

Development of a Socio-Legal Questionnaire for Assessing the Impact of Patent Law on Research and Innovation in Higher Education Institutions

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Abstract

Patent law has emerged as an important legal instrument for promoting research, innovation, and commercialization in higher education institutions. Universities are increasingly encouraging faculty members and research scholars to protect their inventions through patents and to participate in innovation-driven activities. However, empirical assessment of the impact of patent law on research and innovation remains difficult due to the absence of a standardized research instrument. Existing studies have generally focused on individual aspects such as patent awareness, intellectual property management, commercialization, or innovation, without providing a comprehensive socio-legal questionnaire.

The present study aims to develop a structured questionnaire for assessing the impact of patent law on research and innovation in higher education institutions. The questionnaire was developed through a systematic review of literature, identification of relevant constructs, operational definition of variables, preparation of questionnaire items, and design of a structured measurement framework. Eight major constructs were identified to represent the legal, institutional, behavioural, and innovation-related dimensions of patent law. The questionnaire contains 55 items. A five-point Likert scale was adopted to measure respondents' perceptions.

The proposed questionnaire is intended for use among faculty members, research scholars, patent professionals, innovation managers, and Intellectual Property Rights (IPR) Cell coordinators. The instrument is expected to

facilitate future empirical studies, institutional assessment, and evidence-based policy formulation relating to patent law and innovation in higher education institutions.

Keywords: Patent Law; Questionnaire Development; Higher Education; Intellectual Property Rights; Research and Innovation; Socio-Legal Research.

1. Introduction

The role of higher education institutions has undergone a significant transformation over the past two decades. In addition to teaching and research, universities are increasingly expected to generate innovations, protect intellectual property, promote entrepreneurship, and contribute to national economic development. Patent law has therefore become an integral part of the higher education ecosystem by encouraging researchers to protect inventions and facilitating the commercialization of research outcomes.

In India, several government initiatives, including the National Intellectual Property Rights Policy, the National Education Policy 2020, Startup India, the Atal Innovation Mission, and Institution's Innovation Councils (IICs), have encouraged universities to establish Intellectual Property Rights (IPR) Cells and promote patent awareness among faculty members and students. As a result, patent filing activities within higher education institutions have increased considerably.

Despite these developments, researchers continue to encounter several challenges in understanding and utilizing the patent system. Differences in institutional support, legal awareness, availability of patent facilitation services, research culture, and innovation ecosystems significantly influence patent-related activities across institutions. Consequently, there is an increasing need for empirical studies capable of systematically evaluating the impact of patent law on research and innovation.

Empirical research depends upon reliable measurement instruments. A well-designed questionnaire enables researchers to collect standardized information, compare responses across institutions, and identify factors influencing research behaviour and innovation. However, a review of available literature indicates that no comprehensive socio-legal questionnaire currently exists for assessing the multidimensional impact of patent law on research and innovation in higher education institutions. Existing studies have generally relied on self-developed questionnaires designed for individual investigations, thereby limiting comparability and standardization.

To the best of the author's knowledge, no standardized socio-legal questionnaire has been developed in India for measuring the impact of patent law on research and innovation in higher education institutions. Recognizing this methodological gap, the present study focuses on the development of a structured socio-legal questionnaire.

Rather than measuring only patent awareness or commercialization, the proposed instrument integrates legal knowledge, institutional support, research practices, innovation orientation, patent filing challenges, and policy support into a single measurement framework. The questionnaire is intended to provide a practical tool for future empirical research and policy evaluation within higher education institutions.

2. Need for Developing the Questionnaire

Several studies have examined different aspects of intellectual property management in higher education, including patent awareness, innovation, technology transfer, and commercialization. However, these studies generally concentrate on specific dimensions and employ questionnaires designed exclusively for their individual research objectives. As a result, there is considerable variation in questionnaire content, measurement scales, and variables, making comparison across studies difficult.

The absence of a standardized questionnaire creates several practical problems. First, researchers often prepare new questionnaires for every study without following a structured development process. Second, similar variables are measured using different terminology and response formats, reducing consistency. Third, institutions cannot benchmark their performance because different studies evaluate different indicators. Finally, policymakers lack a common framework for assessing the effectiveness of patent-related initiatives across higher education institutions.

