

The Right to Employee Inventions in Patent Law

Debunking the Myth of Incentive Theory

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Introduction

I. Background and Purpose of this Book

A. Compensation for Employee Inventions: Various Legal Schemes

Most inventions today originate from within organisations. Of the 210,454 patent applications which were made worldwide through the Patent Cooperation Treaty (PCT) route in 2016, 85.5 per cent were filed by businesses, 7.5 per cent by individuals, 5 per cent by universities, and 1.9 per cent by governments or research institutes.¹ Although individuals still accounted for a large share of PCT applications in many countries which do not belong to the high income group,² these data show that nowadays over 90 per cent of inventions patented in the whole world are created by employees working for companies, universities, governments and other organisations.

Employee inventors, who typically work in research and development (R&D) departments of companies, are often expected to contribute to the making of patentable inventions. According to the established principle in labour law that employers should enjoy the fruits of labour of their employees their employees' labour, there is no reason why employers have to offer compensation for inventions made in the course of employees' duties in addition to their salaries and benefits. However, patent laws or other related laws in some countries require employers to pay additional compensation for such inventions. For example, according to the German Act on Employees' Inventions,³ employers based in Germany are required to pay employee inventors 'reasonable compensation' in principle if they claim patentable 'service inventions'.⁴ Here, 'service inventions' refers to those made during the term of employment which either (i) resulted from an employee's tasks, or (ii) are essentially based upon experience or activities of the company.⁵

¹ WIPO, *Patent Cooperation Treaty Yearly Review 2017: The International Patent System* (WIPO 2017) 19, 28 Fig A11, www.wipo.int/edocs/pubdocs/en/wipo_pub_901_2017.pdf.

² *ibid* 29 Fig A12.

³ Gesetz über Arbeitnehmererfindungen vom 25 Juli 1957 (BGBl I S 756).

⁴ Act on Employees' Inventions, ss 2, 9(1). However, employers may conclude agreements which are less favourable to employees after service inventions have been reported to the employers: Act on Employees' Inventions, s 22.

⁵ *ibid*, s 4(2).

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The amount of ‘reasonable compensation’ shall be calculated by considering particularly the commercial applicability of the service invention, the duties and position of the employee in the company, and the company’s contribution to the invention.⁶ According to the Guidelines for the Remuneration of Employees’ Inventions in Private Employment⁷ which are issued by the Federal Minister of Labour,⁸ its amount is ‘value of invention’ multiplied by ‘share factor.’⁹ According to the ‘licence analogy’, which is most frequently used in practice of the three calculation methods prescribed in the Guidelines,¹⁰ the ‘value of invention’, or supposed licence fee, is calculated on the basis of total turnover and the usual royalty rate applied to each industrial sector.¹¹ ‘Share factor’ is a numerical value expressed in the form of percentage which represents the inventor’s share in the supposed benefit from the invention, and is determined in consideration of the assignment and solution of the task and his position in the company.¹² Such an elaborate legal scheme for calculating additional compensation to employee inventors is unique to Germany.

Courts in other countries have awarded the additional compensation on a case-by-case basis pursuant to relevant statutory provisions. In Japan, a court decision in 2004 awarded ¥20 billion (then over £10.3 million) to an ex-employee of a company who had invented a blue Light-Emitting Diode during his tenure on the assumption that he had contributed to 50 per cent of company profits (the *Blue LED* case).¹³ On appeal, however, both parties reached a court-mediated settlement, in which the company agreed to pay the ex-employee about ¥840 million (a little more than 4 per cent of the amount originally awarded to him).¹⁴ In the United Kingdom (UK), the High Court of England and Wales in 2009 awarded £1.5 million to a pair of employee inventors who had synthesised a new compound during their tenure. The amount accounted for 3 per cent of the profits their employer had derived from a patented radioactive imaging agent which incorporated this compound (the *Kelly and Chiu* case).¹⁵ Since 2000, French courts have been willing to award a substantial amount of ‘additional remuneration’ for ‘inventions under mission’, namely those made in the course of employees’ duties.¹⁶ Decisions which awarded between €10,000 and €100,000

⁶ *ibid.*, s 9(2).

