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## **Remunerating University Researchers**

A comparative study assessing viable remuneration models for university researchers regarding inventions, copyrights and trade secrets commercialized through the university

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### **Graduate School**

Master of Science in Intellectual Capital Management

Master Degree Project No. 2012:84

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## **Abstract**

In order to promote increased utilization of university research, a more entrepreneurial and industry oriented university is advocated by e.g industry actors, and scholars writing preparatory works. The globally most common legislative change, implemented for example in Denmark Germany, Austria, Norway, and Finland between 2000 and 2007, to provide the university with the tools required to meet the new expectations is the abolishment of the “Professor’s Privilege”. When implementing such overturning changes, several issues and questions arise. One of them is the question of how to remunerate the university researchers. The seemingly trivial question is complicated by the effect different levels of remuneration may have on researcher compliance with disclosure rules, university finances as well as through measures by which the university supports start-up ventures based on university technology. Following the initial part of the paper regarding remuneration for patented inventions, a parallel is drawn also to non-patented patentable inventions, trade secrets in general as well as copyrights. Finally, the limiting premises under which the university is able to commercialize non-patentable intellectual assets, or perhaps rather the lack of intellectual asset status due to lack of control opposing commercialization options, is questioned.

The paper suggests a modified gross revenue model as standard for remunerating university researchers for patents. For the case when the university promotes a third entity utilizing university research the importance of a distinction between the three entities, being the university researcher the company and the university is emphasized. Such a distinction in turn allows the different relations to be handled separately and for most of the relevant aspects to be taken in to consideration. For trade secrets and copyrights, it will initially be concluded under which premises commercialization is possible, and for those cases, a gross revenue model for remuneration will be suggested. Regarding the limited capacity of confidentiality in the university, extended exceptions to the Swedish principles of openness are suggested.

## **Preface and Acknowledgements**

This thesis was written during an internship at Engage AG Key Technology Ventures in Karlsruhe, Germany. Engage's business activity focuses on the diffusion of university research to the industry. This is undertaken either through promotion of tech transfer or through the funding of start-up enterprises comprising the university technology. It goes without saying that this was an inspiring environment for an ICM student and especially one writing his thesis on the topic "university researcher remuneration". As writing the thesis was not my primary task during the internship I was also given the opportunity to take on several versatile and stimulating assignments. The time at Engage AG has been truly rewarding, and I will remember it with joy.

Beside the supportive and kind co-workers at Engage AG helping me to fit the master thesis writing in to the regular work schedule, my gratitude also extends to:

### **Supervisor**

I would especially like to thank my supervisor Caroline Pamp for numerous times helping me get back on track after irrelevant detours and for her time spent carefully reading and rereading my drafts as well as the invaluable feedback she presented after doing so.

### **Father**

My father Göran Nisshagen for the support and input he has provided.

### **Interviews**

Dagmar Vössing, Project Manager Technology Marketing at the KIT Innovation department.

Dr. Kirschenhofer, Start-up manager at MPG innovation,

Johannes Hulthe Vice President Late Phase Clinical CVGI at AstraZeneca R&D

### **The one and only Henrik Bruce**

For digging up secret documents for me. As mentioned, if I ever get the chance to decide, you will be employed.

### **Flat mates**

My gratitude also extends to my German flat mates Isabelle Puenktchen and Susan Funk for taking the time to listen to my cumbersome considerations.

### **My feeders at Shisha Lounge**

Without you guys and your Yufka-Döner mit Scharf I would not have been able to sustain myself during the thesis work

**Karlsruhe, Germany May 20th, 2012**

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**WenzelNisshagen**

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## Abbreviations

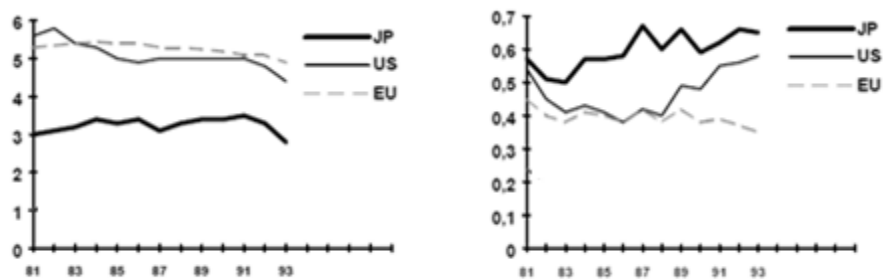
AD	Arbetsdomstolen	Swedish court of labor disputes
ArbEG	Arbeitsnehmererfindungsgesetz	German act on rights to employees' Inventions
BGB	Bürgerliches Gesetzbuch	German Civil Code
BGH	Bundesgerichtshof	German supreme court.
CFR	Code of Federal Regulations	US-Legislation
EPO	European Patent Organization	
GRUR	Deutsche Vereinigung für gewerblichen Rechtsschutz und Urheberrecht	A monthly intellectual property law journal published in German
IP	Intellectual Property	
IPR	Intellectual Property Right	
LAU	Lag (1949:345) om rätten till arbetstagens uppfinningar	Swedish act on employees' inventions
LOA	Lag (1994:260) om offentlig anställning	Swedish law on public employment
PP	Professor's Privilege	
SOU	Statens Offentliga Utredningar	Preparatory investigations undertaken on behalf of the Swedish government.
UR	University Researcher	
U.S.C.	United States Code	
UR	University Researcher	
URL	Upphovsrättslagen	Swedish copyright law
UrhG	Urheberrechtsgesetz	German copyright law
WIPO	World Intellectual Property Organization	
WissR	The journal Wissenschaftsrecht	Translating to Scientific law/rights

## 1 The university and its new role

### 1.1 Background - The developing role of universities in the knowledge economy

Increasingly, universities along with intellectual assets created by universities are regarded as key drivers in the knowledge economy<sup>1</sup> due to its capacity to provide disruptive technologies. As university - industry technology transfer is considered an efficient way to achieve technology diffusion from the universities<sup>2</sup> as well as it is the most efficient way to allow utilization of university research outcomes,<sup>3 4</sup> measures have been undertaken to increase the rate of university results that can be adopted by the industry and thereby be utilized in order to benefit the society.<sup>5 6 7</sup> If successful, the praxis is considered to increase economic growth and provide workplaces.<sup>8 9 10</sup> In doctrine this development is referred to as the second academic revolution, being the change from a researching university to an entrepreneurial university.<sup>11</sup>

The first academic revolution implied the shift from a teaching to a researching university.<sup>12</sup> The current shift has, as its predecessor the first academic revolution, generated conflicts of interest.<sup>13</sup> Examples of interests to be considered



Source: First European report on science and technology indicators, summary, EUR 15929, 1994

Table 1: Publications vs patenting – Poor performance by EU states.

in the current shift are e.g. the importance of free flow of and access to

knowledge, maintained economical and academic incentives for university researchers (UR) and that publicly funded research will generate economic benefits for society as a whole by facilitating new ventures as well as supporting the existing industry. The lack of capacity to promote industrial use of scientific research was highlighted by the European Commission in 1995 in the publication Green Paper on innovation. The commission presented the graphs in Table 1 to display the poor utilization ratio.

<sup>1</sup> Ulf Petrusson. *Universitetet i Kunskapsekonomin*. Stockholm: VINNOVA, 2007 p.20 f.

<sup>2</sup> In this paper a line is drawn between diffusion and utilization. Diffusion per se does not have to imply utilization as diffusion as such can be reached through publication putting the technology in the public domain. Such undertakings can, however, be counterproductive in terms of utilization as companies with a proprietary approach will not consider processing such technologies further. Beneficial diffusion is, in this paper considered to have been accomplished when the diffusion leads to utilization. Those who argue that diffusion can be reached without industry collaboration are thus right also according to the authors terminology, however, this diffusion may in many cases be limited in terms of utilization.

<sup>3</sup> Risaburo Nezu, Chou Siaw Kiang, Prabuddha Ganguli, Krisnachinda Nithad, Koji Nishio, Lydia G. Tansinsin Hwa-Chom Yi, Jia Yujian, *WIPO report – Technology transfer, intellectual property and effective university-industry partnerships*. World Intellectual Property Organization 2007 p. 17

<sup>4</sup> European Union Scientific and technical research committee, CREST report Intellectual property, European Commission, Brussels, 2008 p. 7. The paper stresses the importance of university industry collaboration to ensure European competitiveness.

<sup>5</sup> See Högskolelagen Chapter 2 §1 (Swedish University Act)

<sup>6</sup> See Regeringens proposition 2008/09:50 - Ett lyft för forskning och innovation p. 18 ff. & 21ff. regarding ”samverkansuppgiften”

<sup>7</sup> For the so called “European paradox” implying that European universities can compete with American in terms of research advancements but not in terms of innovation, see European Commission, Green Paper on Innovation, (1995) p.6 where it is argued that (in 1995 when the paper was written and so far the European shift towards an abolishment of the PP had not yet been initiated) “One of Europe’s major weaknesses lies in its inferiority in terms of transforming the results of technological research and skills into innovations and competitive advantages.” The Green Paper refers to industry as well as universities.

<sup>8</sup> Henry Etzkowitz, James Dzisah, Marina Ranga and Chunyan Zhou. The triple helix model of innovation, TECH MONITOR, Jan-Feb 2007 p. 16 f.

<sup>9</sup> MIT, the impact of innovation “the BankBoston report”, 1997 p. 19 f. & p.28

<sup>10</sup> See also: Peter Lotz, Francesco Lissoni, Jens Schovsbo, Academic Patenting and the Professor’s Privilege: Evidence on Denmark from the KEINS database, (2009), Copenhagen Business School, Frederiksberg, p. 20 adding a critical perspective.

<sup>11</sup> Ulf Petrusson. (2007) p.31 f.

<sup>12</sup> Ibid. p. 29 f.

<sup>13</sup> Ibid. p. 29



As part of the second revolution, or perhaps as a prerequisite thereof, in most countries the Professors Privilege (PP) has been abolished. During the discussion before and after the German preparatory works the question of university ownership to patents was brought up, and it was argued that, “the new task of the university” would be impossible to fulfill in case a control position over patents could not be facilitated.<sup>14</sup> The being or not being of the PP has been subject to a lot of discussion, and it is the author’s belief that the sore character of the subject has to do with the symbolic value of the PP, being the freedom of the UR to always maintain complete right of decision when it comes to determining what will happen with the fruits of her work. The abolishment clearly manifests the new role of the university and its employees, a role where the university has been assigned the responsibility of ensuring that publicly funded research will ultimately contribute to society, and certain restraints have been put on the UR in order to facilitate this. Although this, as stated in preparatory works, does not have to be a contradiction to the scientific freedom,<sup>15</sup> <sup>16</sup> the fear remains that providing the university with the capabilities and rights to meet this new responsibility, will not be compatible with the currently predominant notion of free university research, a fear that has shaped the arguments against an abolishment of the PP for some time now. In the Swedish preparatory work SOU 2005 95, this was highlighted as follows “When assessing the legislative proposals handed in as well as other public writings and papers that presented during the years after 1949 it becomes clear that the arguments in favor of and against the PP mainly have been the same during this time. On the one hand, there is a suspicion that the statute potentially provides obstacles to the utilization, commercialization and value creation for society of research results. On the other hand, there is a suspicion that the liberty of research and scientific freedom will be jeopardized if the PP is abolished.”<sup>17</sup> <sup>18</sup> This general notion most likely finds its roots in the fear of economic incentives finding their way in to the university setting, and in the long run influencing legislated freedoms of the UR. See note.<sup>19</sup> Another issue that has been brought forward by the critics is that the Bayh-Dole Act in the US, as well as its derivatives in Europe, indeed increased university patenting efforts but at the same time risk to redirect research focus from valuable long term fundamental research to more applied research as the university has been assigned the responsibility to make a measurable contribution to the economy.<sup>20</sup> <sup>21</sup> This issue has also been addressed by German scholars arguing that economic incentives will alter focus of the publicly financed research.<sup>22</sup> <sup>23</sup> For further discussion on the scientific freedom see 2.3.3 - the scientific freedom, and in relation to constitutional questions (German constitution) see 3.2.5.1 - Sanctions in effect and the German constitution.

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<sup>14</sup> Deutscher Bundestag, Drucksache 14/7573, 26. 11. 2001 p 2 “*Die staatlich finanzierte Forschung dient neben der wissenschaftlichen Erkenntnis als solcher auch der Eröffnung neuer Chancen für Innovation und damit der Stimulierung von Neuerungen im wirtschaftlichen Bereich. Daher gehört die Förderung des Wissens und Technologietransfers zu den grundlegenden Aufgaben der Hochschulen (§ 2 Abs. 7 Hochschulrahmengesetz). Zur Überführung von Forschungsergebnissen in wirtschaftliche Nutzung ist es in aller Regel unerlässlich, dass solche Erfindungen durch ein Patent- oder Gebrauchsmusterrecht gesichert werden. Erst der Patent- oder Gebrauchsmusterschutz gibt begründete Aussicht auf Überführung kommerziell verwertbarer Forschungsergebnisse in wirtschaftliche Wertschöpfung*“.

<sup>15</sup> SOU 2005:95 p. 206. An absolute right to publication is suggested, even if such a measure occasionally would prohibit successful economic utilization.

<sup>16</sup> For definition of the term Scientific freedom see 2.3.3 below

<sup>17</sup> SOU 2005:95. p. 70. (Authors translation)

<sup>18</sup> Vinnforsk -Vinnovas förslag till förbättrad kommersialisering och ökad avkastning i tillväxt på forskningsinvesteringar vid högskolor, Appendix 8 (Report on the abolition of the German PP Overview of changes and challenges) Appendix provided by B. Sternfelder at PVA-MV AG Joachim-Jungius-Strasse 9 180 59 Rostock Germany. p. 24 f.

<sup>19</sup> In the Swedish legislation Högskolelagen (1992:1434) (University act) chapter 1. §6, three principles are set forth. 1) topic for research can be freely chosen, 2) Research methods can be freely developed and 3) research results can be freely published. The suspicion has most likely to do with fear that those “freedoms” might be jeopardized. The suspicion most likely encompasses the fear that economic incentives will tempt the university to force the UR into certain fields or more applied stages of research. See below for a further discussion on the term “scientific freedom”

<sup>20</sup> Joaquín M. Azagra-Caro, Nicolas Carayol, Patrick Llerena. (2006) Research University: Exploratory Evidence at the Laboratory Level. The Journal of Technology Transfer, Nr 31, 257–268, 2006 p.257

<sup>21</sup> Albert Banal-Estanol et al. The Impact of Industry Collaboration on Research: Evidence from Engineering Academics in the UK, page 5

<sup>22</sup> Eduard Reimer, Hans Schade, Helmut Schnippel, Gernot Kaube, Ulrich Himmelmann, Dieter Leuze, Gereon Rother, Michael Trimborn, ArbEG Gesetz über Arbeitnehmererfindungen und deren Vergütungsrichtlinien Kommentar, Erich Schmidt Verlag, Berlin, 8. Auflage, (2007)

<sup>23</sup> Dieter Leuze *Kritische Anmerkungen zu § 42 ArbEG* Gewerblicher Rechtsschutz und Urheberrecht (GRUR) 2005, S. 27 ff.

The author would once more like to stress that the abolishment of the PP should rather be seen as a step in the facilitation of the second academic revolution than the actual catalyst for the same. A comparison can be made with the French law (see especially article: L. 611-7 (p.1). Code de la propriété intellectuelle – French Act on Intellectual Property) which also previously has encompassed a right for the employer, being the university, to obtain rights to UR-inventions.<sup>24 25</sup> Although this has been the case, previous university interest in patenting and commercialization activities has been rather low.<sup>26</sup> Instead, French universities have, in order to play their role as “the researching university” to the fullest, previously considered information diffusion through publication their main task. Regarding the French universities previous patenting praxis the scholar Azagra-Caro stipulated the following: “Independently of the legal framework per se universities usually did to retain these rights which were often considered as “counter-productive” in terms of knowledge diffusion or for attracting industrial funding”<sup>27</sup>, a quote that confirms the authors’ viewpoint regarding the role of the PP in the second academic revolution.

### **1.1.1 The author’s standpoint and starting point for the thesis**

It is the author’s belief that a university in control of IP generated through the university as well as equipped with the capabilities required to do so will allow substantial utilization frequency improvements for university research.<sup>28</sup> The author is however, after an internship at a company which prime task is to promote technology transition from universities to the industry, painfully aware of that those capabilities will not appear out of thin air as soon as legislative amendments are implemented. Reaching the point where the university has obtained those capabilities will require a learning process which might very well be long and difficult. The author also embraces the notion that an abolishment of the PP not per se will pose a threat to the scientific freedom. (For a more thorough discussion on the scientific freedom see below under 2.3.3) The author is furthermore convinced that commercialization through the industry is the most efficient way to reach beneficial diffusion (utilization) as the university seldom has resources and capacity to manage the process to reach the market.

The paper will elaborate on the fictional condition that the PP is abolished. Contractual setups in which universities obtains strategic IP from the UR, could potentially reach the same outcome as legislation regarding ownership. The author, however, emphasizes that legislative amendments to the Law on Rights to Employees Inventions (see 2.2.2) not per se will facilitate successful utilization by the university. As additional capabilities, which potentially will be expensive to implement, will be required, a national approach considering factors such as governmental funding will according to the author most likely be required.

## **1.2 Disposition and research questions**

### **1.2.1 Background to the research questions**

In the previously mentioned SOU 2005 95, concerning the abolishment of the PP in Sweden, the question regarding remuneration to the UR was brought up. Main focus was, however, put on determining a percentage of to the university incomes that should be granted the UR in order to establish an appropriate economic incentive structure. Little guidance was given the process of deciding the base from which the decided percentage should be calculated.<sup>29</sup> The committee states the following: “According to the solution suggested by the committee [...], the researcher/researchers, in addition to the standard remuneration given when an invention is surrendered, be granted a remuneration in height of 30% of the revenues the university obtains by commercialization of the invention after a deduction of direct costs occurring due to the invention, mainly patenting costs alongside fees for external consultant services and legal advice required for the patenting process. By way of exception also costs related to marketing of the specific invention can be included.”<sup>30</sup> Although an indepth assessment of the exact calculation to be applied might

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<sup>24</sup> SOU 2005:95. P. 127 f.

<sup>25</sup> Joaquín M. Azagra-Caro, et al, (2006) p.259

<sup>26</sup> Ibid. p.259

<sup>27</sup> Ibid. p.259

<sup>28</sup> For a comprehensive analysis of the capabilities required see Ulf Petrusson (2007) especially chapter four. The capabilities are referred to as “Förmågor”.

<sup>29</sup> SOU 2005:95. e.g. p. 227 f.

<sup>30</sup> Ibid. 227

not have been a task for the committee, it deserves being mentioned that more accuracy than “By way of exception” will be required if uniform usage of the rule is intended. The committee suggested a model which reduces certain initial costs items before the researchers share is to be calculated (net model). The committee further refers to the German legislation and states that it has been used as a model alongside with the widespread international praxis of granting UR 30%.<sup>31</sup> This is to some extent an ambiguous statement as the German legislation grants a right to 30% of the gross revenues and not as suggested by the committee, 30% from the net revenues.<sup>32</sup> Whether to apply a gross- or net revenue model will be assessed further on in the paper. Another issue which deserves a more thorough analysis than given by the SOU is the question of remuneration to the UR when the university is participating in venture creation, incubation or university equity holding as alternative utilization models.

### 1.2.2 Disposition

The thesis is divided into five main sections each intended to provide the pieces of information and examinations required to answer the research questions.

### 1.2.3 Section one - Sweden

In the first section (chapter two) the current Swedish legal and socio-legal setting is laid forth providing starting points for the viability assessment of potential solutions gathered from other jurisdictions which will follow in chapter three. This section also includes a brief assessment of the development in Denmark since the abolishment undertaken in 2000.

### 1.2.4 Section two – the reference objects

In chapter three the reference objects are presented. This section contains legal background as well as practical solutions undertaken by the universities/research institution examined. The section provides suggestions; whose applicability will be assessed for the Swedish setting in chapter three.

### 1.2.5 Section three – UR remuneration, passive and active universities - analysis

The third section, presented in chapter four, combines information from section two and three and analyses the same in order to suggest viable solutions for income distribution for patent incomes in the Swedish setting. The section is divided in two subsections each comprising a different research question:

#### 1. The passive university

The term “passive university” refers to when the university obtains patent rights which are subsequently licensed or otherwise transacted to generate incomes without any other interaction with a third party than the license agreement. Here the following research question is asked

*“Should a net or a gross model for remuneration be used when calculating the URs share of licensing incomes pertaining to a UR patent?”*

The setting intended is when the university takes no active part in fostering utilization of the patent. Incomes in this model do not have to be strictly monetary but could also entirely or partially consist of equity.

#### 2. The active university

The term “active university” refers to the setting when the university, in addition to obtaining patent rights, promotes the development of the patent after licensing the right to use and developing the technology to a third party, generally a start-up.

*“Can a general model for income distribution to the UR be established for the case when incubation of and/or seed capital funding to start-up companies comprising a UR patent is supported by the university?”*

The situation intended is the one where the university promotes a commercialization which is undertaken in an entity separated from the university.

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<sup>31</sup> SOU 2005:95. P. e.g. 227

<sup>32</sup> The term “net model” is, in this paper used to describe a model where certain cost issues alternatively a fixed percentage or both is deducted from gross incomes before the URs share is calculated.

- a. The main obstacles in this research question is determining to which extent the patent or patents which have been contributed by the UR is driving revenues compared how contributions by the university in terms of facilities equipment incubator personnel etc are responsible for the revenues.
- b. Another interesting aspect for this research question is “additional contributions by the UR” in terms of additional patents handed to the company.
  - i. Also the question will be asked how potential developments/refinements by the UR, which are undertaken in the new legal entity but still benefit the university, shall be valued.

### 1.2.6 Section four – Trade secrets and copyright

The fourth section, to be found in chapter five, questions the patent focus in the debate regarding UR remuneration. It is argued that the value of trade secrets as well as copyrights should be considered as well. The main question asked in this section is: *“Should the UR be compensated in accordance with the model suggested in the first section also for copyrights and trade secrets?”* The relevance of this main question, due to the limiting character of the Swedish legislation regarding secrecy in the university, will be another central topic in this chapter. The additional question will thus be: *“how can non-patented/patentable intellectual assets be commercialized?”*

#### **Trade secrets narrowed down to “Technical know-how “**

Swedish constitutional law restraints the usage of secrecy in Swedish universities thus making the usage of trade secrets difficult. The options available for commercializing non-patented/patentable intellectual assets as well as further obstacles presented by Swedish legislation are elaborated on reaching the conclusion that currently non-formalized technical know-how is the most feasible form of trade secret asset to be transacted by the university. As a part of this subsection, a discussion regarding the usage of package deals encompassing several intellectual assets will also be held. The discussion will problematize the situation when several URs have provided assets to which they are entitled to remuneration in a certain height and that the actual decision of how much of the income that should be attributed to each asset may be arbitrarily decided by university representatives.

#### **Copyright – databases and computer programs**

Also for copyright, virtually the same question as for trade secrets (later narrowed down to technical know-how) will be considered. This being which types of copyright and under which conditions copyright can be transacted. In relation the copyrighted material, the principle of openness will be questioned as it substantially limits the feasibility of database commercialization.

### 1.2.7 Section five – Conclusions from the paper

The sixth chapter contains a walkthrough of the thesis, highlights the most relevant arguments and structures the suggestions. The sixth chapter also contains the author’s standpoints and arguments.

## 1.3 Method and approach

The paper mainly sets out to provide guidance on challenges that have been handled by actors in other jurisdictions for a number of years. Thus a qualitative empiric-descriptive method will be used through which the praxis of such actors will provide guidance as well as potential solutions for the Swedish setting. In addition the industry’s standpoint will be obtained through the same method to provide a more holistic perspective. The empirical approach will be complemented by a classical legal method through which the legal framework of the jurisdictions providing guidance will be mapped out in order to further promote understanding of the solutions implemented by the reference objects. Classic legal method will also be used to outline the current Swedish legal setting and further allowing solutions applied in other jurisdictions to be adapted for the Swedish jurisdiction. As the paper not only sets out to provide potential solutions but also to adopt those solutions to promote university’s mission, legal sociology is applied in order to refine the suggested praxis in order to best benefit this mission.

### 1.3.1 Sources of information and approach

Primary sources of information for the legal methodology are the classical sources of law i.e. Legislation, case law, preparatory works and doctrine. Due to the authors focus on legal sociology, special emphasis has been put on preparatory works as these writings provide considerations regarding predicted effects of legislation. These legal sources are used in order to understand the framework in which the “in-effect application” is undertaken on a local level by the universities assessed. In order to obtain information regarding the university solutions, interviews have been undertaken with representatives from universities as well as policy documents for the same institutions have been assessed. This approach is to be considered qualitative as guidance

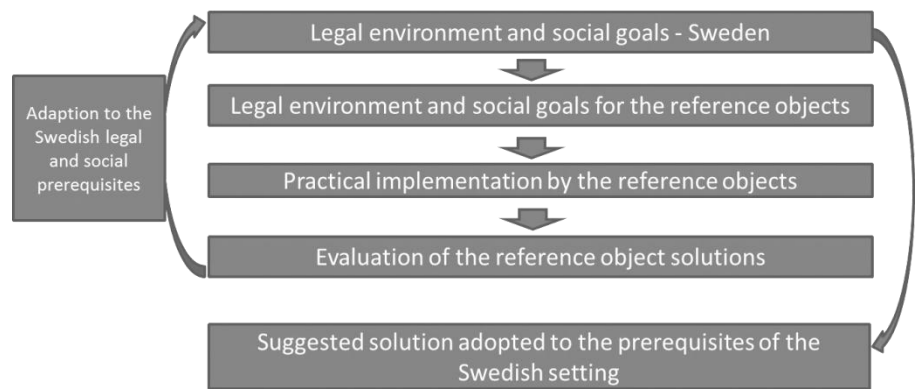


Figure 1: Flowchart presenting the process

has been gathered from a few selected sources and an understanding of these has been promoted rather than statistic evidence of the success of a certain approach.

The intended goal of this approach is to first establish an understanding of the rules set out to govern UR remuneration and secondly to assess how the affected entities, being universities, managed to cope with those legal rules regarding remuneration. Subsequently the Swedish legal and socio-legal landscape was mapped out in order to determine which of the solutions, or modifications thereof, provided by the reference objects, that would be most appropriate in the Swedish setting.

The intended process is displayed in Figure 1: As can be seen the process should gather information from other jurisdictions both in terms of legal prerequisites and university praxis. The information is further processed back to the Swedish setting shaped by current law as well as the intended effects of university ownership to university research. This in turn is intended to provide a suggested solution.

### 1.3.2 Method and approach in relation to the research question

The approach has been chosen as the all the research questions revolve around the main question “can this be done in Sweden, and if so then how?” In order to answer this question, an understanding of what is asked for in Sweden is required as well as an understanding of what is feasible. Thereafter input will be required in order to shape suggestions. This input will be gathered from the reference objects. Legal prerequisites are then compared in order to allow a well-balanced application of the reference solutions in Sweden.