The present study addresses these limitations by developing a comprehensive socio-legal questionnaire based on a systematic methodology. The questionnaire is designed to measure multiple dimensions influencing patent-related research and innovation while maintaining conceptual clarity and ease of administration. The instrument is intended to be sufficiently flexible for application in universities, engineering colleges, research institutions, and other higher education organizations.

3. Research Methodology

3.1 Research Design

The present study adopted a **methodological research design** to develop a structured questionnaire for assessing the impact of patent law on research and innovation in higher education institutions. The study did not aim to test any hypothesis or evaluate respondents' perceptions. Instead, its primary objective was to design a comprehensive research instrument that could be used in future empirical investigations.

A systematic approach was followed to ensure that the questionnaire was relevant, logically structured, and suitable for application in higher education institutions.

3.2 Methodology Adopted for Questionnaire Development

The questionnaire was developed through a sequence of planned activities. The entire process consisted of eight stages, beginning with identification of the research problem and ending with preparation of the final questionnaire.

Figure 1. Stages of Questionnaire Development

Identification of Research Problem



Review of Literature



Identification of Constructs



Operational Definition of Variables



Preparation of Questionnaire Items



Questionnaire Structuring



Expert Review



Final Questionnaire

Each stage was completed before proceeding to the next stage to maintain consistency in questionnaire development.

3.3 Literature Review

An extensive review of literature was undertaken to identify the factors influencing patent law, research, and innovation in higher education institutions.

The review covered:

- Research articles
- Books
- Government reports
- Patent manuals

- National Intellectual Property Rights Policy
- National Education Policy 2020
- WIPO publications
- CGPDTM publications
- University IPR Policies

The literature review had three objectives:

- to identify variables affecting patent-related activities;
- to examine existing questionnaires used in intellectual property and innovation research; and

The review indicated that although several studies measured patent awareness, innovation, technology transfer, commercialization, and institutional support individually, no comprehensive questionnaire integrating all these dimensions was available.

3.4 Identification of Constructs

Based on the literature review and the objectives of the study, eight major constructs were identified.

Table 1. Constructs Included in the Questionnaire

S. No.	Construct	Purpose
1	Patent Awareness	Measures awareness regarding patents and intellectual property rights
2	Knowledge of Patent Law	Measures understanding of patent laws and procedures
3	Institutional Support	Measures support provided by the institution for patent-related activities
4	Research Behaviour	Measures the influence of patent law on research practices
5	Innovation Orientation	Measures respondents' inclination towards innovation
6	Patent Filing Challenges	Measures perceived barriers in obtaining patents
7	Commercialization and Technology Transfer	Measures commercialization opportunities arising from research
8	Government and Institutional Policy Support	Measures perceptions regarding policy support for innovation

These constructs collectively represent the legal, institutional, behavioural, and innovation-related dimensions of patent law in higher education.

3.5 Operational Definition of Variables

Each construct was operationally defined before questionnaire items were prepared. Operational definitions ensured that every construct was interpreted consistently throughout the questionnaire.

Table 2. Operational Definitions

Construct	Operational Definition
Patent Awareness	Awareness regarding patents and their role in protecting inventions
Knowledge of Patent Law	Understanding of patent procedures and legal provisions
Institutional Support	Availability of institutional assistance for patent filing and innovation
Research Behaviour	Influence of patent law on research activities
Innovation Orientation	Attitude towards innovation and technology development
Patent Filing Challenges	Difficulties encountered during patent filing
Commercialization	Perception regarding commercialization of research outputs
Government Support	Perceived effectiveness of government and institutional policies

The operational definitions guided the preparation of questionnaire statements.

3.6 Development of Questionnaire Items

Questionnaire items were developed after examining the variables identified in the literature.

The following principles were followed while drafting each item:

- Each question measured only one concept.
- Technical legal terminology was avoided wherever possible.
- Statements were short and easy to understand.
- Ambiguous and double-barrelled questions were avoided.
- Leading questions were not included.
- Similar questions were merged or removed to avoid repetition.

Initially, a larger pool of statements was prepared. These statements were reviewed repeatedly and refined before inclusion in the preliminary questionnaire.

3.7 Selection of Response Scale

A **five-point Likert scale** was selected for measuring respondents' perceptions because it is simple to administer and widely used in social science research.

The response categories are shown below.