⁷ Richtlinien für die Vergütung von Arbeitnehmererfindungen im privaten Dienst vom 20 Juli 1959 (Beilage zum Bundesanzeiger Nr 156 vom 18 August 1959).

⁸ Act on Employees’ Inventions, s 11.

⁹ Guidelines for the Remuneration of Employees’ Inventions in Private Employment, no 39.

¹⁰ *ibid.*, no 3.

¹¹ *ibid.*, nos 10, 11.

¹² *ibid.*, nos 30–37.

¹³ Tokyo District Court, judgment on 30 January 2004, 1852 *Hanrei jihō* 36. The employee inventor in this case was later jointly awarded the Nobel Prize in Physics in 2014 for the invention with a couple of Japanese academics.

¹⁴ Tokyo High Court, settlement on 11 January 2005, 1879 *Hanrei jihō* 141.

¹⁵ *Kelly and Chiu v GE Healthcare Ltd* [2009] EWHC 181 (Pat), [2009] RPC 12 [203].

¹⁶ Intellectual Property Code, art L611-7(1).

to employee inventors are not rare, and a few courts have awarded €300,000 or more, with the maximum award being €600,000.¹⁷

By contrast, courts in the United States (US) generally allow employers to claim inventions made by employees without paying additional compensation, as long as both parties have made a proper contract in advance.¹⁸ Nonetheless, employees of the Federal Government who have assigned the inventor's rights to the Government are entitled by special legislation to a fixed sum of \$2,000 in the first year, and at least 15 per cent of licensing royalties after deducting patent costs thereafter.¹⁹

B. Rationale for Inventor Remuneration: The 'Incentive Theory'?

One question which arises is why statutory laws in many, if not all, countries make the payment of additional compensation to employee inventors mandatory under certain conditions. A simple view may be that these statutory laws are aimed at fair distribution of profits gained from an invention to its inventor(s). However, this view gives no theoretical explanation as to why only inventors should be given special treatment even though these profits would not have arisen without a contribution made by other employees such as those working in manufacturing and marketing departments.

Some may argue instead that such laws are social legislation intended to improve employee inventors' status as workers. This theory partly explains why the German Act on Employees' Inventions was introduced.²⁰ However, it does not apply to most countries where only a few employee inventors can receive the additional compensation. According to the Patents Act 1977 in the UK, for example, where 'having regard among other things to the size and nature of the employer's undertaking, the invention or the patent for it (or the combination of both) is *of outstanding benefit* to the employer, and' 'it is just that the employee should be awarded compensation', 'the court ... *may* award him such compensation' 'as will secure for the employee a fair share ... of the benefit which the employer has derived' from the invention or the patent.²¹ It is hard to say that the Act has generally raised the social status of employee inventors in the UK since according to this provision the additional compensation shall be awarded only in exceptional circumstances at the court's discretion. Indeed, the *Kelly and Chiu* case has been the only example so far where the English court actually awarded

¹⁷ Sanna Wolk, 'Remuneration of Employee Inventors – Is There a Common European Ground? A Comparison of National Laws on Compensation of Inventors in Germany, France, Spain, Sweden and the United Kingdom' (2011) 42 *International Review of Intellectual Property and Competition Law* 272, 284–85.

¹⁸ See ch 6, s IV.

¹⁹ Stevenson-Wydler Technology Innovation Act of 1980 (Public Law 96-480) § 14 (a)(1)(A)(i), as codified in 15 USC § 3710c (2012).

²⁰ See ch 9, s I.

²¹ Patents Act 1977, ss 40(1), 41(1) (emphasis added).

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compensation. Meanwhile, employee inventors may want to establish their right to additional compensation by collective agreements so that they can redress the social inequality between them and their employers. In Sweden, a collective agreement concluded in 2015 guarantees unionised employees a lump sum payment of either kr22,150 or kr44,300 (≙ €2,400 or €4,800, as of 2016) per invention claimed by their employers.²² Yet in France, there are currently few enforceable collective agreements²³ despite a statutory provision that the conditions for the payment of the additional compensation shall be determined by collective agreements apart from company agreements and individual employment contracts.²⁴ In the US, employee inventors generally regard themselves as professional individualists, and as such are reluctant to unionise.²⁵ In most countries employee inventors have not sought the payment of the additional compensation by collective agreements which are aimed at improving employees' social status as a whole.

