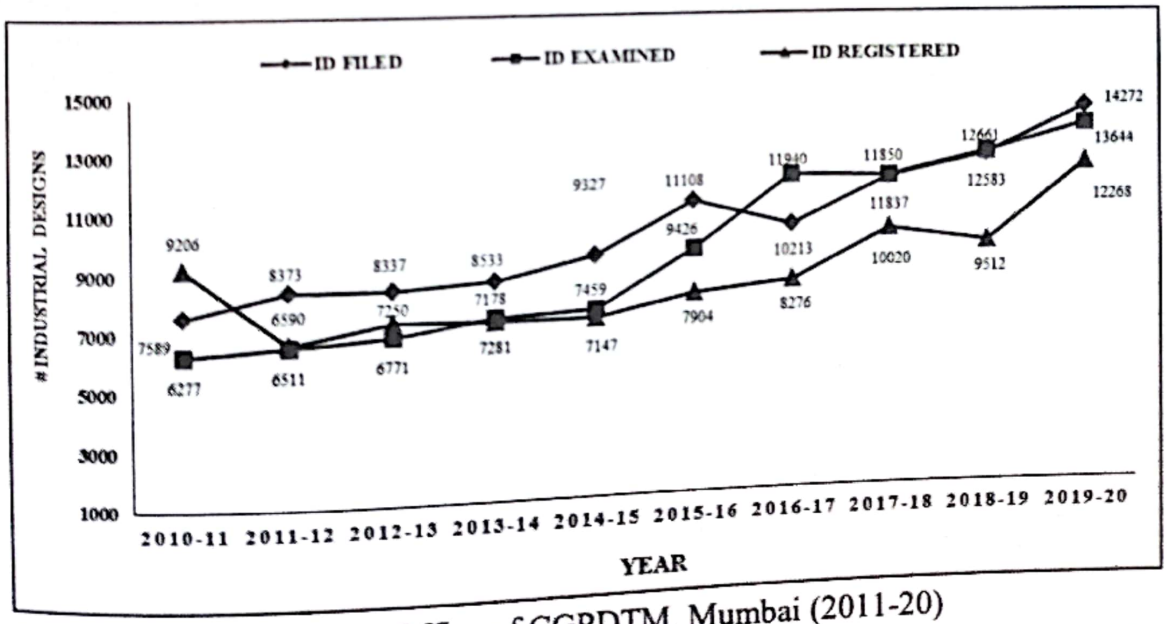
9.15 Designs Registration Trend in India

Figure 2.11 illustrates the statistical trends of Industrial Designs over the period from 2010 to 2020. Within this timeframe, there was a notable growth in the parameters of Designs filed, examined, and registered, with percentage increases of 88%, 117%, and 33% respectively. Across all three parameters, the graph showcases a relatively consistent pattern, culminating in the highest figures recorded in the fiscal year 2019-20 for Designs filed (12,268), examined (13,644), and registered (14,272).

9.16 International Treaties

Two significant international treaties established by WIPO govern various facets of Industrial Designs:

- The Hague Agreement for international registration (1925) (https://www.wipo.int/treaties/en/registration/hague/)
- The Locarno Agreement (1968) for international classification (https://www.wipo.int/treaties/en/classification/locarno/)



Source: Annual Reports, Office of CGPDTM, Mumbai (2011-20) (https://dipp.gov.in/sites/default/files/annualReport-English2020-21.pdf)

Figure 9.2: Profile of Industrial Designs (India) for the Period 2010-20

9.17 Famous Case Law: Apple Inc. vs. Samsung Electronics Co.

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Apple Inc. vs. Samsung Electronics Co. In 2011, Apple Inc. initiated legal action against Samsung Electronics Co. by filing a lawsuit in the United States District Court for the Northern District of California. The lawsuit alleged that Samsung had infringed upon Apple's Designs and Utility Patents related to user interface elements such as the screen app grid and tap-to-zoom functionality. As part of their evidence, Apple Inc. presented a comparison of side-by-side images depicting the iPhone 3GS and the i9000 Galaxy S, aiming to illustrate the perceived similarities between the two models.

