1. Foundations of labour and IP law

Niklas Bruun and Marja-Leena Mansala

1.1 LABOUR AND IP – SEPARATE WORLDS?

There have always been creative human beings who have worked hard in order to improve living conditions and make better use of material natural resources. The story of intellectual property is, however, much younger than the history of mankind; the foundations of IP law as we know it today can be found in the 16th and 17th centuries, in the then most-developed parts of the world, Great Britain and France. During this period, developments started that led to the adoption of the Berne and Paris Conventions in the late 19th century.

Labour law is even younger if we restrict our focus to the modern type of labour law that emanated from the Industrial Revolution. This kind of legal regulation has its roots in economic liberalism, starting in the mid 19th century with the breakthrough of contractual freedom for workers resulting from poor labour conditions and efforts to remedy them with the help of trade unions and other workers' organizations, as well as with protective legislation focusing on health and safety issues in the early stages.

The development of labour law and intellectual property law took different paths during the late 19th century. Labour law developed *towards collective solutions and relations where trade unions were recognized as legitimate representatives for workers* while the development in IP law strongly emphasized and *focused on the creative individual*. The author, the inventor and the creator were, with very few exceptions, the heroes of the developing IP law.

The two fields of law developed separately and without much interaction between them. Especially within labour law, the issue of employee IP has never been the focus for practical or academic labour law efforts. At most it has been regarded as a specific problem for employees who are well educated and in a position where they are able to defend their interests rather well individually. Primarily in countries where white collar workers are well organized, and also represented collectively by trade unions, there have been some special features in this regard.

Within IP law, more attention has been paid to employee IP since those who manage and administer IP in big corporations cannot deal solely with existing IP rights and obligations, but must also handle IP that is created by employees within their working duties. Employee IP has therefore always been an issue for those governing IP, although the degree of attention which has been paid to it has varied to

a large extent. In technologically advanced societies, in particular, there have been debates on employee IP; for example, in the Weimar Republic during the 1920s.¹

Against this very short background it is arguable that labour law has formed the general framework and background within which employers have had to make sure that they can get hold of or acquire rights to employee IP. In this chapter we shall therefore first give a short historical overview of the developments of labour law since the discipline developed. In this context we are not trying to paint a general picture of the evolution of labour law but we are interested in those features and phenomena which are most relevant for employee IP. We start with a short schematic presentation of the technological history that, at least on a general level, is widely acknowledged.²

The first industrial revolution, exemplified by the steam engine, which created power that could be used industrially and by machines and in factories and railways, began in Britain around 1780, and then spread over a long period to the Continent until the mid 1800s and beyond.

The *second industrial revolution*, from the last decade of the 19th century, saw the creation of big factories where consumer goods could be produced in large quantities. The big factories and plants were the seedbed for trade unions and modern labour law. Another important element in this development was the evolution of political democracy and individual voting rights, which gave the labour movement a political platform for improving working conditions and the standard of living.

The third industrial revolution is based on knowledge. It starts in the 1960s and is also called the computer or digital revolution. In the knowledge-based society, knowledge became the first and foremost production factor. Knowledge, its processing and use were decisive for the competitive advantage of different countries and regions. This third revolution related to globalization and the creation of huge hierarchical multinational companies. Already in this context, labour law that was mainly national had problems regulating actors that were multinational.

The fourth industrial revolution is changing our understanding of work, knowledge and competence. Work is done in networking ecosystems and specialized, digitalized data is an important source of production.

The fourth industrial revolution is building further on the digital breakthrough and integrates physical, biological and digital technologies. Artificial intelligence (AI) is expected to be the main engine of the fourth industrial revolution.

¹ Ragnar Knoph, who in 1928 published a book in Norway on employee inventions, reported that the issue was much contested in Germany, but that in Norway the debate on this issue had taken place without huge emotions. See Ragnar Knoph, *Funksjonaersopfinnelsen* (H. Aschehoug & Co. 1928), 3 ff.

² The presentation here is based on Klaus Schwab, *The Fourth Industrial Revolution* (Penguin 2017).

1.2 BASIC FEATURES IN THE EVOLUTION OF LABOUR LAW SINCE THE FIRST INDUSTRIAL REVOLUTION AND ITS IMPACT ON EMPLOYEE IP

1.2.1 From Mercantilist Economy to Contractual Relations

The significant result of the Industrial Revolution was that the old mercantilist economic regime was overthrown and a free contract between employer and worker became the legal basis for the performance of work. It happened first in the leading industrial countries, England, Germany and France, but other European countries followed suit. However, it took time to transform working life from a mercantilistic tradition into a new regime based on contractual relations. Development in this respect was slower in the early industrializing countries than in those that industrialized later. This fact has been explained by Hepple, who argues that the development of labour law lags behind and reflects the economic structure of society only after a considerable lapse of time.³ Many researchers document the difficulties in adopting the idea of the contract of employment in a social system based on status.

In common law countries, the doctrine and understanding of the contractual relationship between master and servant evolved and the transformation from the principle of “duty to work” to a free labour market took time. In civil law countries the legal development was strongly influenced by the Roman law tradition *locatio conductio*. The Roman law thinking had already been adopted in the 1780 French Civil Code, in which it was stated that an employee could be engaged only for a limited period of time or to perform a specific task. The definition of the employment relationship as *locatio conductio operarum* in civil law countries implied the depersonalization of the relationship since the content of the contract lay not in the person, but in the working power of the worker who places his labour on the market, just like the owner of other commodities.

The legal recognition of the contract of employment presupposed the idea of a society where citizens were formally equal before the law. It also presupposed the affirmation of a general principle of the “right to work” understood as the freedom to work and to enter into a contract regarding this work. These ideas gained ground after the French Revolution and in the French Code of 1804. This kind of approach became mainstream in 19th century Europe, and formed the basis for the BGB in Germany of 1900. Around the turn of the century the notion of subordination had also become an essential element in the conceptual understanding of an employment contract that – especially in the growing industries – was defined through the key concepts of dependency and control.⁴

³ See Bob Hepple (ed.), “Introduction” in *The Making of Labour Law in Europe* (Mansell Publishing 1986), 14.

⁴ See further Bruno Veneziani, “The evolution of contract of employment” in Bob Hepple (ed.), *The Making of Labour Law in Europe* (Mansell Publishing 1986), 64 ff.

The concepts of control, subordination and loyalty were the key concepts for labour law and the contract of employment. Categories like public servants (in German *Beamte*) were regarded as being outside labour law and so also were private sector professional workers. In the period before World War II the issue of employee inventions was, with some rare exceptions, not really an issue for labour law since “workers” or “employees” very rarely made inventions.

1.2.2 The Expansion of Labour Law to White Collar Workers

The debate regarding the relationship between employment and IP in the 1920s was very much about what contractual arrangements were needed for white collar workers, who were not covered by real “labour law”, in order to make sure that the employer could benefit from their inventions.

Norwegian researcher Ragnar Knoph has described the legal situation of engineers and other white collar workers in the 1920s in Norway, but also more generally on an international level, with special attention to Germany, in a small book published in 1928. According to Knoph, the right to inventions for employed engineers was essentially regarded as a contractual issue and there was a tradition in older contracts that the engineer assigned all inventions that he/she might do during the period of his/her employment to the employer firm. But Knoph also noted that it had become more common for attention also to be paid to the interest of the inventor in these contracts. For instance Knoph describes the contracts used in the 1920s by Norsk Hydro where a special inventor’s clause was included. Under this clause “All inventions made during the time of employment became the property of the employer if the exploitation of it was regarded as relevant for the activities of the company”. The inventor, however, was entitled to get his name mentioned as inventor in the patent application and other relevant documentation as long as this did not create complications or problems for the granting of the patent or the possible further assignment of the patent rights. Furthermore, the inventor was entitled to some form of remuneration when the company could exploit the invention, the amount of which was to be decided by the company.

Ragnar Knoph discussed at length the contractual validity of clauses that gave the employer full entitlement to all future inventions made by the engineer regardless of their relationship to the tasks and activities of the engineer in his job for the employer. His starting point from a Norwegian and Nordic standpoint was that such an agreement could not be regarded as automatically null and void, but it might be challenged on certain clauses in contract law, for instance it might be against good faith (*tro och heder*) to invoke it in certain situations.

Knoph also advocates the view that the employer’s entitlement to the invention is a derivative one, there being always a transfer from the inventor/employee to the employer.⁵

⁵ Knoph (1928), 53.

Knoph also presented an extensive discussion on how to evaluate the situation when there are no contractual stipulations concerning the contract.⁶ Here he is advocating a rather large margin for the judge to find a hypothetical or concluding clause in the contract due to an analysis of the circumstances in the concrete case.

Knoph is also referring to the development in Germany where already in the early 1920s there had been some collective agreements or *tarifverträgen* for certain groups of employees, sometimes with an academic education. Already here the grouping of three categories: *Betriebserfindungen*, *Diensterfindungen* and *freie Erfindungen* is very relevant.⁷

1.2.3 The Spillover Effect from Labour Law to Employee IP

The interesting development in Germany in the early 1920s was something that was seen later on a large scale especially after World War II. The development can be described as a spillover from labour law towards different groups of professional and academic workers. Different forms of collective regulatory regimes were introduced in order to govern employee IP. Some could be agreed (collective bargaining) or adopted after consultative procedures or unilaterally by the employer (employee invention award schemes or guidelines). The approach to mandatory protective legislation and collective regulatory solutions which had been largely adopted within labour law slowly and gradually gained acceptance also for other groups of workers.

In the US, where the bulk of industrial inventions were made in the 20th century, the approach was not so different from that in Europe. In the US, the development of the “shop right rule” in situations where an invention had been made in the course of employment without any contract governing the matter offered some guidelines on the right to the invention. The shop right rule had no impact on the original right to the invention vested with the inventor. The effect of the shop right rule was that it prevented the employee from asserting his patent monopoly against his employer, and thus gives the latter a licence to practise the invention.⁸ The scope of the licence, usually defined by the employment relationship, preserves to the employer the fruits of the labour which it can be shown that he hired (thus he need not pay twice: once as compensation for the labour and then again for a licence to use the invention).

⁶ Knoph (1928), 55–64.

⁷ The *Betriebserfindung* was regarded as the result of ordinary work based on tasks given to the employee. In respect of the *Diensterfindungen*, the employee played a significant role as inventor and was entitled to be mentioned in the patent application and also to get extra compensation. The *freie Erfindungen* were not regarded as having a relevant relationship to the employment and the rights to the invention stayed with the inventor, although the employer had a priority to acquire rights to it. See Knoph (1928), 68.

⁸ See in detail Robert C. Morris Jr, “Patent rights in an employee’s invention. The American shop right rule and the English view” (1959) 75 *Law Quarterly Review* 483–502, also published in Ann Monotti (ed.), *Employment Law and Intellectual Property Law* (Edward Elgar Publishing 2018).

The International Labour Organization (ILO) and other international organizations were from the late 1920s already seeking to harmonize the rules on employee inventions internationally. In 1928 the First Session of the ILO's "Advisory Committee on Professional Workers" was held and, at its meeting in the following year, the Committee recommended that all patents mention the name of the inventor or the inventors and that compensation "in proportion to the value of the invention and the circumstances in which it was made" be paid to the inventor, unless he has received fair remuneration either in wages or otherwise. The Committee further wanted it to be established that no agreement to the contrary could deprive employees of these rights.⁹

The efforts made by the ILO Advisory Committee for professional workers did not lead to the adoption of any specific instrument within the ILO, although some resolutions were adopted. When the London Conference for the revision of the Paris Convention for Industrial Property was held in 1934, proposals that had been supported by the Committee were tabled as proposals by some Member States. The result was the adoption of Article 4ter of the Paris Convention under which "The inventor shall have the right to be mentioned as such in the patent". This provision, concerning what is commonly called the "moral right" of the inventor to be named as such in the patents granted for his or her invention in all countries of the Union, has now been accepted globally because the Paris Convention has, through the TRIPS Agreement into which it is integrated, achieved worldwide recognition. The question of a mandatory right to a fair remuneration for the inventor was not accepted by the London Conference and therefore the right of the inventor in this regard can be regulated by the Member States in their national legislation. Since the inventor only has the right to be mentioned in the patent, he can waive this right, unless national legislation prescribes otherwise.

The ILO came back to the issue of salaried authors and inventors in 1949 and concluded that there was a strong need for appropriate international standards in this field. The topic was further discussed in 1958. At that time, the preparatory report of the ILO held that the question of employee rights seems "by its very nature to lend itself to regulation by law or collective agreement rather than by individual contracts".¹⁰ At the 1977 Tripartite Meeting on Conditions of Work and Employment for Professional Workers the issue was again discussed. In 1987 the focus had been broadened to cover the protection of salaried authors and inventors.¹¹ Agreement could not be reached on whether the ILO was the right forum for an instrument on the protection of salaried authors and inventors and the search for solutions also became

⁹ See Berndt Godenhjelm, *Problemställningar och enhetssträvandet inom rätten till arbetstagares uppfinningar* (JFT 1965), 190 ff. and International Labour Organization, *The Protection of Salaried Authors and Inventors*, Report for the Tripartite Meeting on Salaried Authors and Inventors (International Labour Office 1987), 6–7, which contain a historical overview of the ILO's efforts in this field.

¹⁰ ILC (The International Labour Conference) 43rd session, Geneva 1959.

¹¹ See ILO (1987).

more complicated due to the fact that the discussions were now focusing on both patents and copyright. The concept of “salaried authors and inventors” also covered a large spectrum of employees in different positions. After different discussions within the ILO, it was agreed that a common basis for an international instrument setting an international common standard was lacking.