In this process a qualitative method is useful as interview sources are capable of revealing how well functioning the legislation as well as university praxis is on a university level. The legal method will in turn be required as the thesis sets out to understand how relevant legal amendments play out in the respective reference countries as well as how they can be expected to play out in Sweden.

### 1.3.3 Limitations of the approach

#### Dependency on interview sources

The approach targeted two reference countries and two universities in each country. During the work process, it turned out the American universities were reluctant, not to say adverse to provide information to students not enrolled in the respective universities. Luckily the dependence on interview sources from these universities could be limited as substantial material regarding their relevant praxis is published online. The effects of this loss of sources could have been limited through an initially broader approach where additional universities were made part of the study. This option was, however, ruled out early on during the work process due to time constraints.

### Biased interview sources

A critical approach must always be kept when obtaining substantial information from interview sources which are part of the organization which is being assessed. Few representatives consider an interview by a master student a suitable forum for self-criticism. This limitation was, to the degree possible, overcome by additional conversations with representatives at Engage. As Engage is an organization detached from the universities, complementing objective information could be obtained through this source to balance the initial input.

### Additional interviews or a quantitative approach

Several questions which would have been interesting to find an answer to have not been answered as the information could not be obtained from the chosen sources and as the need for the additional information presented itself, too little time was left to obtain the information in question. Especially a poll to URs' could have allowed speculations regarding the URs' behavioral patterns that are to be found in the analysis section in chapter four to be exchanged for facts.

### 1.4 Delimitations

The intended scope of the paper covers primarily the utilization/commercialization of patents, trade secrets and copyrights. Numerous aspects which would have been of great interest have thereby been placed outside the scope of the paper. Trade marks, so called German Gebrauchsmuster (utility patent) and contract research, are some examples. The paper sets out to suggest how to remunerate the UR for patents copyrights and trade secrets when the university obtains rights to the asset and utilizes the same through commercialization, thus the limitations are, according to the author, acceptable.

Contract research generally does not allow the university to obtain rights to research outcomes as those accrue to the client subsequently leaving no options for the university to utilize the same through commercialization.<sup>33</sup> Contract research, although common in Sweden, is thus considered to fall outside the scope of this paper.

As for other intellectual assets the limitations are justified by the general approach of the paper. The intention is not to provide a detailed solution for each asset that can be utilized by the university but to provide a holistic picture of the main considerations required when the university obtains incomes through intellectual assets generated by the UR. The author admits that the scope of the paper could preferably have been made wider probably also making the work more comprehensive and interesting. Time constraints have unfortunately made the limitations necessary. The scope of the paper is thus the patents which are marked

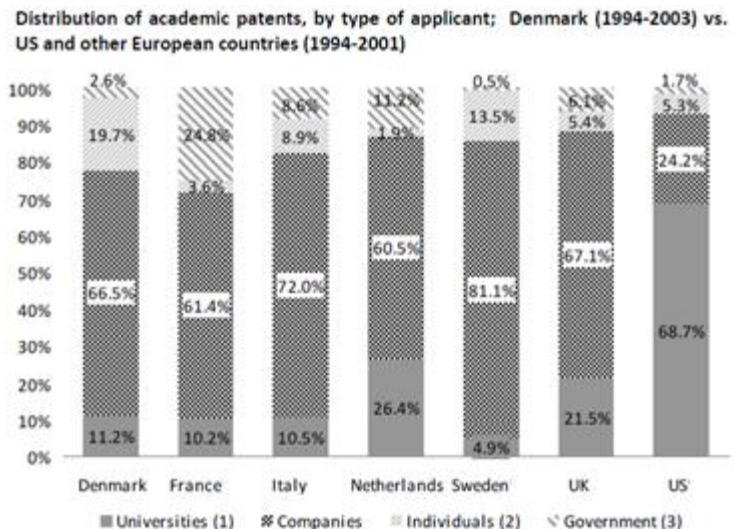


Table 2: : Ownership to patents generate by universities by land. Source: Peter Lotz et al. (2009)

“individual” in Table 2 and the remuneration solutions that are required when those patents are to be re-allocated to the university segment in the same table, as well as the same deliberations for copyrighted material and trade secrets. Note also in the table the vast difference between the European countries and U.S. in terms of the percentage of university patent holding. Seen in combination with Table 1, it is no wonder that a many, including the author himself, believes that a more proprietary university approach may provide substantial improvements to the university research utilization ratio.

Another important delimitation that has been undertaken relates to the incentives which have to be in place for the UR in order to reach compliance. The compliance impact of non-economic parameters such as scientific freedom etc. would have been of interest. As, the papers focus lies on the economic aspects, this limitation can however, be accepted.

<sup>33</sup> Several other solutions are also possible e.g. that the company is entitled to an exclusive license to use patentable outcomes.

## 2 Sweden – Social and legal context

### 2.1 The Swedish legislation in short

Contrary to most other jurisdictions, Swedish legislation still holds an exception for inventions by UR ensuring that rights to patentable university research results accrue to the UR, a so called PP if no agreement stipulating another understanding is entered into between the UR and the university.<sup>34</sup> Consequently, it is up to the UR to choose the model that she considers capable of delivering the most to value. This could be through selling or licensing the patent,<sup>35</sup> through enrolment in university holding companies or simply through letting the knowledge enter the public domain.

### 2.2 The question of ownership and compensation to university inventors and non-university inventors in Sweden

Swedish legislation regarding ownership to and compensation for employee inventions is set for the in the Swedish act “Lag om rätten till arbetstagares uppfinningar (LAU)” (Law on right to employees inventions)

#### 2.2.1 Ownership – non university inventions

The law provides an exception from the main rule being that the inventor shall be the owner to her invention.<sup>36</sup> LAU provides a framework for determining when the employer will have the right to obtain rights to an invention. In order to do so the law classifies inventions in three different categories. “Research inventions”, “other employment inventions” and “other inventions”<sup>37</sup> The category in which an invention is allocated depends on how strongly the invention is connected to the employment and if it falls within the employers field of business.<sup>38</sup> A research invention is an invention which is the result of the employee’s main task being to undertake research- or inventive activities, or if the invention has come to existence due to a specific work task given by the employer. To such inventions, the employer is entitled to an exclusive or partial right.<sup>39 40</sup> Other employment inventions are inventions which have come to existence through some other connection to the employment.<sup>41</sup> For such inventions, the employer is entitled to obtain a non-exclusive license to use the invention in the course of her business and the employer shall also have a preemptive right to obtain further rights to the invention.<sup>42</sup> “Other inventions” are inventions that have come to existence without connection to the employment. To such inventions the employer shall have the right to negotiate a license at terms stipulated by the employee.<sup>43 44</sup>

##### 2.2.1.1 Remuneration - non university inventions

The question of remuneration is not explicitly answered by the law.<sup>45 46</sup> 6§ LAU only states that the remuneration shall be reasonable along with some relevant factors for the assessment. The factors mentioned are; value of the invention, connection between employment and the invention and to which

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<sup>34</sup>“Lag (1949:345) om rätten till arbetstagares uppfinningar” (Act on employees’ inventions), §1, paragraph 2.

<sup>35</sup> The author emphasizes that he does not believe that this is a viable solution if utilization is to be achieved. As touched upon in the previous, also the university will experience challenges when trying to manage technology utilization. Believing that the general UR will manage this by herself is optimistic not to say naïve. In addition, many researchers are not interested in commercial enterprises as they consider their precious time to be better spent researching than undertaking business activities. In total this leads to a lower utilization frequency as well as a sub optimal handling of those patents that are actually utilized through commercialization.

<sup>36</sup> Patentlag, (Swedish patent act )(1967:837) chapter 1, §1.

<sup>37</sup> LAU 3§

<sup>38</sup> Sanna Wolk. Anställdas immaterialrätter - divergenta förhållanden. Ny Juridik 4:04, p. 17-34, p. 17

<sup>39</sup> 3 § 1 st. LAU

<sup>40</sup> Sanna Wolk (2004) p. 23

<sup>41</sup> 3 § 2 st. LAU

<sup>42</sup> Sanna Wolk (2004) p. 24

<sup>43</sup> 3 § 3 paragraph. LAU

<sup>44</sup> Sanna Wolk (2004) p.24

<sup>45</sup> Antonina Bakardjieva Engelbrekt, Ulf Bernitz, Bengt Domeij, Annette Kur, Per Jonas Nordell, Särtryck ur Festskrift till Marianne Levin, Stockholm, Nordstedt Juridik, (2008) p. 714 Compare prop. 1949:101 s. 48 f.

<sup>46</sup> Antonina Bakardjieva et al., (2008) p. 713 f.

extent the employer has taken over rights to the invention.<sup>47 48</sup> For research inventions, the employee is only entitled to remuneration exceeding salary if the value of the invention exceeds what she, when taking salary and additional benefits in consideration, can be expected to contribute with.<sup>49 50</sup> (see further below)

### 2.2.1.2 Additional remuneration - case law

During the eighties “Arbetsdomstolen” (AD) (Swedish court of employment disputes) was moderate when ruling in remuneration disputes and the remuneration has been between 100-300000 SEK. See for example AD 1982 nr. 21 och AD 1983 nr. 19. As the cases are almost 30 years old it can, however, be questioned how they would correspond to the current situation. AD 1983 nr. 19 also highlights the subjective character of the additional remuneration assessment. As stated in the previous paragraph, all the parameters shall be assessed when remuneration is determined. However, the importance attributed to the respective parameters will be up to the court, as mentioned, adding a subjective character to the assessment.<sup>51</sup>

Another, more recent, case, which is clarifying when it comes to research inventions is the “Stockholms Tingsrätt”(Stockholm district court) from 2003 (case T 14043-00). Here the court found that the inventor, due to the fact that her salary was *well below the average for a civil engineer*<sup>52</sup>, had a commercial value exceeding what the inventor could be expected to contribute with based on her salary. The court hence found the presumption outlined in 6 § 2 st LAU non-applicable. A general reasonability assessment was then undertaken and the court found that the inventor should be entitled to remuneration amounting to 300000 SEK.

### 2.2.1.3 Collective agreements

The parties of the labor market (employees and employers) have settled an agreement which overrides<sup>53</sup> the law and is binding for the trade unions and union members connected to the agreement. Especially in the traditional industry, being the engineering industry, the parties of the market are connected to the agreement.<sup>54</sup> The relevant collective agreement is ”Avtal angående rätten till arbetstagares uppfinningar” (Agreement on the right to employees inventions) from 1995 between Svenskt Näringsliv and Privattjänstemannakartellen.<sup>55</sup> The agreement is generally referred to as ”Uppfinnaravtalet” (the Inventor Agreement). Disputes are, according to the agreement resolved in “Industrins uppfinnarnämnd”<sup>56</sup> (the industry’s inventor board), which in effect is a court of arbitration<sup>57</sup>. In comparison to LOU, the employer has been assured a more beneficial position in the Inventor Agreement. This as the employer’s right to obtain rights to inventions is more extensive in the agreement than in LAU.<sup>58</sup> In similarity to the legislation, the agreement provides three main categories of inventions: the A, the B and the C inventions. According to the Inventor Agreement, an A-invention is within the scope of the employment or is the result of a assigned task. B-inventions are all inventions which are related to the employers field of business. To A- and B- inventions, the employer has an unconditional right.<sup>59</sup> C-inventions are “free inventions which the employee can freely use as she pleases.”<sup>60</sup>

The Inventors Agreement stipulates basic levels of remuneration which the parties, when signing the agreement, considered to generally be sufficient. However, as will be seen below, the problem

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<sup>47</sup> Ibid. p. 720 and suggested comparison with Proposition. 1949:101 s. 80 f.

<sup>48</sup> To the extent possible all factors shall be taken in to consideration see AD 1982 nr 21

<sup>49</sup> 6 § 2 paragraph LAU

<sup>50</sup> Sanna Wolk (2004) p. 25

<sup>51</sup> Antonina Bakardjieva et al. (2008) p. 720 f.

<sup>52</sup> Emphasized by the author

<sup>53</sup> Of cause only dispositive and semi-dispositive rules can be negotiated. See below regarding mandatory remuneration.

<sup>54</sup> Sanna wolk (2004) p.25f.

<sup>55</sup> “Uppfinnaravtalet” is not the only collective agreement handling ownership to and remuneration for patents in the employment setting.. However, it is the one chosen for this assessment. As the section is only intended to provide an overview of the industry’s approach to the question this should be sufficient.

<sup>56</sup> § 7 uppfinnaravtalet

<sup>57</sup> Industrins uppfinnarnämnd is thus bound by the procedural rules as set forth in ”lagen (1999:116) om skiljeförfarande” (law on arbitration)

<sup>58</sup> Sanna Wolk (2004) p. 25 f.

<sup>59</sup> Uppfinnaravtalet 1§ and the subsequent comment to 1§

<sup>60</sup> Ibid. 3§ and the subsequent comment to 3§



with those “generally sufficient” lump sums is, as will be seen below, that mandatory reasonable remuneration,<sup>61</sup> in fact, can be much higher. It can be elaborated on several solutions on how to calculate the payment in order for the remuneration to be as well adapted as possible. The Swedish scholar Caroline Pamp has suggested the following list:

- A fixed payment when the invention has been disclosed and an application has been filed.
- A fixed payment divided into smaller payments, each paid at certain stages:
  - At disclosure
  - When rights are obtained (rights to file for a patent)
  - When applications are filed
    - Additional remuneration for each national filing (or through PCT/EPO).
  - When the application is published
  - When a patent is granted.
  - When the patent is licensed.
- Added to the fixed remuneration a flexible remuneration based on e.g.:
  - License revenues
  - Costs saving within the company
  - Increased sales
  - Based on alternative costs for obtaining the same technology from elsewhere.

The listing is helpful when determining a reasonable compensation for the UR as well as when determining when remuneration is to be paid out. This paper is mainly concerned with the flexible remuneration as this will be the final resort when the mandatory character of the law (see below 2.2.1.4) demands a higher remuneration than suggested in the fixed payment.

#### *2.2.1.4 Mandatory character of the law*

The required reasonable remuneration found in 6§ 1. paragraph LAU is mandatory and can thus not be removed through neither employment agreement nor through collective agreements. The mandatory character of the law is justified by the uneven strengths between the employee and the employer.<sup>62</sup> Determining level of remuneration in order to provide a reasonable remuneration is, as previously mentioned, difficult and little guidance is to be found in the law. Hence, in the Inventor Agreement, recommended levels of remuneration are provided. According to the agreement remuneration in level of 700-2550 SEK should be provided when the invention is reported and 2800-22500 SEK should be provided if the invention is filed and leads to a patent.<sup>63</sup> In relation to this, the difference between the A and B inventions is highlighted by the clarification that further remuneration shall always emanate if the invention in question is a B-invention, given that the invention is not of little value.<sup>64</sup> For A-inventions it is stated that additional remuneration should only be provided given that the value of the invention, with regards to salary and additional benefits of the employee, substantially exceeds what can be expected from her.<sup>65 66</sup> As can be seen from the previously mentioned rulings as well as the arbitrament below, reasonable remuneration can substantially exceed the guidelines.

#### *2.2.1.5 Industrins Uppfinnarnämnd – rulings*

As rulings by Industrins Uppfinnarnämnd are not public documents and it is in the interest of the parties to keep the information disclosed during the proceedings confidential, little information regarding the cases ever reach the public.<sup>67</sup> However, certain elements of some cases have been disclosed. One

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<sup>61</sup> Reasonable remuneration will, in this paper be the translation used to describe the Swedish prerequisite “skälig ersättning”.

<sup>62</sup> Sanna Wolk (2004) p. 24

<sup>63</sup> Uppfinnaravtalet 4§ and the subsequent comment to 4§

<sup>64</sup> Ibid. 4§ and the subsequent comment to 4§

<sup>65</sup> Ibid. 4§ b and the subsequent comment to 4§

<sup>66</sup> Svenska uppfinnarföreningen – Arbetstagares uppfinningar p. 3

<sup>67</sup> As mentioned, Industrins uppfinnarnämnd is governed by the procedural rules as set forth in ”lagen (1999:116) om skiljeförfarande” (law on arbitration)

interesting case was handled by Industrins Uppfinnarnämnd in December 2002. The dispute handled the question of reasonable remuneration for an invention which had generated several hundred millions SEK for the employer. The employer had handed the employee 3100 SEK when filing for patent and had offered an additional 9200 SEK if a patent was granted. This was the standard level of remuneration in accordance with the recommendations of the Inventor Agreement, a sum which, however, did not satisfy the employee. The Industrins Uppfinnarnämnd argued that the “invention most likely was an A invention” but did not elaborate further on the matter. The Industrins Uppfinnarnämnd then concluded that, as the company had earned several hundred millions (800<sup>68</sup>) from the invention the, by the inventor, requested 5 million SEK was to be considered reasonable<sup>69 70</sup>

To be noted is that Industrins Uppfinnarnämnd did not consider the salary of the employee (as in case T 14043-00 above) but focused more on the de facto income for the employer.

Another case which will provide guidance in the chapter handling remuneration to non-patented and or non-patentable assets (below), took place in 2000. In this case, Insustrins Uppfinnarnämnd emphasized that right to remuneration requires patentability but not that a patent has been obtained or applied for.<sup>71 72</sup>

### 2.2.2 Ownership to university inventions

In Swedish the PP is called “Läraryndantaget” (the teacher’s exception) referring to the exemption of the UR from the law on employees inventions (LAU). This becomes an exception from the exception (see above) and starting point thus once more becomes that the inventor (UR) should be the sole rights holder of the patentable invention.<sup>73</sup>

### 2.2.3 Remuneration for university inventions

As starting point is that the UR is not obliged to surrender her inventions the question of remuneration from the UR is currently a topic of less importance. However, in case of an abolishment of the PP, as touched upon previously, remuneration issues become topics of high priority.

## 2.3 UR remuneration after the abolishment of the PP

The relationship between the university and the UR differs substantially from the industry relation to its researchers. The researchers in the industry are employed mainly to undertake research which is to be utilized by the company. If ownership to such inventions would not accrue the company it would make little sense for a company to employ researchers in the first place. In the university setting on the other hand, where funding is provided by the government,<sup>74</sup> and the employer is not a profit driven entity but, never the less, has been assigned the mission of facilitating diffusion of knowledge into society, the question of if the university should own the patents generated is more dubious. The solution applied in order to facilitate this and while simultaneously providing an incentive for the UR has so far, in Sweden, been to keep the PP.

### 2.3.1 Copyrights and design rights

For copyrights and national design rights there are no all-embracing legal rules for ownership to IP produced by employees. For copyrights only the presumption is given that software shall become the property of the employer is given by the Swedish copyright act “Upphovsrättslagen” (URL) (40 a §) and for community design rights through a presumption rule in art. 14.3 (EG) nr 6/2002 on Community design rights (EG-FGF).<sup>75</sup>

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<sup>68</sup> Antonina Bakardjieva et al. (2008) p. 727

<sup>69</sup> Sanna Wolk (2004) p. 26

<sup>70</sup> Antonina Bakardjieva et al. (2008) p. 727 – In the festskrift, the sum is referred to as ”not unreasonable” (SIC!) and not reasonable.

<sup>71</sup> Ibid.p. 728

<sup>72</sup> Compare also Uppfinnaravtalet 4§ and the subsequent comment to 4§

<sup>73</sup> Compare Patentlag (Swedish patent act) (1967:837) § 1 with LAU § 1.

<sup>74</sup> This does not have to be the case. Contract research can be undertaken for the industry. However, such settings are not the primary focus of this paper as the question of university commercialization and revenue sharing from such patents will never occur in industry collaboration where the industry becomes property holder. See however the following section Regarding secrecy for Swedish contract research an additional discussion can be found under: 5.4.3

<sup>75</sup> Sanna Wolk (2004) p. 19 f.

Except from the presumptions-rules mentioned, the question of ownership to employees copyrights and design rights have been left to the parties of the labor market. Sources of law in this field are hence, collective agreements and general contractual principles (see further below).<sup>76</sup> In effect, the transfer of rights from the employee is connected to the employees work description and the extent to which the rights are transferred depends on the kind of IP.<sup>77</sup> For copyrights the transaction is limited to the economic rights while the moral rights are reserved for the “artist”( 3, 27 §§ URL). Furthermore, a right to further transact the right for the obtaining party must be agreed upon in order to be allowed. (28 § URL). As for design rights, there is no such thing as moral rights limiting a transaction. This has to do with the fact that the design right is not considered to constitute an additional moral side but solely consist of economic rights.<sup>78 79</sup>

For copyrights the so called “rule of thumb” has been developed to handle the transition of copyrights to the employer as well as the employer’s right to utilize the copyrighted material.<sup>80</sup> The rule of thumb is applicable when no agreement regulates ownership (or law is applicable compare 40a § URS). According to the rule of thumb, the employer will be allowed to use the material in the course of her business.<sup>81 82</sup>

### 2.3.2 Copyrights in the university - databases and computer programs

The SOU committee also briefly touched upon the role of copyright in the context of university ownership to UR IP output.<sup>83</sup> Especially in relation to software copyright. It was argued that the fact that software can be part of a technical solution in the sense of the patent law as its source code *per se* is covered by copyright provides a setting where it would be reasonable to ensure that the two IPR end up in possession of the same owner, being the university.<sup>84</sup> As starting point for software is that it will become the property of the employer,<sup>85</sup> this does not have to be considered a hurdle.<sup>86</sup> However, the committee highlights that UR employment agreements should comprise provisions ensuring rights to valuable copyright to the university. For databases (URL §49) the question is even more relevant as such copyright is not governed by the presumption that the university shall become owner of the economic rights. In this case the ensuring of copyrights to UR through labor agreements becomes important. The committee believes that the absence of such provisions generally has to do with a lack of knowledge regarding the future potential value of such assets.<sup>87</sup>

### 2.3.3 The scientific freedom

The term scientific freedom can imply several meanings. On a political level it can imply the autonomy of the university and its employees in relation to the state or other external powers. This being a central issue in order to ensure that conclusions derived from the research undertaken will be objective and scientific. As an example the research finding that the Saudi Arabian government is totalitarian and that the Quran-based legislation is repulsive out of a human rights perspective will probably not be the output from a Saudi Arabian university. The importance of university autonomy is e.g. emphasized by the Association

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<sup>76</sup> Ibid. p. 20

<sup>77</sup> Ibid. p. 20

<sup>78</sup> Ibid. p. 20

<sup>79</sup> This has to do with the scope of the copyright comprising artistic performances and arts. In those fields the artist has a justifiable right to be mentioned through the moral rights to a larger extent than what is expected to be required for design rights.

<sup>80</sup> Sanna Wolk (2004) p. 21

<sup>81</sup> Ibid. p. 20 f.

<sup>82</sup> For certain groups of workers, there is a certain need for clear guidance regarding ownership to copyright. One such group is journalists. For journalists the matter is thus covered in the collective agreement binding the trade unions Mediaföretagen and Journalistförbundet. This is the so called “Journalistavtalet” containing certain provisions entitling the employer to use copyrighted material provided by the employer,(§ 4) a reasonable solution taking in to consideration the work that a journalist is supposed to undertake for her employer.

<sup>83</sup> SOU 2005:95 p. 52

<sup>84</sup> Ibid. p. 52

<sup>85</sup> URL § 40a

<sup>86</sup> SOU 2005:95 p. 52

<sup>87</sup> Ibid. p. 52

of universities and colleges of Canada after Canada's universities adopt new Statement on Academic Freedom<sup>88</sup>

Scientific freedom could, however, also be more focused on the industry – university setting where the freedom is limited, not due to political oppression but due to economic incentives to direct research efforts. The fear here is that university restricts the freedom of the individual UR to choose subject in order to comply with desires from the industry, restricts the method in order to assure that deliverables will be ready in time and finally restricts the UR's right to free publication in order to assure that a maximized value can be produced for the industry. The Swedish scholar Dennis Töllborg elaborates on this in his novel *Sorg 2.1* where he argues that the central scientific question is switched from “what is worth knowing?” to the question “what can I get paid for doing?”<sup>89</sup> He further argues that if university research is undertaken to generate money it will foster the notion that the best UR is the one who generates the most money<sup>90</sup>. This means that although legislation exists (see next paragraph) which ensures principles of freedom, the social construction within the research facility will push URs in to a chase for money.<sup>91</sup>

In this paper, when referred to scientific freedom, the freedom for the UR to freely choose field of research, to freely choose and alter research method as well as the freedom to control the research results in relation to the university is intended. This is the same definition as provided by the Swedish act Högskolelagen (1992:1434) (University act) chapter 1. § 6, those three freedoms are set forth as follows; 1) topic for research can be freely chosen, 2) Research methods can be freely developed and 3) research results can be freely published.

The author does not believe that the scientific freedom has to be jeopardized if the PP is abolished. However, in order not to generate a mentality in line with the one presented by Töllborg, proper guidelines will be required providing information on to which extent the university may influence its URs in the choice of topic and methods. The author furthermore agrees with the committee of the SOU regarding the freedom of publication which was suggested to remain unconditional.<sup>92</sup>

If a brief international outlook is made regarding the topic of unconditional freedom to publish, no unison viewpoint is to be identified regarding how to balance between the scientific research and society's interest in obtaining information from the university and on the other hand the university's interest in utilizing university inventions and the university's responsibility to diffuse technology. The solutions chosen differ and the choice is influenced by national attitudes and traditions. In France, Norway and Germany<sup>93</sup> a more or less unconditional right to publish is ensured. In Denmark no such right exists and in Britain some universities have adopted policies (not legislative) which provide such a right for publicly funded research but not for privately funded research.<sup>94</sup>

### *2.3.3.1 Contract research - remuneration and scientific freedom - a brief side track to provide perspective*

An example will introduce the topic. Example: *A university is approached by a company which is offering good money for a certain research task. The university, which as most universities always has some black hole to stick endless funds into, accepts the offer. The most suitable research group to undertake the task is determined to be a group led by the prominent UR Werner Karl Heisenberg at the department of nuclear physics. Mr. Heisenberg is not thrilled as he considers himself to have numerous other projects that he considers more important. (Unfortunately, he has had trouble finding funding for those through governmentally funded programs.) Rather hard-sets he determines to take on the project. The task turns out to be extremely hard and it taken no less than four years of seemingly hopeless testing before a breakthrough is reached and, due to Heisenberg's genius, the research can be finalized. During this time period Heisenberg has had little time to work on his other research projects as severe time pressure has*

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<sup>88</sup> Association of universities and colleges of Canada, Canada's universities adopt new Statement on Academic Freedom <http://www.aucc.ca/media-room/news-and-commentary/canadas-universities-adopt-new-statement-on-academic-freedom> October 25, 2011

<sup>89</sup> Dennis Töllborg, *Sorg 2.1* SPC Swedlaw/stella-bianca.se, "open source" 2009:1 Ansvarig utgivare: Dennis Töllborg, p. 108

<sup>90</sup> Dennis Töllborg (2009) p. 109

<sup>91</sup> Compare Ulf petrusson (2007) p. 16

<sup>92</sup> SOU 2005:95 p. 206

<sup>93</sup> For the German reasoning, see for example See also Eduard Reimer et al. (2007) p. 800

<sup>94</sup> SOU 2005:95 p. 128

been the result of the company's desire to launch a new product based on the research. The main result of the research is embodied in a patentable invention which, according to an agreement between the university and the company accrues to the company.