However, it later came to light that the images provided by Apple had been altered to align with the dimensions and features of the contentious Designs. This revelation led Samsung Electronics' legal representatives to accuse Apple of presenting false and deceptive evidence to the court. In response, Samsung countersued Apple in various international jurisdictions, including Seoul, South Korea; Tokyo, Japan; Mannheim, Germany; the United States District Court for the District of Delaware; and the United States International Trade Commission (ITC) in Washington, D.C.

The legal proceedings spanned a period of seven years, involving multiple courts across different countries. In June 2018, after protracted litigation, both companies reached a settlement. As part of the settlement, Samsung was ordered to pay Apple Inc. a sum of $539 million as compensation for the patent infringement claims.

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Chapter 10

GEOGRAPHICAL INDICATIONS

In various nations, specific regions are renowned for their rich traditional knowledge and heritage across sectors like agriculture, food products, textiles, and more. These areas have historically attracted people from distant locations who sought to acquire these distinct products. For instance, Christopher Columbus journeyed from Spain to obtain renowned spices from India. British traders ventured to Arabian countries to acquire Arabian horses for breeding faster horses, aiming for commercial advantages. In a similar vein, China silk and Dhaka Muslin have held substantial appeal throughout history. The esteemed reputation of these products was established and diligently preserved by local experts and masters, who passed down their expertise to succeeding generations. Over time, a significant connection between the produced goods and their geographical origins emerged, giving rise to the concept of Geographical Indications (GI).

A Geographical Indication is characterized as a mark that can be applied to products originating from a specific geographic region, possessing distinctive qualities or a reputation closely associated with that locale. In the context of GI, a profound bond exists between the product and its original place of production

10.1 Acts, Laws and Rules Pertaining to GI

In India, the concept of Geographical Indications (GI) was introduced in 2003 and is regulated by the "Geographical Indications of Goods (Registration & Protection) Act, 1999" along with the Geographical Indications of Goods (Registration & Protection) Rules, 2002.

10.2 Ownership of GI

The ownership or holders of registered Geographical Indications (GI) can include producers, either as individuals or as part of a group, association, cooperative society, or, in specific instances, the government.

10.3 Rights Granted to the Holders

Rights of the GI holder include the ability to grant licenses, sell, transfer, mortgage, or engage in other arrangements related to their product. Any license or assignment must be documented in writing and registered with the GI Registrar to be considered valid and lawful.

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Additionally, the GI holder possesses the right to take legal action against unauthorized use of the product and can provide exclusive authorization to users for the use of goods associated with the registered GI. Moreover, both registered proprietors and authorized users have the right to seek remedies in case of infringement of the GI-protected products.

10.4 Registered GI in India

Geographical Indication (GI) products registered in India encompass various domains such as handicrafts, agriculture, foodstuffs, alcoholic beverages, and more. The first GI tag was bestowed upon Darjeeling Tea in 2004, while the most recent additions include Kashmir Saffron and Manipur Black Rice (Chakhao) in May 2020. As of May 2020, a total of 370 GIs have been registered in India). Among these, handicrafts account for approximately 58%, followed by agriculture at 30%. The remaining categories comprise foodstuffs, manufacturing, and natural goods.http://www.ipindia.nic.in/writereaddata/Portal/Images/pdf/GI_Application_Register_10-09-2019.pdf Regarding the handicrafts category, Tamil Nadu leads with the highest number of GIs (21), followed by Uttar Pradesh (20) and Karnataka (19). Notably, Table 10.4 presents a selection of noteworthy GIs.