Labour law developed significantly during the post-war period. The US and Western Europe saw a fast recovery of the economy after World War II. Low rates of unemployment, a rapid increase in labour market affiliation for both employer and employee, and slow development towards what has been called a welfare state, all emerged.

The labour law regulatory framework has exploded since World War II; labour law is now the epicentre of the welfare state, especially in Europe. Regulation has gradually become very detailed; the legal field that was earlier very much marked by collective bargaining has become highly juridified and is covered by legislation. Although collective bargaining is still prominent in some countries and in some sectors, it is evident that labour law globally has its basis in legislation.

Labour law’s social base has broadened. A branch of law that was very much developed by and for industrial workers has broadened its scope. The service sector is covered, and the new public service employees have become well organized, i.e. teachers, nurses, social workers, etc. In fact the tax system is very much based on the existence of a large group of income-earners or taxpayers dependent on the outcome of their work for their living.

The emergence of a modern labour law with a broad scope of application also created new overlaps between labour law and IP law, since those groups of employees that worked in the creative field and had a significant, often academic, education, were increasingly covered by labour law.

The broadening of labour law was far from the only reason for these new overlaps. Technological and societal development, as well as development within IP law, all contributed strongly to trends in the same direction.¹²

In this introductory chapter, against this very general backdrop of labour law development, we shall first explore the roots of IP law and the technological development – the different industrial revolutions – that have marked development since the breakthrough of industrialization. This is necessary in order to understand the similarities and differences between approaches to the creator, the author and the inventor in IP law.

With this background in mind, we shall come back to labour law and paint a picture of the developments within labour law and how labour law has approached workers who create assets that can be protected by intellectual property regulation.

¹² See Alain Supiot, *Beyond Employment. Changes in Work and the Future of Labour Law in Europe* (Oxford University Press 2001), 14–15.

1.3 BASIC FEATURES IN THE DEVELOPMENT WITHIN IP LAW AND PRACTICE

1.3.1 Justifications for the IP System

In recent decades, there has been a huge debate and focus on the foundations of the IP system. The background for this has been the expansion and development of the IP system as well as its globalization, not least as a consequence of the TRIPS Agreement.

The basic justifications for IP law have usually been divided into three main categories.¹³ We have the utilitarian grounds, building on the philosophical tradition from Jeremy Bentham and basically arguing that whoever contributes to society with useful novel technology should be rewarded.¹⁴ This justification has laid the ground for the reasoning on IP within the law and economics tradition.

The second justification theory owes much to John Locke and his conceptual approach to property. When applied to intellectual property, it is based on the assumption that the fruits of one's labour should belong to the inventor or creator of IP.¹⁵ The third justification has the German philosophers Kant and Hegel as its central sources of inspiration and emphasizes the fact that IP reflects the personality of the creator and inventor.¹⁶

These ideological fundamentals for IP actually developed as a revolutionary shift in copyright and patent history during the 18th century. Geller has described this development as a result of three shifts that characterized the advent of copyright law during this period. Mossoff has described a similar development for patents.

According to Geller, this development of IP in England and France, at that time major exporters of literature, was illustrative for IP development more generally since the development in these countries later expanded and was transplanted globally.¹⁷ The three shifts are described by Geller:

¹³ See Robert P. Merges, *Justifying Intellectual Property* (Harvard University Press 2011), 13–14, who tries to achieve some foundational pluralism by bringing together social practices and institutions into one conceptual approach to IP.

¹⁴ Jeremy Bentham, *An Introduction to the Principles of Morals and Legislation* (Oxford 1879 (1st edn 1689)). See further Justin Hughes, “The philosophy of intellectual property” (1988–1989) 77 *Georgetown Law Journal* 287–366; Ole-Andreas Rognstad, *Property Aspects of Intellectual Property* (Cambridge University Press 2018), 25–26; and Catherina Sganga, *Propertizing European Copyright. History, Challenges and Opportunities* (Edward Elgar Publishing 2018), 25–26 and further references therein.

¹⁵ See Hughes (1988–1989), 296 ff., Rognstad (2018), 28 ff. and Sganga (2018), 20 ff. and literature referred to by them.

¹⁶ See Rognstad (2018), 23 ff. and literature referred to therein.

¹⁷ Paul Edward Geller, “Copyright history and the future: what’s culture got to do with it?” (2000) 47 *Journal, Copyright Society of the USA* 209–264.

First, power over the dissemination of works was decentralized away from the royal executive and its agents when the law granted copyright to individual authors. Second, instead of complex bodies of ad-hoc regulations that censored some works and effectuated monopolies in others, statutes set out simple and uniform rules to allocate out general rights to govern publication and performance, irrespective of the work at issue. Third, rather than depending on enforcement in largely police measures, claimants could bring their own actions against infringers in civil courts.¹⁸

Mossoff describes a similar development in patent law and argues that this shift could take place in British common law courts because judges in the 18th century approached this issue from a theoretical framework of natural rights, including social contract notions and John Locke's labour theory of property.¹⁹ Mossoff further argues that this thinking provided a background for easily justifying and understanding the development of the specification requirement as a consideration for patents. The standard for novelty was transformed from focusing on whether the invention violated the practice of a trade at the time of the grant to whether the invention was "used before and known by" those in the trade, which according to Mossoff was very much understood as an issue of whether the patented product was the result of the inventor's own labour.²⁰

As Norwegian professor Ole-Andreas Rognstad points out, the conclusions that can be drawn from the different common grounds of justification for intellectual property are not obvious and might be quite limited when it comes to the design of positive legal regulation. He notes that the

modern utilitarian take on IP suggests that there are very few (if any) conclusions to be drawn from the use of the property metaphor in relation to justifying IP, both with regard to policy issues concerning how IP rules should play out and with regard to the interpretation of existing rules.²¹

Moreover, when it comes to the notion of labour, Rognstad as a pragmatic representative of Scandinavian realism argues that the very idea that someone who has invested resources in something is entitled to the results of his or her efforts should correspond to the general sense of justice. And he adds that modern policymaking in the field of IP seems to rely on the idea that creators and investors need some kind of reward. Rognstad also argues that although the rightholder deserves the fruits of his or her labour, the scope of such rights must not be incommensurate with the efforts involved, given other legitimate interests. Consequently he claims that with a proportionality-based approach to the labour justification, the use of the term property

¹⁸ Ibid., 225.

¹⁹ Adam Mossoff, "Rethinking the development of patents: an intellectual history, 1550–1800" (2000–2001) 52 *Hastings Law Journal* 1255–1322.

²⁰ Ibid., 1308.

²¹ Rognstad (2018), 77. See also for a similar approach Thomas Dreier, "How much 'property' is there in IP?" in Helena R. Howe and Jonathan Griffiths (eds), *Concepts of Property in Intellectual Property Law* (Cambridge University Press 2013), 129 ff.

should have little bearing on how the balance of interests is to be struck and what constitutes an appropriate reward for the labour performed.²² Finally Rognstad argues that although personality and personhood theories provide a general justification for private property, they fail to specify the further consequences.

We agree with Rognstad that the debate on justification grounds for intellectual property is of limited help when we try to discuss how to concretely design different rights within the intellectual property system. The justification grounds become even more difficult to use when we start to analyse justification for employee IP. This is an area where we can find a wide variety of different theoretical explanations and doctrines as to why the justification models that are generally applicable to intellectual property do not apply at fully and need some special twists.

1.3.2 The Regulatory Background – Copyright

A distinction is usually made between the European (Continental) approach and the common law approach to IP. When we are studying the development of employee IP it is of particular interest to look at the features of these two traditions.

We start with the European approach to copyright, which has the longest historical roots. Historically a work was seen as an expression of the personality of the author and therefore he or she had rights of disposal over the work. European copyright is usually described as being – at least to some extent – a product of the French Revolution and the subsequent legislation in 1791 and 1793 which laid down the principle that “an exclusive right is conferred on authors because their property is the most justified since it flows from their intellectual creation”. These revolutionary copyright laws were drafted and voted for in a general climate that formally recognized “natural rights” to property, including copyright. As indicated above, the German philosophical tradition of Kant and Hegel in 19th century Germany also strongly supported a conceptual approach to copyright that placed the emphasis on the personality aspects of the author.

One could expect that the strong emphasis on the author should be based on a common understanding of who can be regarded as an author. This is, however, not the case; starting from the Berne Convention, authorship is defined indirectly, leaving it open to the Member States to use their own definitions, which have mostly resulted only in descriptions of the author in rather general terms.²³ In the European tradition, the more or less explicit presumption has, however, been that the author must be a human being, which is very much in accordance with what Antoon Quaendvlieg calls the personalist approach, as distinguished from what he describes as the “entrepreneurial approach”.²⁴

²² Rognstad (2018), 83.

²³ See Jane C. Ginsburg, “The concept of authorship in comparative copyright law” (2003) 52 *DePaul Law Review* 1063–1092 at 1069.

²⁴ See further Antoon Quaendvlieg, Chapter 5 of this book, on concepts of authorship and their relevance to IP entitlement.

This tradition had a strong impact on copyright law when the moral rights were recognized by courts in France and Germany in the 19th century. The development finally culminated in the formal recognition of the moral rights in the revision of the Berne Convention, which took place in Rome in 1928. At that stage it was recognized by the participating states that copyright also includes a right of a moral kind due to the fact that the work is a reflection of the personality of its creator. The new Article 6bis had the following content:

Independently of the author's economic rights, and even after the transfer of the said rights, the author shall have the right to claim authorship of the work and to object to any distortion, mutilation or other modification of, or other derogatory action in relation to, the said work, which would be prejudicial to his honor or reputation.

Later, during the 1967 revision of the Berne Convention in Stockholm, a second paragraph was added to the Article 6bis, under which the rights granted to the author in accordance with this paragraph, "shall, after his death, be maintained, at least until the expiry of the economic rights, and shall be exercisable by the persons or institutions authorized by the legislation of the country where protection is claimed".

The European tradition on copyright places a strong emphasis on the individual creator and author of works that could be protected by copyright. It was therefore quite consistent to argue that an author, under copyright law, must always be a physical person who is entitled to moral rights. The European traditional approach to copyright does not allow for corporations to become authors. Therefore the rights to a protected work originally had to be the entitlement of the individual author, while the employer or parties that had commissioned the activity which resulted in this work could only achieve derived rights based on contractual arrangements. The question of how to handle moral rights in this context was not straightforward; here we find slightly different solutions in each Member State, and the solution adopted during the 1967 Stockholm Conference also gave some room for national discretion. The question was to what extent the moral rights could be waived and under which circumstances this could take place. The strong influence of French and German copyright law and ideology explain the great emphasis on moral rights in Europe. This European tradition is not homogeneous. For example, the Netherlands has long had a strong codified tradition under which the employer can "legally" be considered the creator of works created in his employment, although some of the moral rights will remain with the "factual" creator, the employee.

In fact it has been argued that the strong ideological approach to "stand alone" moral rights in France, Germany and Italy actually developed rather late, during the first decades of the 20th century, while there were already strong elements in contract law in the 19th century, where the two central moral rights issues were (i) whether third parties, in particular creditors, could force authors to disclose their unpublished works, and (ii) whether publishers could modify the work or suppress the author's name without the author's consent if the publishing agreement was

silent on this issue.²⁵ Rigamotti argues that the rights to attribution and integrity were originally contractual in nature and that they were later extended beyond publishing agreements to any and all contracts between authors and assignees of licences. Only during the late 19th century were the various elements developed into coherent theories of *droit moral* (France) and *Persönlichkeitsrecht* (Germany) and further into the continental *droit d'auteur* system.²⁶ This system became globalized through the Berne Convention revision in 1928, which was made in the spirit of the German conception of moral rights, which had previously, in 1925, been codified into the Italian Copyright Act. In the common law countries, steps have been taken towards recognition of Berne, Article 6bis, but there has been a persistent reluctance to accept strong moral rights for authors.²⁷

1.3.3 The Regulatory Background – Patent Law

Within European patent law, moral rights have never attracted the same level of attention as in copyright, which is both difficult and easy to understand. On the one hand, the inventor of significant inventions clearly has an interest in receiving the honour and recognition for such an invention. On the other hand, the risk of distortion or mutilation of an invention is rather marginal, and we note that this aspect of protection for an invention is not very prominent. Moreover, in practice, the shorter term of protection for inventions compared with copyright might contribute towards a lesser need for protection of moral rights. This situation might also be due partly to the fact that a patent is a formal, registered right where it is “agreed”, usually once and for all, on who the inventor is.

European patent law, however, has not always been negative towards collective or establishment inventions. For instance, in Danish patent law, prior to the common Nordic patent law in the 1960s, it was stated that in cases where the invention had been made in the context of an establishment in a way that it was not possible to identify one or several “true and real” inventors, the rights to the invention were vested with the establishment. When the 1963 Nordic Patent Committee made its proposal for a common Nordic approach, it had originally included the right for a legal person to apply for a patent in their own name in respect of what was termed an *establishment invention*. This proposal was, however, seriously criticized during the drafting process, and in the final report the starting point was that there is always one or a number of original physical inventors who have the right to the invention. This reflects the general European approach; it has, however, been discussed whether the inventor must also be the first applicant for the patent, but it has generally been accepted that a legal person can also – through an assignment – obtain the right to

²⁵ See Cyrill P. Rigamotti, “The conceptual transformation of moral rights” (2007) 55 *American Journal of Comparative Law* 67–122.

²⁶ *Ibid.*, 93.

²⁷ See Gerald Dworkin, “The moral right of the author: moral rights and the common law countries” (1995) 19 *Colum.-VLA J.L. & Arts* 229.

apply. Also on the assignment issue, we find largely divergent approaches in Europe, from the Nordic idea that an employer can unilaterally take on the rights to an invention to other demands for real assignments, sometimes separately for each means of disposal of the invention (right to use or exclusive right to use). All in all, the core right of the inventor is to be acknowledged as the inventor and to apply for a patent.

