DEVELOPING A DIGITAL PLATFORM FOR INTELLECTUAL PROPERTY MANAGEMENT: A NEW APPROACH TO ENHANCING KNOWLEDGE AND INNOVATION MANAGEMENT

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Abstract

The research and development project entitled “Developing a Digital Platform for Intellectual Property Management: A Case Study of Suan Sunandha Rajabhat University” aimed to develop a digital platform that systematically manages the collection, storage, retrieval, monitoring, and utilization of intellectual property (IP) information of university personnel. The platform serves as a centralized system for the Institute for Research and Development (IRD), designed to enhance knowledge and innovation management efficiency in alignment with the university’s digital transformation strategy. This study employed a Research and Development (R&D) methodology, consisting of four main phases: (1) studying the current situation and user requirements in intellectual property management; (2) designing and developing the digital platform based on the System Development Life Cycle (SDLC) and User-Centered Design (UCD) principles; (3) system testing and refinement; and (4) evaluating the platform’s efficiency and user satisfaction. The findings revealed that the university’s current IP management process remains fragmented across multiple units, leading to duplicated data and delayed information access. The developed digital platform effectively addressed these issues by integrating core modules, including IP data storage and search, status tracking, reporting and analytics, and user management. The system was implemented using PHP and PostgreSQL, ensuring high stability, scalability, and data security. System evaluation results indicated a very high level of satisfaction, with an overall mean score of 4.62 (S.D. = 0.48). The usability aspect received the highest mean score of 4.68, reflecting the system’s user-friendly interface, fast information retrieval, and accessibility across devices. The platform proved effective in improving workflow efficiency, reducing data redundancy, and supporting accurate reporting of IP information. In conclusion, the developed digital platform demonstrated high effectiveness and practical applicability for university-wide implementation. It also holds potential for further development into a Knowledge and Innovation Management System (KIMS) to support technology transfer, research commercialization, and long-term intellectual capital enhancement for Suan Sunandha Rajabhat University.

Keywords: Digital Platform, Intellectual Property Management, Knowledge Management, Suan Sunandha Rajabhat University

Introduction

In the knowledge-based economy, intellectual property (IP) serves as a critical mechanism for driving economic growth and enhancing the competitiveness of both nations and organizations. IP also provides strong incentives for innovation and creative activities. Higher education institutions, as key hubs of knowledge creation, play a vital role in developing research outputs that can be further commercialized through patent protection and practical application. However, patent management remains fraught with challenges, particularly in the interpretation of the scope of protection for method patents. Such ambiguities may allow for indefinite extensions of patent protection, commonly referred to as *evergreening*, which has become a subject of debate across various legal systems (Nimsuwan, 2023).

In the Thai context, although patent law provides protection for inventions, industrial designs, and petty patents, it does not clearly address certain emerging forms of innovation, particularly those related to information technology and artificial intelligence. This legal ambiguity creates constraints in filing for protection and enforcing intellectual property rights (Department of Intellectual Property, 2022). These limitations underscore the need for higher education institutions to establish modern and adaptive intellectual property management systems capable of responding to rapidly evolving technological environments.

Patent management in higher education institutions also faces structural challenges related to document storage and data consolidation. Research outputs and patent-related information are often fragmented across multiple units—such as research offices, faculties, and academic service centers—making it difficult to obtain an integrated overview. As a result, issues such as data redundancy, lack of standardized metadata, inadequate access control, and the absence of analytical tools for strategic decision-making frequently arise (Arayapan, 2020). Empirical studies by Arayapan et al. (2015) further indicate that many Thai universities lack centralized information systems for managing intellectual property knowledge, leading to inefficiencies in reporting, trend analysis, and patent status tracking.

From another perspective, knowledge management (KM) offers a strategic framework for enhancing intellectual property management. KM encompasses both tacit and explicit knowledge, enabling systematic access, sharing, and utilization of knowledge within organizations (Puntavungkool, 2020). This approach aligns with research findings demonstrating that effective knowledge management is closely associated with intellectual capital and contributes to the sustainable competitive advantage of organizations (Journal of Humanities and Social Sciences, Nakhon Phanom University, 2019). Consequently, the development of a digital platform for intellectual property management should be closely integrated with institutional knowledge management strategies to ensure that knowledge creation, storage, and utilization are conducted in a coherent and continuous manner.