Table 3. Response Scale

Response	Score
Strongly Disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly Agree	5

The same response scale was used for all construct-based questions to maintain consistency throughout the questionnaire.

3.8 Preparation of the Preliminary Questionnaire

The questionnaire was organized into two sections.

Section A collects demographic information, including age, gender, designation, academic qualification, discipline, teaching experience, research experience, patent filing experience, and type of institution.

Section B contains construct-based statements arranged under the eight identified constructs.

Grouping similar statements together improves readability and enables respondents to complete the questionnaire more efficiently.

3.9 Expert Review

After preparation of the preliminary questionnaire, it was designed to undergo review by experts in patent law, intellectual property rights, higher education, research methodology, and innovation management.

The expert review is intended to examine:

- relevance of each question,
- clarity of language,
- adequacy of constructs,
- duplication of items,
- overall structure of the questionnaire.

Suggestions received from experts will be incorporated before final administration of the questionnaire.

3.10 Outcome of the Methodology

Following the above procedure, a structured socio-legal questionnaire was developed for measuring the impact of patent law on research and innovation in higher education institutions. The questionnaire provides a systematic framework for collecting primary data from faculty members, research scholars, patent professionals, and IPR Cell coordinators.

The methodology adopted in this study can also serve as a reference for future researchers developing questionnaires in the fields of intellectual property, innovation, and higher education.

4. Questionnaire Development and Structure

Based on the literature review and the identified constructs, a preliminary questionnaire was developed to measure respondents' perceptions regarding the impact of patent law on research and innovation in higher education institutions. The questionnaire was designed using a five-point Likert scale ranging from **1 = Strongly Disagree** to **5 = Strongly Agree**.

The questionnaire consists of two sections. Section A collects demographic information, while Section B contains construct-based statements. Each construct is measured through multiple items to improve content coverage and facilitate future reliability and validity assessment.

Table 4. Structure of the Proposed Questionnaire

Section	Construct	Proposed No. of Items
A	Demographic Information	10
B1	Patent Awareness	6
B2	Knowledge of Patent Law	6
B3	Institutional Support	6
B4	Research Behaviour	6
B5	Innovation Orientation	5
B6	Patent Filing Challenges	6
B7	Commercialization and Technology Transfer	5
B8	Government and Institutional Policy Support	5
Total		55 Items

Representative Questionnaire Items

The following table presents representative questionnaire items developed for each construct.

Construct	Representative Questionnaire Item
Patent Awareness	I am aware of the importance of patents in protecting research outcomes.
Patent Awareness	I understand the basic concept of patentability.
Knowledge of Patent Law	I am familiar with the basic provisions of the Indian Patents Act, 1970.
Knowledge of Patent Law	I understand the procedure for filing a patent application in India.
Institutional Support	My institution encourages faculty members and research scholars to file patent applications.
Institutional Support	My institution has an active Intellectual Property Rights (IPR) Cell.
Research Behaviour	I consider patent protection before publishing research findings.
Research Behaviour	Patent awareness has influenced the way I conduct research.
Innovation Orientation	I prefer research that has practical or commercial applications.
Innovation Orientation	I actively participate in innovation and entrepreneurship activities.
Patent Filing Challenges	Lack of legal knowledge discourages researchers from filing patents.
Patent Filing Challenges	Patent filing procedures are difficult to understand.
Commercialization and Technology Transfer	My institution provides adequate support for commercialization of research.

Construct	Representative Questionnaire Item
Commercialization and Technology Transfer	Collaboration with industry enhances patenting opportunities.
Government and Institutional Policy Support	Government initiatives have increased patent awareness in higher education institutions.
Government and Institutional Policy Support	Institutional policies encourage researchers to protect intellectual property.

Scoring Pattern

Each statement is evaluated using the following five-point Likert scale.

Response	Score
Strongly Disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly Agree	5

Higher scores indicate a more positive perception regarding the influence of patent law on research and innovation.

Coding of Variables For future statistical analysis, each questionnaire item was assigned a unique code.