In the example two issues arise. Firstly it can be questioned if scientific freedom has existed for Heisenberg during those four years. Perhaps it would not be an overstatement to argue that this has not been the case at all. Secondly, Heisenberg will be in a worse position also regarding right to remuneration than if the patent had been developed (based on governmentally funded research), as he in this case would either have had the right to the patent or right to remuneration from the university's incomes from the patent. (depending on if the PP had been abolished or not) Several middle ways are also possible. It could e.g. be so that the company obtains a subsidized license to the patent. Exactly how to solve the problems with contractual research in relation to the scientific freedom is hard to solve and falls outside the scope of this paper. So does the question of UR remuneration for contract research. The problems should however be highlighted.

## 2.4 Denmark – looking in to statistics assessing the outcomes of the abolishment of the PP

Denmark was the first in a line of European countries to abolish the PP. Statistics have ever since been used to argue for or against the abolishment. The following quote along with Table 3 are taken from a paper produced by Copenhagen school of business:<sup>95</sup>

### Distribution of Danish academic patents by technology and type of owner, before and after the professors' privilege abolition

	1977-1999				2000-2003			
	Companies	Gov't	Individuals	Univ.s	Companies	Gov't	Individuals	Univ.s
ELECTRONIS	64.5%	3.2%	32.3%	0.0%	84.0%	0.0%	4.0%	12.0%
INSTRUMENTS	71.1%	4.4%	20.0%	4.4%	74.4%	0.0%	10.3%	15.4%
CHEM.S-MATERIALS	88.6%	0.0%	11.4%	0.0%	62.5%	0.0%	0.0%	37.5%
PHARMA-BIOTECH	58.9%	5.0%	26.2%	9.9%	70.0%	2.7%	5.5%	21.8%
OTHERS	81.3%	0.0%	18.8%	0.0%	86.7%	0.0%	6.7%	6.7%
All technologies	67.6%	3.5%	23.2%	5.6%	73.2%	1.5%	5.9%	19.5%

Table 4 : Structural ownership shift regarding Danish academic patents before and after the abolishment of the PP. Source: Peter Lotz et al. 2009

“Summing up, it is clear that universities take ownership of more patents, but also that this comes at the expenses of individual professors' ownership, which after the act – as expected - is dramatically reduced. Interestingly, also the share of industry-owned patents increases after the act, if only marginally. Taken together, these observations support the conclusion that the act did not produce the wanted outcome, namely for universities to take ownership of more patents in order to create an open market for IP rights to university-based inventions. Companies engaged in collaborative research with university scientists seem to secure ownership to even

Average number of industry sponsored research contracts by country

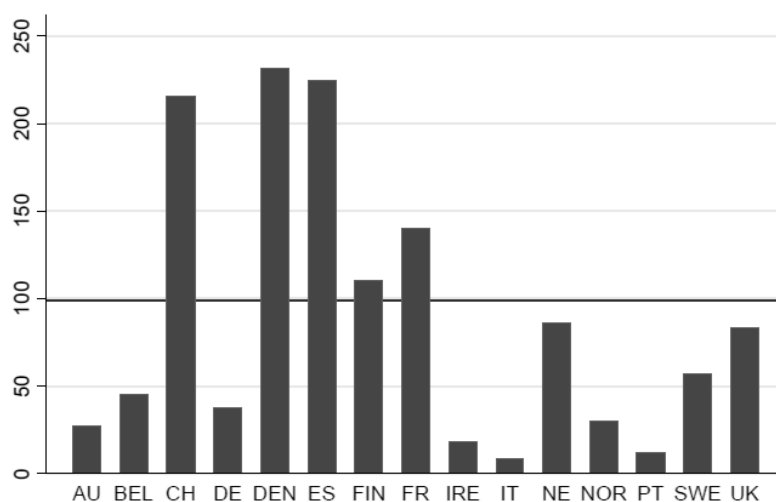


Table 3: Displaying the average amount of contracts per TTO by country. Source: Annamaria Conti et al. 2008.

<sup>95</sup> Peter Lotz, et al. (2009)

more inventions than before the introduction of the act.”<sup>96</sup>

The way the authors have chosen to elaborate on the figures is, out of the author of this papers perspective, somewhat confusing. The intention of an abolishment of the PP generally serves the purpose of ensuring that an increased utilization of university research is facilitated and not to increase the university ownership of patents as such. (something that the authors get back to some degree later in the assessment)<sup>97</sup> On the contrary, as will be described in the following, collaboration with the industry is generally the most efficient way to ensure utilization of university research and if the collaboration is undertaken through funding projects (contract-research) it can be said for sure that the research will be utilized as long as it is commercially viable as the collaboration partner has already paid for the research in exchange for the foreground.<sup>98 99</sup> The high rate of company owned patents may also have to do with that companies tend to be involved in the later phase of the development in the applied part of the development. If this is seen in combination with the high level of industry collaboration negotiated by Danish TTOs, see Table 4, the high level of company owned patents in Denmark is not that surprising<sup>100</sup>.

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<sup>96</sup> Ibid. p. 19

<sup>97</sup> Ibid. p. 20 f.

<sup>98</sup> Questions relating to limited scientific freedom is another question. Surely, this can be an issue as mentioned in 2.3.3.1.

<sup>99</sup> This is a general statement. Other settings can also be imagined where the client company does not simply obtain the rights but for example an exclusive license. The main argument however stands. As money has been spent on the development there is reason to believe that the company will take advantage of the technology if commercially viable.

<sup>100</sup> Table gathered from the following source: Annamaria Conti, Patrick Gaule, The CEMI Survey of University Technology Transfer offices in Europe, College du management de la technologie, Lausanne (France), 2008,p. 21

### 3 The reference objects

In this chapter a broad fact base will be provided in order to facilitate the analysis to come in the following chapters. The chapter will provide:

1. Legislative framework and background for the jurisdictions which will be assessed.
2. Institution and university specific regulations regarding ownership to inventions.
3. Institution and university specific regulations regarding remuneration to URs.
4. Institution and university specific regulations regarding alternative utilization models e.g start-ups, and incubation.

#### 3.1 Objects studied – universities in Germany and the US

As previously mentioned, Germany and German research organizations as well as US and US-American universities will be assessed in order to obtain practical guidance on how UR remuneration can be carried through in different utilization settings. The German institutions which will be assessed are; The Max Planck Gesellschaft along with its utilization entity the Max Planck Innovation and the Helmholtz Gemeinschaft branch Karlsruhe Institute of Technology. On the US side the assessed entities will be Massachusetts Institute of Technology and Stanford University. In the following a short introduction regarding ownership to patents in the respective jurisdictions will therefore be presented followed by a description of university praxis of the same.

#### 3.2 Germany - similarities with Sweden makes Germany a suitable reference object

AS the PP was abolished in Germany in 2002, and the German legal regulation prior the abolishment was similar to the Swedish current legislation as well as the current German legislation regulates issues of relevance to this paper in essence in the same way as a future potential Swedish legislation can be expected to do,<sup>101 102</sup> the German experience will be used as a reference. In fact, the committee in charge of the assessment of the potential Swedish abolishment explicitly stated that the German solution had provided guidance for their suggested wording of the Swedish legislation.<sup>103</sup> For the sake of clarity it should be mentioned that the conclusions of this paper will not only be applicable if legislation removing the PP is implemented in Sweden. The conclusion will also be applicable if similar effects are obtained by individual universities through agreements.

##### 3.2.1 Previously in Germany

Since 1957 the German law “Gesetz über Arbeitnehmererfindungen” (law on employee’s inventions) provided a PP exception which in essence resembled the Swedish PP<sup>104</sup>. In 2002 the exception was abolished and replaced by the current wording stating a university’s right to patentable inventions invented by UR. The driving concern behind the shift was the notion that “the former handling having led to a waste of chances for the creation of economical values, for setting up businesses, for the protection of existing jobs and the creation of new jobs.”<sup>105</sup>

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<sup>101</sup> § 42.4 Gesetz über Arbeitnehmererfindungen

<sup>102</sup> SOU 2005:95. P. 228

<sup>103</sup> Ibid. p. 228

<sup>104</sup>The PP was presented in Gesetz über Arbeitnehmererfindungen §42. The first paragraph states that inventions by professors, Phds, assistants at the university shall be considered „free inventions” meaning that they cannot be claimed by the employer. The second Paragraph provides one exception in case the university has provided “special equipment” required for the research. In this case the university may claim monetary compensation if the patent starts driving revenues.

*(1) In Abweichung von den Vorschriften der §§ 40 und 41 sind Erfindungen von Professoren, Dozenten und wissenschaftlichen Assistenten bei den wissenschaftlichen Hochschulen, die von ihnen in dieser Eigenschaft gemacht werden, freie Erfindungen. Die Bestimmungen der §§ 18, 19 und 22 sind nicht anzuwenden.*

*(2) Hat der Dienstherr für Forschungsarbeiten, die zu der Erfindung geführt haben, besondere Mittel aufgewendet, so sind die in Absatz 1 genannten Personen verpflichtet, die Verwertung der Erfindung dem Dienstherrn schriftlich mitzuteilen und ihm auf Verlangen die Art der Verwertung und die Höhe des erzielten Entgelts anzugeben. Der Dienstherr ist berechtigt, innerhalb von drei Monaten nach Eingang der schriftlichen Mitteilung eine angemessene Beteiligung am Ertrage der Erfindung zu beanspruchen. Der Ertrag aus dieser Beteiligung darf die Höhe der aufgewendeten Mittel nicht übersteigen.*

<sup>105</sup> Catharina Sojde et al vinnforsk rapport Äganderätten till forskningsresultat vid universitet och högskolor appendix 8 P. 4

### 3.2.2 Currently in Germany - Gesetz über Arbeitnehmererfindungen, 1957, in short

The legislation is applicable to public as well as private employees (§1). Only patentable and “*Gebrauchsmusterfähige*” (inventions capable of obtaining a German Utility model protection) are inventions according to the law.(§2). Also *technical improvements* which are not patentable or able to obtain Gebrauchsmuster protection can be obtained by the university (3§, 20§)<sup>106</sup>, The crucial distinction is drawn between “*Diensterfindungen*” (employment inventions) and “*Freie Erfindungen*” (Free inventions). Inventions that come into existence as a result of the employees services or if knowledge which the employee has obtained due to her services has shaped the invention, the invention will be considered a *Diensterfindung*. Other inventions are to be considered *freie Erfindungen*. However, also *freie Erfindungen* shall be reported to the employer (§4, §§18-19) in order for the employer to determine if she shares the employee’s viewpoint regarding the nature of the invention.<sup>107 108</sup> The duty to report inventions to the employer is established in §5. The report shall be written and encompass specified information required for the employer to assess the character and importance of the invention and determine if obtaining rights to it may be interesting.<sup>109</sup> The employer shall at the earliest date in writing confirm that the report has been received and within four months, from the date the report was submitted, in writing communicate if the economic rights to the invention will be obtained. If not communicated to the employee that the employer chooses to abstain from obtaining rights to the invention, the employer is automatically obliged to patent the invention (§§6, 8).<sup>110</sup> The employee is obliged to keep the invention secret during the four months response period (§24.2, §8). The employee is entitled to a reasonable compensation (§§9-12). When the compensation is calculated, parameters such as the economic value of the invention, the inventors’ primary work tasks and position and the employers participation in the process, shall especially be respected.<sup>111</sup>

In §42, rules especially governing the university setting are defined. Apart from those rules, which in some aspects provide *lex specialis*, the general rules of the law apply also for university employees. For university employees, the four months secrecy period does not apply. Instead, the inventor is entitled to make the invention public while teaching or as a research publication after two months (§42.1). The so called negative publication right is laid down in §42.2. This right implies the right to keep an invention secret in case the UR considers a report to the employer to be in conflict with the scientific freedom. If the UR decides to make the invention public at a later stage, she is obliged to instantly report the invention to the employer. If the employer decides to obtain rights to the invention, the UR shall always be entitled to use the invention in her teaching as well as research<sup>112</sup>. This rule is mandatory (§42.3). The UR is entitled to remuneration equivalent to 30% of the gross revenue generated by the university (42.4) starting from the first EUR regardless of to which extent the costs associated with the patent have been covered. All incomes are to be considered regardless of if they are generated in the university or through collaboration with external actors (license sales et cetera). Scientific use for e.g. research within the university is however excepted.<sup>113</sup> This remuneration level was established in order to ensure strong incentives for the UR to report inventions. The law is a protective legislation in favor of

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<sup>106</sup> This will be elaborated on further below in the chapter concerned with trade secrets (technical know-how) and the feasibility to commercialize such assets by universities. See 5.2.2.2

<sup>107</sup> The reason for the duty to report also free inventions is not stated explicitly by the law but added by the author for the sake of clarity.

<sup>108</sup> When discompliance occurs, in effect, the labor agreement has been violated. Damages will however not be claimed as contractual and not through the ArbEG but through the generic rules provided by BGB §823 (delict). Paragraph 2. This is a rather exotic occurrence in labor law which usually protects the employee. In this case, however an exception has been made in favor of the employer as the employer’s capacity to enforce her rights would otherwise be a chimera. See hereto also Bartenbach/Volz (2002) p.840 f.

<sup>109</sup> The reason for the demand for certain information is an interoperation by the author and is not explicitly stated in the law. Additional research regarding potential usage of the invention as well as its commercial viability has to be determined by the employer and is not entirely up to the UR to determine. She shall, however provide the technical information required for the employer to undertake the further assessment.

<sup>110</sup> The obligation applies for filing in Germany( „§ 13 Schutzrechtsanmeldung im Inland“) But not for applying outside Germany( „§ 14 Schutzrechtsanmeldung im Ausland“)

<sup>111</sup> The reader should be reminded that this is the general rule which is applicable for employees in private and public service. Detailed provisions regarding remuneration for UR are found below.

<sup>112</sup> The right does not allow the UR to compete with the employer regarding commercial usage of the invention. The exception relates to education and research purposes.

<sup>113</sup> Eduard Reimer et al. (2007) p. 828



the employee and the regulations in favor of the employee are thus mandatory. The parties contractual freedom has been restricted to some extent however, agreements after notification to the employer is permissible (§22).<sup>114</sup>

As highlighted, the mandatory rules of the legislation are the rules in favor of the UR. Hence, there is no limitation to URs right to contractually negotiate conditions providing further benefits than stipulated by the law. The Hochschullehrerverband (the association of professors), the only organization which opposed the abolishment of the PP, has advised its members to demand in employment-negotiations to be excluded from the rules of the ArbEG to the extent required to avoid being encompassed by reporting rules and obligations to assign patents.<sup>115</sup> The existence of this option should be noted.

### 3.2.3 Computer programs

In Germany, the University becomes owner to copyrights generated by the UR and according to general legal principles in the field of labor law, the employee has an obligation to report the creation to the employer.<sup>116</sup> As for computer programs, dual protection may occur as computer programs may occasionally also be patentable. Ownership to the technical solution patent will fall under the scope of ArbEG as any other invention.<sup>117</sup> When it comes to remuneration for software the German legislation takes the standpoint that there should be no compensation for the copyrighted material as such, as it (i.e. the economic rights) is transacted to the employer by default.<sup>118</sup> Regarding combinations of copyrights and patents, arising when a computer program additionally solves a technical problem the employee is entitled to compensation through the ArbEG. This option has been confirmed by the (BGH) “Bundesgerichtshof” (supreme court of Germany),<sup>119</sup> given that the invention has been disclosed to the employer as an invention in addition to reporting for it as a copyright.

### 3.2.4 Remuneration for computer programs and copyrights in general – in the university

As seen in the previous section, the issue of UR remuneration can be discussed and theoreticized. When it boils down to the actual remuneration in the university setting it is, however, generally regulated in policy document or in labor agreements. As an example it can be mentioned that the Karlsruhe Institute of Technology applies a “between 10-20% of the gross revenue rule”

### 3.2.5 Sanctions

ArbEG does not provide any rules regarding sanctions. The intention of ArbEG is instead to provide guidance on rights and obligations of the employee and employer regarding patents. There are, however, sanctions which can be applicable. If the employee does not report an invention in accordance with the rules of the ArbEG this implies a violation of the labor agreement and may lead to disciplinary measurements.<sup>120</sup> Additionally, the general rules of the “Bürgerliches Gesetzbuch” (BGB) (German civil code) can make the employee liable in case of non-compliance with the reporting rules.<sup>121</sup>

#### 3.2.5.1 Sanctions in effect and the German constitution

When discussing UR compliance with reporting rules mainly two scenarios are troublesome. Firstly, the scenario where the UR does not report the invention and publishes the result thereby ruling out future patenting and secondly, the scenario when the UR patents the invention on her own.

For the second scenario it could be argued that the previously mentioned sanctions are applicable and this should therefore not be an issue as sanctions are available. However, in practice, disciplinary actions are rarely undertaken and when they are, the scope and impact of these measurements

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<sup>114</sup> Sanna Wolk, (2011) Remuneration for employee inventors – is there a common European ground? The Chartered Institute of Patent Attorneys Journal, Volume June 2011. P. 352-358 and June 2011, P. 440-445

<sup>115</sup> Catharina Sojde, Per Eriksson, Margareta Groth, David Nordfors, Lennart Norgren, Jan Nylander Ann-Louise Persson, (2003) Vinnovas förslag till förbättrad kommersialisering och ökad avkastning i tillväxt på forskningsinvesteringar vid högskolor, Appendix 8, p. 5 ff.

<sup>116</sup> Catharina Sojde, et al. (2003), Appendix 3 p. 10

<sup>117</sup> Ibid.

<sup>118</sup> § 69b para. 1 UrhG

<sup>119</sup> BGH “Wetterführungspläne” 24.10.2000

<sup>120</sup> Catharina Sojde, et al. (2003), Appendix 3 p. 9

<sup>121</sup> Ibid.

are limited.<sup>122</sup> The most likely outcome is an official statement informing that the university disapproves. Holding the UR liable is further more highly unusual.<sup>123</sup> As for the first scenario, enforcing compliance is made difficult due to the same reasons as for the private patenting but as if this was not enough the “Deutsches Grundgesetz”<sup>124 125</sup> (German constitution) supports URs who publish their results without reporting in accordance with the ArbEG. The German constitution justifies such an undertaking through Art. 5 paragraph 3 where it is stated that „Kunst und Wissenschaft, Forschung und Lehre sind frei“ (Art, science, research and teaching is (shall be) free). This interoperated means that the state (or university) is not entitled to demand that research outcome is treated in a certain way. Applied, this means that the restrictions required by the ArbEG are void.<sup>126</sup> So far the question has not been tried by the “Bundesverfassungsgericht” (german constitutional court). In a preliminary ruling in 2004 the Bundesverfassungsgericht had to handle the question. The court, however, managed to dodge the core question through a technical maneuver.<sup>127 128</sup>

As can be seen, available legislation does not provide a legal context which ensures compliance as the positive freedom of publication cannot be properly limited.<sup>129</sup> See footnote for additional comments.<sup>130 131</sup> Compliance must instead be built on a voluntary participation by the UR. The logical conclusion will be that the UR must be encouraged to participate through adequate incentives. How this would play out in Sweden deserves a brief assessment. The constitutional issue would perhaps not arise in the Swedish setting but never the less the “carrot or whip question” is of relevance. One alternative, through which compliance can be reached, is by the imposing of sanctions severe enough to ensure that disclosure compliance is reached. Unfortunately, as will be seen in the following 4.1.2, the initial disclosure is not all that is needed from the UR. On the contrary, collaboration is generally required also in the following regardless of if the technology is to be licensed directly to the industry or if it is to be incubated. Although the disclosure can be forced through sanctions, it is thus the author’s belief that incentives must be in place for the further development to be possible. A combination of sanctions, in order to increase the disclosure rate also among URs which are not interested in remuneration but fear reprisals, and remuneration, providing a further positive incentive of particular value during the commercialization process, might thus be the optimal combination.

### 3.2.5.2 *The current discussion in Germany*

Previous ethical discussions, like the ones undertaken in Sweden, have ceased in Germany and currently URs are pleased with the abolishment of the PP as well as the level of remuneration.<sup>132</sup> Instead, today it is companies, which previously utilized the option to obtain patents from URs which were not capable of negotiating favorable license or sales terms that are lobbying against the new university managed utilization of UR inventions.<sup>133</sup> Also the commercialization frequency of university research has increased due to the university ownership.<sup>134</sup> The legal changes are generally considered to be good for the universities which can increase their incomes as well as for the industry and society as new companies are funded, which in turn provide work.<sup>135</sup>

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<sup>122</sup> Interview 13.03.2012, Dagmar Vössing, Project Manager Technology Marketing at the KIT Innovation department

<sup>123</sup> Ibid.

<sup>124</sup> Ibid.

<sup>125</sup> See also Eduard Reimer et al., (2007) p. 789

<sup>126</sup> The German constitution is commonly used to interoperate the wording of and occasionally nullify legislation. In this case the ArbEG, BGB and Labor law. (For employee liability in accordance with BGB §823 see footnote.108)

<sup>127</sup> Bundesverfassungsgericht, Neue Zeitschrift für Verwaltungsrecht, 2004. p.974

<sup>128</sup> Joachim Hübner, §42 Nr.1 ArbEG und der Freiheit der wissenschaftlichen Kommunikatio, Wissenschaftsrecht, 2005, p. 34 f.

<sup>129</sup> See also Eduard Reimer, et al (2007) p. 818 ff.

<sup>130</sup> See also Christina Lux, Rechtsfragen der Kooperation zwischen Hochschuhulen und Wirtschaft, Jur. Diss., Köln 2003, p. 156. – In which She argues that the employee loyalty is enough to oblige the UR to disclosure.

<sup>131</sup> The argument is however fought back by other scholars ( e.g. Eduard Reimer, et al (2007) p. 818 and Pahlow, Louis/ Gärditz, Klaus Ferdinand, Konseptionelle Anforderungen and ein modernes Recht der Hochschuleerfindungen WissR, 2006, p.61) arguing that there is no exception through employee loyalty or other obligation allowing the constitution to be neglected in favor of disclosure in accordance with the ArbEG.

<sup>132</sup> Catharina Sojde, et al.(2003), Appendix 3 p. 10

<sup>133</sup> Ibid.

<sup>134</sup> Ibid.

<sup>135</sup> Ibid.

### 3.2.6 German institutions and universities to be examined

Two German research organizations have been selected for further assessment. These are the Max Planck Gesellschaft (MPG) and the Helmholtz Gemeinschaft (HGF)

### 3.2.7 Structure of the research organizations and relation to universities

An overview of the context in which the researching organizations operate can be seen in Figure 3: Connections between MPG umbrella organization, research centers, university and researcher. and Figure

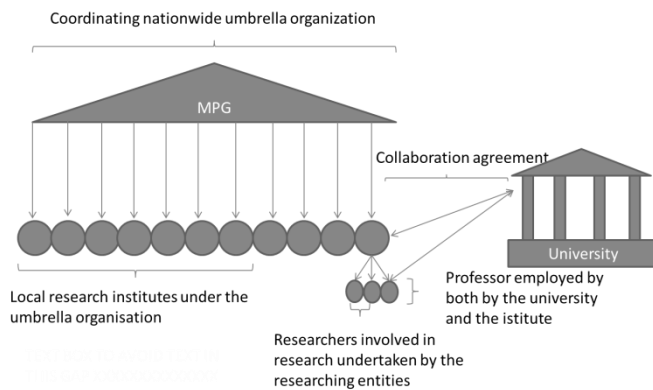


Figure 3: Connections between MPG umbrella organization, research centers, university and researcher.

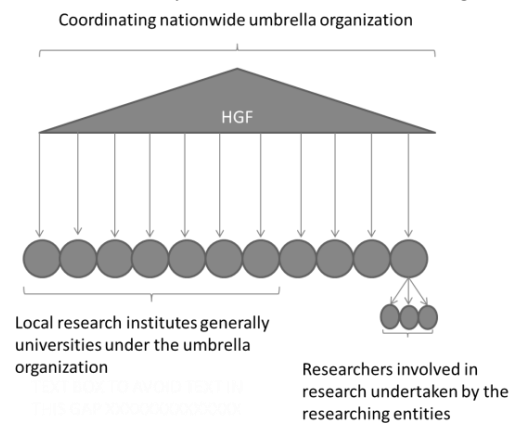


Figure 2: Connections between HGF umbrella organization, research centers, university and UR.

2: Connections between HGF umbrella organization, research centers, university and UR. As indicated by the overview, the research organizations are neither universities, nor subordinated universities. Instead the research organizations are standalone entities. In the following those will be referred to as umbrella organizations as they are coordination research efforts for the local branches nationwide.<sup>136</sup> The two umbrella organizations have different relations to the local institutes which they coordinate. For HGF, the main rule is that the research projects in question are run in separate legal entities. Usually those separate legal entities are “gemeinnützige GmbH” (nonprofit limited liability companies) in the shape of a university. This implies that the contractual partner for the UR is the university itself making the *lex specialis* provisions for universities directly applicable.<sup>137</sup> MPG for its part is a nonprofit research organization organized as an association with sub-coordinated institutions which are not universities and not separate legal entities, implying that the university provisions are not directly applicable and that the counterparty in an employment agreement will be the umbrella organization directly.

### 3.2.8 Applicability of the Gesetz über Arbeitnehmererfindungen § 42.4

As the umbrella organization of MPG is not an educating entity as defined by the German law on employees’ inventions, the rules found in § 42.4 (the remuneration rule for university employees) are not directly applicable.<sup>138</sup> However, in practice researchers employed by the MPG have been granted approximately the same rights as URs are granted by the law. This right is safeguarded in the employment agreements of the MPG staff. The praxis of using the same model for researcher remunerations as within the university is also provided by MPG policy documents.<sup>139</sup>

For URs at the HFG, the university specific legislation is applicable when the legal entities constituting HGF are universities. For this particular study, the Helmholtz institute which will be examined is the Karlsruhe Institute of Technology (KIT). As will be seen below, the KIT is an interesting actor to assess as the university undertakes incubation, seed funding and start-up promotion and can hence provide extensive information on such practices.

<sup>137</sup> The *lex specialis* referred to is the ArbEG 42.2 as presented above.

<sup>138</sup> Compare: Gesetz über Arbeitnehmererfindungen § 42“ Für Erfindungen der an einer Hochschule Beschäftigten gelten folgende besonderen Bestimmungen“ (For inventions by a university employee, the following rules shall apply)

<sup>139</sup> Erfinder-Leitfaden der MPG, 2001 P. 16

To conclude, the German part of the assessment will consist of one actor which is *per se* bound by the legislative rules and one which in effect applies similar rules.