Table 10.1 : List of popular GIs registered in India

GI	Type	State
Darjeeling Tea	Agriculture	West Bengal
Mysore Silk	Handicraft	Karnataka
Kashmir Pashmina	Handicraft	Jammu & Kashmir
Banaras Brocades and Sarees	Handicraft	Uttar Pradesh
Naga Mircha	Agriculture	Nagaland
Tirupathi Laddu	Foodstuff	Andhra Pradesh
Phulkari	Handicraft	Punjab, Haryana, Rajasthan
Basmati	Agriculture	India

Countries from around the world, including Thailand, France, Portugal, Italy, Mexico, Peru, and the United Kingdom, have sought Geographical Indication (GI) protection in India. Examples of this international filing include France's Champagne (wine) and the United Kingdom's Scotch Whisky

10.5 Identification of Registered GI

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Products with registered Geographical Indications (GI) are adorned with a tag that authenticates their production according to established standards and their specific origin. This tag serves as proof of the product's authenticity and the location where it was made. Non-registered products cannot utilize or feature this tag. GI tags generally symbolize the product's origin as well as its cultural and historical significance. Notable examples include Darjeeling Tea, Mysore Silk, and Tirupathi Laddu.

In India, the issuance of GI tags falls under the jurisdiction of the Geographical Indication Registry, which operates under the Department for Promotion of Industry and Internal Trade, Ministry of Commerce and Industry. The registry's headquarters are situated at the Geographical Indications Registry Intellectual Property Office Building in Guindy, Chennai.

While products with GI registration can adhere to the standards set by the GI Registry and be produced anywhere in the world, they cannot bear the GI label unless they are manufactured or grown in the specific geographical area officially recognized by the GI Office. For instance, although Darjeeling Tea plants can be cultivated throughout India, the tea leaves cannot be marketed as "Darjeeling Tea" unless they are cultivated in the specific soil and climate conditions of the Darjeeling region.

10.6. Classes of GI

There are 34 distinct categories for Geographically Indicated (GI) certified products. For example, Class 1 covers chemicals used in various fields like industry, science, photography, agriculture, horticulture, and forestry. This includes items like raw artificial resins, untreated plastics, fertilizers, fire extinguishing compositions, tempering and soldering preparations, chemical substances for food preservation, tanning materials, and industrial adhesives. Class 33 is focused on alcoholic beverages (except for beers), while Class 34 is related to tobacco, smoking-related items, and matches. For more comprehensive information, you can refer to the official CGPDTM Office website http://www.ipindia.nic.in/writereaddata/images/pdf/classification-of-goods.pdf.

10.7 Non-Registerable GI

To be eligible for Geographical Indication (GI) registration, the indications must align with the criteria outlined in Section 2(1)(e) of the GI Act, 1999. Additionally, the provisions of Section 9 must also be met, which disallow the registration of a GI under the following circumstances:

- If its use could potentially mislead or create confusion.

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- If its use contradicts any existing law.
- If it includes scandalous or obscene content.
- If it includes material likely to offend societal sensibilities.
- If it infringes upon the religious sensitivities of any group within India's population.
- If it's determined to be a generic term or indication for goods, and thus not protected or has lost protection in its country of origin or has fallen into disuse there.

10.8 Protection of GI

The enforcement of intellectual property (IP) rights for Geographical Indications (GI) is carried out by the respective legal courts of the relevant country. GI registration offers several advantages. It aids in identifying counterfeit or non-genuine products, enhances the commercial worth of the product, and reinforces legal claims if brought before the judiciary. There are two common methods for safeguarding a GI: the use of sui generis systems (special protection regimes) and employing certification or collective mark systems. Numerous countries, including India, choose to protect GIs through the sui generis system. This decision was made post the TRIPS agreement in 1995, providing countries with the option to adopt either TRIPS standards or the sui generis system. This choice was made recognizing the diversity in legislation, geographical configurations, and resources among different countries. As a result, the sui generis system is not standardized globally but rather varies based on specific jurisdictions and local regulations.

10.9 Collective or Certification Marks

Certification marks serve the purpose of certifying that products meet specific quality criteria, regardless of their origin. These criteria encompass permitted materials and manufacturing processes. As a result, certification marks are employed to differentiate certified products from those that are not certified. On the other hand, collective marks are owned by associations that guarantee adherence to established standards. Collective marks indicate that a product or service originates from a member of a specific association. Enterprises collaborating under a collective mark have committed to meeting predefined quality standards for products or services that share common attributes.