Variable Code	Construct	Item Number
PA1–PA6	Patent Awareness	1–6
PK1–PK6	Knowledge of Patent Law	1–6
IS1–IS6	Institutional Support	1–6
RB1–RB6	Research Behaviour	1–6
IO1–IO5	Innovation Orientation	1–5
PC1–PC6	Patent Filing Challenges	1–6
CT1–CT5	Commercialization & Technology Transfer	1–5
GP1–GP5	Government & Institutional Policy Support	1–5

5. Proposed Validation Framework

The purpose of developing a questionnaire is to create a research instrument capable of collecting reliable and meaningful data. Before its use in large-scale empirical research, the questionnaire should undergo a systematic validation process to ensure that the items are relevant, understandable, and capable of measuring the intended constructs. Accordingly, the questionnaire developed in the present study is proposed to be evaluated through expert review, pilot testing, and statistical validation.

5.1 Expert Review

The preliminary questionnaire is proposed to be reviewed by experts from different disciplines associated with intellectual property and higher education. The expert panel may include patent agents, law academicians, research methodology experts, innovation managers, faculty members involved in patent filing, and IPR Cell coordinators.

Experts will be requested to examine the questionnaire with reference to the following parameters:

- Relevance of each question to the respective construct.
- Clarity and simplicity of language.
- Logical sequencing of questions.
- Coverage of all important dimensions.
- Identification of ambiguous or repetitive statements.
- Suggestions for addition or deletion of items.

The comments received from the experts will be incorporated before finalizing the questionnaire.

5.2 Pilot Testing

Following expert review, the revised questionnaire is proposed to be administered to a small group of respondents representing the target population. The pilot study will primarily assess the practical usability of the questionnaire rather than testing research hypotheses.

The pilot study will focus on the following aspects:

- Ease of understanding the questions.
- Time required to complete the questionnaire.
- Clarity of instructions.

- Difficulty experienced by respondents.
- Identification of confusing or repetitive questions.
- Overall acceptability of the questionnaire.

Feedback obtained during the pilot study will be used to refine the wording and sequence of the questionnaire items.

5.3 Reliability Assessment

Reliability refers to the consistency of a questionnaire in measuring the intended constructs. After pilot testing, the internal consistency of each construct may be assessed using Cronbach's Alpha. Reliability analysis will help determine whether the items within a construct measure the same underlying concept.

Generally, a Cronbach's Alpha value of 0.70 or above is considered acceptable for research purposes. If any item adversely affects the reliability of a construct, that item may be revised or removed before the final administration of the questionnaire.

5.4 Validity Assessment

The validity of the questionnaire will be examined through different approaches.

Face Validity: The questionnaire will be examined to determine whether the questions appear appropriate and understandable to respondents.

Content Validity: Experts will evaluate whether the questionnaire adequately covers all important aspects of patent law and research and innovation in higher education institutions.

Construct Validity: After collection of sufficient responses in future studies, statistical techniques such as Exploratory Factor Analysis (EFA) may be used to examine whether the questionnaire items appropriately represent the proposed constructs.

The purpose of these validation procedures is to ensure that the questionnaire measures the concepts for which it has been developed.

5.5 Ethical Considerations

The questionnaire has been designed in accordance with accepted research ethics.

Participation of respondents should be voluntary. Before administering the questionnaire, respondents should be informed about the objectives of the study and their consent should be obtained. No personal identifying information should be disclosed in any publication arising from the study. The responses collected should be used exclusively for academic and research purposes.

5.6 Expected Outcome

The proposed validation process is expected to produce a structured socio-legal questionnaire capable of measuring different dimensions of patent law and its influence on research and innovation in higher education institutions. After completion of expert review, pilot testing, and statistical validation, the instrument may be used for empirical studies involving faculty members, research scholars, universities, engineering colleges, research institutions, and innovation centres.

The questionnaire may also assist policymakers, higher education administrators, and researchers in assessing institutional preparedness for patenting, identifying barriers to innovation, and evaluating the effectiveness of patent-related policies and support mechanisms.

6. Discussion and Potential Applications of the Questionnaire

The primary objective of this study was to develop a structured socio-legal questionnaire capable of assessing the impact of patent law on research and innovation in higher education institutions. Unlike many previous studies that focused on individual dimensions such as patent awareness, technology transfer, or commercialization, the proposed questionnaire integrates multiple dimensions into a single research instrument. This integrated approach enables researchers to examine the relationship between legal awareness, institutional support, research practices, innovation culture, and policy support within a common analytical framework.