### 3.3 Max Planck Gesellschaft

MPG conducts basic research within then field of e.g. natural sciences, life sciences and social sciences. Research is undertaken through the almost 80 local institutes throughout Germany. MPG undertakes tech transfer through the subsidiary MPG Innovation.<sup>140</sup> MPG Innovation has the outspoken strategy of:

1. “granting industrial companies rights of exploitation of inventions and technical know-how through license agreements,
2. carrying out joint research projects in strategic areas, e.g. biotechnology, the material sciences or organic chemistry, in cooperation with industrial partners from the industry, and
3. enabling the scientists of the MPG to further develop the technologies by setting up their own companies.”<sup>141</sup>

#### 3.3.1 Ownership

As MPG is not a university, the standard rules regarding employees’ inventions are applicable; giving that MPG will be the rightful owner to the invention if claimed by the umbrella organization in accordance with German law.<sup>142</sup> <sup>143</sup> Note that the local branches are not legal entities and thus does not obtain any rights, the rights are instead transacted directly to the umbrella organization which in turn undertakes value creation through MPG Innovation.

#### 3.3.2 Royalty sharing

The first two sub-categories, Monetary and Equity, refer to incomes from licensing activities while the Start-ups section refers to venture creation efforts in which the researcher or the research organization participates.

##### 3.3.2.1 Monetary

According to the “MPG regulation with respect to inventors” - dated 9 March 1967 inventors are entitled to up to 30% of the gross revenue generated when their invention or know-how is licensed to a third party.<sup>144</sup> It should be noted that the MPG appreciates the value of know-how and has, since 1967, considered that also IAs (non- patentable) can be protected as rights and be licensed. The “up to” 30 % rule from 1967 has since then been modified and current praxis gives that the researcher is entitled to 30% of the gross incomes, starting from the first Euro.<sup>145</sup>

MPG does not apply a net revenue rule although possible as MPG is not bound by the *lex specialis* applicable for universities. This has to do with the fact that few patents manage to even cover the patenting costs and maintenance fees.<sup>146</sup> If deduction was undertaken this would decrease researcher incentives to participate in the patenting of new inventions if she cannot be sure of the commercial viability of the invention, an assessment which is furthermore difficult to undertake in advance. As MPG is a nonprofit organization with the main goal of maximizing technology diffusion through licensing activities and not to maximize revenues, this is considered the most appropriate solution.<sup>147</sup>

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<sup>140</sup> Interview Herr Dr. Kirschenhofer, Start-up manager at MPG innovation 24.02.12

<sup>141</sup> Ausgruendungsleitfaden MPG P.5

<sup>142</sup> Erfinder-Leitfaden der MPG, 2001. P. 8

<sup>143</sup> Compare also section 3.2.2 Currently in germany

<sup>144</sup> Erfinder-Leitfaden der MPG, 2001 P. 16

<sup>145</sup> Interview Herr Dr. Kirschenhofer, Start-up manager at MPG innovation 24.02.12. The policy documents still only state an “up to” right for the researcher. However, praxis within the organization currently is to remunerate according to a gross revenue model granting 30%.

<sup>146</sup> Ibid. – MPG however generates a positive net if all disclosures are taken in to consideration.

<sup>147</sup> Ibid.

### 3.3.2.2 Equity

MPG does, under certain conditions, accept equity as payment for a license. The exception applies when the licensee is a start-up enterprise with low liquidity. When equity has been transacted as payment, a percentage of the shares will not accrue to the researcher. Instead the researcher will be granted 30% of the revenues generated when the shares are sold or when dividend is generated by the company.<sup>148149</sup> It should be noted that although MPG endeavors to facilitate rapid exits, it is not unusual that holdings remain in possession of MPG for ten years or more. The distribution of incomes from equity and straight license incomes is displayed in Table 5.

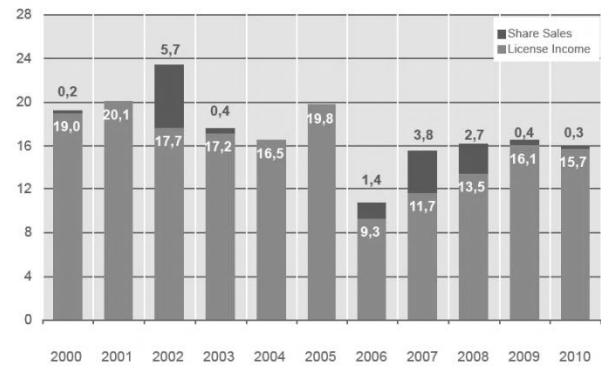


Table 5: MPG Incomes from straight license fees and equity sales the years 2000 - 2010

### 3.3.2.3 Start-ups

Start-ups are never initiated directly by MPG Innovation as this would be too demanding for the organization. Start-ups are instead launched by the researcher herself or an appropriate external actor appointed by MPG Innovation.<sup>150</sup>

- **The researcher finds a start-up**

When the researcher finds the start-up all IP will remain the property of MPG. The start-up will pay a license fee to MPG Innovation, out of which the researcher will be granted 30%. It is up to the researcher and other actors involved in the company to obtain funding from external sources.

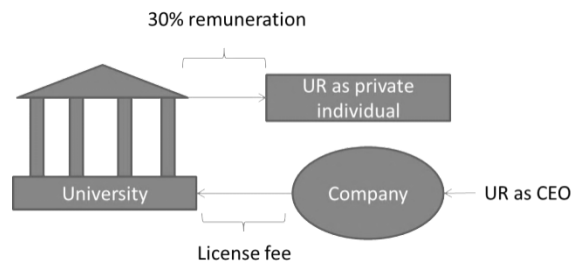


Figure 4: MPG distinction between the entities UR, University and Start-up

- **An external actor finds a start-up**

MPG Innovation occasionally appoints an external actor to undertake the founding of a company comprising IP owned by MPG. From the cash or equity payments the general rules, as stated above, will apply.

## 3.4 Helmholtz Gemeinschaft

HGF consists of 17 research centers conducting research within the fields of natural science – technology and biological – medicine.<sup>151</sup> HGF also has an outspoken strategy of technology transfer comprising the founding of start-ups and licensing activities.<sup>152</sup> Each research center has, furthermore, a Technology Transfer Office (TTO) in order to facilitate the transfer.<sup>153</sup> The HGF institute to be assessed during this study is, as mentioned, the KIT institute in Karlsruhe.

### 3.4.1 Ownership

The HFG UO is not a university. However, the separate research bodies, by which URs are employed, are, leading to applicability of the university specific rules.<sup>154</sup> This does not per se affect the capacity to obtain patents but as the researching bodies are separate legal entities ownership will be claimed by the local HGF centers, which contrary to local MPG branches, are legal entities of their own.

<sup>148</sup> Interview Herr Dr. Kirschenhofer, Start-up manager at MPG innovation 24.02.12

<sup>149</sup> Ibid. The likeliness of dividedn from a start-up in the high tech segment is of cause rather low. However, the option must be covered.

<sup>150</sup> Ibid.

<sup>151</sup> Helmholtz Gemeinschaft, Wissen und Technologietransfer in der Helmholtz Gemeinschaft, p. 5

<sup>152</sup> Ibid. p. 6 ff.

<sup>153</sup> Ibid. p 8

<sup>154</sup> ArbEG § 42

### 3.4.2 Royalty sharing

The first two sub categories, Monetary and Equity, refer to incomes from licensing activities while the Start-ups section refers to venture creation efforts in which the UR or the research organization participates.

#### 3.4.2.1 Monetary

As the KIT is a university in the sense of the German legislation, the mandatory remuneration rules as defined by the ArbEG are applicable and the UR can expect to be granted 30% of the gross revenues.<sup>155</sup>

#### 3.4.2.2 Equity

Equity is generally not accepted in lieu or partial lieu of royalties. Exception is however made for start-ups unable to finance the license fee in cash.<sup>156</sup> KIT never obtains more than 20% of the shares in a company and the UR is then remunerated in accordance with ArbEG 42.4 when the KIT makes an exit.<sup>157</sup> This situation, however, only becomes relevant for the cases when KIT demands a down payment or license payments that are not based on royalty to complement the royalty system. KIT intends to make an exit as soon as possible and preferably within five years.<sup>158</sup>

#### 3.4.2.3 Start-ups, incubation and project seeding

KIT differentiates between the treatment of projects which have not yet taken the form of a company and the ones that have. After the founding of a company KIT will only provide limited services as it is argued that the autonomy of the two entities must be respected and that KIT shall only provide funding to the project in accordance with the seed capital and incubation procedures as presented below.<sup>159</sup>

#### 3.4.2.4 Incubation and Start-ups

KIT runs the Eggenstein Leopoldshafen High-Tech-Incubator. The incubator was founded in 2008 and is mainly meant to be used by KIT start-ups.<sup>160</sup> The companies which are using the incubator facilities, providing office space, the IT infrastructure required as well as chemical and physical laboratories,<sup>161</sup> pay a progressive rent. The rent starts at a low level in order to support the youngest companies and increases in order to force the oldest companies out of the incubator and provide free space for new start-ups. The average total payment for each incubated company has been calculated so that KIT's costs for providing the facilities are covered.<sup>162</sup> No services such as legal or accounting services are provided for the incubated companies.<sup>163</sup> For companies which are utilizing KIT patents, a license fee is to be paid as for any company utilizing the patents.<sup>164</sup> Remuneration to the UR is then paid from this sum in accordance with the rules stipulated by the ArbEG. KIT ensures that a clear line is drawn between the companies in the incubator and the university. The companies must at all times be standalone entities serving their own needs and paying for the same.<sup>165</sup> By ensuring this praxis, with exception for the seeding projects as will be explained below, complications regarding the usage of university resources and effects that this might have on the final kickback to the UR are minimized.

It could be argued that KIT through the incubation indirectly provides additional funds which will increase the average generated income per patent. This as a price higher than a market price will hardly be obtained from any of the incubated companies as they then will decide to leave the facilities. In effect the companies will only utilize the facilities as long as it is beneficial for them and although KIT

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<sup>155</sup> Ibid.

<sup>156</sup> Interview 13.03.2012, Dagmar Vössing, Project Manager Technology Marketing at the KIT Innovation department

<sup>157</sup> Ibid.

<sup>158</sup> Thomas Kroener, KIT Innovation department, mail correspondence

<sup>159</sup> Ibid.

<sup>160</sup> Ibid.

<sup>161</sup> Ibid.

<sup>162</sup> Ibid.

<sup>163</sup> Ibid.

<sup>164</sup> The level of the license payment does not have to be affected by the fact that the technology is licensed by a KIT start-up. However, in affect it could be so that the license fee is royalty based. If this is the case there will subsequently be no need for license payments as long as revenues are not generated.

<sup>165</sup> Although occasionally paying for these needs is made easier as KIT provides e.g. incubation

covers its costs, a more lucrative business could be undertaken by KIT if the premises were rented by a counterparty willing to pay a price motivated by the actual benefits that are provided. In this paper such a contribution will be referred to as indirect funding.

### 3.4.2.5 Seeding projects

KIT has a fund in charge for seed capital investments on behalf of the university. The fund is called KIT Seed Fund and is a financing instrument in the field of innovation with a strong focus on licensing and start-up projects. The term seed funding is not used in accordance with the general notion of its meaning as KIT –seed fund invests in projects rather than a founded company, although the companies, by exception can be part of a company based on KIT-technology.<sup>166</sup> The fund yearly obtains a share from the incomes derived from the current licensing business. KIT views the KIT-Seed Fund as a "generational contract" between old and new projects where old successful projects pay back the support which they previously received.

The KIT Innovation Department is the service partner for the commercialization of KIT research results. The KIT innovation department is also responsible for managing the KIT-Seed Fund. The fund provides support for license-based cooperation projects with industry, which aim for the development of a concrete product. In effect the fund provides KIT-internal "venture capital" which can be invested in technologies derived from the KIT provided that certain requirements are met. The main requirements are a product idea, which will be further developed together with an industrial partner in a limited period of time and a back flow for the KIT after the market launch.<sup>167</sup> License fees from industry partners are generally higher when the licensed technology has been subject to seed funding. This as undertaking the project was in the interest of the industry partner in the first place and the partner's development risk has been reduced through the university's funding.<sup>168 169</sup> Foreground from seed capital projects which are undertaken as a separate entity will become the property of the new entity while foreground to projects which are undertaken within the university will accrue to the university.<sup>170</sup>

A contribution is not made in cash to the project but rather paid to KIT (from the fund). This has to do with the fact that the funds financing scope is "usage of temporary project staff and material resources to cover the projects costs." The fund therefore finances services which can be provided by the KIT staff e.g. legal advice and use of material and facilities.<sup>171 172</sup>

As for UR remuneration, the standard provisions apply. 30% of the, by KIT obtained incomes, will be paid. It could be argued that the URs chances of getting a high payback on her patent will be increased by this investment and that this would be unfair in relation to other URs whose projects have not been funded by seed-fund. However, all URs have the right to apply for the funding and the potential investments are assessed on objective criteria and should thus not be considered an issue according to KIT.<sup>173 174 175</sup>

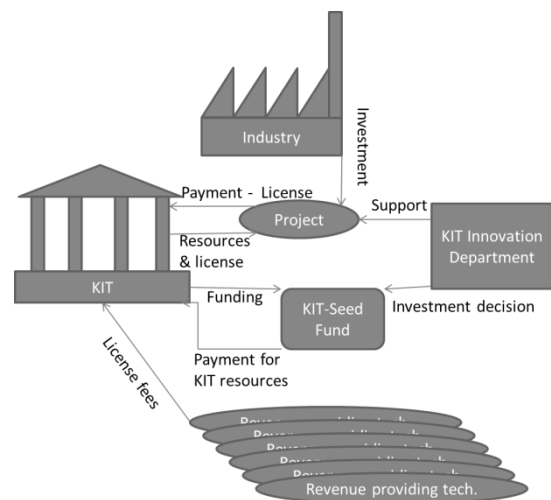


Figure 5: The KIT Seed fund, decision making and funding flow displayed.

<sup>166</sup> Interview 13.03.2012, Dagmar Vössing, Project Manager Technology Marketing at the KIT Innovation department

<sup>167</sup> KIT, FAQ on the Seed Fund <http://www.innovation.kit.edu/english/468.php>

<sup>168</sup> Ibid.

<sup>169</sup> Interview 13.03.2012, Dagmar Vössing, Project Manager Technology Marketing at the KIT Innovation department

<sup>170</sup> Information obtained per mail from Thomas Kroener at the KIT Innovation department

<sup>171</sup> KIT, FAQ on the Seed Fund <http://www.innovation.kit.edu/english/468.php>

<sup>172</sup> Interview 13.03.2012, Dagmar Vössing, Project Manager Technology Marketing at the KIT Innovation department

<sup>173</sup> KIT, FAQ on the Seed Fund <http://www.innovation.kit.edu/english/468.php>

<sup>174</sup> Interview 13.03.2012, Dagmar Vössing, Project Manager Technology Marketing at the KIT Innovation department

<sup>175</sup> The author considers this attitude reasonable. The situation provides an example of when the university must be able to reason in terms of commercial viability.

If however, the question is problematized further it could be argued that the funds provided have indeed ensured that the IP in question eventually generates more income and this at a stage where the university has already signed a collaboration agreement with an industrial partner ensuring her rights to use the future outcome of the project. KIT solves this issue by demanding higher royalty/license fees for patents which have been part of a project supported by the Seed fund. Note however, that this will only be an economic setback for the industry partner. Out of the UR's perspective this is beneficial as the increased license revenues will increase the value of her legal demand on 30% of the university's income. See further below in section 4.3 regarding the relations between the three involved entities being the university, the company, and the UR.

#### **3.4.2.6 Conclusion KIT active participation**

In all of the setups through which KIT creates value from the patent portfolio, the university maintains a clear line between the company licensing technology and the university itself. It does not matter that the project is a start-up from KIT, that seed capital is invested, that the company is located at the KIT incubator, that KIT holds shares in the company or that the UR responsible for the patent is involved in the company and simultaneously still active in the university. The entity will still, as any entity pay license fees to the university, incomes which will then consequently be distributed to the UR in accordance with the mandatory legislation of the ArbEG.<sup>176</sup>

### **3.5 US – Well developed university praxis providing guidelines**

Due to their relatively long and extensive history of university tech transfer to as well as interaction with the industry, US universities will be used as reference objects.

#### **3.5.1 US legislation – The Bayh Dole Act**

Until the passing of the Bayh Dole Act 35 (United States Code (U.S.C.) § 200-212) in 1980, ownership to public funded university research accrued to the federal government.<sup>177</sup> Prior to the enactment of the Bayh Dole act the federal government held title to approximately 28,000 patents. Less than 5% of those patents were licensed to industry for development of commercial product.<sup>178</sup> This was considered a failure by the federal government in terms of adoption of technologies derived from federally funded research.<sup>179</sup> The explicit intention of the legislative due to the Bayh Dole thus became to assure a higher rate of utilization of patents derived from federally funded research in e.g. universities.<sup>180</sup> Currently governmentally funded university research will become the property of the university,<sup>181 182</sup> providing amendments to the starting point being that rights to inventions developed by federal employees shall become government property if “made during working hours, or made with the government’s resources, including money, facilities, equipment, materials, information, or the help of other government employees on official duty, or directly related to the inventor’s official duties or made because of those duties.”<sup>183 184</sup>

However, also after the enactment of Bayh Dole act, patents derived from non-governmentally funded research, as a starting point, belongs to the inventor.<sup>185</sup> In effect however, the issue is generally regulated contractually so that the right will accrue the university or an external founder. One case when the UR might become owner to the patent is if a foundation sponsors research without specifying a party to become IP-holder. This however, should be seen as a rare exception. Especially among the private universities the praxis of contractually ensuring rights has been far

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<sup>176</sup> The author believes that this is the only viable solution out of a UR remuneration perspective. If a distinction is not maintained the impact of university funding, direct or indirect, can hardly be assessed and subsequently, the effects on the researchers final share and the calculation of the same will become even more complex.

<sup>177</sup> Robert Rhines, Consequences of the Bayh-Dole Act, P. 2, 2005

<sup>178</sup> Council on Governmental Relations, (1999) The Bayh-Dole Act A Guide to the Law and Implementing Regulations. p.2

<sup>179</sup> U.S. General Accounting Office (GAO) Report to Congressional Committees entitled “Technology Transfer, Administration of the Bayh-Dole Act by Research Universities” dated May 7, 1998. To be found under: <http://www.gao.gov/archive/1998/rc98126.pdf>

<sup>180</sup> See 35 U.S.C. 200

<sup>181</sup> SOU 1996:70 sid 108 ff

<sup>182</sup> 35 USC § 202

<sup>183</sup> 37 Code of Federal Regulations (C.F.R.) § 501.6

<sup>184</sup> Richard Stim, Profit from Your Idea: How to Make Smart Licensing Deals, P. 83 ff.

<sup>185</sup> SOU 2005:95 p. 206, p.116



developed. In the following the praxis of two private American universities, Stanford and MIT, will be assessed. As the respective Research Policy documents of these the two universities provide more detailed guidance than the actual legislation as well as comply with the latter, the guidelines found in those documents will be used to complement the legislation.

Regarding level of remuneration requested by law in relation to the actual level used by the selected universities a survey undertaken 2001 by the American National institute of health (NIH) has been examined. The study was undertaken in order to examine the use of taxpayers' money in governmentally funded research. As part of this examination the NIH requested the Council on Governmental Relations (COGR), the Association of American Universities (AAU) and the Association of American Medical Colleges (AAMC) to provide information from their members on their use of / distribution of royalty income. According to the study, "University officials consistently reported that the revenues derived from licensing income and other equity are being used to defray the costs of patenting, licensing and related legal and infrastructure expenses associated with technology transfer. In addition, according to COGR, net revenue is shared between the inventor and the university, and the inventors' share is in the range, on average, of 30-35 percent of net income received."<sup>186</sup> "By law, federal inventors must receive the first \$2,000 of income received by the agency and at least 15 percent thereafter, up to a maximum of \$150,000 per year in royalties from all licensed technologies to which they are inventors."<sup>187</sup>  
188 189

### **3.6 Massachusetts Institute of Technology (M.I.T.)**

Proceedings and rules for staff and student at the M.I.T. regarding IP are stated in the policy document "Guide to the Ownership, Distribution and Commercial Development of M.I.T Technology (GODC)".<sup>190</sup>

#### **3.6.1 Ownership**

With exception for thesis's works that have not consumed MIT resources,<sup>191</sup> patents and copyrights (including copyright on software) developed by faculties, students and staff, are owned by M.I.T. when either the intellectual property was developed in the course of or pursuant to a sponsored research agreement with M.I.T. or the intellectual property was developed with significant use of funds or facilities provided by M.I.T.<sup>192</sup>

The rules regarding "significant funds from M.I.T." are strict. For an invention to fall outside the scope of the regulation, only a minimal amount of M.I.T. funds have been used, the invention has been developed outside of the assigned area of research, the development has only consumed insignificant M.I.T. equipment and only utilized M.I.T. facilities to an insignificant extent.<sup>193</sup> In other words the starting point is that all inventions will accrue to the university.

#### **3.6.2 Royalty sharing**

The first two sub-categories, Monetary and Equity, refer to incomes from licensing activities while the Start-ups section refers to venture creation efforts in which the UR or the university participates.

##### **3.6.2.1 Monetary**

The URs share of the incomes is calculated according to a net income model where initially, 15% of the revenues shall be deducted from gross royalty income to cover an administrative fee. The deduction is directed toward covering the expenses of the Technology Licensing Office. Thereafter out-of-pocket costs i.e. costs direct assignable to expenses for a specific case such as patent filing, prosecution and

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<sup>186</sup> Department of Health and Human Services, National Institutes of Health (NIH) - Response to the Conference Report Request for a Plan to Ensure Taxpayers' Interests are Protected ([http://www.ott.nih.gov/policy/policy\\_protect\\_text.aspx](http://www.ott.nih.gov/policy/policy_protect_text.aspx))

<sup>187</sup> Ibid.

<sup>188</sup> There is however no explicit statement in the Bayh Dole act providing a percentage. Only a requirement in 35 U.S.C. 202 (c) (7) (b) that "the contractor share royalties with the inventor"

<sup>189</sup> United states general accounting office, Technology transfer Administration of the Bayh-Dole Act by Research Universities, Washington, 1998

<sup>190</sup> GODS, Revised June 2010, art 1.

<sup>191</sup> Ibid. Art 2.1.5

<sup>192</sup> Ibid. Art 2.1

<sup>193</sup> Ibid. Art 2.1.2

maintenance fees and specific marketing costs are deducted. The sum left will be “the adjusted royalty income.”<sup>194</sup> From the adjusted royalty income one third shall be accrued to the inventor (the inventor’s share).<sup>195</sup>

### 3.6.2.2 Equity

Revenues from university equity holdings which have been obtained in lieu or partial in lieu for a license payment from a start-up will be divided in line with what goes for straight monetary payments. The prescribed shares are then issued by the company to these inventors in the inventors’ names.<sup>196 197</sup> Deduction of 15% (administrative fee) is not that difficult. Further subtracting fixed costs is harder as the shares then must have been assigned a value. However, as the amount of shares required has been determined to equal the initially demanded cash payment this is also a feasible undertaking.

### 3.6.2.3 Start-ups

M.I.T. does under certain circumstances promote start-ups based on M.I.T technology. It is seen as an alternative to licensing the IP to an established business and is done after assessment of several key factors:

- “Is the technology subject to a large development risk? (often large companies in established industries are unwilling to take the risk for unproven technology)
- How do the expected development costs correspond to the expected investment return? (Can the investors in the start-up obtain their needed rates of return?)
- Can the technology be expected to facilitate more than one product or service? (few companies survive on one product alone)
- Will a sufficiently large competitive advantage be reached on the target market?
- Will the potential revenues be sufficient to sustain and allow growth of the company?”<sup>198</sup>

Those questions will determine if a start-up shall be founded for technologies which cannot be directly licensed to an existing business. The decision to found a start-up company for commercializing intellectual property is made jointly by the Technology Licensing Office and the inventors. If a start-up is chosen as the preferred commercialization path, the technology licensing office will assist the UR and the other founders in meeting investors, consultants, and entrepreneurs and accessing other resources for advice at MIT to facilitate the funding of the company.<sup>199</sup> The Technology licensing office will then negotiate a license fee for the technology in question with a representative from the newly funded company. In order to avoid conflicts of interest this representative will not be the UR.<sup>200</sup> Such a conflict of interest could be that the UR will have an incentive not to ensure the best deal possible for the start-up as revenues accruing to M.I.T. will (when deductions in order to reach a net value have been undertaken) to 1/3 accrue to her.

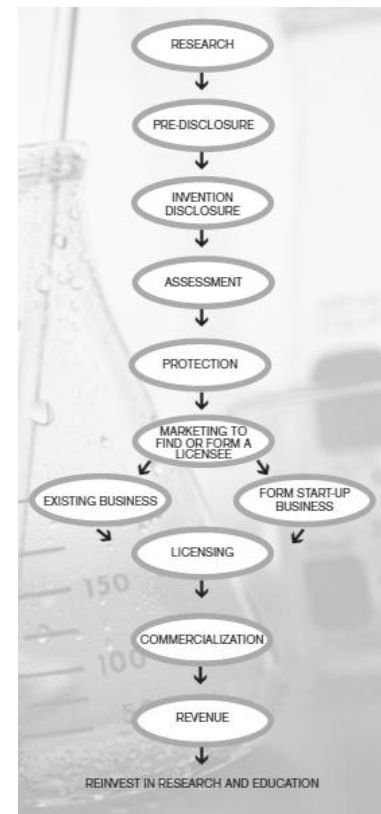


Figure 6 M.I.T. Invention timeline.

<sup>194</sup> Ibid. Art 4.8.A 1-2

<sup>195</sup> Ibid. Art 4.8.A 3

<sup>196</sup> Ibid. Art 4.9.2

<sup>197</sup> An Inventor’s Guide to Technology Transfer at the Massachusetts Institute of Technology p. 30

<sup>198</sup> Ibid. p. 22

<sup>199</sup> Ibid.

<sup>200</sup> Ibid.

Note that M.I.T., much like KIT and MPG maintains a strict line between the university and the newly funded company, in effect separating three relevant entities between which contractual relations will exist, the University, the UR and the new company.

### 3.7 Stanford University

Until 1994, The Stanford University (SU) held a policy stating that, as long as the research leading to an invention was not funded by the government, industry involvements or a foundation which demanded that a certain legal entity should become the IP holder, the UR was granted all rights to the invention.<sup>201</sup> However, in those rather few cases, the UR mostly contacted the SU Office of Technology Licensing (OTL) in order to obtain guidance and help in the commercialization process. This led to the conclusion that an appropriate system should be implemented granting SU property rights to those inventions as well. Currently all employees at SU sign "The SU Patent and Copyright Agreement" ensuring compliance with the new policy.<sup>202 203</sup> The rules which shall apply for research and the commercialization of research are set forth in the SU Research Policy Handbook (RPH).