For Suan Sunandha Rajabhat University (SSRU), the institutional mission explicitly emphasizes research, innovation, and the transfer of knowledge for the benefit of society and national development, alongside the adoption of digital technologies to enhance administrative efficiency (SSRU, 2023). In this regard, the development of a digital platform for intellectual property management not only addresses routine operational challenges related to patent documentation and tracking but also directly supports the university's mission to elevate the quality of research and innovation to international standards.

Accordingly, the research project on the development of a digital platform for intellectual property management is of significant importance. It integrates the R2R (Routine to Research) approach by transforming routine patent management tasks into a systematic innovation that reduces redundancy, enhances transparency, and generates added value from

university research outputs. Moreover, it strengthens institutional capacity and preparedness for sustainable competition at both national and international levels.

Research Objectives

1. To develop a digital platform for the management of intellectual property—including patents, copyrights, trademarks, and other creative works—that enables systematic, efficient storage, retrieval, and status tracking.
2. To examine the problems, challenges, and needs of personnel in higher education institutions regarding intellectual property management, and to incorporate these insights into the design of a system that effectively supports real-world operational requirements.
3. To establish a knowledge management (KM) mechanism that integrates patent and research output data with policy formulation, technology transfer, and commercial utilization.
4. To evaluate the effectiveness of the developed digital platform using key performance indicators, including time efficiency, data accuracy, ease of access, and user satisfaction.

Scope of the Research

1. Content Scope

This research focuses on the development of a digital platform for intellectual property (IP) management within higher education institutions. The platform emphasizes the systematic collection, storage, retrieval, and status tracking of key categories of intellectual property, including patents, petty patents, copyrights, and creative works with potential for utilization. The system design integrates principles of knowledge management (KM) and innovation management to support structured information handling and value creation.

2. Geographic Scope and Target Groups

The study is conducted within the context of Suan Sunandha Rajabhat University (SSRU). The target groups consist of personnel involved in research and innovation activities, including researchers, academic staff, officers of the Institute for Research and Development, as well as personnel related to legal affairs and technology transfer. These stakeholders represent the primary users of the system and play a key role in the university's intellectual property management processes.

3. Time Scope

The research and platform development are scheduled over a one–fiscal-year period, from 1 March 2025 to 30 September 2025. The scope of work covers needs assessment and analysis, system design and development, prototype testing, performance evaluation, and system refinement prior to deployment.

4. Technology and Tools Scope

The proposed digital platform is developed using PHP for web application development, with PostgreSQL employed as the primary database management system to support the storage and processing of intellectual property data. The system is designed as an online platform accessible via web browsers and structured to support scalability and future expansion.

Literature Review

Nimsuwan, S. (2022) conducted a study entitled *"Problems in Granting Patent Protection for New Uses."* The objective of the research was to examine the problems and limitations of protecting new-use patents in Thailand, in comparison with foreign legal systems

such as those of the United States, the United Kingdom, Japan, and India. The study employed a comparative legal analysis, examining statutory provisions, court decisions, and academic literature. The findings revealed that the protection of new-use patents in Thailand poses a significant risk of *evergreening*, or perpetual patent protection, due to ambiguities in legal interpretation. The study emphasizes the necessity of reforming Thai patent law, particularly in terms of definitions and scope of protection, to achieve a balance between innovation promotion and public interest protection (Nimsuwan, 2022).

Arayapan, W. (2020) conducted research titled *"Intellectual Property Policies for Higher Education Institutions in Thailand."* The study aimed to examine IP policies and regulations of Thai universities in comparison with international best practices. Using documentary research, the study analyzed policies from 16 Thai universities ranked internationally and compared them with the guidelines of the World Intellectual Property Organization (WIPO). The findings indicate that IP policies of Thai universities remain limited, particularly in technology transfer, benefit-sharing mechanisms, and ownership rights of research outputs. The study highlights the need for systematic and comprehensive IP policies to enable Thai universities to fully leverage their intellectual property assets (Arayapan, 2020).