Traditional theories on the justification of the patent system may give a clue as to the rationale for the additional compensation employee inventors receive. However, the 'labour theory of property', which holds that an inventor has the natural property right in the fruits of his labour, is untenable on the grounds that the amount of monopoly profits gained by a patent depends on various social factors in the market, and that his idea itself is also fundamentally a social product based on the ideas of others ahead of him.²⁶ The 'reward theory', which holds that an inventor deserves reward for his labour rather than his natural talent or luck, has also attracted little support because a patent may bring him a considerable reward disproportionate to his effort.²⁷ Since the utilitarian argument that a patent offers the best incentive to invent gives a more acceptable explanation for the patent system,²⁸ the most plausible view may be that employee inventors receive additional compensation because this enhances or otherwise contributes to their overall motivation to invent. This 'incentive theory' claims that employee inventors need a special inducement to make inventions because, unlike independent inventors, they are on the regular payroll regardless of their job performance. This argument must be clearly distinguished from the 'reward theory' mentioned above, according to which the reward is given for inventors' effort rather than

²² Agreement concerning the Rights to Employee Inventions between Swedish Enterprise and PTK, s 4(2).

²³ Thomas Bouvet, 'Employee-Inventor Rights in France' (Loyola Law School IP Special Focus Conference, Los Angeles, September 2006) 6-7, toscan2.veron.com/publications/Colloques/Employees_inventions.pdf.

²⁴ Intellectual Property Code, art L611-7(1).

²⁵ See ch 6, s IV.C.

²⁶ Edwin C Hettinger, 'Justifying Intellectual Property' (1989) 18 *Philosophy & Public Affairs* 31, 38-39. It should be noticed that the inventor is prevented from using his idea if someone else has obtained a patent on it before him: Fritz Machlup and Edith Penrose, 'The Patent Controversy in the Nineteenth Century' (1950) 10 *The Journal of Economic History* 1, 14.

²⁷ Machlup and Penrose (n 26) 20; Hettinger (n 26) 41-42. In addition, it does not explain why only the patentee deserves the reward, even though many useful inventions are usually created almost simultaneously by more than one inventor as the society evolves: Machlup and Penrose (n 26) 18.

²⁸ Machlup and Penrose (n 26) 21-22; Hettinger (n 26) 47.

their 'natural talent and luck' beyond their control.²⁹ The additional compensation may be justified as an incentive, but not as what is mentioned as 'reward' here because its amount is usually linked to the social value of the inventions rather than the inventors' effort.³⁰ Compensation offered to employee inventors is comparable to cash prizes historically offered to the general public by governments or other organisations to trigger important discoveries or inventions.³¹ It may boost the creation of inventions by employees, even if only a few who have made fairly valuable inventions can receive it.

C. Does Inventor Remuneration Really Encourage Employees to Invent?

It has been taken for granted in the relevant literature of law and economics that money acts as an incentive for employee inventors to invent.³² Policy makers in many countries may want to boost the creation of valuable inventions that are vital to the industrial development of the country by allowing employee inventors to receive more generous compensation for inventions made in the course of their duties. However, to date there has been no critical examination of whether invention compensation schemes can actually increase the number of inventions made by employees. First of all, employee inventors may not be generally enticed by money. For example, Thomas A Edison was quoted as saying as follows:

One might think that the money value of an invention constitutes its reward to the man who loves his work. But, speaking for myself, I can honestly say this is not so. ... I continue to find my greatest pleasure, and so my reward, in the work that precedes what the world calls success.³³

Employee inventors today may also be naturally motivated to invent by their passion for inventing itself rather than pecuniary rewards they may receive for the success of inventing. And yet they are different to heroic lone inventors like Edison in that they invent in teams in organisations. Today inventions are created in companies through the collaboration of scientists and engineers from various disciplines. However, not all of them are named as inventors according to the

²⁹ Hettinger (n 26) 42–43.