10.10 Enforcement of GI Rights

The enforcement of GI protection rights generally falls under the jurisdiction of the legal court system. The consequences imposed could encompass civil remedies such as injunctions to

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prevent unlawful activities, actions for financial damages, and more. Additionally, the enforcement mechanisms can involve criminal sanctions and administrative measures.

10.11 Procedure for GI Registration

Before submitting an application to register a Geographical Indication (GI), it's advisable to conduct a search to determine if the concerned GI is already protected. This search can be performed using search engines provided by WIPO, such as the "Search of Appellations of Origin and Geographical Indications" tool (https://www.wipo.int/ipdl/en/search/lisbon/search-struct.jsp). Additionally, WIPO has compiled a directory of IP offices in its member countries. By accessing the website of the respective country from this directory), you can search for registered GIs. In India, a list of registered GIs can be found on the official website of CGPDTM (http://www.ipindia.nic.in/writereaddata/Portal/News/367_1_Registered_GI.pdf).

Once the prior search for registered GIs is complete, the applicant can proceed to file an application. The application for GI can be submitted by an individual, organization, or authority established under Indian law. The application should adhere to the prescribed format and be submitted to the Registrar of Geographical Indications along with the requisite fee (http://www.ipindia.nic.in/writereaddata/Portal/IPORule/1_27_1_gi-rules.pdf). The application must outline the interest of the producers of the relevant product. It should also be signed by the applicant or their agent and include details about how the GI's standards will be maintained. Additionally, submitting three certified copies of the region's map where the GI originates is mandatory.

Upon filing the application with the GI Registry, an Examiner will review it for any deficiencies or similarities. If discrepancies are found, the applicant will be notified and required to respond within one month. After the Examiner is content with the response, an examination report is prepared and presented to the Registrar. The application undergoes further scrutiny, and if necessary, the applicant must address any doubts or objections within two months of communication, or the application may be rejected.

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Form No.	Title	Requisite Fee (₹)