Arayapan, W., Maenmat, P., Kabmala, T., & Trairattanachirachai, S. (2015) conducted a study entitled *"Current Conditions and Problems of Knowledge and Information Management on Intellectual Property in Thai Higher Education Institutions."* The research employed a qualitative approach, collecting data through interviews with administrators and IP officers from 12 universities. The results identified major challenges, including fragmented data storage, lack of centralized information systems, insufficient personnel, and unclear policies regarding IP ownership and utilization. The study concludes that developing a centralized platform for storing and tracking IP information would significantly enhance management efficiency (Arayapan et al., 2015).

Wongburanaawat, A. (2024) conducted a study titled *"Legal Measures to Promote the Use of Patents for Environmental Protection in Thailand."* The research aimed to examine Thai patent law and legal measures supporting environmentally related patents through comparative legal analysis of domestic law, foreign legislation, and international agreements. The findings suggest that patents can serve as effective instruments for environmental protection if supported by appropriate legal measures. The study proposes tax incentives and benefits to encourage patenting in environmental priority areas, highlighting the importance of strategic patent management, which can be applied to IP management in higher education institutions (Wongburanaawat, 2024).

Srimaneechai, C. (2023) conducted research entitled *"A Digital Content Platform Model for Next-Normal Education."* The study aimed to develop a digital education platform using a quantitative research approach, collecting data from 638 respondents and analyzing them statistically. The findings indicate that users prefer platforms that are easy to use, mobile-friendly, capable of content integration, and equipped with usage analytics. Although conducted in an educational context, the findings can be applied to UX/UI design principles for digital platforms supporting intellectual property management (Srimaneechai, 2023).

Ramsut, P. (2022) conducted a study entitled *"Digital Platforms."* The research aimed to explain the role of digital platforms as governance structures that regulate access, data flows, and interaction mechanisms, based on literature review and theoretical analysis. The study emphasizes that platforms function not merely as technological tools but as "rule-setters" that shape user interactions and data governance. This perspective underscores the importance of

transparency and governance in designing digital platforms for intellectual property management (Ramsut, 2022).

Rakpolmuang, C. (2014) conducted research titled *"The Promotion of Intellectual Property in Higher Education Institutions in the United States."* Using policy analysis and case studies, the study examined IP management mechanisms in U.S. universities. The findings reveal that U.S. universities have well-established Technology Transfer Offices (TTOs), strong legal support, and benefit-sharing systems that effectively incentivize personnel. The study provides valuable lessons for Thai universities in designing institutional structures and platforms for effective IP management (Rakpolmuang, 2014).

Yubonlaisai, C. (2025) conducted a study entitled *"An Analysis of Intellectual Property Management from Research and Innovation Outputs of Nakhon Phanom University."* Using qualitative methods based on document analysis and field studies, the research found that the university faced challenges related to IP management standards and personnel support. However, it proposed development guidelines to enhance research quality and patent readiness. This case study reflects the realities of Thai universities and provides comparative insights for developing a centralized IP management platform (Yubonlaisai, 2025).

Kampud, P., & Phonphak, S. (2019) conducted research titled *"Management for Intellectual Property Protection in Rajamangala University of Technology."* Employing a mixed-methods approach, the study examined problems, development approaches, and success factors in IP protection. The findings indicate that clear policies, expert personnel, and systematic workflows are key success factors. These insights are useful for defining governance frameworks and stakeholder roles within an IP management platform (Kampud & Phonphak, 2019).

Silaprat, P. (2025) conducted a study entitled *"Development of a Digital Platform Supporting University Education in Suphan Buri Province."* Using a research and development (R&D) methodology, the study collected data through document analysis, interviews, focus groups, and questionnaires. The findings show high user satisfaction and confirm the platform's practical usability in educational settings. Although not directly related to IP, the study demonstrates an effective R&D process applicable to the development of a digital IP management platform (Silaprat, 2025).