#### 3.7.1 Ownership

The policy is stipulated in the RPH of SU applies a similar approach to employee inventions as the one of MIT. It is stated that "all potentially patentable inventions conceived or first reduced to practice in whole or in part by members of the faculty or staff (including student employees) of the University in the course of their University responsibilities or with more than incidental use of University resources, shall be disclosed on a timely basis to the University. Title to such inventions shall be assigned to the University, regardless of the source of funding, if any."<sup>204</sup>

In relation to the UR this is regulated in the employment agreement which states that the provisions of the RPH are applicable in the UR – University relation.<sup>205</sup>

#### 3.7.2 Royalty sharing

The first two sub categories, Monetary and Equity, refer to incomes from licensing activities while the Start-ups section refers to venture creation efforts in which the UR or the university participates.

##### 3.7.2.1 Monetary

Like MIT, SU undertakes deduction for two cost items from the gross revenues. Firstly 15% are deducted to cover expenses of the OTL. Thereafter, directly assignable expenses, typically patent filing fees, are deducted. Out of the remainder, the "net revenue", one third is to accrue the inventor.<sup>206</sup>

##### 3.7.2.2 Equity

Due to its, prior to 1992, praxis of not accepting equity in lieu or partial lieu of royalties SU missed out on substantial revenues during the eighties. The prior prohibition of such holdings was established due to conflicts of interest that were considered to potentially occur if SU would hold shares. Efficient policies were thus implemented in order to ensure that no institutional power would be abused to gain private interests a situation which might occur e.g if UR had ownership interest in a company which she could also influence Stanfords investment policies in. Since 1992, SU accepts equity as lieu or partial lieu of royalties but as an additional measure of precaution, SU never holds more than 20% of the outstanding shares in any venture and does not hold seats at the boards.<sup>207</sup> The outspoken intention when accepting equity is for the university to share some of the risk associated with start-up activities.

UR remuneration will eventuate when the university disposes of its holding. The incomes will be distributed mainly according to the same model as for the direct licensing incomes, namely through deduction of 15% of the gross revenue to cover the administrative costs of the OTL. From the remainder,

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<sup>201</sup> SOU 1996:70 p. 110

<sup>202</sup> Vinova - Äganderätten till forskningsresultat vid universitet och högskolor appendix 3 p. 12 f.

<sup>203</sup> SOU 1996:70 sid 110 ff.

<sup>204</sup> Stanford University Research Policy Handbook, Inventions, Patents and Licensing 5.1.A.1

<sup>205</sup> Patent and copyright agreement for stanford university personnel

<sup>206</sup> Stanford University Research Policy Handbook, Inventions, Patents and Licensing 5.2.A.1

<sup>207</sup> Vinova - Äganderätten till forskningsresultat vid universitet och högskolor appendix 3 p.12 f.

called “net equity”, one third will accrue the UR. However, no “direct costs deduction” will be undertaken.<sup>208 209</sup>

### 3.7.2.3 Start-ups

The SU guidelines and praxis regarding start-ups is essentially a blueprint of the rules stipulated by M.I.T.<sup>210</sup> and will thus not be elaborated on in detail. Both the universities consider the consequent distinction between the university, the new company and the UR of great importance.<sup>211</sup> It could be so that a beneficial license fee is accepted, (e.g. through accepting use of royalty payments implying that close to no license fees will have to be paid until there are actual sales benefiting the start-up) but nevertheless a clear distinction is maintained.<sup>212</sup>

## 3.8 Conclusion chapter three

In this final section of the third chapter the main conclusions will be wrapped up. However, suggested praxis and analysis of the learnings will first be presented in the following chapter.

### 3.8.1 Net or gross revenue model

As can be derived from the review of legislation and university praxis, the universities and institutions that are going to be assessed in the following are uniform in some aspect of relevance for this paper. Firstly, they all obtain control over patents either due to legislation, or university policy combined with contracts or both. Secondly, remuneration is provided to the UR in the level of ~30%.

The main differences to be seen at a first glance regarding UR remuneration in Germany and the US is that the German legislation as well as German research organization praxis reserve 30% of the gross margins a praxis for the UR (gross revenue method) while the two American universities on the other hand initially deduct certain cost items before the inventor’s third is calculated. (net revenue model)

The German approach provides incentives for URs to comply with the reporting rules (German legislation see 3.2.2) and to actively participate in the commercialization process even if the patent in question cannot be expected to generate revenues sufficient to cover its filing costs. This has been the MPG standpoint already prior to the legislation in 2002 and has proven successful in increasing the commercialization frequency of university research.<sup>213 214 215</sup>

As for the US solution where certain cost items are pinpointed and covered for before any percentage based dividend is distributed. This, decreases the economic risk for the university as each patent will be forced to carry its own expenses before remuneration is paid to the researcher. Furthermore it makes the undertaking easier to justify from a political and tax payer perspective as the university does not benefit any of the involved parties, with taxpayer money, before the actual costs have been covered.

### 3.8.2 When equity is accepted as license payment

The most common approach to equity holdings and UR remuneration is that incomes will not accrue to the UR until the university has made an exit. Out of the perspective of the UR this can be expected to imply a substantial remuneration delay. Furthermore, although the upside when a start-up turns out successful might be substantial, so are also the risks associated with investment in high tech start-ups. It could be questioned if UR herself would have invested her funds in such a risky business in case she was to decide.

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<sup>208</sup> Stanford University Research Policy Handbook, Inventions, Patents and Licensing 5.3.1

<sup>209</sup> Stanford University Research Policy Handbook, Equity Acquisition in Technology Licensing and Distance Learning Agreements 4.6.A

<sup>210</sup> Stanford - OTL – inventors guide page 25 f.

<sup>211</sup> Compare: Stanford - OTL – inventors guide page 25 f

<sup>212</sup> The example of royalty based license fees is not SU specific. The model is for example used in Germany by KIT.

<sup>213</sup> Interview Herr Dr. Kirschenhofer, Start-up manager at MPG innovation 24.02.12 and Erfinder-Leitfaden der MPG, 2001 P. 16

<sup>214</sup> Deutscher Bundestag Drucksache 14/5975 Gesetzentwurf. „In der Max-Planck-Gesellschaft wird seit langem ein Drittel des Verwertungserlöses als Erfindervergütung gezahlt. **Dieses Verfahren hat zur Steigerung des Patentaufkommens und damit zur vermehrten wirtschaftlichen Verwertung von Forschungsergebnissen beigetragen.**„ (emphasized by the author)

<sup>215</sup> According to Mr. Kirschenhofer, MPG manages to generate a positive result after deduction of all costs related to the commercialization of MPG research. However, in this context it should be kept in mind that MPG does not limit their commercialization activities to patent but also include trade secrets and copyrighted material thus bringing down the average costs associated with each license agreement. Such a solution would, as will be seen below, currently not be possible in Sweden.

An alternative approach is the one chosen by M.I.T. implying that shares representing the percentage which would accrue to her in case of monetary remuneration would have occurred are granted the UR directly. In effect this means that one third of the shares granted the university for use of the patent shall accrue to the UR.

### **3.8.3 Start-ups, incubators and seed capital**

#### **3.8.3.1 Start-ups**

Start-ups can be rather uncomplicated if the university's role does not imply active participation in the project. As long as the start-up is treated like any company licensing technology from the university and revenues are then distributed to the UR in accordance with the standard rules.

#### **3.8.3.2 Incubators**

For the case of incubation, generally funds are generally indirectly transferred to a start-up through favorable agreements providing the start-up with a range of services varying depending on the incubator in question. Even though the KIT ensures that costs of the university for providing facilities are eventually covered, the arrangements for usage of the incubators are lower than what is motivated by current market conditions. Indirect funding has thus taken place from the university to the start-up and it can be questioned to which extent the funding shall be seen as an investment to be compensated for by the UR, the company or both.

#### **3.8.3.3 Seed capital**

When the university provides seed capital to a project or an incubated company, encompassing the usage of a university technology, funding has obviously taken place it can be questioned to which extent these funds have de facto generated the future success of the patent/entity and to which extent the funding shall be seen as an investment to be compensated for by the UR, the company or both.

## 4 Remuneration and utilization model analysis

This chapter is divided into two parts. The first part will analyze the question of if a net or gross revenue model should be applied and the second part will deal with remuneration issues when the university is participating in the fostering of a technology through incubation and seed capital. The first question is relevant also for universities which do not undertake active promoting activities and will thus be handled in the sub-section referred to as “the passive university” while the second question subsequently will be handled in the sub-section called “the active university.”

### 4.1 Gross or net revenue model – The passive university

In order to propose solutions for how the remuneration issue should be handled in Sweden the solutions provided by the German and US organizations and universities will be elaborated on and adapted to the Swedish setting. The question will be examined from several angles to provide a balanced answer. The stakeholder viewpoints which, to the extent possible, will be examined are:

1. The URs
2. The universities
3. The industry
4. The society

#### 4.1.1 After the second academic revolution

As mentioned in the first chapter, the university has, after the second academic revolution, been assigned a role which includes interaction with the industry and the entrepreneurial approach required to attain efficient technology diffusion and thereby benefit utilization through/in the knowledge economy. It is an error to claim that this new objective for the university implies that the university moves from being an institution of public utility to becoming a revenue driven corporation. On the contrary, the new approach of the university should rather be seen as the up to date model for technology diffusion from the university in to the society in order to benefit the same.<sup>216</sup> Furthermore, the belief that knowledge, which does not provide control positions, will be adopted by the industry has little bearing as the industry actors seldom dare to adopt and develop technology further without being able to assure a control position over its investment. It could be argued that the university should not knuckle under the forces of market power. On the other hand, without industry interaction, university patent utilizations frequency, would be lower and thus less potentially society and economy promoting inventions would ever get the chance to serve public and private interests.<sup>217 218 219</sup>

As for the economic aspects of the university tech-transfer activities, this does not have to be a lucrative venture although the knowledge / assets providing the raw material for the undertaking can almost be seen as a byproduct of the universities regular activities.<sup>220</sup> Studies of US universities have shown that less than one percent of the patents held by universities generate a total revenue of more than one million dollar.<sup>221 222</sup>

Due to generally low revenues from each patent as well as the costs of obtaining, maintaining and strategic planning for it, it is a fairly low amount of patents that ever cover their investment costs. SU estimates the total costs of their undertakings, related to each patent to amount to 25-35K USD including USPTO fees as well as patent attorney/agent costs, sums that only cover a US patent.<sup>223</sup> SU has an average of 600 patent disclosures per year of which approximately 50% lead to patent filing. From the yearly 600 disclosures only 5,3% manage to generate revenues of 100K USD or

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<sup>216</sup> Risaburo Nezu, Chou Siaw Kiang, Prabuddha Ganguli, Krisnachinda Nithad, Koji Nishio, Lydia G. Tansinsin Hwa-Chom Yi, Jia Yujian, WIPO report – Technology transfer, intellectual property and effective university-industry partnerships. World Intellectual Property Organization 2007, p.17

<sup>217</sup> An Inventor’s Guide to Technology Transfer at the Massachusetts Institute of Technology, p. 23

<sup>218</sup> Albert Banal-Estanol et al. The Impact of Industry Collaboration on Research: Evidence from Engineering Academics in the UK, p. 26

<sup>219</sup> Risaburo Nezu et al. 2007 p.17 ff.

<sup>220</sup> MPG has managed to finance the entire commercialization process by funds generated through mainly licensing revenues. It should however, be kept in mind that MPG has the freedom to license not only patents but also trade secrets etc. This in turn allows for utilization of assets which do not require an initial investment.

<sup>221</sup> Stanford office of technology licensing – inventors guide p.23

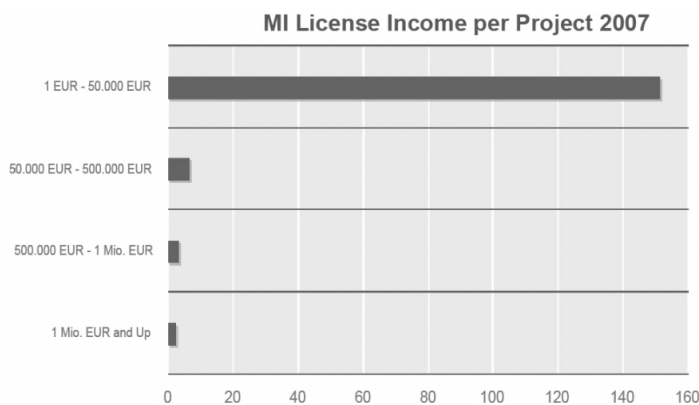
<sup>222</sup> An Inventor’s Guide to Technology Transfer at the Massachusetts Institute of Technology p. 27

<sup>223</sup> Stanford University OTL, Overview of the OTL

more.<sup>224</sup> (Table 6 displays the proceeds from SU disclosures)<sup>225</sup>. As can be concluded the vast majority of the disclosures will in effect never generate a kickback to the UR (for the patent part of the disclosures) as a net calculation is applied.

At MPG figures of up to 50000 EUR are not unusual for application and fees during the first years of protection.<sup>226</sup> Gross revenues for MPG patents obtained during 2007 are displayed in Table 7. MPG applies a strategy where few disclosures are sorted out to not be patented. As pinpointing the most valuable patents is close to impossible before filing, MPG applies this approach in order to assure that protection is obtained for the patents that turn out to be of interest for the industry.<sup>227</sup>

The conclusion that maximized diffusion and there by maximized gains for society will be made possible

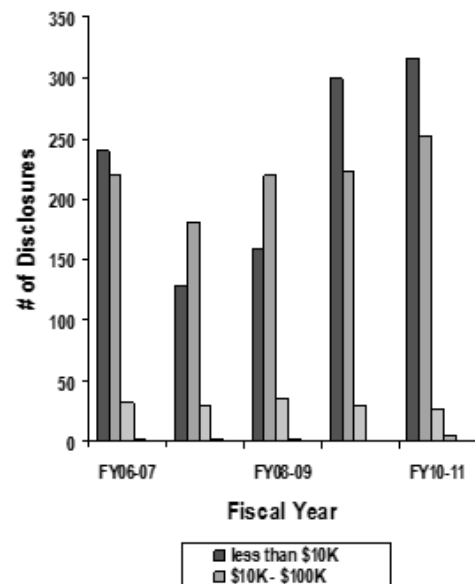


**Table 7 Patents held by MPG spread over income levels. Source: Graph provided by MPG**

through university patenting activities allowing the largest number of patents possible to be available, further leads to the conclusion that it would be in the interest of the society as well as the industry to ensure a remuneration model giving the largest possible incentive to the UR to comply with reporting procedures as well as to decrease the incentives to negotiate away the applicability of the law. (Compare section 3.2.2)

#### 4.1.2 Value of UR participation in the commercialization process

M.I.T. emphasizes the importance of UR involvement during the marketing and commercialization process of university technology.<sup>228</sup> Factors such as the URs connections with the industry through contract research, seminars etc. increases the university's contact surface to the industry improving the chances to find a licensee and the URs capacity to explain the value of the invention (its technological benefits), are crucial when transferring the technology.<sup>229</sup> In line with the argumentation of the Bundestag in the previously mentioned preparatory work, the incentive can be expected to be higher if the UR is granted remuneration even before the patent manages to cover its own expenses,<sup>230 231</sup> it can be assumed from the previous graphs, that a UR active in a jurisdiction where a net revenue model is applied, who lacks faith in her inventions future economic potential and its capacity to carry its own expenses, will



**Table 6: Incomes from utilized disclosures at Stanford university spread over income levels. Source: Stanford University OTL, Overview of the OTL Compare foot note 225**

<sup>224</sup>Ibid.

<sup>225</sup> It should be pointed out that the comparison intended is rather blunt. This as the information provided by the SU OTL (see previous source as well as figure 8) relates to disclosures of not only patents. Also copyrighted material and biologic material which is licensed is included making the equation less vulnerable to patenting costs.

<sup>226</sup> Interview Herr Dr. Kirschenhofer, Start-up manager at MPG Innovation per mail 07.03.12

<sup>227</sup> Ibid.

<sup>228</sup> An Inventor's Guide to Technology Transfer at the Massachusetts Institute of Technology page 24

<sup>229</sup> Ibid.

<sup>230</sup> Interview Herr Dr. Kirschenhofer, Start-up manager at MPG Innovation 24.02.12,

<sup>231</sup> Deutscher Bundestag Drucksache 14/5975 Gesetzentwurf.

have little economic incentive to support a commercialization process.<sup>232</sup> According to the MPG and M.I.T. view, which takes the starting point that a broad patent base should be obtained, as pinpointing future blockbusters is hard to do prior to filing, this would hence be a terrible error simultaneously decreasing the inventors' incentive to report an invention and to further support its development.<sup>233 234</sup>

The topic was explicitly brought up by the German Bundestag (federal legislative body), in its preparatory work "Deutscher Bundestag Drucksache 14/5975 Gesetzentwurf", where it was argued that gross revenue remuneration of 30% would provide a satisfying incentive for the UR to report inventions and support the TTO (equal German organization).<sup>235</sup> A gross revenue model was, however, not the first suggestion brought up during the preparatory works, the "Bundesrat" had previously suggested a net model which was to deduct costs related to patenting before the URs percentage was to be calculated.<sup>236</sup><sup>237</sup> The gross revenue model however prevailed as it was considered to stimulate innovative activities and compliance from URs as well as to provide a simple revenue sharing framework.<sup>238</sup>

#### 4.1.3 Uniform usage of the rule

When stipulating a legal rule or even a praxis document for internal use within a university or other public or private body, the question of how uniform compliance is going to be reached is a topic which needs to be handled. If a rule is intended to have a national coverage, it goes without saying that it, in order facilitate uniformity, should provide as little space as possible for arbitrary decisions by the interoperating decision maker. The matter at stake is mainly the being or not being of a deduction of direct costs as well as assumed standard costs, generally through a percentage based fee. As long as the "jurisdiction" of the policy is as local as on one university, and in effect restricted to one department of the university namely the technology transfer office, uniformity might be reached although the rules provide some space for interoperation while the same freedom could be devastating or the uniformity if applied on a national level. As can be seen from chapter one and two, the two American universities have chosen a net profit calculation whereas the German legislation establishes a gross margin base for the calculation of the inventors share. This ambition for nationwide uniformity, as mentioned, was another incentive for the adoption of a gross margin rule in Germany.<sup>239</sup>

#### 4.1.4 A tax payer perspective to the net / gross revenue question

Two main models are at hand. Either a deduction of both fixed costs and a preset percentage is applied (US), or a plain gross revenue model is applied. (Germany).<sup>240</sup> One question to be considered in this context is the usage and distribution of public funds. As argued previously, a gross model increase incentives for the UR to comply with disclosure rules and support the commercialization process making it a tempting solution out of this perspective. The generous gross revenue model, however, has a major setback. If implemented without consideration the university may end up in a situation where a patent,

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<sup>232</sup> Economic incentive is just one of many important parameters. Many researchers gravitate towards the academia as they consider other values than just plain monetary compensation central. At this point some may also argue that many US universities which have successful technology licensing units apply a net revenue model. This is certainly true but does not take in to consideration that the US universities did not have to make the transit from a PP as prior to the Bayh Dole act, the government became property holder. US researchers have thus never had a reason to consider themselves pinched on the rights. A smooth transition with a high compliance rate from the UR can thus, according the author, be promoted if a gross revenue model is used. As for the other important factors that play in when it comes to what the UR values, e.g. scientific freedom, this question remains and it could be so that these parameters are more important than any remuneration. This however, falls outside the scope of the thesis.

<sup>233</sup> Also at MIT the starting point ist that the broades possible patet base should be obtained. This is al

<sup>234</sup> Lita Nelsen, The Technology Licensing Office, Technology Transfer at MIT (2011) p. 18

<sup>235</sup> Deutscher Bundestag Drucksache 14/5975 Gesetzentwurf. „[...]pauschal festgesetzt auf 30 Prozent des erzielten Verwertungserlöses. **Ein Abzug der Schutzrechtserwirkungs-, -aufrechterhaltungs-, -verteidigungs- und -verwertungskosten findet dabei nicht statt. Dies stellt für die ganz überwiegende Mehrzahl der Verwertungsfälle einen erheblichen finanziellen Anreiz für die Hochschulmitarbeiter dar, Erfindungen zu tätigen und Dienstleistungsfällen zu melden.** (emphasized by the author) Eine solche erlösbezogene Drittel-Regelung für Wissenschaftler hat sich im Forschungsbereich bereits in der Praxis bewährt. „

<sup>236</sup> Bundesrat-Gesetzentwurf Drucksache 14/5939 page5. - §42 paragraph 1

<sup>237</sup> Bartenbach/Volz (2002) p.1275

<sup>238</sup> Ibid. p.1274

<sup>239</sup> Ibid. p.1274

<sup>240</sup> This with exemption for the equity revenues generated by the US universities which only deducts a fixed percentage for the TTO but no fixed costs before the inventors share is calculated.



which has failed to even cover its own patenting costs making it a loss-making deal, still entitles the UR to remuneration. If this is the case for a few patents it would not be an issue. However, if the patent collective held by the university does not carry its own expenses, in effect this would imply that a transaction of public funds to URs would be undertaken and this to compensate her for patents which have themselves brought costs to the university (society)<sup>241</sup>. In preparatory works, the importance of increase utilization of university research has been stressed.<sup>242</sup> From the perspective of this paper, being that such utilization is undertaken through the university as the university will be IP holder, such undertaking will per se generate costs for the university, as at least filing costs and patent fees must be covered for. As has been seen in the previous review of Germany and the US, cost may very well pile up and there are no guarantees that subsequent incomes will eventually cover the cost items. This raises the question if society and tax payer money should pay for a UR bonus system.<sup>243</sup>

The net revenue model takes this issue in to consideration by demanding that each patent covers its own costs before dividend is paid to the UR. Such a solution obviously decreases the economic incentive for the UR to comply.

#### 4.1.5 Suggested solution

Managing to meet all demands and considerations is hardly possible. An optimal solution should encourage the UR allowing maximized patentable output from the university, thereby facilitating maximized societal benefits. Simultaneously the solution should decrease the university's investment risk through decreasing the university's remuneration expenses to compensate for patents which do not reach breakeven. The demands are obviously incompatible.

As there is no guarantee that the university's commercialization activities, even if seen as a collective, will manage to break even<sup>244</sup>, the almost moral question of if a UR should be paid if this is not the case must be handled. One option which would decrease the university's investment risk would be to consider the URs as a collective and only allow remuneration disbursement given that the aggregated revenues from all patents held by the university exceed the aggregated costs for obtaining and maintaining the patents. But then again, as there is no guarantee even for the collective to generate black figures, this may very well completely remove the compliance incentive for all URs. To this it should be added that the actual costs which have occurred for the university can be assumed to exceed the costs for filing and maintaining the patent. A tech transfer office must be maintained, potentially the invention has been further developed by a company which enjoys the benefits of a university incubator or university seed capital has been provided adding further costs on top of the ones already directly related to the patent.

As all demands cannot be perfectly satisfied, a middle way must be found that mediates the interests. One solution would be to use a net income model limited to the deduction of a fixed percentage of the incomes generated by the patent and further more to let the UR's share decrease when the incomes increase. (In effect this would be a gross revenue model where the final percentage granted to the UR has been reduced with the percentage assumed to cover required costs).<sup>245</sup> The obvious weakness of such a solution is that incomes generated by some universities might be higher than for others, as well as necessary expenses may differ leading to the conclusion that, given that all revenues are not pooled in to a national fund and then distributed to the UR, the choice of university to work for will affect the researchers chances of earning money from inventions. This would perhaps not be a preferable outcome

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<sup>241</sup> A reasonable question at this point is "where does the money come from in case the commercialization fails to provide a positive net?" Additional governmental grants or savings within other field of the university's will unfortunately be the answer.

<sup>242</sup> See for example Prop. 2008/09:50 – "Ett lyft för forskning och innovation", regarding the third mission of the university being to interact with the society and increase the utilization of university research results. and SOU 2009:95 regarding the being or not being of the PP.

<sup>243</sup> Although to some extent misleading, as they refer to the funding for research and not for the commercialization the following US-American figures are of interest in this context: licensing revenues from 200 of the nation's research institutions in FY 2007 generated \$2.0 Billion. However this was on a research base of: \$ 41 Billion. (Lita Nelsen (2011) p. 12)

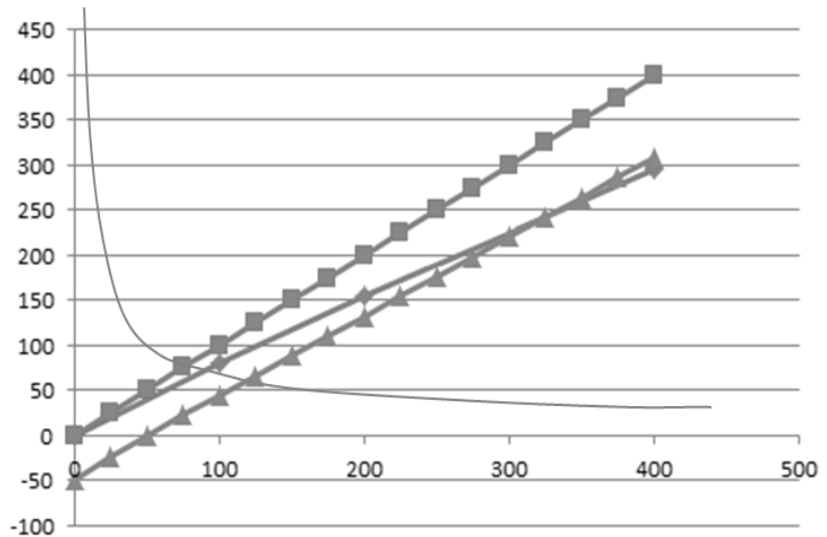
<sup>244</sup> Although this can be managed for example in the case of e.g. MPG. As mentioned in the previous, MPG licenses also non patented/patentable assets.

<sup>245</sup> If this, as mentioned, can ever be the case. If it is concluded that an overall net cannot be reached an acceptable level of loss should be established for this cost item. The level of loss accepted would be dependent on the governmental grants allocated to the university for managing commercialization activities. If the Swedish setting turns out not to be able of generating a net, an outcome which is highly likely, especially during the first years, this is the final resort.

as universities capacity to attract prominent researchers interested in making money, would then be dependent on their capacity to ensure that only successful inventions were picked for utilization in order to avoid monetary waste on less successful patents. If the starting point is taken that MPG's and MIT's analyses are right, namely that future blockbusters cannot beforehand be identified, this would in turn, reduce the amount of successful patents held by the university and be contra productive from of a societal point of view. In order to maintain an incentive for the UR to ensure compliance with disclosure rules, something that will be required due to the historical benefits granted the UR<sup>246</sup>, remuneration should be ensured. It could be that funds obtained by the university, in the end, don't cover the actual costs but then, this is a better outcome than a complete discompliance from the URs<sup>247</sup> as this will undermine the very reason why the university decided to obtain ownership to the inventions in the first place. The final suggestion will be to decrease the percentage granted to the UR but not let the patent cover its own expenses before dividend (remuneration) is provided.

