

Standards For The Quality Of IP Management

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Abstract

The right approach to IP, especially patents in digitization, offers companies, regardless of their size, opportunities to create and protect customer benefits with innovative solutions. At the same time, however, the increasing complexity also increases the risk of infringement of third-party intellectual property rights. For companies that want to proactively develop their IP portfolio, secure freedom to operate, and manage it in a legally compliant, goal-oriented, and consistent manner, the norms DIN 77006 and ISO56005 show ways to manage these processes.¹

Background

No industrial company and hardly any high-growth technology business can ignore the terms “Industry 4.0,” or the “Fourth Industrial Revolution,” and “Internet of Things” (IoT) anymore. Just as software-based solutions are constantly being updated and improved, businesses have been reinventing themselves again and again for hundreds of years. We can already look back on three industrial revolutions. Industry 4.0 joins the ranks, and it forces companies to adapt to a very fast changing business environment. Those who want to gain competitive advantages are developing new business models, use cases, and applications with significant digital components. Intelligent platforms are changing the way we interact with customers in production; the use of new communication standards (e.g., 5G), cloud computing, and artificial intelligence; and digital twins is closing the gap between software and hardware, leading to greater agility and higher efficiency in the Industrial Internet of Things (IIoT).² This also changes the way intellectual property is handled, especially patents.

Digitalization and the resulting changes in business ecosystems³ are leading to a radical rethinking in the way intellectual property (IP) is handled. Companies have always tried not only to legally secure their own

range of services by patenting their technical developments, but also to gain exclusive market positions by designing patent portfolios that are specifically geared towards customer benefits. Such IP strategies allow for the expansion of one’s own market share and many other advantages. With new business partners, markets, and competitors, including those from other industries, exploiting the opportunities and avoiding the risks entails a complexity that even larger companies cannot master comprehensively.

Typical digital interaction patterns for creating customer benefits such as condition monitoring, pre-emptive maintenance, or updating mobile devices over the air from the cloud are covered by a large number of patents, and the number of patents for such interaction patterns is increasing rapidly worldwide. For the companies that come from the development of physical products and transaction-oriented business models, organizationally rather small and more manageable patent developments are adapted.

To sum up, the new developments in the technological and economic area, related to Industry 4.0 and IoT, lead to a stress test of the operational IP management.

In addition, digital patents are different. They do not come from physical reality or technical functionality, but from the application, the solution, or the use case. This also affects the analysis of the competitive situation, including third-party patents to be considered. A classic freedom-to-operate search, which has the purpose of identifying all relevant third-party patents in order to largely rule out infringement, is therefore very extensive and time-consuming, or almost impossible. There are considerable dangers and liability risks lurking in the large patent portfolios of third parties, such as when using mobile phone technologies in your own campus networks or IT technologies in new products.

Dealing with IP risks is not only one of the special challenges for entrepreneurs because of their possible impact on business operations, but also because of the personal consequences for managing directors and board members resulting from the violation of due diligence. These personal consequences can go as far as personal liability of the managing director. Such personal liability can occur, for example, if management fails to establish an organization that is suitable for damage prevention. Since failure to observe third-party IP rights can result in severe sanctions, such as sales bans or claims for damages, the identification and con-

1. This article is based on a German publication: Wolfgang Berres, *et al.*, DIN 77006—“Ein Managementsystem für den Umgang mit IP,” *Mitteilungen der deutschen Patentanwälte*, 112 no.11 (November 2021) 473—524.

2. Emiliano Sisinni, *et al.*, “Internet of Things: Challenges, Opportunities, and Directions,” *IEEE Transactions on Industrial Informatics*, 14 (November 2018) 4724-4734.

3. James F. Moore, “Predators and Prey: The New Ecology of Competition,” *Harvard Business Review*, 71 (1993) 75-83.

sideration of third-party patents is an essential element of damage prevention.

Development of IP Management Standards

It is quite common for organizations to implement the ISO 9001:2015 quality management standard to improve their overall operational performance, continuous improvement, and risk-based thinking. But as companies experience increasing IP challenges in the field of digital innovation, they need to be able to respond to the various threats they face in a more specific set up. This results in a new understanding of the use of standards in IP management as well.