Du, W., Somjai, S., & Somjai, A. (2024) conducted a study entitled *"The Impact of Organizational Culture, Innovation Inputs, and Digital Technology on SMEs' Intellectual Property Innovation Capability."* The research examined SMEs in Hefei, China, using a simple random sample of 343 firms and analyzed causal relationships through structural equation modeling (SEM). The results supported all hypotheses (H1–H6), indicating that innovative organizational culture positively influences IP innovation capability. Additionally, innovation investment and digital technology adoption were positively associated with IP innovation capability, with mediating effects observed among organizational culture, innovation inputs, and innovation outcomes. This study highlights the importance of integrating organizational culture, digital technology, and innovation investment, providing a valuable conceptual framework for studying IP and innovation development in emerging economies.

Research Methodology

1. Research Methodology

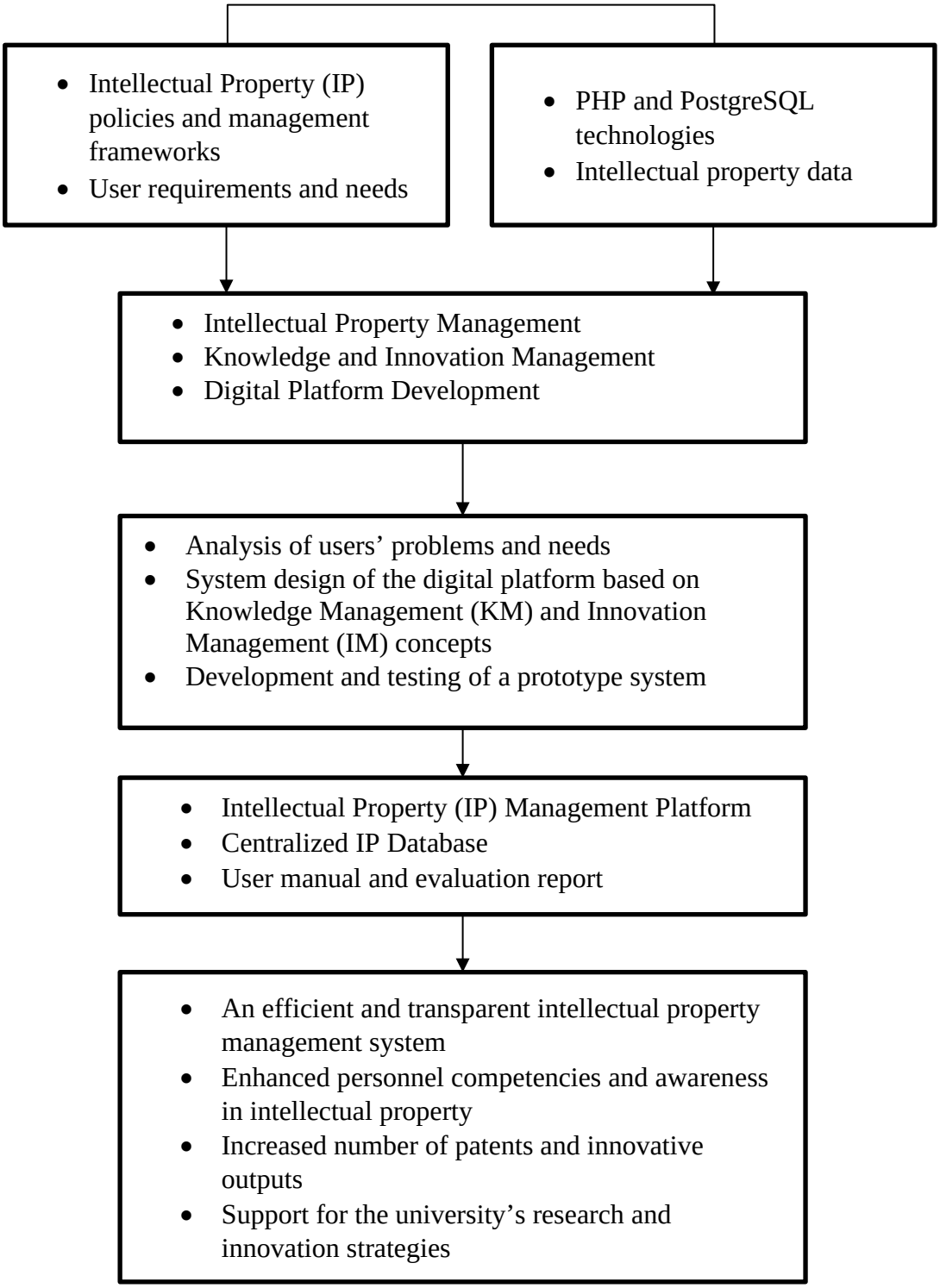

Figure 1 Conceptual Framework of the Research Project

2. Research Steps

2.1 Study of the Current Situation and Needs in Intellectual Property Management

The researcher conducted an investigation into the current state of intellectual property (IP) management at Suan Sunandha Rajabhat University, focusing on data collection from relevant units, including the Institute for Research and Development, various faculties, and innovation centers. The objective was to examine existing practices in storing and managing patents, copyrights, and creative works, as well as to identify problems and limitations of the current systems. These issues include fragmented data storage, the lack of standardized metadata recording, delays in information retrieval, and data redundancy.

The findings from this investigation were analyzed in conjunction with the needs of key user groups, namely academic staff, researchers, and administrative personnel, in order to define system requirements and functional features that effectively support real-world use. The research instruments employed in this phase included:

• Questionnaires to survey personnel needs related to intellectual property information systems

• In-depth interviews with officers from the Institute for Research and Development to identify process-related challenges

• SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) to formulate strategic guidelines for developing an effective digital platform

Preliminary results indicate that intellectual property management within the university lacks a centralized system capable of integrating all types of IP-related data. This situation leads to data redundancy and difficulties in information retrieval, highlighting critical requirements that inform the design of the prototype system in the subsequent phase of the research.