Table 8 provides a graphical comparison of the impact on the monetary basis for calculating the URs share given three different models. The first one is a straight gross revenue model, the second is a net model deducting a progressive (providing digressive incomes for the UR) percentage and the third is a model deducting initially fixed costs followed by a deduction of a set preset percentage. In detail the formulas for the models are the following:

1. In the first model, (large cubes) no deduction is undertaken; monetary basis for calculating the URs share (MB) = Gross revenue (GR).
2. In the second model, (small cubes) a set percentage (20%) of the gross revenue is deducted;  $MB = 0,8 * GR$  in addition the formula is changed after the first 100 to  $MB = 0,75 * GR$  and after 200 to  $MB = 0,7 * GR$
3. In the third model, (triangles) the gross revenue is decreased with a fixed sum of 50 and then an additional 12% is subtracted from the remainder;  $MB = (GR - 50) - ((GR - 50) * 0,12)$  where the assume fixed costs for the patenting procedure is 50.



**Table 8: Alternative models for calculating the inventors share. Comparison made with an approximation how patent incomes are spread. X-axis displays revenues while the y-axis displays the monetary base left to calculate the UR's share from.**

The line starting in the upper right corner is an approximation of how the amount of university patents are distributed over the amount of incomes obtained per patent. As can be seen the vast majority of the patents will never cover their costs and will thereby never generate revenues for the inventor if model 3 is applied. As most of the patents entering the university portfolio will generate none to little revenues, and can hence be allocated to the part of the diagram where the third model still generates a negative value, a low economic compliance incentive can be expected for the UR.<sup>248</sup>

If a model which demands a higher fixed percentage but no direct cost deduction is applied (model 2) equivalent total revenue may be reached for the university, allowing coverage for the fixed cost items as well, without removing compliance incentives. The system can be compared to an insurance system (Reversed as a few will carry the costs of many and not the other way around). "Damage" from

<sup>246</sup> The historical benefits refer to the PP. In order not to generate too much dissatisfaction in the UR community, systematic discompliance, remuneration will be inevitable.

<sup>247</sup> This both regarding compliance with disclosure rules and in terms of involvement in the continuous development.

<sup>248</sup> Interview Herr Dr. Kirschenhofer, Start-up manager at MPG innovation 24.02.12

disclosing a commercially less viable patent is spread over the collective. Costs are divided so that no patent will ever be in a “debt position”. The model is only viable for the university as long as the licenses paid to the university will, after deduction of the UR’s share, cover the actual costs. Otherwise the same moral question as presented above will stand, however decreased as the kickback to the UR has been decreased. The third model is, as can be seen the US net revenue solution which will not provide any remuneration for the UR until the patent has generated approx. 75.

## **4.2 When equity is accepted in lieu or partial lieu of license fees**

### **4.2.1 University holds shares**

If the university accepts ownership to equity in lieu for cash, and remuneration for this “income” is not undertaken until the university exits its holding, several issues arise in relation to the UR. Firstly, the remuneration payment will be delayed substantially. Secondly, the revenue share which has been earmarked for the UR will, without her consent, be invested in high-risk equity, an investment which would perhaps not be the investment of choice for the UR if she was to determine by herself. Thirdly, even if it would have been her investment of choice, she will be in a worse position than if she would have made a direct investment on her own as she will not be able to influence the company through her fictional shareholding and cannot defend her shareholding in case of dilution when new shares are issued.<sup>249</sup> This given, it becomes clear that if two URs, (UR1 and UR2) both transfer one invention each to the university from which UR1’s is licensed to a partner paying in cash and UR2’s to a partner paying in equity, UR2 will be in a worse position than UR1. (This disregarded that equity might turn out valuable, a factor which can be neglected as the UR who was remunerated directly in cash can as well invest this money in a suitable start-up of her choice if this is what she desires to.)

As has been discussed in the previous it is of essence to ensure minimized chances for arbitrary handling and the most far reaching economic incentives possible for the URs in order to ensure compliance with disclosure rules and, when necessary, provide her valuable knowledge in the commercialization process. If the university jeopardizes the UR’s remuneration through arbitrary acceptance for cash payments, the desired incentives are hardly in place. As it has been concluded that equity is not a preferred payment out of the UR’s perspective, the subsequent question to be asked is which alternatives that are available. A “zero equity tolerance” can be established ensuring that no company capable of paying in cash will be able to obtain a license paid in equity. Unfortunately this disqualifies a number of potentially successful ventures which simply do not have the liquidity to manage cash payments. Out of a technology diffusion perspective this must be considered contra productive. This especially for patents in high risk fields such as bio technology where few capital intense actors are willing to undertake development on basic university research but prefer that the technology is developed in start-ups before acquisition.<sup>250</sup> Also out of the UR’s perspective, this is not a beneficial solution as it implies that potential incomes from equity will be ruled out, and in some cases not be substituted with cash payment.

### **4.2.2 The UR holds shares**

The approach used by M.I.T. where the UR obtains shares directly and does not have to wait for the university to utter the shares before she will be property holder (of money) is here avoided. However, it can be questioned to which extent It will make a difference for the UR to become shareholder in the company as she as shareholder in a non-publicly traded company in a start-up phase, will most likely have to wait as long as the university before she will have the chance utter her shares i.e. public equity offering or a sale of the company. The same main issue, as when the university holds the shares until the date of exit, will thus occur when the UR is granted ownership to “the inventors share measured in equity”. There are, however, two substantial improvements in this setting compared to when the university holds the equity. Firstly, the UR can, if she desires to do so, defend her parental ownership when new shares are issued and secondly she can exercise voting power affiliated to the shares.

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<sup>249</sup> The latter issue (dilution) as well as voting rights, is not an issue in the case of M.I.T as shares directly accrue to the UR

<sup>250</sup> Interview with Johannes Hulthe Vice President Late Phase Clinical CVGI at AstraZeneca R&D

### 4.2.3 Suggested solution for equity

One solution would be to accept equity in lieu for cash payments given that certain strict criteria are fulfilled. An exact assessment criteria will not be handled in this paper but a suggestion is that a similar approach to the one of MPG innovation and KIT (see above) is applied. This simply being to assess the feasibility of a cash payment and where this is not possible, equity will be accepted. Such a model assures cash payment to the extent possible but does not miss out on equity when cash payment is not feasible due to the weak economic position of the licensee. As long as this can be assured, the previously mentioned issues can be considered as neglectable and the high risk investment as more of an option with a zero downside. Regarding official ownership to the shares earmarked for the UR, it is suggested that ownership is transferred to the UR in order for her to be able to defend her ownership percentage during new issuing of shares as well as allow her to utilize voting power associated with the shares.

### 4.3 Start-ups, incubation and seed capital – The active university

Firstly a line must be drawn between universities where the PP still applies and universities which become the owners to inventions generated by the UR. This paper focuses on the latter. The effects of university involvement in commercialization through active measures such as incubation differs substantially between the case when ownership to a patent is held by the UR or a company to when it is held by the university. In case of university ownership, the university promotes its own chances of increased revenue streams if an UR invention is promoted as ownership to the invention is maintained by the university and subsequently license fees for the usage of the patent will benefit the university.

An active university constellation will comprise at least the university, the UR and a company to which the technology is licensed. Two sets of relations must thus be assessed. Firstly the *University – Incubated/seed financed company relation* and secondly the *university – UR relation*. The core questions to be asked in all settings where the university plays an active role are virtually the same. Firstly, how shall the university be compensated for supporting the company (the first relation) and secondly, how does this affect the remuneration provided from the university to the UR (the second relation).

The active university hence provides obstacles not present when in then passive university setting. However, doing so has proven to substantially increase the chances for its technologies to reach the market. E.g. in the case of biotech almost no new technologies make it directly from the university to the industry but must be further developed in an intermediate host i.e. a start-up first as medical companies are reluctant to adopt high risk technology which has substantial time left in the pipeline.<sup>251 252</sup> Finding funding for start-ups is always a challenge and it is at this crucial stage the university can provide a soft start for the technology /company through “active university measures” such as incubation or seed funding.

As an example the large pharmaceutical actor Astra Zeneca has even adopted a business model according to which the amount of early stage in-house development should be decreased and replaced with a division undertaking technology scouting searching for investment and collaboration propositions.<sup>253</sup> For the neurology division this development has been completed and Astra Zeneca currently relies entirely on acquisition to fill the later phases of the pipeline in this field.<sup>254</sup> To say it out loud, it will be up to the university to provide chances for university early stage research to reach the market as no commercial actor would be willing to handle the risk. In this context it can be reconnected to the criticism, concerned with the shift from fundamental to applied research, presented against the second academic revolution in the initial chapter 1.1. Moving focus from fundamental to applied research would thus not only increase the rate of technology that could be instantly transacted to the industry but also save the university the bother and costs associated with seed and incubation activities required if the early stage research is to reach the market.

#### 4.3.1 Start-ups

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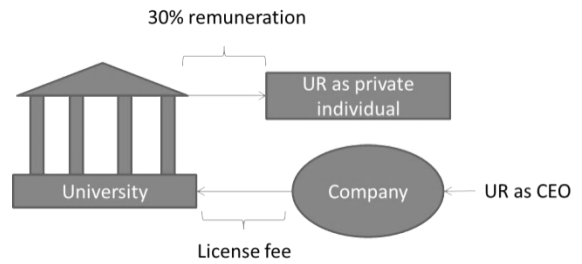
<sup>251</sup> Interview with Johannes Hulthe Vice President Late Phase Clinical CVGI at AstraZeneca R&D

<sup>252</sup> An Inventor’s Guide to Technology Transfer at the Massachusetts Institute of Technology page 22

<sup>253</sup> Interview with Johannes Hulthe Vice President Late Phase Clinical CVGI at AstraZeneca R&D

<sup>254</sup> Ibid.

After the abolishment of the PP, start-ups can be rather uncomplicated out of a UR remuneration perspective. This goes for the cases when the university's only connection to the start-up is the license agreement. This provides a situation where the licensee can be treated as any company licensing the technology from the university. In such case it becomes irrelevant if one or more of the URs responsible for developing the invention are involved in the start-up. MPG applies this approach see Figure 7. The role of the university can in such a case be considered "passive" and the main issue becomes the distribution of revenues as described in the previous.



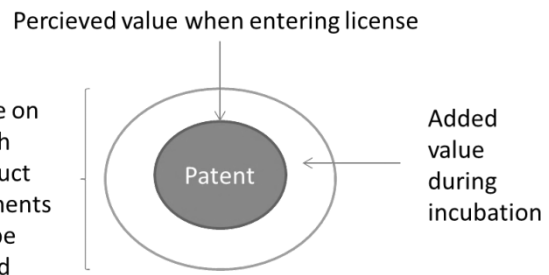
**Figure 7: MPG distinction between the entities UR, University and Start-up**

Start-ups can also become more complicated, in case the start-up has further connections to the university. Situations when this is the case are when incubation in university facilities is allowed or when university seed capital is provided. (See below)

#### 4.3.2 Relation one - University - incubated company

There is no unison definition of what incubation implies.<sup>255</sup> The services provided can differ from incubator to incubator and can be limited to usage of office space and a coffee machine or encompass laboratories and even legal and accounting services. Either way the common factor is that access to the services is generally provided to a price lower than motivated by the services provided and that the university undertakes those subsidies in order to provide a chance for university technology to reach the market.

As incubated university technologies are seldom finalized and ready for the market but instead will utilize the services provided in order to reach this point, the question may be asked how much of the future value of the technology (measured in increased license fee to the university) that can be traced to the patent and how much that is the result of refinements partially funded by the university. Furthermore, if it is concluded that the university should be compensated for this use of university resources, how should this be done and finally, how should this affect the remuneration provided to the UR from the university?



**Figure 8: Illustration displaying the substantial additional components that will be required for the technology to be ready for the market. I.e. comparison between raw technology and the customer value proposition paid for by the customer.**

*Example: A UR at university has made the invention X. X is patented and together with some colleagues and an external actor the UR founds a company which is subsequently incubated in the university's incubator. When the company is founded the company and the university agrees on a license fee based on royalty with a royalty percentage per unit sold based on the development of the patented technology X at the time.<sup>256 257</sup> According to the license agreement the company is entitled to research*

<sup>255</sup> For the interested reader the scholar Ulf Petrusson suggests definitions and further explanation in Petrusson (2007). For the purpose of this paper, the exact performances of the incubator is, however, of less importance. This is as the mere fact that funds are directly or indirectly provided by the university is enough to raise the question how such contributions should be valued and handled in relation to the start-up and the UR.

<sup>256</sup> The setting where then newly formed company pays on a royalty basis to the university is common in Germany. Engage Ventures AG, a company which undertakes commercialization of university research usually manages to negotiate such conditions when founding a company based on university technology which subsequently is incubated in a university incubator. Statement from Tomt Lenz at Engage Ventures AG in Karlsruhe Germany

<sup>257</sup> See also An Inventor's Guide to Technology Transfer at the Massachusetts Institute of Technology page 27

"Most licenses have licensing fees that can be very modest (for start-ups or situations in which the value of the license is deemed to warrant a modest license fee) or can reach hundreds of thousands of dollars. Royalties on the eventual sales of the licensed products can generate similar or greater revenues, although this can take years to occur".

further on the technology. The following years the company manages to improve the technology substantially, largely due to the services provided by the incubator.

Figure 10 symbolizes the development stages of the technology. Let us assume that the development can be subdivided in to ten different phases and the technology is patentable after the second phase. The percentages indicated above are the rate of royalty which would be required from a producer utilizing the technology when producing a certain product. Now assume that the UR founds the company and incubates the same after step two of the development. At stage ten the incubated company

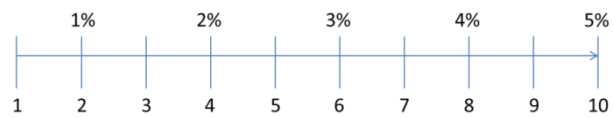


Figure 10: simplified value increase of the patent along with additional components added

starts handing out production licenses (which is allowed by the initial agreement with the university<sup>258</sup>). For each unit produced the company will obtain 5% of the turnover of the licensee while the university will only be entitled to one percent. If the UR would have finalized the development within the university, the university would have been entitled to 5%.

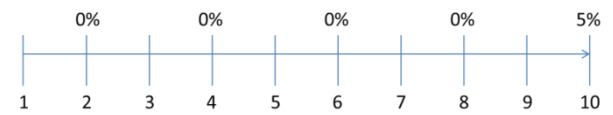


Figure 9 simplified value increase of the patent along with additional components added

The example is simplified but gives an indication of the issues at question. As the university is co-funding the development (to which extent depends on the services provided as well as the level of rent demanded by the university from the incubated company for the usage of the incubator) it would be reasonable that the university should be entitled to a proportionate increase of the incomes in relation to the indirect funds provided. Of course, the most frequent reason for incubating start-ups containing UR-technology is that the patents cannot be directly licensed to an external actor making the simplification not only a simplification but also to some extent misleading. The royalty development would most likely more accurately presented in Figure 9. However, the example never the less provides a simplified version which will allow the following assessment.

#### 4.3.2.1 Some perspective – if funds were to be obtained from a venture capital firm

In order to further put the character of the indirect investment in to perspective a comparison can be made with what any other investor would demand. Let us assume that the usage of the facilities on a yearly basis costs the start-up 20.000 EUR while the actual value of the services provided is 100.000 EUR. This means that the yearly indirect funds provided by the university at this stage are 80.000EUR. How would any other start-up investor argue? Most likely she would calculate a net present value on the start-up followed by an assessment on which percentage of the shares that would currently respond to the value of her investment, taking the expected time before exit, a hurdle rate of up to 30% plus some extra percent representing the yearly kickback from an alternative safe investment, in to account.

Out of a tax payer perspective, universities indirectly providing funds without obtaining any compensating rights can be questioned. However, once more the actual task of the university being not to maximize revenues but to promote technology diffusion.<sup>259</sup> The idea of the entrepreneurial university shall thus not be confused with an incorporated university.<sup>260</sup> On the other hand, the same

<sup>258</sup> Also legislation allows such usage to some degree PL §3 paragraph 3.

<sup>259</sup> Ascan be seen so far no viable explanation of where the required funds are to be taken from is given, this topic will be handled in the final chapter, see 6.2.

<sup>260</sup> Compare SOU 2005:95 p. 14 where it is argued that license revenues are not intended to make the university self-sustaining. Instead the intention is to ensure more efficient technology diffusion. The author shares this viewpoint as he considers a shifted focus towards late stage research with the prime objective to generate revenues will decrease an already limited scientific freedom even further. The author argues that the scientific freedom provided can be considered to be limited already as researchers have to adapt her research to the fields which can obtain public funding (severely impairing the proud wording of Högskolelagen claiming to ensure that the UR should be free to choose topic). If in addition to this, the goal for the undertaken research becomes to generate the highest potential economic output form the results, research would not only be limited in its initial scope but also regarding the output which would be directed to areas where the largest potential economic payback would be possible. If only the first restraint, being the preset funded research fields are limiting the UR, at least she maintains her freedom to reach the results she considers most relevant for the project in question. If, however, also a certain end product was

almost moral question, raised in the previous chapter regarding the passive university deserves being raised also here. What happens if the university does not manage to cover its new arising costs? Have we established a system which will in effect transacts public funds to companies and individuals? If so, can this be justified on a political level? Such questions must be assessed on a national budget level and cannot simply be answered through indications of that the costs arising for the commercialization would indeed exceed the incomes generated. The questions will be returned to in 6.2.

#### *4.3.2.2 Compensating the university for indirect funding*

Considering the comparison in the previous paragraph, potential options for the university to be compensated for investments undertaken will be examined in the following. Several options can be elaborated on.

Firstly, the university can negotiate a partial ownership to foreground after incubation in exchange for the services provided. This will allow the university to demand a percentage of the revenues generated by such IA. (Being the outer circle in the previous example see Figure 8 or Figure 11). This solution will intertwine the university and the company as ownership to all valuable IA will be shared. It is questionable if such models would be viable at all and furthermore if it is in the interest of the university to obtain a complex portfolio of additional IA and it would definitely not be in the interest of the company which would not be able to control its IA.

Secondly a higher royalty rate fee can be demanded from the company in exchange for the funding. (See 3.4.2.5 regarding seed capital from KIT). If the increased royalty to the university is calculated properly, the second solution allows the university to extract proportionally increased revenues from the company in relation to the “investment” made by the university. The advantage with the second solution is that the incubated company will only be charged the generally low incubation fees during the development allowing efforts to be focused on bringing the technology to the market. When later, revenues are obtained compensation will subsequently be granted the university for the services previously provided. The drawback with the second solution is that incubated companies will be bound to the higher license fee after the technology has reached the market making it less competitive.<sup>261</sup> Calculating the increased rate of royalty will furthermore be a hard task as commonly work is undertaken in incubated companies without monetary compensation e.g. by the UR. This complicates a calculation where the investments from third parties are compared with the indirect funds provided by the university in order to estimate a percentage of the development that has been facilitated with university funds. “Perfectly balanced justice” will thus never be reached, however, a fair enough estimate leaving rather large margins in favor of the incubated company will still be an improvement.

Thirdly, the university can keep track of the market value of the services provided during the time the company spends in the incubator. From this sum the actual incubator rent is subtracted and the resulting sum is considered a debt which the incubated company will owe the university and be obliged to repay when certain criteria are fulfilled e.g. a certain yearly net income. Upside in this solution is, as in “the increased percentage solution”, that the incubated company will enjoy the subventions while no revenues are obtained making the venture more likely to succeed in the first place. When assessing this solution with the comparison to a normal investment entity and the shares which would be demanded in such a relation this is, of course not a satisfying level of compensation as the success rate for start-up companies would never be sufficient for the university to reach a break even on such credit granting activities. This is the reason for venture capital companies to demand a high kickback in case of success.

Finally the second and third solution can be combined allowing an increased royalty rate to be applied until the debt has been repaid. The effects of this solution can also be reached by applying an amortization plan which takes the economic condition of the company into consideration by e.g. adapting the payments to the health of the company.

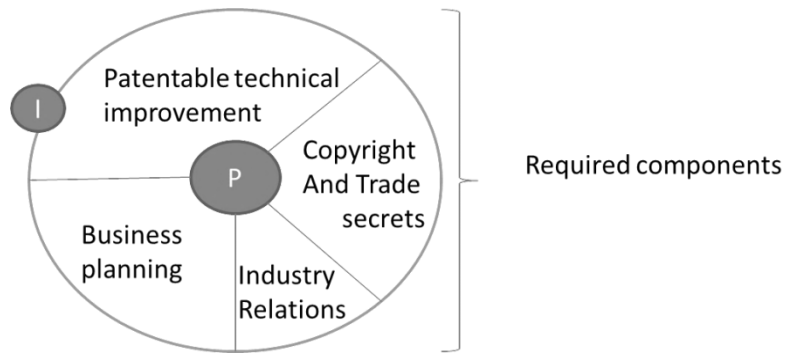
#### *4.3.2.3 Components of the improvement space*

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demanded the author considers the scientific freedom to be nothing more than a chimera and hardly even that. (compare also 2.3.3 on the Scientific Freedom)

<sup>261</sup> Although this must be considered a minor setback when taken in to perspective that the technology as such has been provided at a discount rate.

In this paper, the improvements (I) presented in Figure 11 constituting the outer circle, primarily refers to technical improvements such as complementing patents, databases and trade secrets. However, it should also be mentioned that business plans, industry networks etcetera are also invaluable components, built during the startup phase, providing the contextual environment in which the value of the initial patents can be utilized.



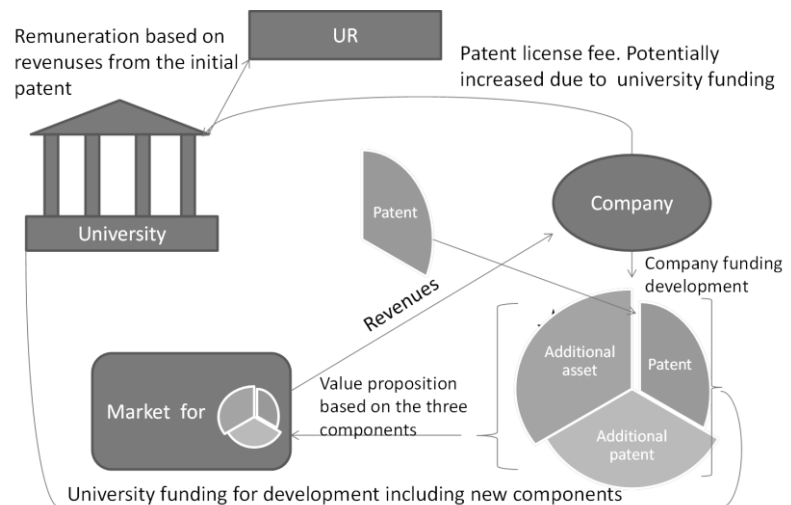
**Figure 11: Problematising the components of the total required improvements.**

Now this presents additional problems to some of the models through which the university can be compensated. To which foreground shall right be claimed? The option to claim additional foreground assets has already been questioned in the previous but deserves being elaborated further on. Co ownership to a patent (usually in practice a license with special provisions) is conceivable compared to coownership to a business plan or good industry relations. In effect this means that investments undertaken by the university will be spread on the different fields of required improvement but foreground can only be negotiated for some of them. The author thus argues that coownership shall be avoided also on the ground that it is difficult to determine to which asset coownership should occur as well as how the ownership should be regulated. (Compare also 4.3.2.2 –compensating the university for indirect funding)

### 4.3.3 Relation two – University – UR

In this section, initially the question must be asked what the UR is to be remunerated for by the university. The answer to this question is that the following assessment is only concerned with remuneration for the initial patent on which subsequently the new venture is based.

Here, the question to be answered is if the relation between the UR and the university shall be affected by the funding provided by the university to the company. A relevant aspect of this is the fact that the university will only be obliged to remunerate the UR for incomes derived from the patent which she initially developed and not for the additional assets/patents developed by her in the course of her work at the company.



**Figure 12: Displaying the initial patents role in the final customer value proposition.**

The simple answer to this would thus be that the relationship, regarding the initial patent, has not changed. A counter-argument would be that the researchers chances to obtain remuneration depend on if there is a market for the patent, in turn, such market does not exist until the patent is complemented by certain assets/patents, the development of those complementing factors have been made possible by funds provided by the university and the initial “patent – UR – University” relation can thus be said to have been affected. In other words, without the investment made by the university, the UR would not have been able to obtain any remuneration. On the other hand it can be argued that the economic implications arising from the collaboration due to the funding should be settled between the university and the company solely and that the UR in many cases make substantial



additional, non-university paid contributions to the start-up See below ( 4.3.3.1– Additional contributions by the researcher).

**4.3.3.1 Additional contribution by the UR**

This sub-chapter handles the contributions by the UR after the founding of a start-up. A simplified example clarifies the setting:

*A UR has disclosed an invention to the university TTO. The TTO considered the invention to have economic potential and subsequently patents the invention. As the invention is in a rather early stage, no company willing to license the patent is found. The TTO thus asks the UR if she is interested in commercializing the technology through the founding of a company, an offer which is accepted by the UR. In order to manage the company and undertake additional research on the topic inside the company, the UR decreases her employment to a 50% service at the university. Little payment is handed to the UR for this work at the company as the start-up’s economic strength is rather limited. After two years, the UR manages to develop a complementing downstream patent<sup>262</sup> which facilitates industrial usage of the initial patent (in combination with the new patent). The patent is developed as part of her service in the company and the patent accrues to the company.<sup>263</sup>*

In this example the UT has in fact, with a minimal monetary compensation, undertaken the research required to generate value from the first upstream patent held by the university. When comparing the relationship between the UR and the university in case the development is undertaken in the university contra a separate entity the following chart provides an overview.

	Value generated for the university Development in a separate entity (start-up)	Value generated for the university. Development within the university
The first patent	Commercial value facilitated and ownership maintained.	Commercial value facilitated and ownership maintained
The second patent	No ownership obtained	Ownership obtained

**Table 9: Outcome for the university in case of further research efforts within contra outside the university**

As can be seen, although no further investments are made by the university in the start-up scenario<sup>264</sup> the university enjoys benefits provided by the researchers work. For further clarity a similar chart can be made out of the viewpoint of the UR.<sup>265</sup>

<sup>262</sup> A downstream patent as facilitator for value extraction from the first patent is used in the example. Knowhow or other IA can, however, also be the complementing information carrier required to facilitate value creation from the initial patent.

<sup>263</sup> Note that this example assumes that no ownership conflicts arise between the university and the company regarding the invention.

<sup>264</sup> The example is simplified. We assume that no incubation options or seed capital is provided.

<sup>265</sup> The example provided is simplified. If assumed that the UR is also a shareholder in the start-up the indirect gain from those shares might exceed the kickback she would have received if the second patent would have accrued the university and she thus would have been entitled to a percentage of th university’s license incomes.

	Compensation by the university to the UR in the start-up setting	Compensation by the university to the UR in the development in the university setting
The first patent	Percentage kickback from university license incomes	Percentage kickback from university license incomes
The second patent	Nothing, however, university incomes from the first patent are facilitated leading to incomes for the UR.	Percentage kickback from university license incomes

**Table 10: Outcome for the UR in case of further research efforts within contra outside the university**

As can be seen, the UR has in fact contributed to future university incomes in virtually the same way as the university has made the UR's future remuneration possible (as explained above 0 relation two – University - UR).