IP Management Standards, like ISO 56005⁴ or DIN 77006,⁵ have been created to support companies and IP service providers in developing their abilities to handle the challenges of a modern and compliant IP management. They provide guidance to the design of an up-to-date intellectual property management system,⁶ *i.e.*, the introduction of effective processes and an assignment of tasks, which is aligned with the company's strategy and business objectives. They focus on leadership and strategy, tools and methods, and finally, as introduced in DIN 77006, on the implementation of the concept "plan-do-check-act,"⁷ which leads to improved productivity and error prevention.⁸

ISO 56005 Innovation Management—Tools and Methods for Intellectual Property Management

By 2014, the International Organization for Standardization (ISO) set up the ISO/Technical Commission 279, aiming to provide tools and methods using the holistic approach to innovation management, its implementation and its interaction with stakeholders in the innovation process. The commission's main objective was to standardise tools and methods dedicated to the field of innovation and in interaction with all actors in innovation management for industrial, environmental

4. ISO 56005:2020-11.

5. DIN 77006:2020-06 *Intellectual Property Management Systems*—Requirements.

6. Axel Mittelstaedt, "Strategisches IP-Management—mehr als nur Patente," *Wiesbaden*: 2009, 55ff; Alexander J. Wurzer, Theo Grünewald, and Wolfgang Berres, "Die 360° IP-Strategie," *München*: 2016, 187ff; Oliver Gassmann, Martin A. Bader, and Mark James Thompson, "Patent Management," *Cham*: 2021, 103ff.

7. Abhijit Chakraborty, "Importance of PDCA Cycle for SMEs," *SSRG International Journal of Mechanical Engineering*, 3 (May 2016) 13-17.

8. Alexander J. Wurzer, Stephan Hundertmark, "IP Management—Key Skills in a Knowledge Economy," *Journal of Korean Law*, 8 (December 2008) 181-200.

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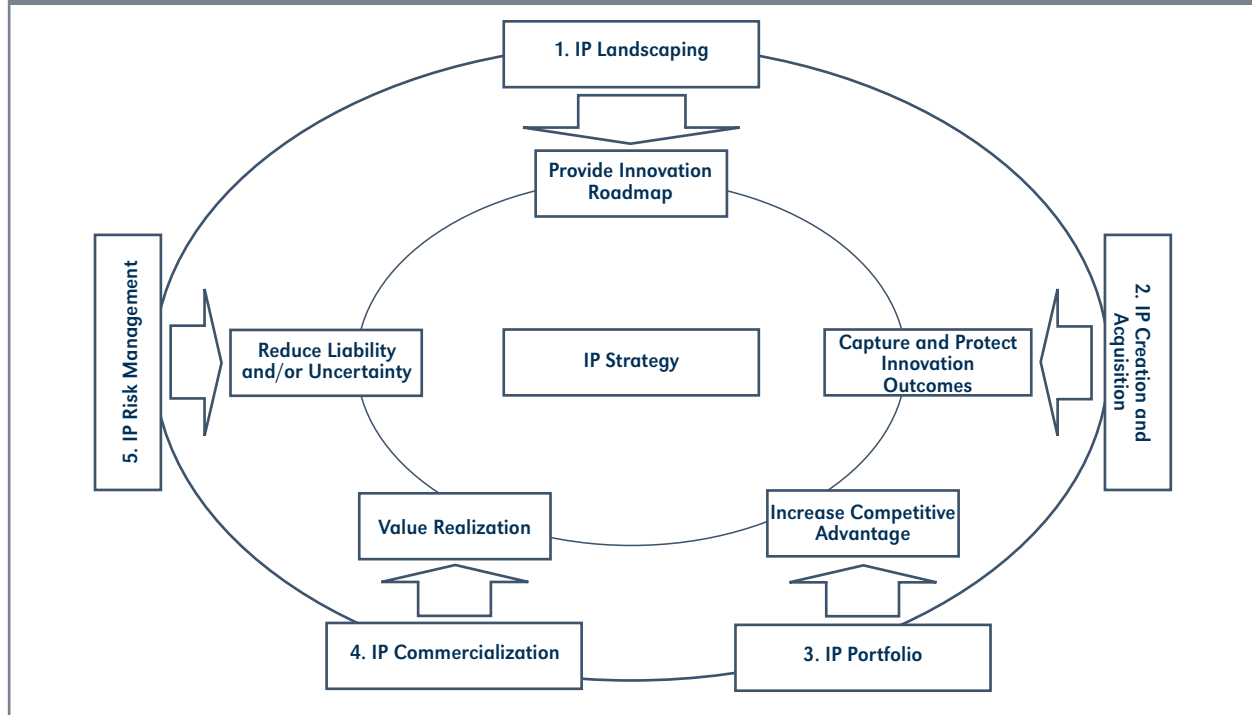
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Figure 1. IP Management Activities That Contribute To Innovation Management



and social benefits. From work developed by the ISO/TC 279, a set of five documents is already published:⁹