2.2 Design and Development of the Digital Platform for Intellectual Property Management

The digital platform was designed and developed based on the System Development Life Cycle (SDLC) framework and user-centered design principles to ensure that the system effectively supports real-world usage. The development process consisted of the following key stages.

2.2.1 System Architecture Design

The researcher analyzed the essential system functions, including intellectual property data storage and retrieval, patent registration status tracking, user management, and reporting capabilities.

2.2.1.1 Definition of a web-based application architecture

2.2.1.2 Design of the database schema using PostgreSQL

2.2.1.3 Design of the user interface (UI) and user experience (UX)

2.2.2 System Implementation

2.2.2.1 Development of the server-side application using PHP

2.2.2.2 Development of core system modules, including:

- Intellectual property data storage and search module
- Patent registration status tracking module
- User and access rights management module
- Reporting and usage statistics module

2.2.2.3 Integration and interoperability

Application Programming Interfaces (APIs) were designed to support future integration with research and innovation database systems.

2.3 System Testing and Refinement

The prototype system was tested to evaluate its accuracy, stability, and overall suitability. System testing was conducted in three phases:

2.3.1 Internal Testing

Testing was carried out by the development team to verify the functionality of core features, data accuracy, and database connectivity.

2.3.2 Pilot Testing with the Institute for Research and Development

Pilot testing was conducted in collaboration with staff from the Institute for Research and Development to evaluate system performance in real-world scenarios, such as new IP registration, information retrieval, and report generation.

2.3.3 User Acceptance Testing (UAT) The system was made available to target users, including academic staff, researchers, and relevant university personnel. User satisfaction and feedback were collected and analyzed to refine and optimize the system prior to full-scale deployment.

3. Data Collection

Evaluation of System Effectiveness and User Satisfaction, and Data Analysis

3.1 Data Analysis and Statistical Methods

3.1.1 The completed questionnaires were examined to ensure data completeness and accuracy prior to analysis.

3.1.2 Descriptive statistical analyses were conducted using the following methods:

Part 1 Frequencies were calculated and summarized as percentages, and the results were presented in descriptive narrative form.

Part 2 Frequencies and percentages were calculated, together with the mean ($\bar{x}$) and standard deviation (S.D.).

Part 3 The results were interpreted and summarized in descriptive narrative form.