#### 4.3.4 Conclusion additional contributions by the UR

In the relation between the university and the UR there will be no need for further remuneration for additional contributions. The UR has made the active choice to pursue the potential upside of a start-up and for research undertaken in such a start-up she will be remunerated if the company proves successful. By facilitating usage of the initial technology, which is still held by the university she will, furthermore be remunerated by the university. Comparing this conclusion with “0 relation two – University - UR”, above it is tempting to argue that the UR – university relation even out. As a counter-argument it could be pointed out that the UR will/may also enjoy remuneration from the company and thus, she would be compensated twice. This argument is however invalid as it does not take in to consideration that the company-university relation is regulated separately.

##### 4.3.4.1 Seed capital

When seed capital is provided by the university virtually the same issues as in the case of incubation occurs but in a more refined shape as the investment is not indirect and can thus easily be estimated.<sup>266</sup> Money has been spent by the university to promote the development of a company of which the university, at most, will own only a small percentage of. As ownership to the development, as a starting point accrues to the company, some model to remunerate the university would be desirable. In essence, the models provided in the Incubator chapter above are relevant also in the seed-capital setting.

KIT has chosen to solve the question by increasing the royalty demanded for the future usage of the technology. This provides for several desirable incentives. The UR will be encouraged to find collaboration partners within the industry, not only as this will provide increased chances for the technology to reach the market at all but also as the revenues provided to the university will increase and in turn increase the final kickback accrued to her. Industry co-development has furthermore a statistically higher rate of success than development undertaken solely by the university,<sup>267</sup> this in turn increasing the overall intention of university research being to speed up technology diffusion in to society.<sup>268</sup> According to M.I.T. and SU Statistics 70% of the licensees of university technology are known by the inventor indicating that the relationship between the UR and industry will promote the diffusion chances of university technology.<sup>269 270</sup>

<sup>266</sup> Given that the services provided by the university case can be re calculated to a sub based on a market value for the services

<sup>267</sup> Albert Banal-Estanol et al. p. 26

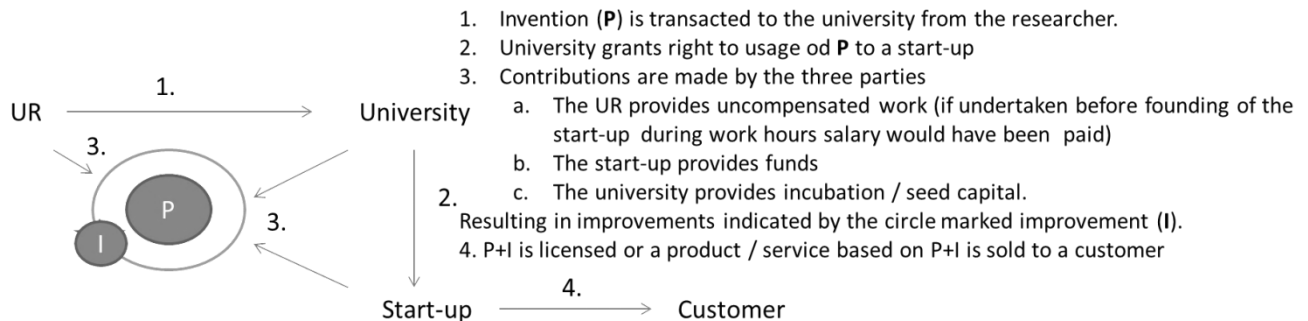
<sup>268</sup> See above regarding the second academic revolution.

<sup>269</sup> An Inventor's Guide to Technology Transfer at the Massachusetts Institute of Technology, p. 23

<sup>270</sup> Stanford - OTL – inventors guide p. 6.

#### 4.3.4.2 Solution incubators and seed capital

In order for a solution to be suggested the chain of transactions and contractual relations will be clarified in detail. The contractual relations are divided into two schemes. The first explains the origin and flow of Intellectual values emanating from the university (UR) and the second, the flow of monetary compensation emanating from the customer of the end product or service. The occurring relations or transactions (steps) are explained in chronological order for each scheme.



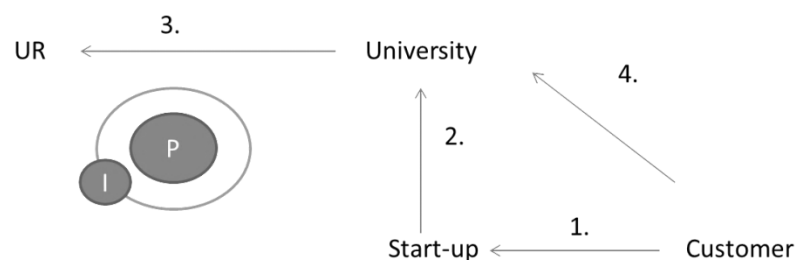
**Figure 13: Stream one moving from the UR towards the final customers**

Step 1 is the relation between the UR and the university is based on legislation and employment agreements. Step 2 is a license agreement with a content which can vary and, as will be seen, in turn affect the reversed flow of monetary remunerations. Step 3 is where difficulties regarding future revenue sharing occur as contributions are undertaken by several stake holders. In step 4 **P+I** as a package start generating revenues.

The second scheme takes place in time after the first chart and displays how the assets resulting from the first chart generate monetary compensation and suggests models for sharing those revenues. In this scheme the difficulties presented previously in the chapter are presented in step 2 and 3.

The license model in step two is dependent on if/how foreground has been negotiated in step three of the first scheme. If the university takes on a more commercial approach the fourth complementary step might also become relevant.

Among the suggested solutions, guided by societal deliberations and the arguments provided the intention is now to choose between the solutions 2 a, b or c as well as 3 a, b, c for the second scheme. When doing so the factors free labor provided by the UR, funds provided by the university and funds provided by the start-up company must be considered as well as, and this even more important, the incentive for the contribution. (which benefits can the stake holder assume will derive from the investment?)



**Figure 14: Stream two moving from the final customer to the UR and the university.**

1. Payment for license or product / service for **P+I**
2. License payment to university based on:
  - a. Percentage of incomes from **P**
  - b. Percentage of incomes from **P** plus a certain percentage for university investments (also premium based on **P**-incomes)
  - c. Percentage of incomes from **P** plus a certain percentage of incomes derived from **I**
3. Remuneration from the university to the UR (dependent on the university–Start-up relation).
  - a. 30% of **P**
  - b. 30% of **P** plus 30% of the incomes obtained by the university from **I**
  - c. 30% of **P** plus a lower percentage for revenues obtained from **I**
4. If the university has obtained contractual rights to certain foreground (part of **I**) a separate license agreement must be established between the customer and the university. (provided that a license to this has not been granted to the start-up allowing usage of this foreground asset as well)

#### 4.3.5 Analyze and conclusion - chapter four

Regarding the university – Company relation, the effects a chosen solution would have on the main objective for the university, being to facilitate technology diffusion into society, must be considered. (See in the previous regarding the role of the university after the second academic revolution). Of certain interest is the insight that important future inventions are hard to pinpoint prior to patenting as well as that the industry, and this particularly in certain fields, lacks capacity / does not find it economically beneficial to undertake early stage research. Out of a society perspective it would thus be desirable that the university filled this gap in order to provide the required early stage research for the industry, incubated at the expense of the university. The costs associated with such undertakings may, however, be substantial leading to the conclusion that the university should be compensated in one way or another for the process to be feasible. As presented, there are several potential solutions available for the university in case a market motivated compensation for the risky investment is to be obtained. However, turning the university in to a revenue driven venture capital enterprise in relation to the startups would not serve the university's intended purpose, and would not provide the safe harbor required by early stage university research which cannot be instantly transacted to the existing industry.<sup>271</sup> The most commercially viable projects will not be the ones requiring university subventions. On the contrary, if commercial viability could instantly be identified in all start-ups taking off from the university, the need for university funding would not be there in the first place as the industry would notice such options. As this is not the case a soft start is required in order to allow the technology to develop to a stage where commercial viability can be identified by the industry. The examples of university technology which did not even have a clear field of use while developed but later on have become core technologies in the modern society are abundant. As an example red laser can be mentioned. When invented few, if anyone, could predict the large area of future use. The author considers this a strong argument not to confuse the university's opportunities to apply a strictly commercial approach with a requirement to do so. Furthermore the solutions presented where the university ensures compensation through co-ownership to assets the administration of such a portfolio would be demanding for the university as well as it would be extremely limiting for the start-up and in the long run most likely contra-productive regarding technology diffusion as the start-up's capacity to undertake transactions involving the assets on its own will be limited. A suggested model is thus one that compensates the university for its cost items and adds the margin required to allow development of e.g. incubators but does not put additional restraints on the new ventures.

Taking the mentioned considerations in to account alongside with the previous discussion on "Additional contributions by the UR - 4.3.3.1" the conclusion from this chapter is that suggestions 2a and 3a in Figure 14, shall be used. Added to this the university shall, in accordance with the debt solution in section "compensating the university for indirect funding 4.3.2.2" demand compensation for the market value of the service provided during the incubation. With market value, the value a commercial actor would have had to charge in order for her to manage development of her business well as a reasonable dividend on her investment. This also goes for seed capital provided to an incubated company.

In the case of seed capital investments in a project undertaken by the university on demand by an industry partner, an increased royalty fee is motivated as the university, in this scenario has taken economical risks which would have been carried by the industry partner if the partner would have obtained the rights to use and develop the invention by herself. (The KIT solution see 3.4.2.5)

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<sup>271</sup> Taking for example the pharmaceutical industry as an example, this becomes abundantly clear. As revealed during the interview with Johannes Hulthe at AstraZeneca, the industry is reluctant to involvement in research which has a long way left to the market. This has also been the Authors experience when discussing implementation of university research with companies in several different fields while working for Engage Ventures. Each industry and each company has a meaning of its own when it comes to determining at which stage of development involvement is feasible.

## 5 Trade secrets and copyright

In this chapter remuneration for non-patentable assets as well as non-patented potentially patentable assets will be elaborated on. Databases becoming IPR through copyright/neighborhood rights<sup>272</sup> and to some extent computer programs, will be the core in the part of the chapter handling non-patentable assets and technical know-how be focused on in the part of the chapter focusing on non-patented but potentially patentable assets.

To be accurate, the term “Technical know-how” should be clarified. An IA constituting technical know-how, in the sense of this paper can take several forms:

1. Non-patentable technical knowledge on how to e.g. on how to optimize a certain process. (could be a best mode for a patent)
2. Patentable non-patented inventions
3. Non-patentable technical knowledge on how to e.g. on how to improve a certain process which is kept secret and thus constitute a potential trade secret.

It can be noted that the author does not intend to question the principles of public access to public documents and thus limitations regarding usage of certain intellectual assets in the university setting will, due to the Swedish constitution, be restrained. However, in order for a discussion to be undertaken regarding the value of trade secrets and their role in relation to patents,<sup>273</sup> initially the chapter will not regard such limitations. Regarding the feasibility of utilization of technical know-how, trade secrets in general and copyrights in the university setting, however, a discussion suggested extended secrecy (as an exception from the starting point being public access to public documents) will be undertaken in the end of the chapter.

### 5.1 Technical know-how in relation to trade secrets

When referring to technical know-how a distinction is intended towards the term “trade secret” although technical know-how may be protected as a trade secret.<sup>274</sup> In this writing the narrowed term “technical know-how” will be focused on as the encompassed assets, under certain conditions, can be preferable to a patent also for a patentable technical know-how or used to complement a patent. As the previous chapters have provided a thorough analysis of how to remunerate for patents, technical know-how, out of this perspective, will be complementing and complemented by the previous chapters. As Swedish universities, due to Swedish legislation, can only be maintaining secrecy to a limited extent, issues regarding secrecy will also briefly be touched upon. However, as an introduction, firstly trade secrets in general will be discussed.

### 5.2 Trade secrets in general

If technical know-how is protected as a trade secret, applicable Swedish legislation will be Lag (1990:409) om skydd för företagshemligheter” (Act on the protection of trade secrets). According to the act, a trade secret is information on business or operational issues applicable in the course of business, which are kept secret and in case of publication could damage the business competitiveness.<sup>275</sup> The term “information” comprises written or by other means documented information e.g. drawings, models, prototypes as well as an individual’s knowledge on a certain matter although it has not been documented.<sup>276</sup>

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<sup>272</sup> A database is a related (neighboring) right in the sense of Directive 96/9/EC. See also Lag (1960:729) om upphovsrätt till litterära och konstnärliga verk § 49.

<sup>273</sup> The discussion is extended to include also trade secrets as the available literature regarding trade secrets is more extensive than the same regarding technical knowhow. (As mentioned technical knowhow can constitute a trade secret).

<sup>274</sup> WIPO – IPpanorama Module 4 Trade Secrets page 23 f.

([http://www.wipo.int/export/sites/www/sme/en/documents/pdf/ip\\_panorama\\_4\\_learning\\_points.pdf](http://www.wipo.int/export/sites/www/sme/en/documents/pdf/ip_panorama_4_learning_points.pdf))

<sup>275</sup> Lag (1990:409) om skydd för företagshemligheter 1§

<sup>276</sup> Ibid.

### 5.2.1 Trade secrets versus patents<sup>277</sup>

The difference between patents and trade secrets regarding how protection is obtained is fundamental. Trade secret status is obtained for a certain intellectual asset through undertaking measures to assure secrecy while patents will be published during the granting process.

The World Intellectual Property Organization (WIPO) has published the following clarifying comparison between patents and trade secrets: “Some advantages of trade secrets include:

- Trade secret protection has the advantage of not being limited in time (patents last in general for up to 20 years). It may therefore continue indefinitely as long as the secret is not revealed to the public.
- Trade secrets involve no registration costs (though there may be high costs related to keeping the information confidential).
- Trade secrets have immediate effect.
- Trade secret protection does not require compliance with formalities such as disclosure of the information to a Government authority.

There are, however, some concrete disadvantages of protecting confidential business information as a trade secret, especially when the information meets the criteria for patentability:

- If the secret is embodied in an innovative product, others may be able to inspect it, dissect it and analyze it (i.e. "reverse engineer" it) and discover the secret and be thereafter entitled to use it. Trade secret protection of an invention in fact does not provide the exclusive right to exclude third parties from making commercial use of it. Only patents and utility models can provide this type of protection.
- Once the secret is made public, anyone may have access to it and use it at will.
- A trade secret is more difficult to enforce than a patent. The level of protection granted to trade secrets varies significantly from country to country, but is generally considered weak, particularly when compared with the protection granted by a patent.
- A trade secret may be patented by someone else who developed the relevant information by legitimate means.<sup>278</sup>

### 5.2.2 The importance of trade secrets

In order to get an idea of trade secrets importance in the modern economy, some figures can be presented. A recent study estimated the value of trade secrets held by U.S. publicly traded companies to astonishing five trillion dollars.<sup>279</sup> <sup>280</sup> Furthermore when an assessment of Standard&Poor's 500 (S&P 500) being the marketplace value of 500 of the largest publicly traded companies in the US was made in 2005 and compared with an assessment measuring the same parameters in 1975, it was found that 1975, 16.8% of the total value of the S&P 500 was attributed to intangible assets while in 2005 the same assessment came to the conclusion that the 79.7% of the S&P 500 marketplace value consisted of intangible assets.<sup>281</sup> As can be seen the importance of the intangibles has been and can be expected to rise making the importance of addressing management of intangibles as core topic.<sup>282</sup> Furthermore the vast majority of those intangible assets making up the value of S&P 500 have been concluded to be trade secrets<sup>283</sup> <sup>284</sup> something that reflects the large companies' positive attitude towards trade secrets.<sup>285</sup> The intention of this paragraph is to indicate not only the growing importance of trade secrets but also to specify the

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<sup>277</sup> As will be seen, in this section the so called "Technische Verbesserungsvorschläge" will be explained and elaborated on. This will mainly leave one aspect of the German legislation out of the assessment, the so called "Gebrauchsmuster" which simply can be explained as a kind of utility patent. The Gebrauchsmuster is left out of the assessment as it adds little to the discussion.

<sup>278</sup> WIPO Program activities, Patents or Trade Secrets? [http://www.wipo.int/sme/en/ip\\_business/trade\\_secrets/patent\\_trade.htm](http://www.wipo.int/sme/en/ip_business/trade_secrets/patent_trade.htm)

<sup>279</sup> Elizabeth A. Rowe, "Contributory Negligence, Technology, and Trade Secrets," 17 *George Mason Law Review*, P. 5

<sup>280</sup> *Ibid.*

<sup>281</sup> Congressional Research Service, John R. Thomas *The role of trade secrets in innovation Policy 2010*. Page 2 f.

<sup>282</sup> The statistic evidence of the previous increase is evident. The author allows herself to assume that the development has not yet come to an end. This however is the authors own prediction.

<sup>283</sup> Congressional Research Service, John R. Thomas *The role of trade secrets in innovation Policy 2010*. Page 3

<sup>284</sup> R. Mark Halligan, *Protection of U.S. Trade Secret Assets: Critical amendments to the economic espionage act of 1996*, *The John Marshall Review of intellectual property law*, P. 657 f.

<sup>285</sup> Wesley M. Cohen, Richard R. Nelson, John P. Walsh, *Protecting their intellectual: Appropriability conditions and why U.S. manufacturing firms Patent (or not)*, National bureau of economic research, Cambridge (2000) p. 1 f.

importance of technical know-how. It can be concluded that if trade secrets make up the “vast majority” of the value of all intellectual assets, the trade secret sub section technical know-how is of a dignity fair enough to deserve being examined when UR remuneration for intellectual assets is discussed. To this comes the even larger importance of technical know-how in Germany and Sweden compared to the U.S due to the lack of “best mode” requirements. Technical know-how can thus be used to complement and provide the patent holder with competitive edge also after the expiration of the patent.<sup>286</sup>

#### *5.2.2.1 The private sector – remunerating non patented inventions*

According to the collective agreement Uppfinnaravtalet, the fact that the employer does not apply for a patent does not per se affect the researcher’s right to remuneration.<sup>287</sup> In the case law from Industrins Uppfinnarnämnd, previously presented, this principle was also established<sup>288</sup> leading to the conclusion that the parties of the labor market as well as the relevant court of arbitration respect the value of non-patent protected inventions.

It must be noted that this only leads to the conclusion that not-patented patentable inventions which shall provide rights to remuneration as patented inventions, and not that this right shall be extended to also encompassing non-patentable assets. Nevertheless the assessment has provided support for the notion that non-patented patentable inventions shall be remunerated also in the university setting.<sup>289</sup>

It is tempting to answer the question regarding usage of trade secrets in the same manner as patents, also in the university setting in the affirmative. Unfortunately such a practice is made almost impossible due to the Swedish constitution demanding public access to public documents and a prerequisite for the maintenance of a trade secret.<sup>290</sup>

#### *5.2.2.2 Germany - Remunerating non patentable technical-improvement-suggestions...*

The German Law on Employees' Inventions contain a special section for so called “technical improvement suggestions” The employee is entitled to reasonable compensation for the suggestion if the suggestion grants the employer a commercially advantageous position similar to the one that would have been obtained through a IP right (read patent).<sup>291</sup> The rule must be read in combination with another provision in the same legislation presenting the so called “monopoly principle” stipulating that the employer shall obtain a monopoly right to use the asset, for a demand for remuneration to be relevant.<sup>292</sup><sup>293</sup> A trade secret concerned with a technical improvement certainly qualifies for this description and is also what’s intended. In other words the ArbEG § 20 provides a legislative right to employee remuneration for trade secrets of technical character. Below in section 5.3.4. *German models of value estimation of inventions*, models for calculating estimating the value of the IA in question is suggested.

#### *5.2.2.3 ... and emphasizes the importance of separating know-how value in licensing, sales and technology trade agreements*

In the German remuneration guidelines which will be presented below, the value of know-how in tech transfer through license,<sup>294</sup> sales,<sup>295</sup> and technology trade.<sup>296</sup><sup>298</sup><sup>299</sup> The need to be able to separate the value of the know-how is emphasized as the employer is entitled to subtract certain components of a

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<sup>286</sup> Jestaedt D and Buehling J. Trade secrets in Germany page 3

<sup>287</sup> Uppfinnaravtalet 4§ and the subsequent comment to 4§

<sup>288</sup> Antonina Bakardjieva et al., (2008) p. 728

<sup>289</sup> The author intends to show that certain praxis applies in the private sphere and thus that such a praxis would be reasonable also in the university setting, to the extent possible see 5.2.3 Secrecy and the principle of openness.

<sup>290</sup> “Truckfrihetsförordningen” (the chapter on the freedom of the press) See in the following

<sup>291</sup> ArbEG § 20

<sup>292</sup> ArbEG § 9

<sup>293</sup> See also Bartenbach/Volz (2002) p. 365 ff.

<sup>294</sup> Richtlinien für die Vergütung von Arbeitnehmererfindungen im Privaten dienst, Nr 14, para. 2

<sup>295</sup> Eduard Reimer et al. (2007) p. 404 f.

<sup>296</sup> Richtlinien für die Vergütung von Arbeitnehmererfindungen im Privaten dienst, Nr 16, para. 2

<sup>297</sup> Eduard Reimer et al. (2007) p. 410 f.

<sup>298</sup> Richtlinien für die Vergütung von Arbeitnehmererfindungen im Privaten dienst, Nr 17, para. 2

<sup>299</sup> Eduard Reimer et al. (2007) p. 418

complex license agreement from the obligation to remunerate the employee.<sup>300</sup> This, as a net model is applied in the private setting which allows the employer to deduct certain cost items (associated e.g. with development or production) and some parts of the gross revenue income (parts that have no legislative basis for remuneration as they relate to assets which do not provide a basis for remuneration) can be deducted before applying the percentage that the employee is entitled to.

#### *5.2.2.4 Out of the university perspective*

In Germany remuneration is demanded already for qualified technical improvements and certainly for patentable intellectual assets which are not patented. In Sweden legislation, case law as well as collective agreements clearly expresses the importance of such assets through imposing obligations to remunerate on the employer.

Now, if this is how important trade secrets are considered by the industry, and the university, in line with its new responsibilities due to the second academic revolution, is supposed to adapt its behavior in order to promote knowledge and technology diffusion through entrepreneurial efforts, would it not be reasonable for the university and legislators to adopt the view that technical know-how, just like patentable inventions, should be: 1. Encouraged and 2. Diffused through commercial means?

### **5.2.3 Secrecy and the principle of openness**

#### *5.2.3.1 Starting point – access to public documents<sup>301</sup>*

The regulation of public access to documents in possession of a public body takes its starting point in the Swedish constitution “Tryckfrihetsförordning (1949:105)” (act on the freedom of press) According to the law “handlingsoffentlighet” (access to public documents) shall apply to all public documents as long as no exceptions are applicable. The two prerequisites which need to be fulfilled for the document in question to be a public document are “document” and “public document”. The prerequisite document is defined as written or drawn information along with recordings which can be read, heard or in any other manner provide information with the help of a technical device<sup>302</sup>. A document is public when it is kept by the public body<sup>303</sup> and has either been established (upprättat)<sup>304</sup> by the public body or has been received by the public body (inkommen handling – received document) by another party.<sup>305</sup> A document in possession of a public body which has been established by or provided to the public body is considered a public document and shall thus be subject to the rules regarding access to public documents, implying public access, provided that no exceptions are applicable.<sup>306</sup>

#### *5.2.3.2 Limitations to the public access to public documents*

According to the Tryckfrihetsförordning exceptions to the public access to public documents are only to be undertaken in a limited set of cases<sup>307</sup> and each exception must be stated explicitly in law.<sup>308</sup> The law intended is Offentlighets- och sekretesslagen (SFS 2009:400) (Act on openness and secrecy). For the kind of documents that would be required to formalize trade secrets within the university no such exception is applicable.<sup>309</sup>

This is also the reason why this paper narrows the scope of the trade secrets to non-formalized technical know-how. The benefits for the university’s commercialization activities that would

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<sup>300</sup> Kurt Bartenbach, Franz-Eugen Volz, *Arbeitnehmergesetz – Kommentar zum Gesetz über Arbeitnehmererfindungen* 4. Edition Carl Heymanns Verlag, Köln 2009.

<sup>301</sup> The assessment on public access to documents in possession of a public body can be further problematized if e.g. the question of when documents are finalized and when they are still working documents etc. It is, however, not the intention of the paragraph to clarify all such aspects but simply to clarify the unbeneficial legal environment for trade secrets in Swedish universities.

<sup>302</sup> Tryckfrihetsförordning (Swedish Act on the Freedom of Press). Chapter 2 § 3.

<sup>303</sup> Ibid.

<sup>304</sup> Ibid. Chapter 2 § 7.

<sup>305</sup> Tryckfrihetsförordning (Swedish Act on the Freedom of Press) Chapter 2 §§3, 7

<sup>306</sup> Ibid. Chapter 2 §§3,6

<sup>307</sup> Ibid. Chapter 2 § 2. – The cases intended are outlined in the paragraph.

<sup>308</sup> Ibid. Chapter 2 § 2

<sup>309</sup> When referred to documents, the wide definition given by Tryckfrihetsförordningen chapter 2 § 3 is intended. It should also be mentioned that contract research Chapter 8 § 9 sekretesslagen (1980:100) Act on secrecy and collaborative research to some extent can be protected. See also NYFOR SOU 1996:70 Offentlighet och sekretess i myndighets forskningsverksamhet p. 230 ff,



occur if secrecy was enabled are obvious. If trade secrets could be maintained within the university, licensing activities of know-how could be undertaken largely in accordance with the MPG model (See section 3.3). As costs associated with maintaining a trade secret are low in comparison with a patent and obtaining it is virtually free, this would be a splendid way to add black figures to the problems regarding coverage for university costs presented in the previous.<sup>310</sup> However, as this is not a feasible solution with the current Swedish legislation, focus will be put on non-formalized technical know-how in the following regarding currently feasible solutions.

The importance of public access to public documents within the university can be justified referring to the importance of scientific freedom. As touched upon in the section regarding scientific freedom See 2.3.3, ensuring public access to scientific results is of great importance e.g. in order to avoid classification of regime critical research results.

#### 5.2.4 Transacting technical know-how and UR subsidiary posts

The limiting characteristic of the Swedish legislation leaves us with a serious issue if technical know-how is to be transacted, namely the question of what to transact. If the know-how is formalized and transacted to a third party it will be a public document providing little competitive edge for the licensee<sup>311</sup> and non-formalized technical know-how is more difficult to transact than if the know how had been laid down in a manual handbook etcetera.

Furthermore the university's control position over non formalized know how is severely limited through the mandatory right of the UR to accept subsidiary posts (in Swedish "bisyssla")<sup>312</sup> which expands the rights to subsidiary posts for URs further than the general rules given for public employees.<sup>313 314 315</sup> A subsidiary post is any task/post/assignment undertaken that is not of private nature and is not part of the employees main occupation.<sup>316 317</sup> The UR is obliged to inform the university of the subsidiary posts that she takes on<sup>318</sup> and the university shall inform the UR of which subsidiary posts that are allowed.<sup>319 320</sup> This promotes sufficient monitoring of which subsidiary posts that are held by the UR but does not limit the employees options to accept such posts. Subsidiary R&D posts related to the UR's field of research are allowed opening for consultancy assignments such as counseling in scientific questions or taking a seat at the board of directors in a company whose business activity relates to the UR's field of research.