1. ISO 56000:2020—Innovation Management—Fundamentals and Vocabulary
2. ISO 56002:2019—Innovation Management—Innovation Management System—Guidance
3. ISO 56003:2019—Innovation Management—Tools and Methods for Innovation Partnership—Guidance
4. ISO/TR 56004:2019—Innovation Management Assessment—Guidance
5. ISO 56005:2020—Innovation Management—Tools and Methods for Intellectual Property Management—Guidance

The ISO 5600X family is designed as a framework in a standardized format to support innovation management procedures starting from the idea, via research and development, up to the IP creation and verified products or services.

ISO 56005 as a part of the 5600X family is designed as a guideline to systematically manage IP within the innovation environment. It supports the innovation process and provides an IP strategy, which is aligned

with the business strategy including five major activities and outcomes to help organizations protect and maximize their best ideas (see Figure 1):

IP landscaping, IP creation and acquisition, IP portfolio, IP commercialization, and IP risk management.

The ISO 56005 standard can be used for any type of innovation activities and initiatives and is based on certain principles derived from the innovation management system, such as:

- realization of value for all relevant stakeholders,
- leadership that inspires and engages employees, and other interested parties, to generate, protect, and leverage IP,
- alignment of the overall strategic direction for the management of IP with its business and innovation strategies,
- access to a diverse range of internal and external IP knowledge sources to systematically develop the organization’s IP expertise,
- management of innovation uncertainty and risks from an IP perspective, and,
- generating, protecting, and leveraging IP for long-term value creation based on shared values, beliefs, and behaviours across the organization

IP management responsibilities related to innovation should include, *e.g.*:

- definition of innovation outputs that need to be

9. Lopes, Ana, *et al.*, “Challenges in the Integration of Quality and Innovation Management Systems,” Koulouriotis, Dimitrios [Edt.], Standards 2022 2(1) 52-65; <https://doi.org/10.3390/standards2010005>.

protected as the organization’s IP assets and the appropriate resources to manage this IP,

- monitoring IP in the public domain that is relevant as input to innovation activities, to avoid potential infringement of third-party rights, to identify potential infringements of the organization’s IP, and reporting risk and opportunities to interested parties, and,
- establishing awareness and providing training, as necessary, within the organization

The Annex of ISO 56005 gives an overview regarding tools and methods for invention record and disclosure; IP generation, acquisition and maintenance; IP search; IPR evaluation; and IP risk management that is a best practice collection of directions and strategies, helpful especially for SMEs, on how to systematically manage IP within the innovation environment.

DIN 77006 Intellectual Property Management Systems—Requirements

In 2016 a working committee at the German Institute for Standardization (DIN) was constituted to deal with the creation of standards and specifications in the subject area of “Quality in Intellectual Property Management” in a first step on a national and second on a European and/or international level. This standards working committee was the result of the DIN SPEC 1060:2010 DE “Service Quality in Intellectual Property Management” committee, which was published in 2010 as the result of a state funding project for the development of the service and knowledge economy in German.¹⁰

The German DIN standard can be generally seen as

a more specific, stricter version of the ISO 56005. It takes a comprehensive approach to the organizational landscape of the company with a strong focus on processes and quality and provides a set of rules to implement an IP management (see Figure 2).

A significant difference between DIN77006 and ISO 56005 is that the DIN standard combines the classic advantages of the ISO 9000 family of standards with its High-Level-Structure. This means that an already established standards landscape is used, such as the principles, glossary (ISO 9000),¹¹ requirements (ISO 9001), and strategies for sustainable implementation (ISO 9004),¹² and these are combined with the requirements of modern IP management. This also means that the DIN standard has adopted the structure for management system standards.¹³

Target Groups and Application

DIN 77006 is a systematic tool to establish, implement, and maintain an IP management system in almost every organization. The standard is open to almost all types of business models. For example, if an organization generates IP itself, the standard requirements for this must be met. When claiming conformity with DIN 77006, all relevant requirements for the specific business model must be fulfilled. Exceptions are only possible if requirements cannot be applied by the organization. For example, if an organization, like e.g., a patent attorney, does not generate its own IP, the organization only describes in the scope that IP services are provided. The requirements for IP generation can then be excluded in the following.