³⁰ *ibid* 42. The court in *Kelly and Chiu* held that '[t]he amount of compensation [awarded under the UK Patents Act] is to be determined ... so as to secure a just and fair reward to the employee': *Kelly and Chiu* (n 15) [59] (emphasis added). Yet the word 'reward' was not used in the sense that the inventor deserves reward for his labour, because the court assumed that the compensation is paid so as to reduce 'the disparity in benefit between employer and employee': *ibid* [52].

³¹ Suzanne Scotchmer, *Innovation and Incentives* (Cambridge, Massachusetts, The MIT Press, 2004) 41–45.

³² See, eg, Roland Kirstein and Birgit Will, 'Efficient Compensation for Employees' Inventions' (2006) 21 *European Journal of Law and Economics* 129, 135 fn 27.

³³ Orison Swett Marden, *How They Succeeded: Life Stories of Successful Men Told by Themselves* (Boston, Lothrop, 1901) 237 fn 1.

criteria of inventorship in patent law. Regarding pharmaceuticals, for example, scientists who do not work on drug synthesis are unlikely to be named as co-inventors of a successful drug even though they may play a key role in the whole drug discovery process.³⁴ It may adversely affect the morale and teamwork of employee inventors as a whole if they regard the award of the compensation to a few named inventors unfair. Relevant to this point are diverse societal norms on 'distributive justice', that is, whether people think named inventors should deserve more because they have made special contribution (eg, West Europe and North America) or that all the members of a project team should be given equal treatment regardless of their contribution so that group harmony will be maintained (eg, Confucian Asia).³⁵

Meanwhile, it may be argued that the motivation of employee inventors is in fact not a crucial factor for the success of inventing. While incentives offered to unskilled workers may immediately improve the productivity of the work they do, such as assembling parts of an automobile, those offered to employee inventors may not, because, even if such incentives enhance their motivation, inventions cannot be made without creativity. Moreover, irrespective of their motivation, inventions may be created as a result of mere serendipity, or even failures, as is the case with Post-it® note adhesive to be mentioned later.³⁶ Needless to say, an incentive is worthless if it does not produce a good effect on the end result. Given the complex factors which determine the success of inventing, a reasonable doubt arises that invention compensation schemes cannot immediately boost the creation of useful inventions by employee inventors.

D. Problem of Harmonisation and the Purpose of this Book

Legal literature on employee inventions have tended to focus on the apparent differences of legal schemes for compensating employee inventors among jurisdictions and highlight the need for international harmonisation of these national laws in an era when many companies operate across borders and often cooperate with research partners overseas. The varied national laws cause not only legal uncertainty, which makes it difficult for multinational corporations to plan their business strategies, but also unequal treatment of employee inventors who engage in the same R&D project in subsidiary companies abroad or foreign companies they are posted to.³⁷ Harmonisation is a particularly critical issue for the European Union (EU) which is committed to strengthening the European single

³⁴ See ch 3, s II.

³⁵ See ch 3, s III.

³⁶ See ch 4, s V.

³⁷ Marie-Christine Janssens, 'EU Perspectives on Employees' Inventions' in Marilyn Pittard, Ann Louise Monotti and John Duns (eds), *Business Innovation and the Law: Perspectives from Intellectual Property, Labour, Competition and Corporate Law* (Cheltenham, Edward Elgar, 2013) 117–18.

market. In 1997, the European Commission suggested in its Green Paper that ‘differences between national laws on employees’ inventions are having an effect on the freedom to provide services in the single market and/or on the conditions of competition.’³⁸ Yet only two years later did the Commission declare that it ‘[did] not intend to take any legal initiative in this field’ for the reason that ‘the issue of employees’ inventions is one which should be dealt with primarily at national level.’³⁹ Similarly, Article 60(1) of the European Patent Convention (EPC) only provides that ‘the right to a European patent shall be determined in accordance with the law of the State’ that either an employee or an employer is connected with.⁴⁰ As things stand, the relevant laws in European countries differ considerably.⁴¹