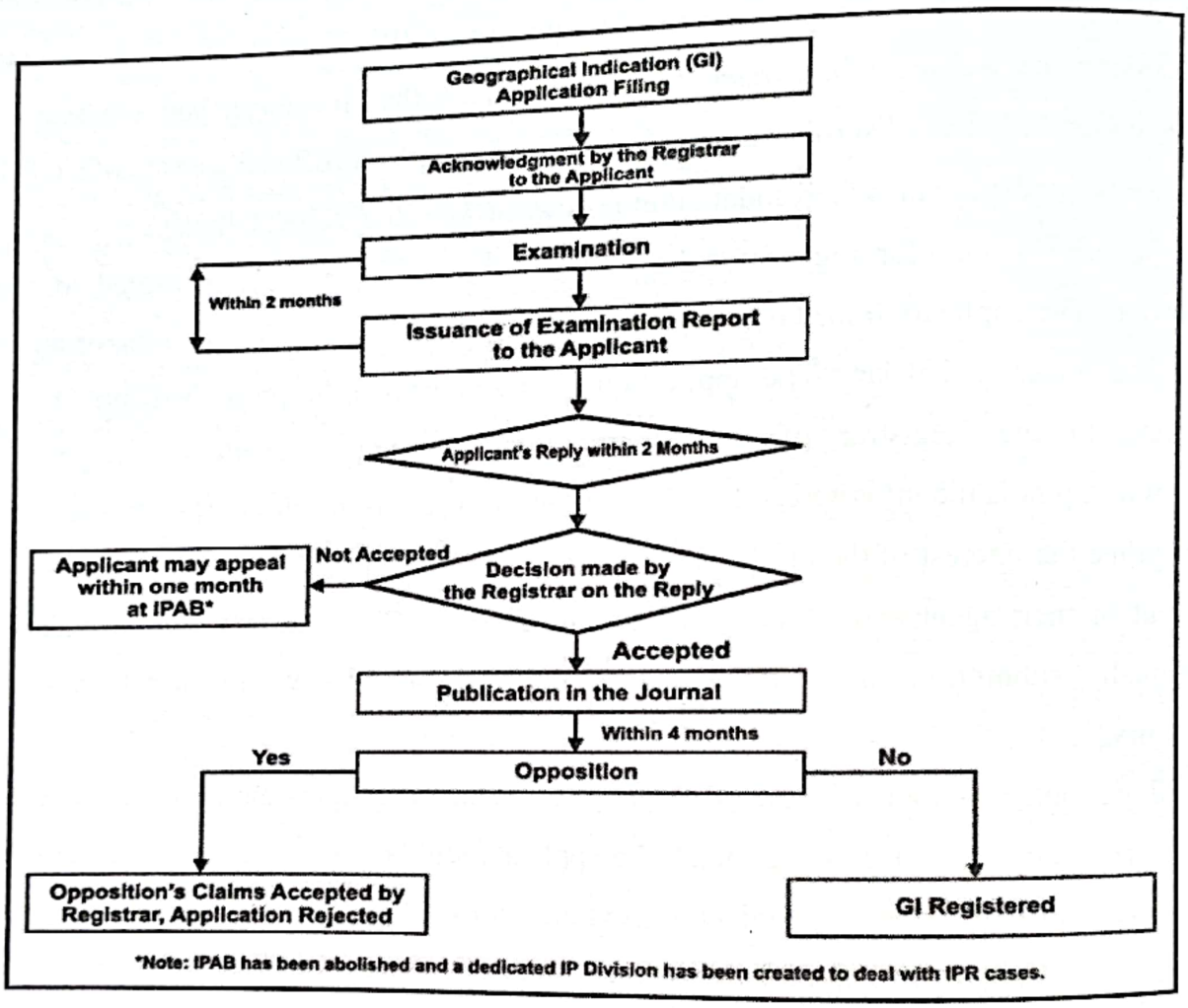


Figure 10.1: Flow chart for the process of GI registration

Once the Registrar approves the application, it is published in the official Geographical Indication Journal (http://www.ipindia.nic.in/journal-gi.htm) to allow for objections to the claims in the application. Objections must be filed within four months of publication. If no opposition is received, the GI is registered with the filing date as the registration date. Initially, the GI is registered for a ten-year period, which can be renewed upon payment of the appropriate fee.

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GI-1	Application for the registration of a Geographical Indication for goods included in one class.	5000
	Application for the registration of a Geographical Indication for goods included in one class from a Convention country.	5000
	A single application for the registration of a Geographical Indication for goods in different classes.	5,000 for each class
	A single application for the registration of a Geographical Indication for goods in different classes from a Convention country.	5,000 for each class
GI-2	Notice of opposition to the registration of a Geographical Indication or an opposition or an authorised user.	1,000 for each class
	Form of counter-statement.	1,000
	Application for extension of time for filing notice of opposition.	300
GI-3	Application for the registration of an authorised user of a registered Geographical Indication.	500
	Request for issuance of a registration certificate as an authorised user.	100
	For renewal of an authorised user.	1000
GI-4	Renewal of the registration of a Geographical Indication at the expiration of the last registration.	3,000
	Application for restoration of a Geographical Indication or an authorised user removed from the Register.	1000 plus applicable renewal fee
	Application for renewal within six months from the expiration of last registration of Geographical Indication.	3,500
GI-8	Application for registration of a Geographical Indications agent.	1000
GI-10	Application for cancellation of an entry in the Register or to strike out goods.	300

The important forms to file GI in India under various classes are mentioned below table