The situation is different in the field of IP risk management. Here all process participants, internally in

Figure 2. Development Of The Standards For IP Management

ISO 56005	DIN 77006
Guideline in innovation management	Requirements for an IP management system
Design framework for the use of IP in innovation management	Optimization of the entire organization through quality-assured handling of IP
Definition of IP strategies to support the overall organization strategy	Create an IP strategy to achieve long-term business goals
Application of consistent IP tools and methods to support efficient IP management	Integration of IP management into the company’s management system
Best practice recommendation	Auditable—proof of conformity

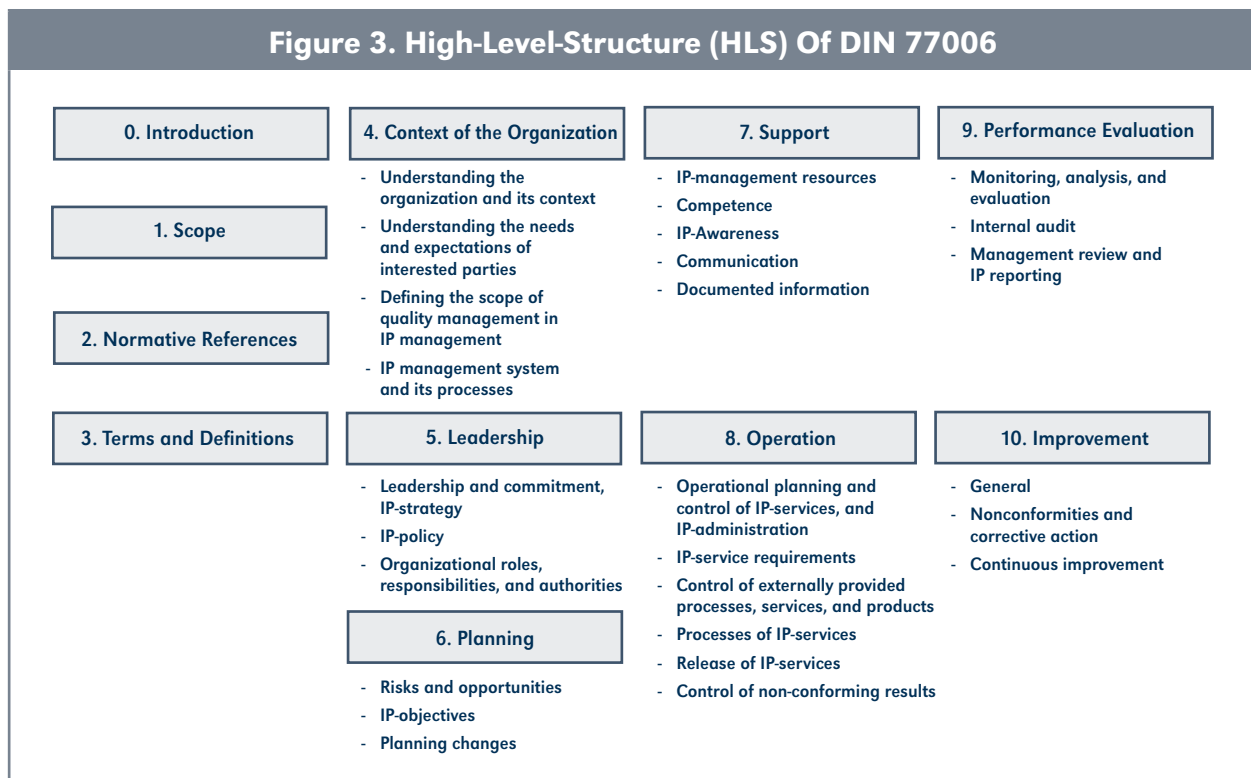
10. DIN/DKE, Deutsche Normungsroadmap, Dienstleistungsnorme, Bundesministerium für Wirtschaft und Energie, Fachbeirat der Koordinierungsstelle Dienstleistungen im DIN, Berlin: 2015.