However, an obvious route to harmonisation, whether at the EU or the global level, is to abolish all the national laws which provide for compensation for invention made in the course of employees’ duties. The ultimate purpose of this book is to push the case for the abolition of such compensation schemes that are purportedly aimed at giving employee inventors an incentive to invent. Through reference to the latest surveys on motivations of employee inventors in advanced countries and research findings in econometrics and social psychology I will challenge in this book the popular assumption that monetary rewards⁴² can motivate employee inventors to create more invention, which most legal scholars have not even questioned. A further point to be made is that compensation for employee inventions is not justified as payment for the transfer of their ownership from employee inventors to employers since the rights in employee inventions should *ab initio* belong to employers in principle. This will reinforce my argument for repealing the diverse statutory laws which have lost their practicality and yet become an obstacle to cross-border operation of companies.

II. Scope and Contents of the Book

A. Employee Invention

This book deals with inventions made by employees in the course of their normal or specifically assigned duties during working hours using their employers’ resources, which will be referred to as (i) ‘employee inventions’ in this book. Statutes

³⁸ Commission, ‘Promoting Innovation through Patents: Green Paper on the Community Patent and the Patent System in Europe’ COM (97) 314 final, 18.

³⁹ Commission, ‘Promoting Innovation through Patents: The Follow-Up to the Green Paper on the Community Patent and the Patent System in Europe’ COM (1999) 42 final, 14.

⁴⁰ Convention on the Grant of European Patents (European Patent Convention) of 5 October 1973, art 60(1).

⁴¹ Wolk (n 17) 296; Janssens (n 37) 113.

⁴² In the following text I will use the word ‘reward’ not to indicate ‘reward theory’ of the patent system mentioned earlier but in its ordinary sense.

in some jurisdictions state that employers may be required to pay compensation only when such inventions are either patentable or actually patented.⁴³ The terms ‘invention’ and ‘patent’ are interchangeable unless stated otherwise in this book.

Apart from ‘employee inventions’, (ii) employees may make inventions not in the course of their duties but during working hours or using their employers’ resources. From the results of a survey conducted in six European countries, the US and Japan to be mentioned later, it is estimated that about 10 per cent of all the inventions made by employees are such ‘incidental inventions’.⁴⁴ Employers are not naturally entitled to own or exploit them without special legislation or legal doctrines because employment contracts do not cover such inventions. In addition, (iii) employees may make inventions independently of their duties outside working hours without using their employers’ resources. The ownership of such ‘independent inventions’ is naturally vested in the employees themselves regardless of jurisdiction since they are no different from those made by independent inventors. Those who want to acquire or exploit such inventions must enter into a contract with the inventors in accordance with the general principles of contract law. These (ii) incidental and (iii) independent inventions will be left out of consideration in principle although the treatment of incidental inventions will be briefly discussed in chapters five and six (the shop right rule in the US).

B. Employee Inventor

This book mainly covers inventions made by scientists and engineers working in companies. Whilst inventions made by government employees are treated in the same way as those made by company employees in Germany,⁴⁵ inventors working in the public sector receive a special bonus in the US⁴⁶ and France.⁴⁷ Such special bonus schemes for government employees will not be further investigated since they cover only a negligible number of inventions.⁴⁸ However, I will discuss inventions made by academics separate from those made by company employees in chapter eight since they may require special treatment because of the academic freedom university researchers enjoy.

C. Contents of the Book

This book is divided into two parts. Part I of this book will show through an interdisciplinary approach that compensation offered to employee inventors is in fact

⁴³ See, eg, Act on Employees’ Inventions (Germany), s 2; Patents Act 1977 (UK), s 40(1)(a); Patent Act (Japan, as amended up to Act No 55 of 2015), art 35(4).

⁴⁴ See ch 3, fig 14.

⁴⁵ Act on Employees’ Inventions, s 1.

⁴⁶ See text to n 19.

⁴⁷ Intellectual Property Code, arts L611-7(5), R611-14-1(II)(III).

⁴⁸ See text to n 1.

unlikely to have a positive effect on their motivation, productivity and creativity. The analysis will reveal that the legislature cannot expect to encourage the creation of valuable inventions by making compensation for some employee inventions mandatory.