1.3.4 The US Development and its Impact in Europe

The 1787 US Constitution copyright clause, echoing the 1710 English Statute of Anne, made the public's interest equal, if not superior, to the author's and lacks the focus on the individual creator:²⁸ Article I, section 8, clause 8, of the United States Constitution grants Congress the specific power: "To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries".

The clause forms the basis for intellectual property laws in the United States, specifically copyright and patent laws. The background for such a clause was not primarily a personal rights approach nor to express authority to promote the progress of science and the useful arts, but rather as a means of ensuring authority to do so in a particular way, namely, by securing exclusive rights for limited times for authors and inventors to their respective writings and discoveries.²⁹ The clause seems, however, to have had slightly different implications for, on the one hand, copyright law and, on the other, patent law.

In copyright law, this constitutional recognition has not extended the right to copyright to an employee for works that are created within an employment relationship. Fisk argues that the lack of an explicit recognition of moral rights in US law made it possible to develop the legal fiction of the employer as the creator in respect of employee works, which was codified in 1909.³⁰

The 1909 US Copyright Act prescribes that the original copyright to employee works lies with the employer under the work-for-hire doctrine. Catherine L. Fisk has studied in detail the origins of this Act.³¹ She has been able to show that during the first part of the 19th century the rights of employee authors received considerable

²⁸ See Jane C. Ginsburg, "A tale of two copyrights: literary copyright in revolutionary France and America" (1990) 64 *Tulane Law Review* 991–1031, at 998 and Ginsburg (2003), 285.

²⁹ Edward C. Walterscheid: "To promote the progress of science and useful arts: the background and origin of the intellectual property of the United States Constitution" (1994) 2(1) *Journal of Intellectual Property Law* 1–56.

³⁰ Catherine L. Fisk, "Authors at work: the origins of the work-for-hire doctrine" (2003) 1(15) *Yale Journal of Law & the Humanities* 1–70 at 68. See also Rochelle Cooper Dreyfuss, "The creative employer and the Copyright Act of 1976" (1987) 54(2) *University of Chicago Law Review* 590–647.

³¹ See Fisk (2003) and Catherine L. Fisk, *Working Knowledge. Employee Innovation and the Rise of Corporate Intellectual Property, 1800–1930* (The University of North Carolina Press 2009).

respect from the courts. Around 1860 a shift appeared, and courts began to recognize ownership to copyright either through express or implicit contracts. The development led to a situation in which, at the beginning of the 20th century, the default rule became the opposite of what it had been before 1860: employers became entitled to their employees' creative works in the absence of an agreement to the contrary.³²

Fisk tries to explain this development and the adoption of the legislative legal fiction of employer creation by referring to some specific historical developments. She argues that the cases where the question of employer ownership of employees' creative products were presented profoundly affected the courts' perceptions of the situation. The overwhelming majority of 19th-century cases involved either legal publishing (court reporters and treatise authors) or the theatre.³³

Fisk explains how courts were able to reconcile employer ownership with authors' rights in some cases by elaborating a fiction of employer authorship (employer control and instructions) and in others by positing the existence of collective creation.³⁴ Fisk also points to the fact that most of the so called "employed" authors during the 19th century were "independent contractors" and outside the scope of labour law as characterized by the master-servant law.

One reason behind the breakthrough of the work-for-hire-doctrine was the increase in collaborative forms of production, especially collaboratively produced commercial media. Firms naturally claimed ownership to these important assets within the corporate form of business organizations that developed during the end of the 19th century.

Within copyright, the US Constitution has not been seen as problematic for the US work-for-hire doctrine, which expressly recognizes the employer as author as a legal fiction.³⁵ The fact that US copyright law has adopted such a legislative exception to the main rule that the physical author is the original rightholder illustrates that even in the US the starting point is rather similar to the one in European jurisdictions.

The work-for-hire doctrine also illustrates the tensions between US law and the Berne Convention regarding moral rights. On the other hand, the work-for-hire doctrine is not so far from the presumption rules we find in European Union law, although the European law is based on the starting point that the rights of the employer must be based on a derivative right, an assignment from employee to employer. The concept of collective works which is known in French law also shows some similarities to the "work for hire" doctrine.³⁶

The Dutch debate and practice around sections 7 and 8 of the Dutch Copyright Act of 1912, which clearly inspired by the US example three years earlier, show that in fact a very pragmatic approach to moral rights for authors has also been in place in Europe for more than 100 years. The tension between such a clause and the

³² See Fisk (2003), 5–6.

³³ Fisk (2003), 7.

³⁴ See Fisk (2003), 8.

³⁵ The Netherlands adopted a similar solution in 1912.

³⁶ See Chapter 7 of this book, written by Sylvie Nérissou and Stéphanie Le Cam.

moral rights under the Berne Convention has resulted in a number of court cases and interpretative problems.³⁷ Some aspects of the scope of application, especially of section 8 and its application to independent contractors of commissioned works, are still under debate.³⁸

Within US patent law there have traditionally been some features which have led to much attention being paid to the first and true inventor, the individual behind the invention. The origin of the focus on the “the first and true inventor” was already to be found in the British Statute of Monopolies originating in 1623.³⁹ The focus on the circumstances of the inventive process clearly also includes a focus on the behaviour of the individuals involved. Adam Mossoff shows how the focus on the first and true inventor in combination with the developing requirement of novelty was actually linked to the labour theory of property introduced by Locke. He explains how the standard for novelty developed, from exploring whether the invention violated the practice of a trade at the time of the grant, towards whether the invention was “used before and known by” those in the trade. The relevant question was whether the patented product was the result of the inventor’s own labour. And the test for this was whether anyone at any time in the past knew about or used the patented invention within the realm. If yes, the invention could not be regarded as the result of the inventor’s own labour and thus he failed to rightfully earn his patent. In this sense the true and first inventor had a natural right to be recognized as the creator.⁴⁰

Also, in the many jurisdictions that traditionally have based themselves on the first-to-file principle, the requirement that the real inventor has to be mentioned in the patent application has strong roots and has also been codified in the Paris Convention, as mentioned above. On the other hand, there has always been consensus that the legal person to whom the patent rights are transformed can apply for the patent. Even in the US, where the copyright law recognizes a codified work-for-hire doctrine, patent law presupposes that the initial owner of the right to an invention is always the physical person, the inventor.⁴¹

1.3.5 Summing Up – What Had to Be Regulated?

It is rather paradoxical that within intellectual property law and doctrine the moral rights of the author within copyright have been considered very important while the “moral rights” of the inventor have never received the same attention. Still, it seems

³⁷ See J. Seignette, “Authorship, copyright ownership and works made on commission and under employment” in Bernt Hugenholtz, Antoon Quaedvlieg and Dirk Visser (eds), *A Century of Dutch Copyright Law, Auteurswet 1912–2012* (deLex B.V. 2012), 127–140.

³⁸ *Ibid.*, 140.

³⁹ See Justine Pila, “‘Sewing the fly buttons on the statute’: employee inventions and the employment context” (2012) 32 *Oxford Journal of Legal Studies* 265–295.

⁴⁰ See Mossoff (2000–2001), 1307–1308.

⁴¹ See J.J. Hawley, M. Trimble and D.C. Wilson, “United States of America” in S. Wolk and K. Szkalej (eds), *Employees’ Intellectual Property Rights* (2nd edn, AIPPI Law Series, Kluwer 2018), 649–661.

that the right to be named as inventor and receive recognition for the invention is a well-respected right globally and a fundamental building block for the international patent system.

As regards employee IP, against this background we can note that the important issues which a legal system has had to address include, at least, the following: whether employees as creators or inventors obtain any rights to works or inventions that they have created. Here we can see that they usually get the recognition right or the right to attribution and an original entitlement and that there must be an assignment whereby rights are transferred from the employee to the employer. The exception is the legal fiction where the employer by law is made the “creator” of such works.

There are several options as to how the assignment can be made. Contractual means are most common, but there is a wide variety as to how these contractual arrangements can be regulated, from complete contractual freedom to different restrictions or guidelines. Presumptive rules or implied rules are common; if nothing is agreed, the right to the employee-created work or invention is considered to have been transferred. The presumptive rule might also include parallel rights, shop rules which can give the employer a right to exploit IP although the “ownership” stays with the employee. There can be different kinds of time limits involved: the employer may be given a reflection period during which IP can be claimed. The assignment of moral rights has to be evaluated separately from the issue of economic rights. But even with economic rights, there might be some restrictions, and there might exist a residual remuneration right that is left after the transfer of certain exclusive rights (so called unwaivable rights).

1.4 IP AND EMPLOYMENT IN THE FACE OF CHANGING TECHNOLOGY

1.4.1 IP between Continuity and Change

Regulatory development within IP during the seven decades since World War II has been closely intertwined with and linked to technological development. Technological development has had a significant impact on the copyright legal regime, but patent legislation has very much remained the same when it comes to its basic material content. The unchanged legal form has, however, not restricted changes in patent policies and practices, where we can see different features evolving in different fields of technology.

Although technological development has brought many changes in law, the regulatory regime regarding the right to employee inventions and creations has very much remained intact. The description Professor Berndt Godenhjelm made in his monumental Chapter (7) on Employee Inventions in 1975 is still valid today, with the exception of the regulatory regime in the former East European Soviet bloc. We have some countries with regulation by provisions in a special statute (the Nordic and German Acts as prominent examples), we have countries where the issue is regulated

in a Patent Act and we have countries where the regulation is mainly based on contract law and connected case law.⁴²

It is perhaps surprising that, in spite of rapid technological transformation, the law on employee inventions has remained largely unchanged. The stability of the legal regulation also applies to copyright, although there are some developments we have to take note of. In copyright the variety of works has grown, as well as the different forms in which a work might appear.

Copyright started from the printing of books. The next step was the printing of newspapers. Artists made paintings, paintings became part of marketing and design. Theatre became more common. The development included the introduction of employees specializing in producing works or creations that were protected by IP. The issue of employee IP was rarely in the focus of the efforts of the legislator. The issue could be managed by contractual arrangements and the development could also show different features in separate sectors. Journalists formed trade unions or other organizations in order to promote their interests, and in many countries clauses on IP were introduced in collective agreements, while in the theatre, with its performing artists, the question of copyright was important mainly for the playwrights, and copyright issues were not regarded as an employee IP issue.

Many of the traditional professions where IP was produced were regarded as free professions, with freelancers, so the persons working in these fields did not meet the requirements for working in an employment relationship. This was also very much due to the fact that these persons did not work for one and the same company, but had many contractual partners, as typified in the professional practice of photographers or musicians.

The general trend to strengthen IP by, for instance, prolonging the term of protection to cover 70 years from the death of the author, also worked against the extensive recognition of employee rights. It was generally already difficult to justify to the general public why the grandchildren of an author should still be entitled to remuneration for copies sold 100 years after the creation of a book or song. It was even more so if the author had been employed by a company which had paid wages to the author for his work during the time of the creation. The general tendency to reward not only personal genuine creativity, but also investment in and organization of creative work with IP was also at odds with a notion of individualistic IP (and with employee IP as one form of this individualistic approach). The film director, the producer of music, the broadcasting company, the producer of a database are all persons entitled to copyright or to so-called neighbouring rights.

The digital revolution has had a huge impact on IP and also on the economic significance of IP. The whole data programming industry has been based on copyright protection. This area of IP is, however, not so focused on individual creative performance and we do not see much recognition in the form of identification of creators

⁴² See Berndt Godenhielm, "Employee inventions", Chapter 7 in Eugen Ulmer (ed.) *International Encyclopedia of Comparative Law* (J.C.B. Mohr (Paul Siebeck) 1975).

or their moral rights; although we do have heroes in this profession as well, for example, the creator of the Linux program (Linus Torvalds). In fact, it has even been argued that moral rights are of no relevance in the context of databases. It therefore comes as no surprise that the position of employees doing data programming under the European Union Directive on the legal protection of computer programs was specifically regulated, although the Directive otherwise closely followed the general approach under the Berne Convention.⁴³

This is illustrated by the fact that the specific features of data programming did not hinder an application of the Berne Convention when it came to the term of protection. Authorship was also defined by closely following a European interpretation of Berne. Here it was stated that the author of a computer program shall be the natural person or group of natural persons who has created the program or, where the legislation of the Member State permits, the legal person designated as the rightholder by that legislation. Where collective works are recognized by the legislation of a Member State, the person considered by the legislation of the Member State to have created the work shall be deemed to be its author. In respect of a computer program created by a group of natural persons jointly, the exclusive rights shall be owned jointly.

A regulatory novelty, a mandatory presumption rule, was introduced regarding employee IP: “Where a computer program is created by an employee in the execution of his duties or following the instructions given by his employer, the employer exclusively shall be entitled to exercise all economic rights in the program so created, unless otherwise provided by contract” (Article 2). This presumption was later also introduced in the Database Directive.⁴⁴

This approach was actually adopted at EU level for the first time as an optional choice for Member States in the Directive on the legal protection of topographies of semiconductor products in 1986. Here it was stated that Member States may provide that, where a topography is created in the course of the creator’s employment, the right to protection shall apply in favour of the creator’s employer unless the terms of employment provide to the contrary.

As we have seen in specific cases, the EU regulatory framework has introduced a presumption in favour of the right of the employer regarding copyright created within the framework of an employment relationship. These rules have resulted in two different interpretations regarding the general state of the art: some argue that the explicit legislative provisions have been necessary since they codify the exception to the main rule which is that there is no general presumption in favour of the employer. Others claim that these rules reflect the general principle that an employer is entitled to attain copyright in a work that is created within the employment relationship or in

⁴³ European Union Directive 91/250/EEC of 14 May 1991. This Directive was later consolidated as Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs.