11. DIN EN ISO 9000:2015-11 *Quality Management Systems—Fundamentals and Vocabulary*.

12. DIN EN ISO 9004:2018-08 *Quality Management—Quality of an Organization—Guidance to Achieve Sustained Success*.

13. David Scrimshire, “Understanding and Exploiting the ISO 9001:2015 Changes,” *Advanced Engineering*, 11 (2015) 327-331; Walter Mattli and Tim Büthe, “Setting International Standards: Technological Rationality of Primacy of Power?,” *World Politics*, 56 no1 (October 2003) 1-42.

Figure 3. High-Level-Structure (HLS) Of DIN 77006



the company as well as externally in law firms or research offices, have an obligation to avoid risks and to observe the relevant requirements to ensure the necessary quality.

In any case, and what is of utmost importance, is that DIN 77006 requires an analysis of the applicable requirements regarding the organization's business model. The standard itself does not contain detailed information as to which specific requirements are needed in which organization.

If the organization operates a single management system (e.g., only quality) or an integrated management system (e.g., quality and environment), it may additionally map the IP requirements of DIN 77006 without having to introduce a completely new system.

If no management system exists yet, DIN 77006 contains all the essential requirements to establish an IP management system that is based on internationally accepted standards (HLS).

The High-Level-Structure of DIN77006

Standards define characteristics and the application of rules. The aim is to improve products, processes, and services, but also to improve understanding on

certain topics.¹⁴ An important aspect of the compatibility of management systems is the uniform standard structure, the so-called High-Level-Structure (HLS).¹⁵ According to this structure, the organization can combine different requirements and create an Integrated Management System (IMS).¹⁶ For example, ISO 9001 plus DIN 77006 or ISO 9001 and ISO 14001¹⁷ plus DIN 77006. See Figure 3.

DIN 77006 deliberately follows this high-level structure. According to this common structure, any organization can "integrate" its identified and documented IP processes into an existing, known, and established management system structure. DIN 77006 is fully compatible with the general HLS standard requirements, e.g., context and interested parties, leadership,

15. Peter Mendel, "The Making and Expansion of International Management Standards: The Global Diffusion of ISO 9000 Quality Management Certificates," in: Gili S. Dorori, John W. Meyer and Hokyu Hwang, *Globalization and Organization*, Oxford: 2006, 137ff.

16. M. Asif, Erik J. De Bruijn, and Olaf A. M. Fischer, "Corporate motivation for integrated management system implementation: Why do firms engage in integration of management systems: A literature review and research agenda," in: *16th Annual High Technology Small Firms Conference*, HTSF 2008, Enschede, the Netherlands.

17. ISO 14001:2015 *Environmental Management Systems—Requirements with Guidance for Use*.

14. Naceur Jabnoun and Hassan Abdullah Al-Ghasyah, "Leadership Styles Supporting ISO 9000:2000," *Quality Management Journal*, 12 (Februar 2005) 21-29.

risk and opportunity management, planning of goals, and many more requirements like internal audits, management reviews, and improvement.¹⁸

The architecture of DIN 77006 is also derived from the HLS. A brief overview of the structure of DIN 77006 shows this very clearly:

- Chapter 0-2 is formulated in a way that is comparable to ISO 9001 and contains additions to enable transferability to the different IP organizational forms (see *e.g.*, specific information in 0.3 Success Factors).
- Chapter 3 defines all necessary terms. As far as possible, the terms for the IP management system are partly modified quotations from DIN EN ISO 9000 (quality management, principles, and terms).
- Chapter 4-10 describes the essential requirements for the introduction, implementation, and maintenance of an IP management system.

Appendix A of DIN 77006 contains helpful explanations, examples, and comments for almost every requirement chapter and sub-chapter. The appendix enables the reader, without deep knowledge of the normative terminology, to transfer services between requirements for management systems and IP topics independently.

To this end, exemplary listings are used to clarify, for instance, which internal and external topics constitute the context of the organisation relevant to the implementation of the standard, or who can be an interested party in the sense of the standard. Furthermore, important terms such as IP strategy, IP policy, and IP objectives are explained and distinguished from each other in the appendix.

Last but not least, an essential task of the appendix is to clarify concepts such as the development of IP strategies, the generation of IP, IP risk management, IP awareness-raising, IP administration, IP enforcement, etc., by listing examples of typical sub-processes that are to be set up and operated for the implementation of the concepts in accordance with the standard.

18. Agota Giedre Raišienė, “Advantages and Limitations of Integrated Management System,” *The Theoretical Viewpoint*, 1 no1 (2011) 25-36.