3.1.3 Data analysis was performed using computer-based statistical analysis with SPSS for Windows. The analytical procedures included:

1) Analysis of questionnaire data to obtain frequencies and percentages.

2) Analysis of questionnaire data to calculate the mean ($\bar{x}$) and standard deviation (S.D.).

3.2 Evaluation of the Effectiveness of the Digital Platform for Intellectual Property Management

The effectiveness of the developed digital platform for intellectual property management was evaluated by five experts, with the assessment covering three dimensions:

3.2.1 System performance evaluation (Performance Test)

3.2.2 Functional accuracy evaluation (Functional Test)

3.2.3 System usability evaluation (Usability Test)

3.3 Evaluation of the Effectiveness of the Digital Platform by General Users In addition, the effectiveness of the digital platform was evaluated by 100 general users. The assessment was also conducted across three dimensions:

3.3.1 System performance evaluation (Performance Test)

3.3.2 Functional accuracy evaluation (Functional Test)

3.3.3 System usability evaluation (Usability Test)

Both evaluation phases employed questionnaires based on a five-point Likert scale.

4. Data Analysis

The researcher processed the evaluation instruments and analyzed the results obtained from both experts and general users through the system satisfaction assessment. The data were analyzed at both the overall dimension level and the individual item level, using a five-level criterion-referenced interpretation based on the Likert scale (as cited in Pisuttha Areerard, 2007: 176), as follows:

Mean score 4.50–5.00 = **Strongly agree**
Mean score 3.50–4.49 = **Agree**
Mean score 2.50–3.49 = **Moderately agree**
Mean score 1.50–2.49 = **Disagree**
Mean score 1.00–1.49 = **Strongly disagree**

This interpretation framework was used to evaluate the effectiveness and user satisfaction of the digital intellectual property management platform in a systematic and standardized manner.

Research Results

Results of Data Analysis on System Effectiveness. System Performance Evaluation by Experts. The evaluation results obtained from five experts and 100 general users indicate that the developed platform demonstrates a high level of system performance and user satisfaction. The findings suggest that the digital intellectual property management platform effectively supports its intended functions and meets user expectations. Detailed results are presented as follows.

Table 1: Mean Scores and Standard Deviations of User Satisfaction with the System

Evaluation Dimension	$\bar{X}$	S.D.	Level of Opinion
1. System Performance	4.62	0.48	Very High
2. Functional Accuracy	4.55	0.52	Very High
3. Usability	4.68	0.44	Very High
Overall Assessment	**4.62**	**0.48**	**Very High**

Table 1 presents the results of the evaluation of the digital platform for intellectual property management. The sample used for the evaluation consisted of **five experts** and **100 general users**, who assessed the system across three main dimensions: **system performance**, **functional accuracy**, and **usability**.

The analysis reveals that the **overall mean score** of the evaluation was **4.62**, with a **standard deviation of 0.48**, which corresponds to the **"very high"** level. This indicates that the majority of users expressed a high level of satisfaction with the system as a whole and perceived that the developed platform effectively meets user needs.

When considering each dimension individually, the findings show that:

- **Usability** achieved the highest mean score at **4.68** (S.D. = **0.44**), which falls within the **"very high"** level. This result indicates that users perceived the system as easy to understand and use, with clear menus and screen structures, rapid access to information, and support for multiple devices such as computers, tablets, and smartphones. These features contribute to user confidence and convenience in actual system usage.
- **System performance** recorded a mean score of **4.62** (S.D. = **0.48**), also at the **"very high"** level. This finding reflects that the system is stable, operates efficiently, and is capable

of processing and displaying information accurately, without experiencing connectivity issues or slow data loading during testing.

- **Functional accuracy** yielded a mean score of **4.55** (S.D. = **0.52**), corresponding to the **"very high"** level. This suggests that key system functions—such as data entry, information retrieval, status tracking, and report generation—operate as designed and adequately fulfill user requirements.

In summary, the evaluation results demonstrate that the developed digital platform exhibits **the highest level of effectiveness across all dimensions**, including performance, functional accuracy, and usability. The platform is therefore suitable for practical implementation within **Suan Sunandha Rajabhat University**, and it also shows strong potential for further development into an institution-wide knowledge and innovation management system in the future.