⁴⁴ See the Directive on Databases 96/9/EY and the Directive 87/54/EEC of 16 December 1986 on the legal protection of topographies of semiconductor products.

other words “is created by an employee in the execution of his duties or following the instructions given by his employer”.

One relatively recent development in IP law is its human rights dimension.⁴⁵ One could even argue that human rights form a modern version of moral rights in the sense that the justification for such rights is found in the inherent dignity and worth of all persons creating scientific, literary or artistic products.⁴⁶ However, the human rights dimension goes beyond the moral rights approach since, under the International Covenant on Economic, Social and Cultural Rights, it covers “the protection of the moral and material interests” resulting from creative work.⁴⁷ In 2005, the UN Committee on Economic, Social and Cultural Rights adopted a General Comment on the interpretation of this Article 15.⁴⁸ Here the Committee points out that the author under the Convention always refers to natural persons and that the entitlements of legal entities are not protected at the level of human rights.⁴⁹ The right to benefit from the protection of the moral and material interests resulting from one’s scientific, literary or artistic productions can, however, under certain circumstances, also be enjoyed by groups of individuals or by communities. The Committee further refers to the concept of material interests and notes a close linkage with the right of any worker to adequate remuneration, which is codified in Article 7(a) of the Covenant. The linkage to remuneration for employee IP is evident.⁵⁰ It is not a very controversial conclusion to argue that a grave infringement of employees’ IP rights may also constitute a violation of human rights.

1.4.2 The Development of IP Management and Governance

We have seen that the development of employee IP legislation has been rather sparse over many decades. This fact should not be taken as an indicator that the handling of IP in employment relationships is still similar to what it has been. The rise of “the knowledge society”, the fourth industrial revolution and breakthrough of IP-based

⁴⁵ One can of course argue that IP law has always contained a human rights dimension, but the debate on this topic has exploded during the last decades.

⁴⁶ International Covenant on Economic, Social and Cultural Rights. Adopted and opened for signature, ratification and accession by General Assembly resolution 2200A (XXI) of 16 December 1966, entry into force 3 January 1976, under Article 27. See especially Article 15 para. 1(c) of the Covenant. See also Aurora Plomer, “Human dignity and patents” in Christophe Geiger (ed.), *Research Handbook on Human Rights and Intellectual Property* (Edward Elgar Publishing 2015), 479–495.

⁴⁷ Article 15 para. 1(c).

⁴⁸ General Comment No. 17.

⁴⁹ Under the European Convention on Human Rights, the protection of property has, however, been extended to intellectual property rights. See L.R. Helfer and G.W. Austin, *Human Rights and Intellectual Property. Mapping the Global Interface* (Cambridge University Press 2011), 63.

⁵⁰ See also Niklas Bruun, “Article 17(2) right to intellectual property” in Klaus Lörcher, Filip Dorssemont, Stefan Clauwaert and Mélanie Schmitt (eds), *The Charter of Fundamental Rights of the European Union and the Employment Relation* (Hart Publishing 2019), 377 ff.

products and services have brought about huge changes in how IP has been handled and governed. The development has brought about changes regarding how IP is created, how it is exploited and how it is valued. Here again we can only paint a rather broad and simplified picture of a rather complex reality.

The background for this development is that intellectual property rights (IPRs), as tools for innovation governance, can be described as being performed at least at three different levels: (i) the level of society, governments and legislation, (ii) the level of markets and (iii) the level of organizations of various kinds (companies, universities, etc.).⁵¹ From this point of view, legislation and law-based institutions like patent and trade mark offices and others can be seen as the basic infrastructure in which different actors, including governments, operate. From this perspective it is not a problem, but rather an advantage that the basic infrastructure for employee IP is stable and predictable.

Granstrand argues that this notion of IPRs as governance tools has a number of important dimensions: dissemination of patent information helps inter-organizational coordination of R&D across firms, industries and nations.⁵² The IPR system facilitates trade and transfer of IP through licensing, which can take place by using a variety of licence types and payment schemes that altogether govern flows of new technologies and knowledge resources. Licensing could also be used internally by firms, not only to govern intra-firm technology transfer but also for financing in-house R&D as well as for corporate venturing. Granstrand furthermore underlines that if IPRs are functional for governance through incentivizing and coordinating inventive and innovative activities, it is natural to ask if firms could create additional “extra-legal IP rights systems” of their own. He seems to regard traditional reward schemes for internal ideas as one form of such private ordering. He also argues that the growth of open innovation justifies more attention and attempts to create such systems.⁵³

We must recall that the third industrial revolution was information-intense, and knowledge and science became crucial factors of production. During this period, the main players were big national corporations, national champions that expanded to opening global markets. These companies had huge R&D departments and often developed knowledge and technology in-house. The process of inventing and creating became systematic and collective. It also had to be properly managed. Companies had to decide what knowledge should be protected by IP, what knowledge could be shared by others and so on. During this period IP became much more important; information could be exploited by IP and the development described by Granstrand took place.

Up until the 1980s, the in-house corporate R&D laboratory had been a major component of the prevailing corporate model for technological advancement and success. Starting in the early 20th century, a substantial proportion of all PhD scientists were

⁵¹ Ove Granstrand, *Evolving Properties of Intellectual Capitalism. Patents and Innovations for Growth and Welfare* (Edward Elgar Publishing 2018), 352.

⁵² Granstrand (2018), 355.

⁵³ Granstrand (2018), 356.

employed in well-funded separate research divisions within large corporations. In the 1980s the prevailing ideology slowly changed and these organizations asked, why integrate R&D into the firm when you could buy it externally and so reduce costs?⁵⁴ This concept could, however, only work if R&D is a distinct commodity in a well-functioning market that is a result of the commodification of science and where intellectual property can function as a tool for managing this development.

The development of governance of IP and management of the creative process resulting in IP has taken place in various ways in different sectors depending on the role IP has for concrete products and services. As we know, a pharmaceutical patent usually covers a product, a drug that has been proven to produce some effects. The one and only patent is crucial for the final product. In the ICT sector, important products may contain hundreds of patents. The search for patentable solutions is a long-term effort, but one invention is only a small step forward; often the involved employees do not really know whether it might be of any real value for the employer company.

The growing complexity of the governance of the IP-protecting new technology is not only a result of the fact that different fields of technology have different specific features. It is also due to the fact that the business models for using this IP have evolved into complicated slicing up of users' rights; in copyright especially, this is common practice.

The systemic development of knowledge and information within companies, R&D activities and an increase in applications or claims for IP protection also set higher requirements for the governance or management of this process. Actors have to know what is in-house knowledge, what is background knowledge shared by all players, and what is foreground new knowledge, known by only a few.

Granstrand points out that investments made by companies in new technical knowledge have traditionally meant investments in mainly in-house R&D.⁵⁵ However, companies nowadays also increasingly build up their technology base using other strategies, for example by buying small innovative companies, which has become common practice in some branches, and by technology collaborations between different companies and organizations. The strategies of purchasing of licences and R&D services have also increased in parallel with technology scanning and technology intelligence.

If we contextualize these general remarks into concrete observations, the reality for companies for which IP is relevant was that they had to know what the tasks of their employees were, what they were doing and to create incentives for them to report on technological progress. Furthermore, decision making on what to patent, what to publish, and what to keep secret had to be taken in a fast and efficient manner. The timing of inventive activities, the identity of the inventors, and their role in the

⁵⁴ See Filip Mirowski, *Science Mart – Privatizing American Science* (Harvard University Press 2011), 16.

⁵⁵ Granstrand (2018), 63.

development of the invention all had to be known. This knowledge has a twofold function: it not only helps the company to protect and claim IP and establish its ownership to any rights; it also serves the employer to fulfil its obligations towards the employees in the form of remuneration and incentivization. The regulation of employee inventions has this twofold function, in particular, but it is also relevant for copyright. The employer has to keep track of authorship of employee copyright, and management is important here, too.

The need for clear and transparent IP management systems in relation to employees is also evident from the fact that IP-intense companies have very often adopted internal rules or regulations for the internal handling of IP. In some countries, national legislation can give some dispositive guidelines on this issue, while in other countries that is not the case. In spite of that, the internal handling of creative or innovative value-creating activities can be regulated internally. In particular, when the employer needs to make sure that IP rights are transferred from the employee to the employer there is a need for regulation on how this can take place.

During the fourth industrial revolution, the need for efficient management of IP continues to grow. This period is often described by keywords such as globalization and decentralization, the latter in the sense that big organizations are replaced by more flexible network-organizations and some of the R&D work is outsourced in different ways to start-ups and to industry–university collaborations. In this context it becomes extremely important to keep track and manage information and knowledge, to define trade secrets, open knowledge, and what should be protected. These decisions have to be deeply embedded in the general business strategy of the company, otherwise bad IP management might have disastrous consequences.

Ulf Petrusson gives a good description of the need for capabilities that are necessary for knowledge-intensive business and for their employee inventors in order to create value.⁵⁶ The capabilities to document and in other ways capture the invention are important, and also crucial are the capability to govern the organizational implementation of the invention by training that can promote careers and the capability to govern production processes.⁵⁷

1.4.3 The Labour Law Picture

1.4.3.1 A historical overview

The evolution of labour law since World War II can generally be described as starting in the late 1940s with the post-war rebuilding phase, when labour law, unionization and also employer organizations were developed and strengthened. This period also saw an expansion of labour law partly coordinated by the ILO and also promoted by the social-democratic European labour movement, which formed a democratic alternative to the communism of the Soviet bloc and therefore was supported by moderate

⁵⁶ See Chapter 2 by Ulf Petrusson in this *Handbook*.

⁵⁷ Ibid.

employers. The tripartite cooperation in the ILO was to a large extent formed by this political context during the post-war years and this became very visible after the collapse of the Soviet Union and the European socialist bloc: in the early 1990s, influential representatives for the employers' organization did not see any role for tripartite cooperation and questioned whether ILO cooperation was needed.⁵⁸

Labour law is very much a result of the mode of production during industrialization, when consumer goods are produced in huge quantities in big factories where the employees can form trade unions for different sectors of industrial production.

The third and fourth industrial revolutions have changed the societal preconditions for labour law since the mode of production has undergone considerable changes.⁵⁹ Globalization has exported production units to countries with low wages and other production costs, while automatization has resulted in the disappearance of many manual jobs. The large number of unemployed is at least partly a consequence of the fact that there are no longer many jobs for unqualified (unskilled) workers. Society has been transformed into a service society where shops are open very late, where services are provided 24/7 online or manually. Women have largely entered the labour market, part-time and temporary work has become the new normal, along with temporary agency work, platform work and on-call work. The trade unions in most countries are in decline and labour laws are being deregulated since they are regarded as obstacles to access to the labour market and for small entrepreneurs to expand their activities.

In this context it is not possible to go into detail regarding the evolution of labour law generally. It is, however, necessary to point out some determining factors that can explain the changing status of professional employees or white collar workers who form the group that normally produce or create results in their work that can be protected by IP.

1.4.3.2 The changing status of professional “white collar” employees

The first general trend we must note is that the number of persons employed in tasks that are IP related has grown significantly in all developed countries during the last 50 years. The number of academically or professionally educated persons has grown exponentially, as has the number of students enrolled in educational institutions in technical or cultural fields.

The changes in organizations that employ these professional workers have resulted in a tendency towards less stable employment relationships for these employees compared with the situation in the 1960s and 1970s. The management policy for the employers at that time was that professional workers had stable lifelong employment

⁵⁸ See Kari Tapiola, *The Teeth of the ILO. The Impact of the 1998 ILO Declaration on Fundamental Principles and Rights at Work* (ILO 2018), 9.

⁵⁹ See Hyden, Håkan, “Normativa grundmönster – mot en teori om rättsliga förändringsprocesser” (“Normative patterns – towards a theory of legal transformation processes”) in volume in honour of Anna Christensen, Ann Henning (ed.) *Normativa Perspektiv* (“Normative perspectives”) (Juristförlaget i Lund 2000), 119–155.

contracts and this group of workers was not affected by workforce reductions during redundancies and collective dismissals. These employees were seen from a strategic point of view as key employees and they usually had deep insights into the key technology or activities of the employer. At that time corporations usually also had one clear home-base, and could justifiably be referred to as “national champions”.

During the third and fourth industrial revolutions this picture has changed profoundly and the position of the numerous professional employees has become very similar to that of the rest of the workforce. Redundancies and workforce reductions apply similarly to everyone. The employer is more rarely a large corporation but often a subsidiary to a multinational group of companies. Professional employees are employed for fixed-term projects by flexible organizations with many parties, sometimes including universities or other educational institutions. Restructurings, transfers of undertakings, start-ups and venture companies also create a permanent flux in the structures and activities of the employers. For professional employees, therefore, we have seen a transformation from the perspective of having stable employers offering permanent employment and lifelong careers towards a situation with flexible, often multinational employer companies, rapid changes and a risk allocation where professional workers cannot count on lasting employment, but can only rely on their knowledge and capabilities to find new employment (employability) in a situation of redundancy. In some countries, for instance the Nordic ones, this changed status of professional workers has led to increased unionization.

One important global development among big multinational groups of companies is that they have to a large extent outsourced their R&D activity, as noted above. Those companies that some time ago had huge research departments have usually made – at least some – efforts to slim that organization and to partly replace it by outsourcing different projects, by entering into different forms of research cooperation with other companies and by cooperation with universities and research organizations and with start-up companies. From the point of view of management policy, these policies will decrease the number of permanent employee positions and create more fixed-term positions within projects and for risk-taking small entrepreneurs.

Different groups of professional workers are in slightly different positions. Some of them have a clear professional identity. An example is journalists, who produce works protected by copyright and have a rather uniform professional profile. The same apply to programmers in the data industry, designers in the fashion industry or copywriters within advertising agencies.