19. Mary Walton, *The Deming Management Method*, Perigee Books, 1988.

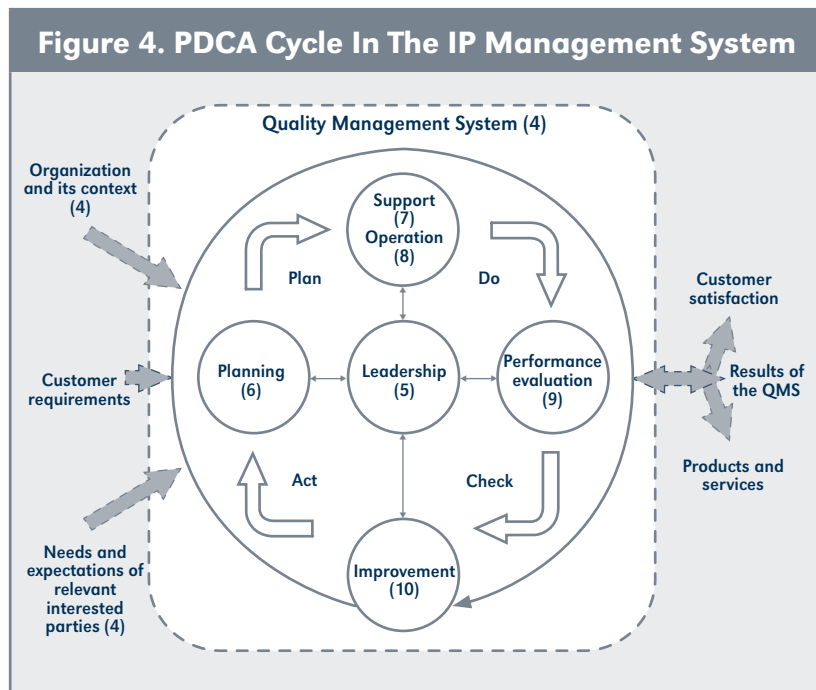
Process Model of DIN77006 and ISO 9001 Family

What the standards of the ISO 9001 family have in common is a process model that establishes a plan-do-check-act cycle (PDCA, plan-do-check-act)¹⁹ within the company (see Figure 4). This cycle receives impetus from customer demands and feedback from expressions of customer satisfaction or dissatisfaction. It serves to constantly improve the quality management system.²⁰

The process model assumes that the phases of the improvement cycle consist of processes that are interconnected.²¹ The processes for creating products and providing services (core processes, service processes) are triggered by customer requirements and end with a service to the customer. They are designed and enabled by management and resource processes. Supporting processes (*e.g.*, development, procurement, accounting) provide services to the core processes or to external interested parties who are not customers. ISO 9001 recommends documenting quality management systems in a process-oriented manner.

The purpose of an IP management system from a business perspective is to provide an organizational framework to deal with IP risks and opportunities,

Figure 4. PDCA Cycle In The IP Management System



20. Michael Bell and Vincent Omachonu, “Quality system implementation process for business success,” *International Journal of Quality & Reliability Management*, 28 no.7 (August 2011) 723-734.

21. Milé Terziowski and Jose-Luis Guerrero, “ISO9000 Quality System Certification and its Impact on Product and Process Innovation Performance,” *International Journal of Production Economics*, 158 (December 2014) 197-207.

among other things. The IP management system should be established as an iterative process:

- IP-Strategy (generate), IP-Policy (publish), and IP objectives communicated (**plan**).
- IP risks and IP opportunities are to be determined and appropriate IP objectives and processes are to be defined (**plan**).
- The corresponding processes are then to be carried out as part of the operation or support (**do**). This concerns the topics of IP awareness, IP administration, IP generation, IP enforcement, IP defense, and IP transactions. (**do**).
- The performance and effectiveness of the IP management system must be checked regularly and recorded using IP reporting (**check**), the IP management system must be evaluated by internal or external audits systematically. The results must be written down in documented information (management system review).
- to subsequently initiate improvements to the IP management system (**act**), if necessary.

These iterative steps must be carried out regularly against the background of the IP strategy and IP policy formulated by management. DIN 77006 deals with the respective sub-processes separately and provides information for an appropriate implementation.