Following this introductory chapter, chapter two will discuss the motivation and productivity of employee inventors and show that financial incentives are unlikely to encourage the vast majority of employee inventors to be more productive. The results of several empirical surveys that have examined job satisfaction and motivation of professional scientists and engineers are consistent with the theory about workers' motivation in psychology, which holds that values intrinsic in a job can motivate workers to higher levels of job performance whilst monetary rewards cannot. In addition, studies in econometrics have yet to confirm a causal relationship between financial incentives offered to employee inventors and their productivity measured by the number of inventions they make. These findings bring into question the effectiveness of the invention compensation schemes.

Chapter three will provide theoretical explanations as to why such schemes do not work in the context of inventive activities taking place in modern companies. In the contemporary commercial environment, inventions are usually created in organisations through the combined efforts of scientists and engineers from various disciplines. The incentives offered to a few who are named as inventors under patent law will influence the working relationships among all the employees who contribute to the creation of inventions in practice. Scholars in social psychology have noticed that there is a relationship between social norms and reward allocation rules generally adopted by organisations in each society. In the light of their theory, the invention compensation schemes clash with the social norm in 'collectivist societies' such as Confucian Asia where group harmony is a guiding principle of organisations in general, whilst the schemes are likely to promote egocentric behaviour of employee inventors especially in 'individualist societies' such as English-speaking countries where people tend to attach great importance to individual achievement. These observations will help to explain why the schemes are likely to fail in various societies. Furthermore, it will be shown that team-based incentives offered to employee inventors as a whole are also unlikely to work according to the theories in business management and social psychology.

Whilst the above discussions concern the influence of the invention compensation schemes on the quantity of inventions employee inventors make, chapter four will discuss their influence on the creativity of employee inventors, which determines the quality of employee inventions, so to speak. On the basis of contemporary research findings in psychology about the effect of financial rewards on creativity, it will be shown that the schemes are unlikely to encourage the creation of valuable inventions which embody highly creative ideas even if the amount of compensation paid to employee inventors is linked to the commercial value of the inventions. Furthermore, a specific case study of organisational practices to encourage workplace creativity in a multinational technology company

will show that the schemes have little, if any, effect on the creativity of employee inventors because workplace creativity depends greatly on non-pecuniary factors such as the interpersonal relationships among colleagues and the vision of supervisors and top management.

Whilst it will be observed in Part I that compensation for employee inventions is unlikely to act as an effective incentive to invent, it may be argued that employers are still required to pay compensation for the transfer of employee inventions if their ownership is initially vested in employee inventors. Independently of the fundamental principle in labour law that employers naturally enjoy the fruits of labour expended by their employees, patent laws in some civil law countries have traditionally adopted the ‘inventor principle’, which holds that only natural persons capable of creative activities can become the initial owner of inventions made by them. In accordance with this principle, the German Patent Act,⁴⁹ for example, makes it clear that the right to a patent of an invention initially lies with its inventor(s).⁵⁰ The US Constitution also vests the ownership of inventions in their inventors on the assumption that it serves to promote the progress of science.⁵¹

Part II will show that compensation for employee inventions cannot be justified as payment for the transfer of their ownership in principle despite the ‘inventor principle’ or the US Constitution. Chapter five will provide the theoretical justification for this conclusion in terms of encouraging ‘innovation’ in society. The meaning of the term ‘innovation’ needs to be clarified here in connection with the aforementioned ‘incentive theory’ about the patent system. The theory suggests that incentives should be given to make inventions available to end users, not just to create inventions.⁵² Current economic theory holds that patents generate an incentive to invent by enabling patentees to recoup the sunk costs of innovation.⁵³ ‘Innovation’, as the super-ordinate concept of ‘invention’, is composed of ‘(1) the generation of an idea or invention, and (2) the conversion of that invention into a business or other useful application.’⁵⁴ Recognising the risk of imitation by competitors, economic theory presumes that patents prevent rival firms from doing so for a limited time so that they can recoup the costs of innovation through monopoly pricing.⁵⁵ According to this theory, this prospect for monopoly profits generates an incentive to innovate⁵⁶ which conceptually includes that to invent.