For such groups there might develop rather stable practice within different professions, in many countries also confirmed by collective agreements. In these collective agreements we also sometimes see clauses on copyright. In the Nordic countries copyright is dealt with in such collective agreements and often the main disagreement over the content of such agreements will be copyright related. In particular, the question of whether agreed wages should cover secondary use of some copyrighted works has been controversial; for example, when digital media started to develop, it was asked whether employees should be entitled to some additional compensation for the use of the employed journalists’ articles in digital media.

Although collective agreements on employee IP are relevant in some countries, the general picture both in Europe and globally is that employee IP is predominantly dealt with as an individual issue between the employer and the employee. The reasons for this are rather obvious; creative and inventive activities are always individual, even when the process of creation or invention is done in a group by a collective. The most radical examples of regulation through collective agreements can be found in Sweden, where what are termed “non-compete” contracts and employee inventions are both comprehensively regulated in collective agreements entered into by the labour market parties.⁶⁰

The obvious exception and spillover effect from labour law into copyright are the extended collective licences. They form a part of collective agreements for authors and copyright holders. The extended collective licensees have recently been codified in EU law in the Directive on copyright and related rights in the Digital Single Market (DSM Directive).⁶¹

1.5 THE NEW TRENDS AND THEIR IMPLICATIONS – NON-COMPETES AND TRADE SECRETS

1.5.1 Background

The digital revolution has had an enormous impact on how information is created, used and stored in companies. Globalization has created a real international labour market for inventors and creators. At the same time, the new technology has created new ways for conducting industrial espionage or for producing counterfeit products or copies. Also the technical means for stealing or copying information have radically improved, so that it is very easy for an employee to leave the employer company with a significant amount of confidential information on a memo stick or in another format without having to make any effort that will attract attention.

⁶⁰ See Bengt Domeij, *Från anställd till konkurrent* (“From employee to competitor”) (Lojalitetsplikt, företagshemligheter och konkurrensklausuler 2016).

⁶¹ Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC. According to the Preamble (at 47) it is important that mechanisms of collective licensing with an extended effect are only applied in well-defined areas of use, in which obtaining authorization from rightholders on an individual basis is typically onerous and impractical to a degree that makes the required licensing transaction, namely one involving a licence that covers all rightholders concerned, unlikely to occur due to the nature of the use or of the types of works or other subject matter concerned. Such mechanisms should be based on objective, transparent and non-discriminatory criteria as regards the treatment of rightholders, including rightholders who are not members of the collective management organization. In particular, the mere fact that the rightholders affected are not nationals or residents of, or established in, the Member State of the user who is seeking a licence, should not be in itself a reason to consider the clearance of rights to be so onerous and impractical as to justify the use of such mechanisms.

This general development has resulted in serious efforts by the corporate world to protect trade secrets, internal know-how and other forms of strategic knowledge. The fact that many employees nowadays tend to change employer quite often is also a factor behind this trend. The development of far-reaching contractual arrangements for protecting in-house information, not least in relation to those employees who work with and develop this information, has been a prominent feature of the development in corporate practice. This practice has in many cases gone so far that the legislators in many countries – while recognizing that there are serious problems – have imposed limits on how far employers can go in order to keep information undisclosed and avoid competitors “freeriding” on information that they have received by unfair methods.

There is a very close link between intellectual property rights and trade secrets in the sense that the employer always has a choice to either patent an invention or keep it as a trade secret.⁶² The problem in such a situation of confidentiality is of course that the moral rights of the inventor will not be respected. No one will know the identity of the inventor in a situation where nobody knows about the invention. It is easier to guarantee the employee’s economic rights in such a situation; the legislators in some countries have expressly stipulated that when the employee is of the opinion that he/she has made a patentable invention, but the issue will never be tested due to the fact that the employer decides not to disclose the invention, the invention shall be dealt with as if it was patentable unless the employer is able to bring evidence showing that this is not the case.

1.5.2 Regulation of Non-Competition Clauses

The issue of protecting trade secrets by restricting former employees from taking up new employment is a classic one and it has been thoroughly dealt with in both the common law world⁶³ as well as in the continental civil law systems. As Blake points out, there is a long tradition in common law dating back to the 18th century, and even earlier, where non-competes are dealt with as a form of restraint of trade. In the British tradition, the case *Nordenfelt v. Maxim Nordenfelt Guns and Ammunition Co. Ltd* from 1894 formulated the modern doctrine on restraint of trade according to which all restraints are prima facie void.⁶⁴ However, a restraint clause will be upheld in circumstances where it can be demonstrated that the restraint is “reasonable” both between the parties and with reference to public interest. *Nordenfelt* primarily involved the sale of business, but the argumentation of the Court explicitly included

⁶² Here we need not address the issue of whether or not trade secrets are a form of “intellectual property”; see Lionel Bentley, “Trade secrets. Intellectual property but not property?” in Helena R. Howe and Jonathan Griffiths (eds), *Concepts of Property in Intellectual Property Law* (Cambridge University Press 2013), 60–93.

⁶³ See Harlan M. Blake, “Employee agreements not to compete” (1960) 73(4) *Harvard Law Review* 625–691. JSTOR, www.jstor.org/stable/1338051, accessed 30 May 2020.

⁶⁴ This case is also referred to by van Caenegem in Chapter 13 of this book.

a statement according to which, when dealing with a restraint on trade between an employer and an employee, greater emphasis must be placed on protecting the employee's interest since there is a lack of freedom of contract between master and servant or between an employer and a person seeking employment.

The main perspective on non-competes in common law tradition has been that of competition and markets. In the civil law tradition the approach has to some extent integrated the competition perspective, but non-competes are also regarded as labour law issues of fairness in the relationship between the employer and the employee. Since the non-compete clause seriously restricts the possibility for the employee to find a new employer, such a clause should only be used when there are important reasons for it and the employee should be compensated for it economically, at least in situations where the clause is of significant duration. Non-compete clauses were regulated in the German *Handelsgesetzbuch* from 1897. The legislation on unfair commercial practices could in certain cases be applied against a former employee who, after the termination of the employment, started a business that competed with his/her former employer. This approach was later adopted by the legislators in all the Nordic countries.

The basic traditional starting point for evaluating non-compete clauses, which is still valid today, is that the non-compete clause cannot be justified in order to protect information and experience gained by the employee in the normal course of employment and such information that is generally known among persons within the circles that normally deal with the kind of information in question.⁶⁵

The application of this starting point is not very straightforward. There have been several problems with non-compete clauses in the evolving international business practice, which is mainly based on contractual arrangements.

As William van Caenegem and Alan Hyde both point out in their contributions in this book, the contractual arrangements often include far-reaching non-competes with excessive time durations, excessive economic sanctions and excessive personal scope of application. We also find a rather broad range of reasons for such clauses, for instance, "non-compete clauses" for protection of investments in education, stating that if the employer has contributed to or paid for the education of the employee, the latter is not allowed to take up a job with any competitor before a certain period (e.g. ten years) from the date the education was concluded.

The far-reaching contractual practice and the use of these clauses in order to exercise undue pressure on former employees not to take up activities in the same field as the former employer is not only a loss for the individual but also for society, in the sense that knowledge and resources cannot be used in a way that serves the interests of society.

⁶⁵ The EU Directive 2016/943 of 8 June 2016 on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure also sets out this starting point.

The reaction has been a reassessment of the legitimacy of non-compete clauses in many countries, for instance in the US and the Nordic countries, where a rather strict approach to use and conditions for using non-competes has been adopted by the legislators and also by the courts.⁶⁶ The reason for this is that non-competes clearly restrict the mobility of employees on the labour market, especially for professional workers. On the other hand, there is some evidence that non-competes might promote the willingness of employers to train and educate employees besides being regarded as an important tool by which trade secrets can be protected.

Non-competes are in fact a very blunt tool for achieving goals that can be achieved by tailor-made contractual clauses. There is, for example, no real significant reason why the issue of specific costs for education or training of an employee cannot be dealt with outside the area of non-competes by regulating the responsibility for these costs in a situation where the employer does not benefit from this investment.

Non-competes seem to have lost legitimacy due to the fact that professional workers can no longer count on job security and long careers with the same employer. In such a situation, where mobility is the new norm, non-competes should be restricted to a minimum and only be used when they are regarded as absolutely necessary.

There seems to be a significant consensus among economists and lawyers that several studies and the debate on non-competes have shown that the only really significant justification for non-competes is the protection of trade secrets. The reason for this is that there is no really effective means to control the actual behaviour of an employee who has started to work for a new employer and that the only efficient restriction is to prohibit such activity altogether. In order to avoid unnecessary prolongation of the period when the employee is hindered from taking up new employment, it is necessary to create some costs for an employer requesting such a prolongation. In many jurisdictions, therefore, the obligation to pay compensation to the employee who faces restrictions due to a non-compete clause has been introduced.

The underlying human rights approach to the right or freedom to work for individuals has also contributed to restrictions on non-competes. The right for everyone to freely take up a profession or a job is also restricted by non-competes. Respect for the dignity of the worker requires the legislator to set clear limits for contractual freedom in this field.

The general trend, at least in developed knowledge-based economies, is towards restricting the scope of application and use of non-competes. On the other hand, there is a general trend in the opposite direction by strengthening the protection of trade secrets and especially the means and tools that the employer can use when an unjustified disclosure of a trade secret has taken place.

⁶⁶ See Domeij (2016).

1.5.3 Trade Secrets and Employees

The protection of trade secrets attempts to strike a balance between exclusivity on the one hand and access to information on the other. Employees leaving for competitors naturally desire to be able to move freely between employers, bringing with them all the knowledge, information, skills and capabilities they have developed during their earlier career. The former employer, on the other hand, wants to retain knowledge of technology and strategy, as well as knowledge of customers' identity and contracts.⁶⁷

Trade secrets differ from patents and copyrights in that they will not necessarily ever be made public, and there are no moral rights involved, such as the right to attribution. The employee will usually not get public recognition for having developed a trade secret, but he will for a patentable invention or a significant copyright-protected work. There is no entitlement to extra compensation, although internal reward systems might apply in some organizations. When a trade secret becomes public, it is free for everyone to use and the investments made in developing it can usually not be recovered.

The regulation of trade secrets has drawn a lot of international attention during the post-TRIPS period. The definition of trade secrets in the TRIPS Agreement, which has its roots in US legislation, has been adopted globally and issues relating to the enforcement of sanctions against unlawful acquisition, use and disclosure of trade secrets have been high on the agenda.⁶⁸ In practice, the protection of trade secrets has particular relevance in relation to employees who usually have not only knowledge about but also a high degree of unsupervised access to trade secrets and therefore acquisition is in many cases quite easy for them. The arguments for increased protection for trade secrets have usually been that the value of information in the economy has grown and that employee mobility has risen. On the other hand, one may ask whether this increased mobility may also be used as an argument for rethinking the concept of "trade secret", since an employer that offers (implicit) contracts for lifetime employment should be able to insist on ownership of a broader range of information than today's software company that hires only for the job, on the understanding that employees will be back on the job market in six months or so, hoping to trade on what they learned at the last employer.⁶⁹

During the preparatory work for the new EU Directive, there was an awareness that a very strong protection for trade secrets might have unintended negative con-

⁶⁷ See Bengt Domeij, "The Trade Secrets Directive and employees" in J. Schovsbo, T. Minsén and T. Riis (eds) *The Harmonization and Protection of Trade Secrets in the EU. An Appraisal of the EU Directive* (Edward Elgar Publishing 2020), 149–170 and Magdalena Kolasa, *Trade Secrets and Employee Mobility. In Search of an Equilibrium* (Cambridge University Press 2018), 7–36.

⁶⁸ The EU Directive 2016/943 of 8 June 2016 on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure is a prominent example of the increased attention paid to the protection of trade secrets.

⁶⁹ This is what Alan Hyde argues in Chapter 3 of this book.

sequences for labour mobility specifically and for labour relations and freedom of speech in the workplace more generally. Therefore these issues received attention not least in the European Parliament.

In the Preamble there is an explicit clause requesting that the Directive should not be understood as restricting the freedom of establishment, the free movement of workers or the mobility of workers as provided for in Union law. Nor is it intended to affect the option of concluding non-competition agreements between employers and employees, in accordance with applicable law.⁷⁰

There is also an explicit clause stating that the Directive should not affect the right of social partners to enter into collective agreements, where provided for under labour law, as regards any obligation not to disclose a trade secret or to limit its use, and the consequences of a breach of such an obligation by the party subject to it. This should be on condition that any such collective agreement does not restrict the exceptions laid down in this Directive, when an application for measures, procedures or remedies provided for in this Directive for alleged acquisition, use or disclosure of a trade secret is to be dismissed.⁷¹

Furthermore it is stated, against the background that the Directive provides for measures and remedies which can consist of preventing the disclosure of information in order to protect the confidentiality of trade secrets, that it is essential that the exercise of the right to freedom of expression and information, which encompasses media freedom and pluralism, must not be restricted, in particular with regard to investigative journalism and the protection of journalistic sources.⁷²

The measures, procedures and remedies provided for in the Directive should not restrict whistleblowing activity. Therefore, the protection of trade secrets should not extend to cases in which disclosure of a trade secret serves the public interest, insofar as directly relevant misconduct, wrongdoing or illegal activity is exposed. This should not be seen as preventing the competent judicial authorities from allowing an exception to the application of measures, procedures and remedies in a case where the respondent had every reason to believe in good faith that his or her conduct satisfied the appropriate criteria set out in this Directive.⁷³

These statements in the Preamble have been followed up in the Directive. Article 5 provides for certain exceptions: under this provision,

Member States shall ensure that an application for the measures, procedures and remedies provided for in this Directive is dismissed where the alleged acquisition, use or disclosure of the trade secret was carried out in any of the following cases:

- (a) for exercising the right to freedom of expression and information as set out in the Charter, including respect for the freedom and pluralism of the media;

⁷⁰ Preamble, 13.