The questionnaire has been developed primarily for higher education institutions where research, innovation, and intellectual property generation are important academic activities. It is suitable for faculty members, research scholars, postdoctoral researchers, innovation managers, patent professionals, and coordinators of Intellectual Property Rights (IPR) Cells. Since the questionnaire focuses on respondents' perceptions rather than discipline-specific technical knowledge, it may also be adapted for use across different academic disciplines, including engineering, science, agriculture, pharmacy, medicine, management, and law.

One of the major strengths of the questionnaire is its multidimensional structure. Patent-related activities are influenced by numerous legal, institutional, administrative, and behavioural factors. Measuring only patent awareness or the number of patents filed provides an incomplete picture of the research environment. The

present questionnaire attempts to capture these interconnected dimensions through separate but related constructs. This structure allows researchers to identify both strengths and weaknesses within an institution's innovation ecosystem.

The questionnaire may also assist higher education institutions in evaluating their existing intellectual property ecosystem. Responses collected through the instrument can help institutions identify areas requiring improvement, such as increasing patent awareness, strengthening IPR Cells, providing legal support, improving commercialization opportunities, or introducing additional training programmes for faculty members and research scholars. The results may also support the formulation of institutional policies relating to innovation and intellectual property management.

The instrument may further be used by government agencies, funding organizations, and accreditation bodies to understand the effectiveness of patent promotion initiatives implemented in higher education institutions. Comparative studies conducted using a common questionnaire may provide useful evidence for evaluating national innovation programmes and institutional best practices.

Although the questionnaire has been developed specifically for Indian higher education institutions, the overall framework may be adapted for application in other countries after suitable modification to reflect differences in patent legislation and higher education systems.

7. Limitations of the Study

The present study is limited to the development of a socio-legal questionnaire and does not include empirical validation using responses collected from participants. Consequently, the reliability and validity of the instrument have not been statistically established in the present paper.

The questionnaire has been developed primarily with reference to the Indian patent system and the regulatory framework governing higher education institutions in India. Adaptation may therefore be required before applying the instrument in other jurisdictions.

The proposed questionnaire is perception-based and depends upon respondents' understanding and experiences relating to patent law and innovation. Individual responses may therefore vary according to institutional environment, academic discipline, and prior exposure to intellectual property rights.

Finally, the questionnaire has been developed for higher education institutions and may require modification before application in industrial organizations, research laboratories, or private companies.

8. Future Scope

The questionnaire developed in the present study provides a foundation for future empirical research. Subsequent studies may administer the questionnaire to faculty members, research scholars, patent professionals, and IPR Cell coordinators across universities and colleges to examine the impact of patent law on research and innovation.

Future researchers may statistically evaluate the questionnaire using techniques such as reliability analysis, content validity assessment, exploratory factor analysis, confirmatory factor analysis, and structural equation modelling. Such studies will further strengthen the psychometric properties of the instrument and improve its applicability.

The questionnaire may also be adapted for comparative studies involving government universities, private universities, deemed universities, engineering colleges, and specialized research institutions. Comparative analysis may provide valuable insights into institutional differences in patent awareness, innovation culture, commercialization practices, and policy implementation.

In addition, the instrument may be modified for international comparative studies by incorporating country-specific legal and institutional provisions relating to intellectual property rights.

9. Conclusion

The present study developed a structured socio-legal questionnaire for assessing the impact of patent law on research and innovation in higher education institutions. A systematic methodology involving literature review, construct identification, operational definition of variables, item development, questionnaire structuring, and preparation of a validation framework was followed to develop the instrument.

The proposed questionnaire consists of eight major constructs representing the legal, institutional, behavioural, and innovation-related dimensions of patent law. The instrument has been designed to provide a standardized framework for collecting primary data from faculty members, research scholars, patent professionals, innovation managers, and IPR Cell coordinators.

The questionnaire has the potential to support empirical research, institutional assessment, and policy evaluation relating to patent law and innovation in higher education institutions. It may also assist universities in identifying strengths and gaps within their intellectual property ecosystem and facilitate evidence-based decision-making for improving research and innovation practices.

The present paper should be regarded as the first stage in the development of the instrument. Future empirical studies involving expert review, pilot testing, and statistical validation will further establish the reliability and validity of the questionnaire and expand its applicability in intellectual property and higher education research.

The questionnaire is expected to facilitate evidence-based policy making for universities and government agencies working in intellectual property and innovation.

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