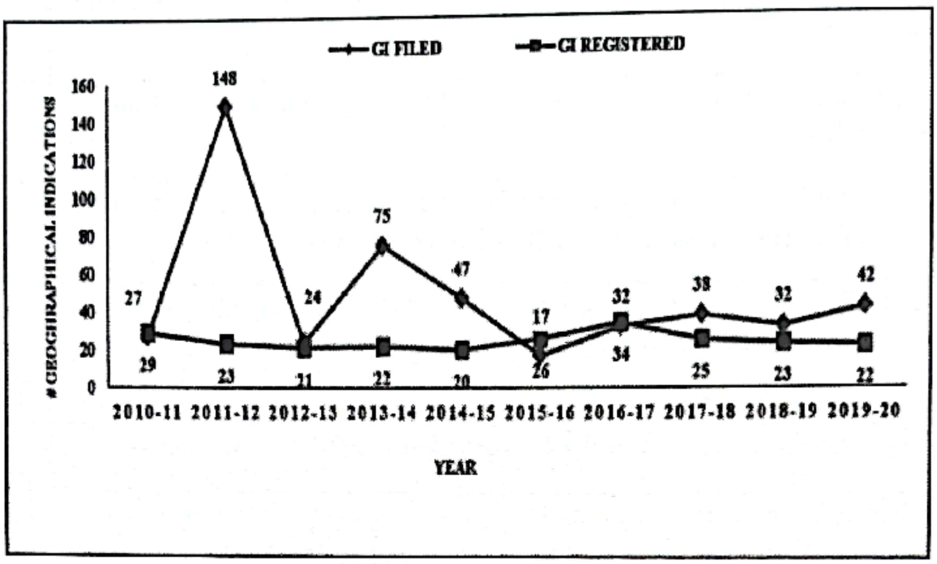
Table 10.2: Important application forms related to GI.

10.12 Documents Required for GI Registration

- Details about the applicant 's name, address and particulars.
- Application form GI-1A.
- Statement about the designated goods being protected under GI.
- Class of goods.
- Affidavit to establish the claim of genuinely representing the interest of the producers.
- Characteristics of GI.

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- The special human skill required (if any). 96 Figure 2.12: Flow chart for the process of GI registration.



Source: Annual Reports, Office of CGPDTM, Mumbai (2011-20) (https://dipp.gov.in/sites/default/files/annualReport-English2020-21.pdf)

Figure 10.2: GI profile (India) for the period 2010-20

10.13 GI Ecosystem in India

India is among the geographically and traditionally rich countries. The scope of generating GI products in India is enormous. These products can contribute to the economic development of a particular region or society. However, till June 2021, a total of 370 GI have been registered in India, which is much below its potential (https://ipindia.gov.in/writereaddata/Portal/Images/pdf/GI_Applicati on_Register_10-09-2019.pdf). Figure 2.13 represents the statistics for GI (filed, and registered) for the period 2010-20. Maximum number (148) of GI were filed in 2011-12 whereas, minimum number (17) was observed in 2015-16. Not much change in the 98 number of GI registrations was observed during the period 2010-20. Each year the number hovered around in the twenties, with maximum registrations (34) seen in 2016-17.

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Chapter 11

CASE STUDIES ON PATENTS

This chapter includes detailed the process through which one party sues another for making allegedly unlawful claims upon their patented inventions,without the patent holder's permission.

11.1 Case Study Of Curcuma(Turmeric)patent

Turmeric, a tropical herb cultivated in the eastern regions of India, finds versatile applications within the country. Among its various uses, turmeric powder is extensively employed in India for medicinal, culinary, and dyeing purposes. It serves as a blood purifier, aids in treating common colds, and exhibits anti-parasitic properties for managing several skin infections. Additionally, it plays an indispensable role as a key ingredient in numerous Indian dishes.

In 1995, the University of Mississippi medical center was granted a patent by the United States for the wound healing properties of turmeric. The patent encompassed the utilization of "turmeric powder and its administration," encompassing both oral and topical applications, for the purpose of wound healing. This exclusive right granted the authority to sell and distribute products based on this patent.

However, this patent was met with opposition from the Indian Council for Scientific and Industrial Research (CSIR), which contested the patent and presented well-documented evidence of prior usage of turmeric for similar purposes. Although turmeric's healing properties were widely known and practiced in Indian households for generations, unearthing published information specifically detailing the use of turmeric powder for wound healing through both oral and topical methods proved to be a challenging endeavor. After extensive research, a total of 32 references were located in various languages, including Sanskrit, Urdu, and Hindi, establishing the historical use of turmeric for wound healing.