⁷¹ Preamble, 12.

⁷² Preamble, 19. The fact that media freedom and pluralism are reflected in Article 11 of the Charter of Fundamental Rights of the European Union is also referred to here.

⁷³ Preamble, 20.

- (b) for revealing misconduct, wrongdoing or illegal activity, provided that the respondent acted for the purpose of protecting the general public interest;
- (c) disclosure by workers to their representatives as part of the legitimate exercise by those representatives of their functions in accordance with Union or national law, provided that such disclosure was necessary for that exercise;
- (d) for the purpose of protecting a legitimate interest recognised by Union or national law.

These cases of justified revealing of trade secrets appear quite rarely in practice, but their codification is a clear indication of the new intervention of human rights approaches to the employment relationship and the need to allow whistleblowing. On the other hand, the Directive is general in its approach and treats employees as any other parties in contractual relationships without introducing different specific sanctions for them.

The only important exception in this regard is Article 14(1): “Member States may limit the liability for damages of employees towards their employers for the unlawful acquisition, use or disclosure of a trade secret of the employer where they act without intent.” This is an exception to the main rule in the same paragraph, according to which Member States shall ensure that the competent judicial authorities can order an infringer, who was engaging in unlawful acquisition, use or disclosure of a trade secret, to pay the trade secret holder damages appropriate to the actual prejudice suffered as a result of the infringement.

The main problem with trade secrets has always been that they fit badly into the system of general intellectual property law.⁷⁴ Patent law has been justified as a reward for inventors who disclose their technology to wider society, while trade secret law seems to encourage inventors not to disclose their inventions. And yet trade secrecy offers some significant advantages for inventors compared to patent protection. It is cheaper and quicker to obtain, it may last longer and it extends protection to types of business and process information that might not be patentable. On the other hand, trade secrecy is useless when the invention can easily be traced from an end product by reverse engineering. Trade secrecy only works when valuable information is and can be kept confidential. The main justification for protection of trade secrets is that without such protection we would likely see even more efforts towards (factual) secrecy.⁷⁵

From the point of view of employees, strong trade secrecy protection is problematic. It is not always easy to draw the line between, on the one hand, trade secrets

⁷⁴ The EU Directive explicitly denies the IP character of trade secrets protection. In the Preamble (16) it is stated that this Directive should not create any exclusive right to know-how or information protected as trade secrets. This view is shared by many IP researchers; see, for instance, Ghidini, G and V. Falce, “Trade secrets as intellectual property rights: a disgraceful upgrading – Notes on an Italian ‘reform’” in R.C. Dreyfuss and K.J. Sandberg (eds), *The Law and Theory of Trade Secrecy* (Edward Elgar Publishing 2011), 140–151.

⁷⁵ See Mark A. Lemley, “The surprising virtues of treating trade secrets as IP rights” in R.C. Dreyfuss and K.J. Sandberg (eds), *The Law and Theory of Trade Secrecy* (Edward Elgar Publishing 2011), 109–139.

and, on the other, experience and skills gained by employees in the normal course of their employment or information generally known among, or readily accessible to, persons within the circles that generally deal with the kind of information in question. For that reason, employers also want to resort to non-competes in order to ensure that up-to-date knowledge is not transferred to the new employer.

For an employee it is also a problem that, by definition, the author or inventor of a trade secret will not obtain general recognition or attribution for his or her achievement. It is, of course, possible to internally cooperate to reward an inventor or author of a trade secret, but there are no legal obligations for the employer to introduce such systems.

The knowledge of the trade secret might in a complicated way be part of the intellectual capital of the employee. It is a challenge for modern IP and labour law to introduce some rights for an employee whose right to mobility has been restricted to gain some financial compensation. In fact, development regarding the regulation of non-competes indicates that employers requiring long abstention from working for competitors will have to pay compensation to their former employees.

1.6 THE CHANGED ROLE OF UNIVERSITIES, UNIVERSITY RESEARCH AND EMPLOYEES

1.6.1 General Trends

In many countries, there is one group of employees whose legal position has undergone profound changes regarding intellectual property rights. This group consists of university researchers. The change is not only due to the facts that the number of employees in academia has increased significantly and that their general position in many countries has been transformed towards that of employees in private companies. The new trend which Ann Monotti explores in detail in Chapter 12 is that national innovation policies urge or mandate university involvement in managing and exploiting IP that academic employees create for the public benefit.⁷⁶

There is broad common understanding that university–industry technology transfer forms an important – today even crucial – part of national innovation systems. There is also a growing awareness that academia can and should play a more efficient role in facilitating IP claims of research and in creating favourable opportunities for commercialization of research results. There has been a long series of international reports from the Organisation for Economic Co-operation and Development (OECD)

⁷⁶ See Ann Monotti in her Chapter on university employees and intellectual property in this *Handbook*. See also Monotti, Ann and Sam Ricketson, *Universities and Intellectual Property. Ownership and Exploitation* (Oxford University Press 2003) and Justine Pila, “Who owns the intellectual property rights in academic work?” (2010) 32(12) *European Intellectual Property Review*, 609–613.

stating that the potential for commercialization of research done within universities is not fully utilized.⁷⁷

An important element of the infrastructure for national innovation policy is IPR legislation. Traditionally this legislation has been regarded both as a provider of incentives for the generation of new knowledge and as a tool for spreading knowledge or disseminating new technology. Furthermore, the IPR regime has not been regarded as a direct tool or instrument for innovation policy, but more as a provider of a stable infrastructure and precondition for that policy. In this regard, there are several reasons for reconsidering these traditional roles of IPR legislation.⁷⁸ One of the many reasons for reconsidering some of the IP regulation is due to the changed role of academia in claiming IP for its research results and managing the commercialization of this IP.

The process of change in the role and tasks of academia in claiming IP has been profound globally, and not at least in Europe. Universities have been linked into and regarded as part of the national innovation systems. Structural and legislative changes have been undertaken and, as a result, universities are expected to play an active role in the promotion and commercialization of research results. In this context the role of researchers has changed profoundly, as we shall explain below.

1.6.2 Three Historical Models

Historically, the relationship between industry and academia has differed considerably over time. We can distinguish three different models.⁷⁹

The ivory tower or open research model

This model regards academia as the right place for basic research while applied research with IP potential should be done within research and development (R&D) and business research. The classic Humboldt University was largely built on such ideals. Some of the principles of this model are still much respected as ideal types,

⁷⁷ See for example OECD, *Turning Science into Business* (2003) and OECD, *University–Industry Collaboration. New Evidence and Policy Options* (2019).

⁷⁸ Several international reports stress the importance of IPR legal regimes as instruments for innovation policy. See Eric J. Iversen, “Fundamental and contextual issues involving the strategic use of IPRs” (Center for Innovative Research (STEP), Working Paper No. A-01, 2002), available at www.step.no/Notater/A-01-2002.pdf; Robin Cowan, Luc Soete and Chervonnaya Tchervonnaya, “Knowledge Transfer and the Services Sector in the Context of the New Economy” (Maastricht Merit-Institute, Research Memoranda 020, 2002), available at <https://collections.unu.edu/view/UNU:1093> and Wesley M. Cohen and Stephen A. Merrill (eds), *Patents in the Knowledge-Based Economy* (National Research Council 2003).

⁷⁹ The elaboration of this model categorization has been made in an international project led by Mats Lundquist and Ulf Petrusson, Center for Intellectual Property (Gothenburg, Sweden). The author was a part of this group.

although the divide between basic research and applied research in its traditional sense seems to be obsolete.⁸⁰

The unregulated collaboration model

The unregulated collaboration model represents a typical post-war Nordic/German approach. In this model, technology transfer takes place through collaboration between, on the one hand, individual researchers and research groups and, on the other, industry. The role of the university as an institution is only that of a facilitator. Universities have not been covered by the regulation of employee inventions in the private sector, which gives the private industry employer the right to its employees' inventions and entitles the employee to economic compensation for the assignment. Rather, in these countries the so-called "teacher exemption" applies. Cooperation between industry and academia takes place through individual professors, and often it is informally based on long-term mutual cooperation and trust. This is how big German and Swedish corporations have successfully cooperated with academia for decades. Companies like Astra, ABB, Volvo, Siemens, Mercedes-Benz, Eriksson and many more are good examples of this, and the same can be said of Nokia in Finland. The model seems to work especially well in small homogeneous countries, where flexible cooperation based on relations of trust is possible.

Nordic universities have long developed their contacts with society and industry in an informal and collaborative manner in which the individual researcher is regarded as the most important player on the academic side. The legal base for this collaboration has been the so-called "teacher exemption". The academic personnel have been exempted from the regulatory regime applicable to employees that gives the employer a right to claim rights to an invention made by the employee within the employment relationship. This legislation was introduced in the wake of World War II in Sweden and Denmark and confers the rights to inventions made at the university principally on the researcher. A similar solution was adopted by Finland and Norway as a result of the general Nordic harmonization within patent law that took place in the 1960s.⁸¹

State universities cannot claim ownership even if the resources for the research come from public funds. This leads to a situation where the researcher primarily makes the decision to develop an invention into a commercial product, and where the researcher can negotiate directly with a financier from industry, or decide to start up a spin-off company of which the researcher has whole or part ownership. These arrangements have clear advantages in options for free negotiation between inventors and financiers/developers, compared to other regulation systems. They also have

⁸⁰ See Mowery, David, Richard Nelson, Bhaven Sampat and Arvids Ziedens, *Ivory Tower and Industrial Innovation: University–Industry Technology Transfer Before and After the Bayh-Dole Act* (Stanford University Press 2004), 36.

⁸¹ For information on this background see Niklas Bruun, *Uppfinnarrätt i anställningsförhållande* ("Inventors' rights in the employment relationship") (Finlands juristförbund 1982), 23.

disadvantages since there is no clearly recognized or planned “innovation system”. Instead, many initiatives are made by individual researchers, who often have less knowledge and experience of developing and marketing. The risk that many innovations from the university sector are ignored and forgotten because of the fairly anarchistic organization of technology transfer seems to be rather high.

The licensing model for patentable inventions

The licensing model has been applied in the United States for many years and the Bayh-Dole Act of 1980 can be described as a typical legal form of that model. Technology transfer is seen as an important task for universities, which may acquire IP and sell licences to business. This is clearly a more formal approach than the traditional Nordic one.⁸²

Traditionally Europe has been divided into two different traditions. Countries which have detailed regulation on employee inventions have excluded university employees from the application (the teacher’s exemption). The reason has traditionally been that universities are not expected to apply for or use IP.

Around the turn of the millennium, the Nordic collaboration model was highly debated, and a wind of regulatory change was blowing. In Denmark (1999), Germany (2002), Norway (2003), Japan (2003) and Finland (2006) the law was changed and the teachers’ exemption abolished.⁸³ In Sweden a similar reform was under discussion, but the reform ended up staying at the level of contractual practice. This means that universities are entitled to acquire rights to inventions made by faculty members. There are several reasons for this. In a global environment, this kind of national research structure can no longer work; science has to become more formal and also more professional.

1.6.3 The Finnish Example

The teachers’ exemption was introduced in Finland in 1967, due to a wish to synchronize laws and regulations in the Nordic sphere.⁸⁴ With the Nordic university culture in a changing world, a clash arose between traditional academic norms and the development of an entrepreneurial culture in university settings. These two cultures involve different norm systems, which also implicate laws and regulations on different levels.

⁸² See Mowery et al. (2004); Michael J. Remington, “The Bayh-Dole Act at twenty-five years: looking back, taking stock, acting for the future” (2005) 19(6) *Journal Industry and Higher Education* 408–415.

⁸³ See Niklas Bruun and Michael B. Landau, “University and employees’ inventions in Europe and the United States” in Wim Helwegen and Luca Escoffier (eds), *Nanotechnology, Commercialization for Managers and Scientists* (Pan Stanford Publishing 2012), 291–337.

⁸⁴ A new law was introduced in 2006. For a commentary on the new legislation, see Niklas Bruun and Mikko Välimäki, *Korkeakoulukeksinnöt: Uuden lain tavoitteet, tulkinta ja käytäntöön soveltaminen* (“University inventions, the new Act, its purposes, interpretation and use in practice”) (IPR University Center 2007).

One of the reasons for the changes in the Finnish law pointed towards the difficulties with a teachers' exemption in the new and growing research landscape. Total external financing to universities was only 8 per cent in 1985, in 2002 it was 37 per cent, and the trend has continued; in 2017 it was 52 per cent.⁸⁵ In 2017 the external financing for *research* in medicine was 63 per cent, in technology, 60 per cent, but in humanities, 38 per cent.⁸⁶

With a strong dependence on external financing, this new situation also resulted in larger projects and involvement of different types of personnel, some with other types of agreements on intellectual property rights. Even in the Finnish universities and high schools, the teachers' exemption was not applied to all research personnel. Membership of the European Union (EU) also demanded an adaptation to European law, since large EU projects with hundreds of different researchers in multinational collaborations made a teachers' exemption in some countries impossible to manage. Generally, the teachers' exemption made the development of innovations for commercial use difficult to deal with, and an imaginary innovation chain quite ineffective. Researchers often had difficulties finding appropriate support for the development, and, even if they did, the different ownership regulations for the members in a project group were a hindrance to successful commercialization.

When the law was set up, a distinction between "open research" and "contract research" was made. The teachers' exemption was abolished for the latter, but kept for open research. The term "contract research" was used when there were more financiers than the university research councils, which normally support basic research. Open research was defined as a project where there were no other financiers involved and no agreements were attached to the use of the research results. EU projects were always to be seen as contract research, since they always involved many financiers and interests. The new law also concerned all researchers in the Finnish university sphere and also those at professional high schools.