Discussion

The findings of this study demonstrate that the application of digital technology in intellectual property management can significantly enhance the efficiency of data storage and knowledge accessibility. This result is consistent with the concept proposed by Puntavungkool (2020), who emphasized that **knowledge management (KM) is a critical tool for creating added value within organizations and for maximizing the effectiveness of intellectual property management**.

Furthermore, the evaluation results indicating that both **functional accuracy** and **usability** were rated at the highest level are aligned with the principles of **User-Centered Design (UCD)**. UCD emphasizes designing systems that respond directly to real user needs, particularly in terms of ease of use, clarity of interfaces, and rapid access to information. The high usability scores suggest that the developed platform successfully supports user interaction and operational efficiency.

When compared with the findings of Arayapan (2020), who identified the absence of centralized information systems and data redundancy as major challenges in intellectual property management within higher education institutions, the present study demonstrates a clear advancement. The developed platform addresses these issues by serving as a centralized system that integrates intellectual property data across all relevant units within the university. As a result, the data become unified, transparent, and easily retrievable, thereby improving overall management effectiveness.

System testing further confirms that the developed platform reduces operational complexity for administrative staff and significantly enhances user convenience. These improvements contribute positively to strengthening the university's knowledge and innovation management capabilities. Moreover, the outcomes of this research are consistent with the **SSRU Digital Transformation policy** and the **20-Year Rajabhat University Strategy (2017–2036)**, both of which aim to promote sustainable development toward becoming a digitally driven university.

Overall, the findings underscore the strategic value of integrating digital platforms, knowledge management, and user-centered design in intellectual property management, particularly within higher education institutions seeking to enhance research, innovation, and institutional competitiveness at the national and international levels.

Recommendations

1. An automated notification system should be implemented via email or mobile applications to alert users when patents or intellectual property assets are approaching their expiration dates.
2. An analytical dashboard should be developed to enable university executives and administrators to monitor trends and statistics related to intellectual property in real time.
3. An automatic data backup system should be integrated to prevent data loss and ensure information security and system reliability.
4. An Intellectual Property Data Center should be established under the Institute for Research and Development to serve as a centralized unit for managing and governing the university's intellectual property data.

Acknowledgement

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References

Arayaphan, W. (2020). Intellectual property policy for higher education institutions in Thailand. *Manutsayasat Journal, Chiang Mai University, 21*(2), 176–197. https://doi.org/10.14456/mjcmu.2020.12

Arayaphan, W., Kabmala, L., & Triratanasirichai, M. (2015). The current situation and problems of knowledge and information management on intellectual property in higher education institutions in Thailand. *KKU Research Journal (Graduate Studies), 15*(2), 21–38.

Du, W., Somjai, S., & Somjai, A. (2024). The impact of organizational culture, innovation inputs, and digital technology on SMEs' intellectual property innovation capability. *Procedia of Multidisciplinary Research, 2*(11), Article 47. https://doi.org/10.14456/pmr.2024.47

Nimsuwan, E. (2023). Problems of patent protection for new uses. *Bot Bundit Law Journal, 79*(3), 82–108.

Rakpolmuang, C. (2014). The promotion of intellectual property in higher education institutions in the United States of America. *Journal of Education Studies, Chulalongkorn University, 42*(3), 175–193.

Silparat, P., & Jattamalo, P. (2025). Development of a digital platform to support higher education in Suphan Buri Province. *Srisuvannabhumi Review Journal, 3*(2), 94–108.

Srimaneechai, C. (2023). A digital content platform model for next normal education. *Journal of Technical Education Development, 35*(127), 87.

Wongburana-wat, A. (2024). Legal measures to promote the use of patents for environmental protection in Thailand. *Thammasat Law Journal, 53*(4), 1244–1290.

Yubonlaisai, C., Mikhama, K., Charaskamonpong, S., & Kanokayan, K. (2025). A study of intellectual property management from research and innovation outputs of Nakhon Phanom University. *Journal of Research and Development of the Mekong Sub-Region, 4*(1), 13–26.