⁴⁹ Patentgesetz vom 16 Dezember 1980 (BGBl 1981 I S 1).

⁵⁰ Patent Act, s 6 first sentence.

⁵¹ US Constitution, art I, § 8, cl 8. This constitutional principle is utilitarian in nature and thus distinguished from the ‘inventor principle’, which merely focuses on the fact that only natural persons can make inventions.

⁵² Hettinger (n 26) 48.

⁵³ Alexander Tabarrok, ‘Patent Theory versus Patent Law’ (2002) 1(1) *Contributions to Economic Analysis & Policy* 1, 1, mason.gmu.edu/~atabarro/PatentPublished.pdf.

⁵⁴ Edward B Roberts, ‘What We’ve Learned: Managing Invention and Innovation’ (1988) 31(1) *Research-Technology Management* 11, 12. As Roberts succinctly put it, ‘Innovation = Invention + Exploitation’: *ibid* 13.

⁵⁵ Tabarrok (n 53) 1.

⁵⁶ *ibid*.

It was assumed before the advent of corporate laboratories in the late nineteenth century in the US that inventors would become innovators who exploit their inventions themselves. However, this assumption is no longer sustainable today, when most employee inventors have neither the inclination nor the ability to do so. It will be proposed in this chapter that as between employers and employees employee inventions should belong to employers for the sake of innovation and that they should be allowed to exploit employee inventions without paying compensation in principle.

Next, it will be seen that employers are generally allowed to acquire employee inventions without paying compensation in the US (chapter six) and other common law jurisdictions such as England and Wales, Australia and Canada (chapter seven). The US Constitution, which was drafted in the late eighteenth century, vests the ownership of inventions in their inventors to make it clear that a patent is not such a monopolistic privilege as was arbitrarily granted by the English absolute monarchy. Nevertheless, employers in the US naturally acquire employee inventions even in the absence of explicit agreements to that effect where the inventors are 'hired to invent'. Otherwise employees become the owner of inventions they have made in principle although employers acquire a 'shop right', or the right to use the inventions without paying royalties, where the employees have made them during working hours or using employers' resources. Employers usually require prospective employees to sign pre-invention assignment agreements in order to eliminate the uncertainty about the rights in inventions made by employees, and such agreements have generally been held as enforceable even though the employees are usually not allowed to claim additional compensation for the inventions according to these agreements. It will be shown that US courts have virtually made the constitutional principle a dead letter so as to put priority on the need to encourage innovation in the society. Employers in other common law jurisdictions are generally not required to pay compensation for the transfer of employee inventions because they naturally become the initial owners of the inventions according to the employment contracts under which employee inventors owe a duty to invent.

However, inventions made by university researchers cannot be treated in the same way because they do not usually owe a duty to invent but only a duty to research under their employment contracts. Chapter eight will suggest an approach to the ownership of such inventions using recent decisions of the Australian courts as a basis for the discussion. There is a legitimate concern that if inventions made by academics should belong to universities, academics cannot publish their research results freely because they are required to protect the patentability of the inventions. Yet now most European countries have done away with the 'professors' privilege', which used to allow academics to retain their ownership, on the assumption that it created a barrier to innovation. Meanwhile, there is a strong argument that inventions made in academia should not be owned by someone in the first place because universities should essentially be the institution of 'open science' where it is expected that researchers disseminate their research

results to the public freely to promote further scientific inquiry. Discussing the implications of this argument, the chapter will provide a theoretical analysis of the topic on the assumption that universities should be involved in patenting only on a limited basis.

In chapter nine the validity of the aforementioned ‘inventor principle’ adopted in some civil law countries will be questioned through analysis of the rationale for compensation to employee inventors under the German Act on Employees’ Inventions and the latest amendment to the relevant provisions in the Japanese Patent Act in 2015. It will be shown that the ‘inventor principle’ has in fact been compromised to accommodate the need to promote innovation, which will shake the assumption that that principle still demands the payment of compensation for the transfer of employee inventions in theory.

Finally, chapter 10 will discuss the policy and theoretical implications of this study and conclude that compensation for employee inventions should not be made mandatory regardless of jurisdiction because there is no legitimate reason to require employers to pay it.