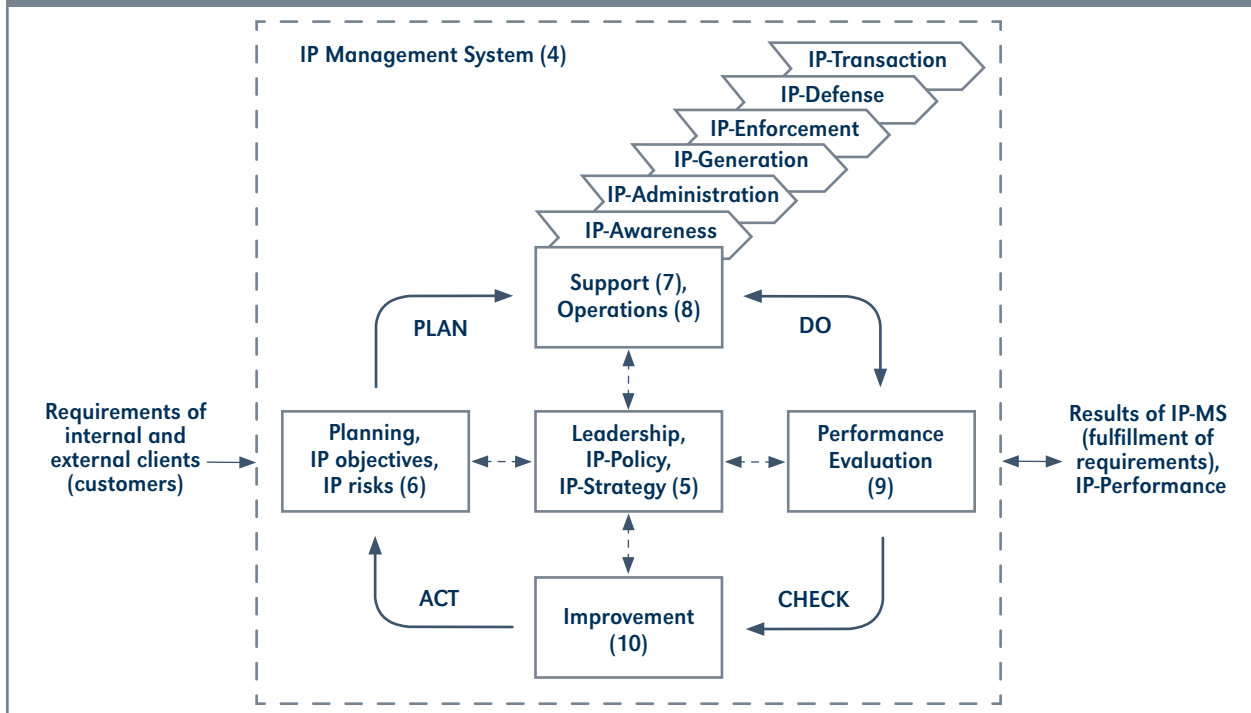
Due to the standard structure described above, the typical IP processes are assigned to certain standard chapters:

- Leadership and Commitment IP Strategy: 5.1.
- IP Risk Management: 6.1 Actions to address risks and opportunities.
- IP Awareness: 7.3 IP awareness.
- IP Administration: 8.1 Operational planning and control.
- 8.4 Processes of IP Service Provision:
 - IP Generation
 - IP Enforcement
 - IP Defense
 - IP Transactions
- IP Reporting: 9.3 Management review and IP reporting. See Figure 5.

The specified IP management processes lead to proper handling of IP and help companies to integrate IP management processes into the core process landscape. In an industrial company, these (sub)processes should be reflected in product development, for example, but also in marketing, sales, and service.

The standard explicitly points out that IP management must be aligned with the overall strategy of the company, but that the above processes can be carried out both within the company and externally, *i.e.*, by third parties. Accordingly, suitable agreements must be made with these service providers to ensure compliance with standards.

Figure 5. PDCA Cycle And Process Model In The IP Management System



Benefits of DIN 77006

DIN 77006 supports an organization to establish an efficient and legally secure IP management system. As a result, *e.g.*, compliance requirements of the organization are determined, understood, and permanently fulfilled by all departments and/or members of the organization. The systematic approach of DIN 77006 (PCDA principle) with the documentation requirements across all hierarchical levels and processes ensures that all relevant legal and regulatory requirements can be met and that processes are optimally integrated in terms of achieving corporate goals.