The changes in Finnish legislation have been strongly promoted by universities and by authorities in charge of R&D policies, less so by the industry. Generally, the industry argues that it is easier to negotiate with researchers that know and understand the subject matter than with tech-transfer officers who are more interested in following general policies and in creating a surplus for the university.

In Denmark and Germany, too, the experience from the new legislation is mixed and some critical voices are heard. The German policy that abolished the professor's privilege was based on the presumption that the costs and risks of patenting were so high that professors did not have sufficient incentives to patent, but that presumption was wrong with regard to those German professors who had prior connections with industry partners. For this important group of academics, patenting decreased sub-

⁸⁵ Statistics for 2017, Statistics Finland, www.stat.fi/til/tkke/2017/tkke_2017_2018-10-25_kat_004_fi.html.

⁸⁶ Ibid.

stantially.⁸⁷ Again, from the Danish experience of the new legal regime, we learn that there was a risk of universities concentrating too much on showing results in numbers of patented inventions instead of numbers of innovations that actually have led to commercial utilization.⁸⁸ In Norway there was a drastic decrease of patent applications with university academics mentioned as the inventor following the abolition of the “professor’s privilege”.⁸⁹

1.6.4 Towards the Entrepreneurial University

Three models were presented earlier. As has already been foreseen by several researchers, the latest developments make it plausible to see a shift towards a fourth model. They have introduced the concept of the “entrepreneurial university”, indicating that academic institutions are getting involved in the value-creating process emanating from research activities.⁹⁰ Here commercial utilization of knowledge is regarded as a core mission of the university, alongside education, research and public service. This ideal sets new demands for the management of research.

While the legislators in Europe seem to be moving from some kind of unregulated collaboration model based on free contractual relations towards a model resembling the US licensing model, it is clear, however, that academia is increasingly taking on features that can be related to the entrepreneurial university, where the process of research, identification of innovation, claiming of IP, and managing it and its commercialization mark a complex but integrated process, in which international networks and project collaboration play a crucial role. The university might step in and participate in or facilitate all of this. It might even set up and finance start-up companies and spin-offs or introduce venture capital in order to commercialize its innovations, but still the faculty researchers retain considerable control, discretion and accountability over the ways in which they engage in these new activities.

⁸⁷ Dirk Czarnitzki, Torsten Dopherr, Karin Hussinger, Paula Schliessler and Andrew A. Toole, “Knowledge creates markets: the influence of entrepreneurial support and patent rights on academic entrepreneurship” (2016) 86 *European Economic Review*, 131–146, at 137.

⁸⁸ For an evaluation report in Danish, see Inside Consulting, Cowi A/S and Eskil Hansen (for Videnskabsministeriet), “Evaluering af forskerpatentloven” (“An evaluation of the Danish Act on Researchers’ Patents”) (2004).

⁸⁹ Hans K. Hvide, and Benjamin F. Jones, “University innovation and the professor’s privilege”, NBER Working Paper 2016, No. w22057. See www.nber.org/papers/w22057, accessed in May 2020.

⁹⁰ See Henry Etzkowitz and Loet Lydesdorff (eds), *Universities and the Global Knowledge Economy: A Triple Helix of University–Industry–Government Relations* (Cassell 1997) and Scott Shane, *Academic Entrepreneurship: University Spinoffs and Wealth Creation* (Edward Elgar Publishing 2004).

1.6.5 Academia and Copyright

The discussion relating to academia and intellectual property has increasingly related to copyright. This is due to the profound changes brought about by digitalization.

There are new ways to disseminate research results and to teach that change the traditional uncontested starting point that academic employees hold the copyright to their research publications, teaching material and research material. Research material is nowadays, to a large extent, accessible in databases, which under the European Union database Directive in many cases might be protected by a *sui generis* right belonging to the university.⁹¹ Teaching material is increasingly developed collectively into online learning courses, to which universities claim copyright, in order to be able to further develop and use the course material.

Even scientific publishing is undergoing a fundamental shift in its business model where we move from traditional academic publishing to open science and open access. The open access publishing business model is based on a model for scientific publishing where the cost allocation is transformed. Traditional publishing was based on free access for the academic researcher to scientific journals as long as the contribution offered for publication met basic qualitative requirements. The consumers of the publication (libraries, research institutions, universities) had to pay the publisher for access and use of the publication. In the new open access model the authors or researchers have to pay “entrance fees” in order to gain access to publish in an “open journal” and have their articles peer reviewed. After publication, the articles are, however, freely accessible for all on the internet.

The big international publishing houses are slowly adapting to the new business model of open access. On the other hand, they are in many cases still upholding elements of the traditional publishing model and sticking to earlier contractual practice. This creates tensions for researchers who are expected to publish openly (which is in the interest of their employers, the universities), but also are expected to publish in the best international publications.

The transformation towards the model of open access publication will therefore take some time and some clashes between universities and publishers cannot be avoided in this context. The risk is that the academic employees will be the losers in this game unless they are provided with support and also allowed some flexibility to negotiate compromise solutions in order to be able to publish in the best journals in the respective field.

1.6.6 The Way Forward

There is no doubt that the considerable changes that have taken place in the expectations and requirements that state and society set for universities have an impact on

⁹¹ Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases.

how knowledge is managed within them. Universities today need a clear strategic vision, not only on IPR, but also on data and privacy. Unfortunately there is a tendency, not at least among university managers, to believe that there can be one simple solution (one size fits all) for IP regulation in universities. The fact is that there is no such simple solution; there is a need for a toolbox with many tools and a sustainable infrastructure. One part of this infrastructure must be formed by the classical principles of academic freedom; another is formed by the constitutive norms within the international IP system.

1.7 CONCLUSIONS

1.7.1 Implications for the Reward System and Ownership

Traditionally, the patent system has been seen as an incentive for investing in inventive activities such as research and development. Traditionally also, the reward system for employee inventions has been seen as giving employee inventors an incentive to invent.

Although this presumption has been questioned by Odaki, who argues that “inventor remuneration offered to employee inventors is unlikely to have a positive effect on their motivation, productivity and creativity”, we see no reason to abandon this traditional starting point.⁹² In our view Odaki does not see employee inventorship as part of a functioning reward-management system in modern corporations, but presents a collection of different – more or less convincing – examples in support of the view that legislation requiring remuneration schemes should be abolished. The perspective of the requirements for value creation in knowledge-intense business is lacking in Odaki’s presentation, which offers a collection of historical examples⁹³ from different jurisdictions and fields of technology in support of her predetermined starting point.

Some of the arguments that Odaki presents are not, in our view, really arguments in favour of abolishing remuneration rights (or for the introduction of an *ab initio* right to employee IP for the employer), but arguments that should be taken into account when a functioning system for transfer of rights to an invention is designed. An example of this is Merges’ argument in support of the right of the employer to be able to acquire rights to an employee’s invention.

⁹² Kazuhide Odaki, *The Right to Employee Inventions in Patent Law. Debunking the Myth of Incentive Theory* (Hart Publishing 2018), 179.

⁹³ Odaki (2018), 59–61, refers to the example of Bell Laboratories in 1912, where a separate 100 dollar award for each new patent was paid to the employees, which led to competition between the inventors and limited their cooperation. The position of researchers at that time was, however, not really comparable to that of ordinary employees and the problem here was not that the incentives did not work, but that the incentives were not structured in an appropriate way to encourage cooperation between the inventors.

Robert Merges' famous article on "The law and economics of employee inventions" defends the right of the employer to acquire the right to an employee invention since otherwise there can be a "hold-up" situation where the invention cannot be used. If there is a unilateral right for the employer to acquire rights to the invention, this problem does not exist; so in fact the "hold-up" problem can be solved within the framework of an obligation for the employer to pay remuneration to the inventor.⁹⁴

The fragmentation of rights in the digital economy, and the fact that inventions have increasingly become the result of collective efforts, strongly justify legal solutions which put the right to an invention or a protected work in the hands of one (legal) person. This is by no means a new observation, but something that has already been an important argument for granting film producers copyright to films etc. Therefore the old US shop right system does seem slightly outdated. This also applies to legislative arrangements that grant parallel rights to inventors and employers in some jurisdictions.

It also seems that in a dynamic modern network society, where stable corporate structures are less common, reward systems in the form of licences and licensing agreements are only rarely justified, and lump sum rewards are more appropriate. If the value of the invention is difficult to foresee or predict, it might be an idea to agree on an option for a reconsideration of the agreed or decided remuneration. This by no means indicates that rewards for inventors, both in money and other forms of benefits, as well as in fame and recognition, are obsolete.

1.7.2 How to Build Efficient and Fair Employee IP Regulation?

We can foresee that the fourth industrial revolution will dramatically change the nature of work in many industries and occupations.⁹⁵ To what extent it will change our perception of employee IP is less clear. The foundations of IP have proven to be rather robust, as our historical overview has shown. But future corporations will still need capabilities to document and capture inventions and to manage and govern the value-creating process.

If we want to ensure a fourth industrial revolution that is empowering and human-centred, we need to bring some security and stability into fast-changing social and political patterns. In this context we cannot go into a general discussion on how to structure the future of labour law, so we shall only reflect on the future of employee IP, which without doubt will play an important role in the development.

As a starting point, we can note that on a global scale there exist two different legal constructions for employee IP. The first one assumes that there always is one or more than one human being identifiable behind a work or an invention; we just have to sort out who. The second is that, in cases when protected works are created within

⁹⁴ Merges, Robert, "The law and economics of employee inventions" (1999) 13 *Harvard Journal of Law and Technology* 1–54.

⁹⁵ See Schwab (2017).

an employment relationship, the employer – a legal person – can be regarded as the *ab initio* holder of copyright and IP. Behind these constructions we have extensive economic, philosophical and moral justifications which we need not discuss further here; but the fact that they are deeply embedded in the national legal culture of different states make an international harmonization of law in this field difficult to achieve.

It seems possible, however, to present some functional equivalents or goals that can be achieved within different legal approaches to ownership, author- or inventorship and which are important if we seek to achieve the classical goal for employee IP, which is to find solutions that can be regarded as fair from the point of view of employees (and can incentivize them), but at the same time make sure that employers can acquire rights and use IP in the most efficient way. If fundamentally different national regulatory regimes for IP can fulfil these basic requirements, we think that they can co-exist side by side.

There are in our view four principles that a functioning employee IP must fulfil in order to meet the requirements of the new digitalized and globalized knowledge economy:

- (i) It must not restrict the employee's entitlement to recognition for the achievements.
- (ii) It must not restrict the possibility for the employer to collect IP's exclusive rights and decision making (transactions capability) in one and the same commercial hand.
- (iii) It must not be an overly complicated and lengthy process to determine any compensation for the employee.
- (iv) There must be ways of solving conflicts in a manner that creates confidence and reliability.

Finally in this chapter, we now briefly comment on these four basic requirements.

- (i) The important thing is that the employer's rights to intellectual property should not restrict the employee's entitlement to recognition of the creative achievement in an appropriate form.⁹⁶ This is fully in accordance with the global requirement that inventors should be identified and named. The system of moral rights also protects the authors and it is clear that in the modern labour market, where employees have to keep themselves competent and update their capabilities in order to be employable, it is crucial that the achievements of employees are recognized and visible. This is less easy to implement in a system where the work made for hire rule prevails, but it could of course

⁹⁶ This was a unanimous recommendation from the AIPPI Congress in Geneva 2004 when question Q183 was discussed.

be done by special clauses to give recognition to those physical persons who contributed to the creation of a work.

The close link between human rights and moral rights, or the right to recognition, is worth noticing. It is regarded as part of the requirement to treat an employee with dignity to recognize any extraordinary achievements. It is even more important today: in the good old days in the 1960s and 1970s, innovative and creative employees could count on a lifelong career with the same employer and on increased wages and other benefits.⁹⁷ Today, all this is to a large extent gone. It does not seem fair that the only results of an excellent inventive performance by the employee will be strict contractual non-competition clauses. There must be recognition, and the right to recognition must be strengthened. Especially in situations where achievements are protected as trade secrets, it is difficult to see how an efficient right to recognition can be construed, but nonetheless efforts in this regard should be made.

- (ii) We have already discussed (at (ii) above) that the regulation should be designed in order to avoid fragmented ownership of rights. The need for rightholders to be able to use a bundle of rights together or split rights up is important. It is clearly not efficient if there are many employee rightholders (in the global context even in different countries and jurisdictions) who can create “hold up”-situations.
- (iii) Traditionally, compensation schemes for employee IP have been able to produce fairness by linking the compensation to actual sales of products implementing the invention through licensing agreements. The problem is that things change fast and corporate structures are undergoing continuous restructuring. Unresolved claims in respect of employees are not very practical, and licences for employees or former employees are only rarely a good solution. Lump sum compensation with a special clause giving the right to additional remuneration in certain rare situations seems to be the most practical solution and, as a starting point, compensation can and should also be reflected in wages paid to an employee. Claims for compensation need to be resolved in a speedy manner.
- (iv) Too often the creation of significant IP or a breakthrough invention results in a conflict between the employee and the employer. The conflict can be around compensation, technological development, or both. Too often this conflict ends with an exit strategy for the employee, which might be an easy way out for both parties but clearly does not promote efficiency in the employer organization or the common interest of technological progress. Therefore much more attention should be paid to conflict resolution.

The AIPPI resolution Q183 recommends that courts which have jurisdiction in the field of intellectual property rights should also be competent to decide on all disputes between employers and employees over those rights.

⁹⁷ Even in the Asian countries, Japan and South Korea, where such a tradition still prevails, we see changes in employment patterns. See Nari Lee, Chapter 8 in this book.