Consequently, the patent was revoked by the United States Patent and Trademark Office (USPTO). The USPTO reasoned that the claims made in the patent were obvious and anticipated, acknowledging that the utilization of turmeric for wound healing was an ancient practice. This

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ruling not only protected the traditional knowledge (TK) inherent to India but also affirmed that the healing attributes of turmeric were firmly rooted in historical wisdom.

11.2 Case Study of Neem Patent

The initial application for a patent concerning Neem was submitted by W.R. Grace and the Department of Agriculture of the USA to the European Patent Office. This patent pertained to a technique for managing fungal issues on plants, involving the application of a formulation containing Neem oil to the fungi. India responded by raising legal objections against the patent's approval.

The initial application for a patent concerning Neem was submitted by W.R. Grace and the Department of Agriculture of the USA to the European Patent Office. This patent pertained to a technique for managing fungal issues on plants, involving the application of a formulation containing Neem oil to the fungi. India responded by raising legal objections against the patent's approval. The opposition to the patent's issuance was lodged by the Research Foundation for Science, Technology, and Ecology (RFSTE), based in New Delhi. This effort was undertaken in collaboration with the International Federation of Organic Agriculture Movements (IFOAM) and Magda Aelvoet, a former green Member of the European Parliament (MEP).

The Neem tree, deeply ingrained in India's heritage, boasts an array of powerful compounds, prominently including azadirachtin found in its seeds. This tree finds extensive application, serving as an astringent across various domains. Its bark, leaves, flowers, and seeds are harnessed for treating an array of conditions, ranging from leprosy to diabetes, skin ailments, and ulcers. For generations, Neem twigs have been utilized as antiseptic toothbrushes. Opponents of the patent provided historical evidence from ancient Indian Ayurvedic texts that outlined the use of hydrophobic extracts from Neem seeds for centuries. These extracts were documented as effective in treating dermatological conditions in humans and in safeguarding agricultural plants against fungal infections.

Upon review, the European Patent Office (EPO) recognized deficiencies in terms of novelty, inventive progression, and potential prior art in relation to the patent. Consequently, the patent was invalidated. In addition to this, multiple recent US patents have been issued for Neem-based emulsions and solutions.

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11.3 Case Study of Basmati Patent

The United States Patent Office granted a patent to 'RiceTec' for a specific strain of Basmati rice, an aromatic rice variety cultivated in India and Pakistan for many centuries. Rice holds the position of a primary dietary staple across a significant portion of Asia, particularly in countries like India and Pakistan. Over the course of history, farmers in this region painstakingly developed, nurtured, and preserved a diverse array of more than a hundred thousand distinct rice varieties, tailored to various preferences and requirements.

In their patent application submitted in 1997, Ricetec openly acknowledged that high-quality Basmati rice traditionally originates from northern India and Pakistan. The application even acknowledged that in some regions, the term "Basmati" exclusively pertains to rice grown in these two countries. Despite this acknowledgment, the company proceeded to assert that they had invented unique "novel" Basmati lines and grains that facilitated the production of superior, higher-yielding Basmati rice on a global scale.

In response, the Indian Government contested only three out of the twenty claims presented in RiceTec Inc.'s original patent application. The focus of the challenge was exclusively on claims related to specific characteristics of Basmati rice, notably starch index, aroma, and grain dimensions.

It's important to note that the World Trade Organization (WTO) Agreement doesn't mandate countries to grant patent protection to plant varieties. Rather, it requires countries to establish legislative measures for the protection of plant varieties in some manner, not necessarily through patents. However, the United States, being a strong advocate of patent protection for plant varieties, allowed for the patent application to proceed.

RiceTec's patent encompassed the protection of three strains developed by the company, enabling them to label their strain as "Superior Basmati Rice." In this Basmati case, RiceTec achieved this patent by introducing crossbreeding with Western strains of rice, subsequently asserting this altered strain as their inventive creation. This case exemplifies the challenges highlighted in the Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement concerning the patenting of biotechnological processes.

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