The introduction of DIN 77006 provides benefits for industrial companies and service providers in the IP sector in several respects:

- by providing a comprehensive and practical set of rules,
- through the integration of IP (partial) processes into the core processes of the company,
- by creating the necessary conditions to increase opportunities in the development of patentable (digital) business models and use cases,
- through the introduction of risk management for IP and thus the reduction of possible liability risks, and last but not least,
- by communicating a contemporary role of IP and the internal and external employees responsible for IP for a successful future of the company.

By establishing, implementing, and maintaining an IP management system compliant with DIN 77006, a company will be able to meet the diverse challenges of the upcoming digital transformation more securely and efficiently.

Conclusion

The definition of a quality standard specifically tailored to IP management was created to match the established High-Level-Structure (HLS) of existing standards, such as the well-known international quality standard ISO 9001 Quality Management Systems—Requirements²² and the international standard for innovation management ISO 56002. ISO 56005 Innovation Management—Tools and Methods for Intellectual Property Management—Guidance²³ describes tools and methods for advanced IP management, whereas the system-standards DIN 77006 and ISO 56002 are compatible to existing (certified) management sys-

22. DIN EN ISO 9001:2015-11 *Quality Management Systems—Requirements*.

23. ISO 56005:2020 *Innovation Management—Tools and Methods for Intellectual Property Management—Guidance*.

tems. Here is a summary of the experience gained almost two years after the publication of the standard.

After a large number of training courses, seminars, and workshops, supported by QIMIP,²⁴ a part of the German Institute for Inventorship (DIE),²⁵ and by European institutions such as the Center for Intellectual Property Studies (CEIPI)²⁶ at the University of Strasbourg, the Intellectual Property Helpdesk of the European Commission,²⁷ as well as the European Patent Academy of the European Patent Office,²⁸ the following advantages have been reported by the participants:

- By implementing the standard at the operational level, there are no extensive, additional administrative tasks for the IP department or other departments of the company. This applies in particular to small- and medium-sized enterprises (SMEs). Additional effort and efficiency gains through standardization balance each other out.
- Patent departments of large companies and IP service providers, including large law firms that have already been certified according to ISO 9001 in the past, saw the new DIN 77006 as a useful addition.
- The amended assignment of roles and tasks required by the new DIN 77006 improves IP awareness, changing the perspective on IP from a cost factor to a measurable success factor for the company. Those responsible for patents see DIN 77006, which integrates IP management into existing management systems, as enhancing their role within the company. In addition, they understand the new standard as a response to increasing pressure from internal and external customers with regard to handling of IP risks as freedom-to-operate, particularly during digital transformation of company processes, the supply chain, sales channels, products, services, and customer relationships.

24. <https://qimip.de/>. The Quality Initiative for the Management of Intellectual Property (QIMIP®) is a department of the non-profit German Institute for Inventions (D.I.E.) and supports the implementation and dissemination of DIN 77006 for quality in IP management. In addition, QIMIP® provides relevant information for interested parties and stakeholders in the national innovation system, conducts appropriate training, supports the development of suitable processes, and accompanies users during implementation as well as the qualification and evaluation of implementation partners.

25. <https://rudolf-diesel-medaille.de/>.

26. <https://www.ceipi.edu/en>.

27. <https://en.wikipedia.org/wiki/IPR-Helpdesk>.

28. <https://www.epo.org/about-us/services-and-activities/academy.html>.

- Companies without established IP management processes and those which rely on the support of external IP service providers, *i.e.*, patent attorneys, patent search agencies, patent fees service providers, etc., will in the future also expect them to behave in a standard-compliant manner about the outsourced processes and to provide corresponding proof of conformity.²⁹
- For IP service providers, the standard is still be-

coming a differentiating factor in attracting new customers and clients. In addition, based on the standard, new services will also emerge, *e.g.*, in the areas of training, consulting, and auditing.³⁰

In summary, the standard provides important guidance in designing and continuously improving effective processes and meeting IP compliance requirements. ■

Available at Social Science Research Network (SSRN): <https://ssrn.com/abstract=4179676>.

29. Rajorshi Sen Gupta, "Risk management and Intellectual Property Protection in Outsourcing," *Global Business Review*, 19 (November 2018) 393-406.

30. Marcus Holgersson, Sarah van Santen, "The Business of Intellectual Property: A Literature Review of IP Management Research," *Stockholm Intellectual Property Law Review*, 1 (July 2018) 44-63.