This is a reasonable demand since these courts usually have knowledge and capabilities to decide such cases. On the other hand, the “battle is lost” when disputes between employer and employee have to be settled by the courts. We need smoother conflict resolution both at company level and at national level. In some countries, bodies for such conflict resolution exist, for instance, the “Employee Inventions Board” in Finland.

The Employee Inventions Board is a statutory committee, the task of which is to issue opinions on matters concerning the application of the Finnish Act on the Right in Employee Inventions. The Board functions as an independent body under the Ministry of Economic Affairs and Employment. The Board has a chairperson and eight members. The chairperson and two other members are neutral (they do not represent either the employers or employees); three of the members represent the employer’s side and three, the employee’s side. The chairperson has to have a legal education and be competent to act as a judge.

The employer or an employee may ask the Board for an opinion. The opinion may also be requested by a court considering a dispute over an invention or by the Finnish Patent and Registration Office when it is considering a patent application. The opinions are free of charge for the applicant. A request for an opinion must be submitted in writing. The request for an opinion and the appendices to it must be submitted to the Board in two original copies. The Board is responsible for supplying the opposite party with the necessary documents.

As a rule, the Board considers all matters in writing. However, an oral hearing may be arranged if the Board considers this necessary. The opposite party will be provided with an opportunity to give a written reply in respect of the request for an opinion. The Board may ask the parties concerned to provide further information if this is considered necessary. The Board also has the right to obtain from the employer, and the companies belonging to the same group as the employer, and the employee concerned the information that is considered necessary for issuing an opinion.

The opinions issued by the Board are considered as recommendations. They are not binding on either the party requesting the opinion or the opposite party. A party to the case must, however, notify the Board whether it intends to comply with the opinion. The notification must be submitted within two months of the end of the month in which the party concerned receives its copy of the opinion.

Experiences of the Finnish Employee Inventions Board are mixed. Too often the employer might see the recommendation issued by the Board as a starting point for further negotiations, not as something to implement as such. This attitude is not very helpful for a future good relationship between the parties. On the other hand the Board has in many cases been able to replace the inventor’s very optimistic views of the value of the invention with more realistic calculations. The Board’s handling of the dispute tends to narrow it down and concentrate it on interpretation of the Act or some company scheme

regarding compensation. The great advantage for the inventor is of course that there are no costs involved for the employee who takes his or her case to the Board; on the other hand, inventors will have to bear the costs of their own lawyer, if they want to use one, which in practice is often the case.

The use of a Board might sometimes be a rather formal and laborious procedure. We therefore think the use of some kind of arbitration might be a good way forward, especially if costs for such a procedure can be kept at a reasonable level.

REFERENCES

- Bentham, Jeremy, *An Introduction to the Principles of Morals and Legislation* (Oxford 1879 (1st edn 1689)).
- Bentley, Lionel, "Trade secrets. Intellectual property but not property?" in Helena R. Howe and Jonathan Griffiths (eds), *Concepts of Property in Intellectual Property Law* (Cambridge University Press 2013), 60–93.
- Blake, Harlan M., "Employee agreements not to compete" (1960) 73(4) *Harvard Law Review* 625–691. JSTOR, www.jstor.org/stable/1338051, accessed 30 May 2020.
- Bruun Niklas, *Uppfinnarrätt i anställningsförhållande* ("Inventors' rights in the employment relationship") (Finlands juristförbund 1982).
- Bruun, Niklas, "Article 17(2) right to intellectual property" in Klaus Lörcher, Filip Dorsemont, Stefan Clauwaert and Mélanie Schmitt (eds), *The Charter of Fundamental Rights of the European Union and the Employment Relation* (Hart Publishing 2019), 369–382.
- Bruun, Niklas and Michael B. Landau, "University and employees' inventions in Europe and the United States" in Wim Helwegen and Luca Escoffier (eds), *Nanotechnology, Commercialization for Managers and Scientists* (Pan Stanford Publishing 2012), 291–337.
- Bruun, Niklas and Mikko Välimäki, *Korkeakoulueksinnöt: Uuden lain tavoitteet, tulkinta ja käytäntöön soveltaminen* ("University inventions, the new Act, its purposes, interpretation and use in practice") (IPR University Center 2007).
- Cohen, Wesley M. and Stephen A. Merrill (eds), *Patents in the Knowledge-Based Economy* (National Research Council 2003).
- Cowan, Robin, Luc Soete and Chervonnaya Tchervonnaya, "Knowledge Transfer and the Services Sector in the Context of the New Economy" (Maastricht Merit-Institute, Research Memoranda 020, 2002), available at <https://collections.unu.edu/view/UNU:1093> (last accessed February 2021).
- Czarnitzki, Dirk, Torsten Dopherr, Karin Hussinger, Paula Schliessler and Andrew A. Toole, "Knowledge creates markets: the influence of entrepreneurial support and patent rights on academic entrepreneurship" (2016) 86 *European Economic Review*, 131–146.
- Domeij, Bengt, *Från anställd till konkurrent* ("From employee to competitor") (Lojalitetsplik, företagshemligheter och konkurrensklausuler 2016).
- Domeij, Bengt, "The Trade Secrets Directive and employees" in J. Schovsbo, T. Minsén and T. Riis (eds) *The Harmonization and Protection of Trade Secrets in the EU. An Appraisal of the EU Directive* (Edward Elgar Publishing 2020), 149–170.
- Dreier, Thomas, "How much 'property' is there in IP?" in Helena R. Howe and Jonathan Griffiths (eds), *Concepts of Property in Intellectual Property Law* (Cambridge University Press 2013), 116–136.
- Dreyfuss, Rochelle Cooper, "The creative employer and the Copyright Act of 1976" (1987) 54(2) *University of Chicago Law Review* 590–647.

- Dworkin, Gerald, "The moral right of the author: moral rights and the common law countries" (1995) 19 *Colum.-VLA J.L. & Arts* 229.
- Etzkowitz, Henry and Loet Lydesdorff (eds), *Universities and the Global Knowledge Economy: A Triple Helix of University–Industry–Government Relations* (Cassell 1997).
- Fisk, Catherine L., "Authors at work: the origins of the work-for-hire doctrine" (2003) 1(15) *Yale Journal of Law & the Humanities* 1–70.
- Fisk, Catherine L., *Working Knowledge. Employee Innovation and the Rise of Corporate Intellectual Property, 1800–1930* (The University of North Carolina Press 2009).
- Geller, Paul Edward, "Copyright history and the future: what's culture got to do with it?" (2000) 47 *Journal, Copyright Society of the USA* 209–264.
- Ghidini, G. and V. Falce, "Trade secrets as intellectual property rights: a disgraceful upgrading – Notes on an Italian 'reform'" in R.C. Dreyfuss and K.J. Sandberg (eds), *The Law and Theory of Trade Secrecy* (Edward Elgar Publishing 2011).
- Ginsburg, Jane C., "A tale of two copyrights: literary copyright in revolutionary France and America" (1990) 64 *Tulane Law Review* 991–1031.
- Ginsburg, Jane C., "The concept of authorship in comparative copyright law" (2003) 52 *DePaul Law Review* 1063–1092.
- Godenhjelm, Berndt, *Problemställningar och enhetssträvandem inom rätten till arbetstagares uppfinningar* (JFT 1965).
- Godenhjelm, Berndt, "Employee inventions", Chapter 7 in Eugen Ulmer (ed.) *International Encyclopedia of Comparative Law* (J.C.B. Mohr (Paul Siebeck) 1975).
- Granstrand, Ove, *Evolving Properties of Intellectual Capitalism. Patents and Innovations for Growth and Welfare* (Edward Elgar Publishing 2018).
- Hawley, J.J., M. Trimble and D.C. Wilson, "United States of America" in S. Wolk and K. Szkalej (eds), *Employees' Intellectual Property Rights* (2nd edn, AIPPI Law Series, Kluwer 2018), 649–661.
- Helfer, L.R. and G.W. Austin, *Human Rights and Intellectual Property. Mapping the Global Interface* (Cambridge University Press 2011).
- Hepple, Bob (ed.), "Introduction" in *The Making of Labour Law in Europe* (Mansell Publishing 1986), 1–30.
- Hughes, Justin, "The philosophy of intellectual property" (1988–1989) 77 *Georgetown Law Journal* 287–366.
- Hvide, Hans K. and Benjamin F. Jones, "University innovation and the professor's privilege", NBER Working Paper 2016, No. w22057. See www.nber.org/papers/w22057, accessed in May 2020.
- Hyden, Håkan, "Normativa grundmönster – mot en teori om rättsliga förändringsprocesser" ("Normative patterns – towards a theory of legal transformation processes") in volume in honour of Anna Christensen, Ann Henning (ed.) *Normativa Perspektiv* ("Normative perspectives") (Juristförlaget i Lund 2000).
- ILC (The International Labour Conference) 43rd session, Geneva 1959.
- Inside Consulting, Cowi A/S and Eskil Hansen (for Videnskabsministeriet), "Evaluering af forskerpatentloven" ("An evaluation of the Danish Act on Researchers' Patents") (2004).
- International Labour Organization, *The Protection of Salaried Authors and Inventors*, Report for the Tripartite Meeting on Salaried Authors and Inventors (International Labour Office 1987).
- Iversen, Eric J., "Fundamental and contextual issues involving the strategic use of IPRs" (Center for Innovative Research (STEP), Working Paper No. A-01, 2002), available at www.step.no/Notater/A-01-2002.pdf.
- Knoph, Ragnar, *Funksjonærsopfinnelsen* (H. Aschehoug & Co. 1928).
- Kolasa, Magdalena, *Trade Secrets and Employee Mobility. In Search of an Equilibrium* (Cambridge University Press 2018).

- Lemley, Mark A., “The surprising virtues of treating trade secrets as IP rights” in R.C. Dreyfuss and K.J. Sandberg (eds), *The Law and Theory of Trade Secrecy* (Edward Elgar Publishing 2011), 109–139.
- Merges, Robert, “The law and economics of employee inventions” (1999) 13 *Harvard Journal of Law and Technology* 1–54.
- Merges, Robert P., *Justifying Intellectual Property* (Harvard University Press 2011).
- Mirowski, Filip, *Science Mart – Privatizing American Science* (Harvard University Press 2011).
- Monotti, Ann (ed.), *Employment Law and Intellectual Property Law* (Edward Elgar Publishing 2018).
- Monotti, Ann and Sam Ricketson, *Universities and Intellectual Property. Ownership and Exploitation* (Oxford University Press 2003).
- Morris, Robert C. Jr, “Patent rights in an employee’s invention. The American shop right rule and the English view” (1959) 75 *Law Quarterly Review* 483–502.
- Mossoff, Adam, “Rethinking the development of patents: an intellectual history, 1550–1800” (2000–2001) 52 *Hastings Law Journal* 1255–1322.
- Mowery, David, Richard Nelson, Bhaven Sampat and Arvids Ziedens, *Ivory Tower and Industrial Innovation: University-Industry Technology Transfer Before and After the Bayh-Dole Act* (Stanford University Press 2004).
- Odaki, Kazuhide, *The Right to Employee Inventions in Patent Law. Debunking the Myth of Incentive Theory* (Hart Publishing 2018).
- OECD, *Turning Science into Business* (OECD 2003).
- OECD, *University-Industry Collaboration. New Evidence and Policy Options* (OECD 2019).
- Pila, Justine, “Who owns the intellectual property rights in academic work?” (2010) 32(12) *European Intellectual Property Review*, 609–613.
- Pila, Justine, “‘Sewing the fly buttons on the statute’: employee inventions and the employment context” (2012) 32 *Oxford Journal of Legal Studies* 265–295.
- Plomer, Aurora, “Human dignity and patents” in Christophe Geiger (ed.), *Research Handbook on Human Rights and Intellectual Property* (Edward Elgar Publishing 2015), 479–495.
- Remington, Michael J., “The Bayh-Dole Act at twenty-five years: looking back, taking stock, acting for the future” (2005) 19(6) *Journal Industry and Higher Education* 408–415.
- Rigamotti, Cyril P., “The conceptual transformation of moral rights” (2007) 55 *American Journal of Comparative Law* 67–122.
- Rognstad, Ole-Andreas, *Property Aspects of Intellectual Property* (Cambridge University Press 2018).
- Schwab, Klaus, *The Fourth Industrial Revolution* (Penguin 2017).
- Seignette, J., “Authorship, copyright ownership and works made on commission and under employment” in Bernt Hugenholtz, Antoon Quaendvlieg and Dirk Visser (eds), *A Century of Dutch Copyright Law, Auteurswet 1912–2012* (deLex B.V. 2012), 115–140.
- Sganga, Catherina, *Propertizing European Copyright. History, Challenges and Opportunities* (Edward Elgar Publishing 2018).
- Shane, Scott, *Academic Entrepreneurship: University Spinoffs and Wealth Creation* (Edward Elgar Publishing 2004).
- Statistics Finland, www.stat.fi/til/tkke/2017/tkke_2017_2018-10-25_kat_004_fi.html, 2017.
- Supiot, Alain, *Beyond Employment. Changes in Work and the Future of Labour Law in Europe* (Oxford University Press 2001).
- Tapiola, Kari, *The Teeth of the ILO. The Impact of the 1998 ILO Declaration on Fundamental Principles and Rights at Work* (ILO 2018).
- Veneziani, Bruno, “The evolution of contract of employment” in Bob Hepple (ed.), *The Making of Labour Law in Europe* (Mansell Publishing 1986), 31–72.

Walterscheid, Edward C. “To promote the progress of science and useful arts: the background and origin of the intellectual property of the United States Constitution” (1994) 2(1) *Journal of Intellectual Property Law* 1–56, accessed May 2020 at <https://digitalcommons.law.uga.edu/jipl/vol2/iss1/1>.