There are, however, limitations stipulated for UR involvement in subsidiary posts. The limitations can be divided into three fields. Firstly, subsidiary posts damaging the reputation of the employer,<sup>321</sup> secondly subsidiary posts that limit the employees capacity to fulfill commitments to the employer (work hindering),<sup>322</sup> and finally subsidiary posts which would compete with the employers business.<sup>323 324 325</sup> The first two limitations can be excluded<sup>326</sup> however, if finally concluded that the

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<sup>310</sup> It cannot be said for sure that such licensing activities would generate revenues. However, due to the lack of cost to apply for protection the likeliness can be expected to be higher than for patents. (Authors assumption)

<sup>311</sup> The document will be considered public if established (finalized) within the administrative authority (being the university) and if transacted to a third party this will be even more obvious.

<sup>312</sup> Högskolelag (1992:1434) chapter 3 § 7.

<sup>313</sup> Compare Högskolelag (1992:1434) chapter 3 § 7 and Lag (1994:260) om offentlig anställning §§ 7-7c

<sup>314</sup> So called "ämnesbundna FoU-bisysslor" (R&D posts related to the UR's field of research)

<sup>315</sup> LOA § 7 limits this right by stating the subsidiary occupation may not undermine the public's view of the university as a reliable institution.

<sup>316</sup> Prop. 1970:75 s. 58

<sup>317</sup> AD 1985 nr 69

<sup>318</sup> Högskoleförrordning (Swedish University Act) (1993:100) chapter 4. § 32

<sup>319</sup> Ibid.chapter 4. § 31

<sup>320</sup> LOA §7 a

<sup>321</sup> So called "förtroendeskadlig bisyssla"

<sup>322</sup> So called "arbetshindrande bisyssla"

<sup>323</sup> So called "konkurrensbisyssla"

<sup>324</sup> Prop 2000/01:147 p. 9

<sup>325</sup> Subsidiary posts competing the employers field of business is also handled in the collective agreement regarding salaries and benefits for public employees, the so called "ALFA agreement" Chapter 1 § 16. In the ALFA agreement subsidiary posts through which the employee directly or indirectly provides services or products which are the same as the ones provided by the employer shall be considered as competing and be prohibited.

utilization of research results falls within the field of the university, UR subsidiary posts utilizing the technical know-how would certainly be in violation with this limitation. Currently, however, there is a clear line drawn for how the utilization of research results should be handled after the second academic revolution and some scholars even argue that this uncertainty is taken advantage of by URs claiming that utilization does not fall within the activity of the university per se but the encouraging of utilization doing so. In effect, it could be argued that, this would imply that the UR's utilization is not competing but rather in the interest of the university.<sup>327</sup>

As can be seen, most likely, the university will not be able to transact the technical know-how on its own due to constitutional limitations. If transacted through the UR in the form of non-formalized technical know-how, it cannot be said for sure that many researchers will not pursue such options on their own as a secondary position in order to ensure a more satisfying percentage of the company's payment. There is, in other words a rather large potential write-off to be expected regarding the technical know-how that will finally be commercialized through the university. In the following, technical know-how that is actually transacted through the university will be intended.

### **5.2.5 Given that the “transaction” is undertaken through the university- how to remunerate?**

For MPG, the use of trade secrets and know-how in tech transfer, either as a standalone trade object or as a complement to a patent, as well as the researcher's right to remuneration in such cases were brought into light already in 1967.<sup>328</sup> Ever since, MPG has applied the policy that researcher remuneration shall be the same regardless of the nature of the licensed subject matter.<sup>329</sup> The simple answer to the question would be that trade secrets should simply be treated as patents regarding UR remuneration. However, given the weak bargain position of the university presented in the previous, perhaps the percental remuneration can be increased. Given that there, in comparison to the case of a patent, are no costs related to obtaining control over the technical know-how, such an increase might be justifiable. “Trade secrets” are of course limited to technical know-how as long as the option of secrecy is cut back in the university setting.

### **5.2.6 Technical know-how and patents sold simultaneously or at package prices**

The question can be problematized further. If we assume that the technical know-how is licensed to a company as part of a patent license deal and not in a license deal of its own and the UR of the patent is not the same UR as the one who provided the technical know-how. In jurisdictions such as Germany, where the UR has a mandatory legislative right to 30% of the university incomes or for universities that have granted the inventor rights to 30% of the incomes through labor agreements, the issue must be tackled. If furthermore a right to remuneration for non-patented matter that is transacted from the university has been laid down in law or labor agreement as well, no margins or error remain as the two researchers are both entitled to a percentage on the revenues derived from their respective assets. In the perfect world the exact income from the patent and the other asset could be determined however this is hardly the case<sup>330</sup>

Determining the actual license value of the patent respectively the technical know-how might be difficult or close to impossible. It could very well be so that the usage of the patent is impossible without the trade secret and vice versa resulting in a standalone value of zero for the two assets separately.<sup>331</sup> Mainly two options are available. The issue can be stressed during the license negotiations and, although the assessment is hard also for the licensee, she is asked to present the percentage of the

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<sup>326</sup> General examples of subsidiary posts that damage the employers reputation is medical doctors prescribing drugs and simultaneously undertake work for a medical company or similar subsidiary posts which may make the public employees objectiveness questionable. As a rule of thumb the employee shall ensure that she does not free ride the reputation of the employer to stay on the safe side. Regarding work hindering subsidiary posts, the employee shall manage to undertake the work hours assigned for in the labor agreement and not allow the subsidiary post to hinder the undertaking of tasks expected to be handled by her.

<sup>327</sup> Ulf Petrusson (2007) p. 16 f. and 64 f.

<sup>328</sup> ErfinderLeitfaden MPG p. 20 f.

<sup>329</sup> Ibid.

<sup>330</sup> Given that only the patent was to be guaranteed a lowest percentage, some margin could be added to the UR providing the patent. However, if also the non-patented/patentable matter qualifies for remuneration, such a solution is no longer feasible as also the UR providing this matter will have legal demands.

<sup>331</sup> The issue is of course present also when two complementing patents are licensed simultaneously.

total license fee that she would attribute to the two components. The most compelling solution however, would be to avoid package pricing. If this is done the university can be sure not to be in breach of any legislation as long as “the 30% payment” is undertaken. Although the second solution may seem compelling, the core of the problem has, however not been resolved being that the asset will be licensed simultaneously and that the licensee as well as the university will regard the assets as a package leading to a potentially arbitrary valuation of the cost items during the negotiation where the negotiating parties are representatives of the university and a representatives from the potential licensee. What is needed to enable a fair valuation of the separate assets in the package is a valuation model.

#### 5.2.6.1 German models of value estimation of individual assets when complex several assets are simultaneously put in to use - so called “Schutzrechtskomplexe” (Compositions of IP rights)

The question of how to value the individual assets when a complex composition of assets that are simultaneously being put in to use has been handled by German preparatory works and subsequently elaborated on by the national doctrine<sup>332 333</sup> as well as expressed in official guidelines. The official document providing the most accurate guidance is the “Richtlinien für die Vergütung von Arbeitnehmererfindungen im Privaten dienst” (guidelines for remuneration for employee inventions in private entities).<sup>334</sup> The guidelines are ill named as the naming indicates that they are applicable for inventions in private companies exclusively. However, this is not the case as the guidelines are applicable also for the non-private setting, technical improvements<sup>335</sup> (which can be protected as trade secrets see 5.2.2.2 - Germany - Remunerating non patentable technical-improvement-suggestions) and patentable inventions kept secret.<sup>336 337</sup> The guidelines provide three methods to assess the value of an asset.<sup>338</sup> The models developed will here be suggested to be used in order to decide the value of the individual components in an IA packet deal.

##### 5.2.6.1.1 Method 1: Calculation according to the license analogy

This method starts with a comparison of an invention (A) solving the same technical issue as the new invention (B). The performance of A within the company is compared with the performance of B in terms of e.g. additional /reduced work hours required per unit produced, final quality of product, material consumption and so forth. Comparisons are then made in terms of scope of the IP protection as well as the protections coverage in the relevant industry. Furthermore the notion that a license with a small company generally requires a higher royalty rate due to the lower volumes generated by such a company, should be taken in to consideration.<sup>339</sup> When this comparison has been made between the invention A and B, the intention is that a relevant royalty/license value should be estimated for B with the license price for A as starting point and then modified based on pro or cons being revealed during the previous assessment.<sup>340</sup> If the invention is one of many technical solutions in e.g. one apparatus, industry praxis should be taken into consideration regarding if the license fee should be calculated on the apparatus as a whole or based on a smaller component comprising the invention.<sup>341 342</sup>

In order for method one to be accurate there are several prerequisites that need to be in place and most importantly the reference object patent A.

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<sup>332</sup>Bartenbach/Volz (2003) p. 1276 ff. „Allerdings ist stets zu prüfen, ob die Einnahmen **kausal auf Grund der zu vergütenden Diensterfindung anfallen**. Nur insoweit kann von Einnahmen aus der Verwertung der Erfindung gesprochen werden.“

<sup>333</sup> Kurt Bartenbach, Franz-Eugen Volz, Soenke Flock, Arbeitnehmererfindervergütung, Kommentar zu den Amtlichen Richtlinien für die Vergütung von Arbeitnehmererfindungen 4. Edition Carl Heymans Verlag, Köln, 2009. p. 542 (on so called “Schutzrechtskomplex” translating to IP complexes)

<sup>334</sup> Richtlinien für die Vergütung von Arbeitnehmererfindungen im Privaten dienst, Nr 20 regarding complexes.

<sup>335</sup> Found in ArbEG §20,

<sup>336</sup> Found in ArbEG §17

<sup>337</sup> Kurt Bartenbach et al. (2009) p. 542

<sup>338</sup> Richtlinien für die Vergütung von Arbeitnehmererfindungen im Privaten dienst, Nr (3 a, b, c)

<sup>339</sup> Ibid., Nr (3 a), (6)

<sup>340</sup> Ibid. Nr (9)

<sup>341</sup> Richtlinien für die Vergütung von Arbeitnehmererfindungen im Privaten dienst Nr (7)

<sup>342</sup> Bartenbach/Volz (2002) p. 426 f.

#### 5.2.6.1.2 Method 2: Calculation according to the concrete business operation value

In short this method generates a value of the invention by an estimation of the decrease of costs and the increase in revenues which the invention causes. Additional factors are then used in order to adjust the value e.g. potential risks and costs associated with the implementation of the technology being for example switching costs.<sup>343</sup> Compared to the first method this method does not require a reference invention/asset. Making it less accurate but allows a wider area of application.

#### 5.2.6.1.3 Method 3: A comparison with technologies on the market

This method is applicable when no similar technology is used within the company and therefore no benchmark against the current situation is possible. A similar technology is hence sought and the market price of this invention is taken as starting point<sup>344</sup>. The accuracy of the final model is highly dependent on information on other assets being available for license, their performance as well as the pricing of these.

### 5.2.7 Applicability of the value estimation models

The valuation models can be applied in order to assure that the components in a package deal are all valued fairly allowing the right “obtained value” to be the basis for the respective remuneration calculations.

The author’s suggested usage of the methods will have limited application in larger package deals as occasionally the value of all assets must be unraveled before a fair measurement is ensured for the asset which is intended to be analyzed. Example: *1. Four different assets will be part in a package deal. Three of the assets have already been licensed in prior agreements giving that the value of those can be estimated and the final one subsequently concluded. 2. Three assets are to be part of a package deal. One of the assets has already been licensed out, one can be measured with the license analogy and the final one can subsequently be concluded. 3. 87 different assets are to be licensed and none of them has previously been valued in a separate license deal...* The approach is useful as a complement in the second case but will not serve a purpose in the first as accurate estimates are already given by previous license fees. Nor will it be feasible to use it in the third case as the method is rather blunt and will thus generate to large deviations to be used in deals of this size. Although limited in its use, this German method for measuring in house – use value of patents may provide some guidance in minor package deals.

The inaccuracy is further increased if previous license-valuations for some of the assets are used without consideration as the license-value of these particular assets is generally contextual and thus affected by which company that licenses them as well as the development within the field since the previous license agreement. The first licensing company may have had a certain application in mind while the second licensing company may have licensed for another purpose.<sup>345</sup> Outside factors that are to be considered are primarily the development of other similar or interchangeable assets that would decrease the value of the asset.

If such factors are not regarded, the valuation of the new assets included in the new license deal might turn out to be incorrect. A simplified example: *Five years ago a university licensed technical know-how on a specific application of fuel-cells to a company The company licensed the know-how in order to undertake further research on their own. At the time little research had been undertaken worldwide in the field and no other actors on the market were able to provide similar assets. Today, the university is approached by another company interested in licensing the fuel cell know-how, which in order to simplify then example, has not been developed further along with several other assets controlled by the university. A lump sum is negotiated for the entire package containing the fuel-cell know-how, a related patent and a database<sup>346</sup>. The two new assets have not yet been licensed and the price for those*

<sup>343</sup> Richtlinien für die Vergütung von Arbeitnehmererfindungen im Privaten dienst Nr (3 a,12)

<sup>344</sup> Ibid.(3 a, 13)

<sup>345</sup> The first company might produce a high margin product while the second produces a low margin product. Jet another company might want to license the asset to undertake research.

<sup>346</sup> To further simplify the example it is assumed that the license agreement does not include payment based on royalty but on a yearly lump sum. If instead royalty was to be used the calculation would instead be based on percentage rate that could be demanded by each of the assets from the end product and then the total sum obtained by the university be divided in accordance. E.g. total revenues = 100’ based on three assets demanding: A1:2% A2:3% A3:5%. As  $0,02/10 = 20\%$ , 20% of the obtained 100’ or a total of 20’ are to be

*must thus be estimated. The a reasonable rate for the patent can, however, be found using Method 3 where the patent is compared with another patent which is to be found on the market. Subsequently the share to be obtained by the database is concluded through deducting the value of the two assets that are now considered to have been concluded. As can be seen, we risk applying an incorrect value for the know-how leading to a, in this case, under valuing of the other assets.*

But then again, ensuring that the exact right percentage of the incomes is allocated to the right patent is an utopia. If the German methods are combined with the a conscious use of pre-valuation at least a ball park figure can be obtained allowing figures to be reached that are at least justifiable.

### **5.3 Copyright – databases and computer programs**

For an introduction to copyrights and databases see section 2.3.1 above. The value of a database can be substantial. The output of several years of research can for example be captured in a database simply consisting of a trial and error list. Such a list can save the one interested in further developing a technology several years of costly research.

In Sweden, computer programs and databases, although both part of the same type of IP being copyright, are substantially different out of a university control position perspective. As for all public documents held by a public body, the information contained in the database as well as in the computer program will become subject of public access when established by the public body. This will affect the two types of copyrighted material subject matter in substantially different ways. The computer program will maintain its value as the algorithms, constituting the vital parts of the program, are not allowed to be copied demanding of the one interested in using the “solution” provided by the program, to code a program capable of undertaking the same task. As for the database, the protection from copying is of much less help. Illustrated in the following example:

*At the University of Torstenboda in the north of Sweden a research group of chemical researchers has been mapping out all the potential application areas for a certain salt. The research project has been going on for the last 20 years and the group has finally finalized a database comprising no less than 200.000 areas of use where the salt does not perform better than cheaper alternatives and a total of 4 areas of use where the salt is the optimal alternative. A company which has been monitoring the development and shown great interest in the research approaches the university the following day and demands access to the database. As public access to the public document, being the database, applies there is nothing left to do but to hand out a copy of the database to the company representative. In the reception, the representative is instructed that the material is, although public, still covered by copyright, and that she is not allowed to copy the material. “No need to” the company representative replies, skims through the documents writes down the four interesting application areas and takes some notes regarding performance in other fields. I don’t even need this one she says, subsequently handing the printout back to the receptionist and on behalf of her company expresses gratitude for the 20 years of costly research that the university has saved her company.*

The example, although slightly stretched, displays how the value of the database is not to be found in the right to prevent others from copying but in the information contained a value which cannot be protected by copyright. It could be inferred that a database can be maintained a secret as long as it is not finalized/established (upprättad). This is certainly true; however, if the university is interested in diffusing the information through commercialization this requires that the database is transmitted to the licensee in turn turning the document public. As actors interested in entering such agreements with a university in Sweden certainly are aware of the rules that apply for public documents it is not likely that any sane actor would pay anything for such a database.<sup>347</sup> The public document status does not only decrease potential licensees’ willingness to pay for the information but also efficiently removes any chances of obtaining a competitive edge from acquiring the information.

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used when calculating remuneration to the UR who has provided A1. For the case when royalty is used industry specific starting points for rate can be used. See Alexander Poltorak, Paul Lerner, *The essentials of patent licensing*, (2004) p. 101 ff.

<sup>347</sup> As transmitting the document, in any form, from the public body would turn it public entitling other interested actors to access.

### 5.3.1 For copyrights that can be transacted - level of remuneration

As in the case of trade secrets /technical know-how, there seems to be little reason to argue for a lower level of remuneration to the UR providing copyrighted material than an UR providing a patent. On the contrary, as cost related to copyright are lower for the university than patenting costs a larger margin could be granted the UR. This given that a gross revenue model is used. If instead a net model is used more incomes will accrue to the UR but this will have to do with the modest sum to be deducted for actual costs for obtaining the IP in the first place.

## 5.4 Final analysis chapter five - further questioning the limited secrecy

### 5.4.1 Trade secrets

As presented, the usage of trade secrets in general is not feasible in the university setting. The alternative and limited usage of non-formalized technical know-how is, however, possible. The usage of technical know-how is unfortunately to some extent out of the control of the university due to the UR right to subsidiary posts and uncertainty regarding to which extent subsidiary posts including spreading utilization of technical know-how would be competing with the university's field of business. Furthermore, if technical know-how is used in package transactions, it could be that conflicts occur when determining which value obtained by the university that is actually derived from the respective assets.<sup>348</sup> For this situation, the usage of valuation models is suggested. The author considers the models of valuation provided by the guidelines "Richtlinien für die Vergütung von Arbeitnehmererfindungen im Privaten dienst" to provide supportive guidance in similar situations.

### 5.4.2 Copyrights

Copyright for databases in the university setting is generally not an IP to rely on if a competitive advantage is intended. It must be kept in mind that copyright only provides limitations regarding the right to duplicate the work in question and not for the information as such. The competitive edge to be obtained with a university held database must thus be considered as limited. If compared with the industry which can maintain advantages through databases not only during the time of legal protection of the copyright but also through complementing use of trade secrets allowing the information to serve the company as long as the secret can be maintained, the position of the university must be considered unsatisfyingly weak.

Regarding computer programs the author considers the same framework as for patents to be suitable when regarding remuneration.

### 5.4.3 Final word regarding the usage of secrecy within the university

In SOU 2005:95 it was argued that rules governing secrecy in the university should be extended. One topic of interest handled in the preparatory work was novelty for non-contract research inventions. The committee suggested that "Secrecy shall apply for information regarding patentable inventions which shall or have been disclosed to the employer according to the law [...] secrecy shall apply regardless of if the information can be handed out without any private entity suffering damage from the undertaking, i.e. the secrecy shall be absolute. Secrecy shall maintain for the information during a timespan not exceeding 20 years. Confidentiality of source shall not apply".<sup>349</sup> (author's translation) "Five years of secrecy shall be implemented for information regarding inventions and research results during research collaboration between the university and another public body, company or other private entity, if it can be assumed that the private entity may suffer damage of the information is mad public."<sup>350</sup>(author's translation). "To the extent decided by the government, secrecy shall be possible for information regarding inventions or research results which are part of an application for funding by the government to a university. Secrecy in this aspect shall, however only apply if it can be assumed that a private entity would suffer damage if the information was disclosed."<sup>351</sup> (authors translation)

The committee hereby addressed the issue that an inventions novelty and public access to public documents (openness) may not be compatible as public access may make documents containing

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<sup>348</sup> As mentioned also relevant for situations when several patents or several pieces of technical knowhow are simultaneously transacted and not only for the combination technical knowhow and patents.

<sup>349</sup> SOU 2005:95 p. 152

<sup>350</sup> Ibid. p. 160

<sup>351</sup> Ibid. p. 166

information regarding the invention damage the novelty leading to patent hindrance.<sup>352 353</sup> Note also that the document in question does not have to be requested for novelty damage to occur. The availability itself constitutes ground for hindrance.<sup>354</sup>

Taking into consideration that the last review of Sekretesslagen (SOU 2003:99) did not handle any material changes regarding universities and university employees as well as changes related to patent novelty and patentability constituted core in the change presented in SOU 2005:95, the author would like to take the opportunity to highlight the question of secrecy to non-patentable assets. As presented in the previous, the untapped potential value of university trade secrets and copyrights is substantial. If the financial issues relating to the third mission of the university if the scope of commercialization is limited to patentable inventions, the benefits of increased secrecy options for the university also for trade secrets and databases becomes obvious.

Certainly, the very idea of secrecy within the university can be considered to antagonize the idea of free research when described as the free exchange of ideas and enlightenment of the public and surely it would speak against the fundamental constitutional Swedish ideas of public access to public documents.<sup>355</sup>

On the other hand, the author argues, that public funds are used to promote research, not for the sake of research being undertaken but in order for the research to subsequently benefit the public which funded it in the first place. The very reason for the current discussion e.g to be found in SOU 2005:95, is that commercialization of university research is considered the most efficient way to ensure technology diffusion benefiting society. The third mission of the university and the second academic revolution are according to the author, no more than an outflow of this insight. In effect, what we see is a system which, based on the suspicion that decreased openness by the university would lead to limits in the scientific freedom, hinders the majority of the potential value generated by the universities to benefit the public in the most stringent way possible. The current setting promotes mainly two outcomes. Firstly, the most appealing, being that the research is taken on by an industrial actor capable of leading in to the market. To be noted is that the university will not be able to influence which company that does so, for which purposes the research is undertaken or demand compensation for the usage. The second is that the research is abandoned as no industrial actor would even consider investing further in a project which is based on information available in the public domain. The rhetorical question “who has benefited from this?” is obviously redundant. The counterargument would be that the public has had access to the documents forcing the author to ask the questions: “what additional value has this brought the public? Does the public really benefit more from access to technical documents and databases which they would not understand even if they had the slightest idea of their existence, which they don’t and actually requested them, which they don’t, than it would benefit from this information being protected so that it could be put to use in e.g. a cure for cancer?” The committee of the SOU argues that that a balance must be found between openness and protection for private interests in this question.<sup>356</sup> The author on his side argues than “private” in the previous sentence should be replaced by “public interest in getting something back for all the tax money spent” and that the balance currently tipped over absurdly in favor of the openness.

It is here argued that the question to be asked is not if also other intellectual values paid for by taxpayers should be ensured to finally benefit the same through commercialization but rather how.<sup>357</sup> As indicated by the previous paragraph the lack of secrecy severely limits Swedish universities’ possibilities to diffuse research results and this is also the reason why the author suggests that secrecy should apply also for trade secrets within the university as well as restrictions regarding public access to databases should apply.<sup>358</sup>

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<sup>352</sup> Patentbesvärsträtten ruling 12.05.2005 in case nr 05–071

<sup>353</sup> SOU 2005:95 p. 153

<sup>354</sup> EPO Board of Appeal 15 mars 2000 case nr T 0087/96

<sup>355</sup> This, further relating to the political level of the scientific freedom as presented in the initial chapter, posing a threat to the UR community which might fear to be gaged in the long run.

<sup>356</sup> SOU 2005:95 p. 150

<sup>357</sup> In SOU 2005:95 (p. 16) the question of if and how to commercialize other IAs than patents seems so distant that the reader gets the impression that it would be an impossibility. It is explicitly stated, that a patent seems to be the only way.

<sup>358</sup> Compare also Vinnforsk rapport, Åganderätten till forskningsresultat vid universitet och högskolor Appendix 8 P. 22 f. where the German setting is elaborated on and the question is asked if a patent is preferable or if other solutions may be equally/more satisfying. (read usage of trade secrets). The lack of this option in Sweden must be considered and absurd hindrance.

For contractual research there are exceptions applicable in order to ensure patentability. So called “uppdragssekretess” (assignment confidentiality) and “samverkanssekretess” (collaboration secrecy). The regulation is however only applicable when a private subject is involved and the secrecy is limited in time to maximum ten years.<sup>359</sup>

To conclude it would be desirable with secrecy for trade secrets and copyright. However, some restrictions might be required. The trade secret could, if no restrictions applied, be used to hold research results generated in the university secret without limitation in time. If compared with the patent, which firstly is published and secondly is by definition have a limited time of protection before entering the public domain, it can be seen that utilization through patents is in line with the principles of openness, something that cannot be said about the nature of the trade secret or databases kept secret.

A suggested compromise could be to limit the time of secrecy to e.g. 10 years and demand that that certain criteria is fulfilled in terms of commercial potential is forthcoming. This in order to ensure that secrecy will not be applied for assets as a standard procedure. By doing so, commercially viable assets are allowed to be utilized and other information which may be of interest to the public is not classified. Such an approach can, at least, not be blamed for shooting flies with cannons in the same way as the current setup does.

#### **5.4.3.1 Brief comparison with other European states**

In a survey undertaken by the European Union Scientific and Technical Research Committee in 2008 15 member states of the European Union were assessed regarding secrecy for publicly funded research.<sup>360</sup>

In several legislations provisions apply that force universities to disclose research that has been publicly funded. Examples are: Belgium (Flanders region), Denmark and Germany. In Germany however some parts of the results may be kept secret and must thus not be published. In France publicly funded results has to be published. Switzerland follows the rules of the Swiss National Science Foundation. These rules require publication of research results given that there is not a reasonable ground to maintain secrecy. Norwegian URs are entitled to publish; the right is unconditional given that a third party will not suffer damage from the publication. In most of the other countries there were no legal requirements demanding publication.<sup>361</sup>

If compared with the Swedish context as presented in the previous, it does not take Ulf Petrusson to reach the conclusion that Swedish universities will hardly manage their tasks after the second academic revolution unless legal amendments are implemented regarding secrecy.

#### **5.4.4 Principles for remuneration if trade secrets were to be remunerated**

Given that an increased secrecy becomes reality in the future, the author suggests that principles much like the ones used in Germany should be applied also in Sweden when determining an employee’s right to remuneration<sup>362</sup>. The two main principles intended are: 1. “The principle of causality”, being the causality between employer incomes and the employer delivery (being a patent, a trade secret or copyright).<sup>363 364</sup> 2. “The principle of monopoly position” (referring to the competitive edge provided by the asset in question). For remuneration to be required the employer should be able to protect the asset and gain a competitive edge in relation to competitors.<sup>365 366</sup> The competitive edge will, in the case of a trade secret also be maintained if another company develops the same trade secret but does not let the information enter in to the public domain.

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<sup>359</sup> Offentlighets och sekretesslagen Chapter 31, § 12

<sup>360</sup> European Union Scientific and technical research committee, CREST report Intellectual property, European Commission, Brussels, 2008, p. 60

<sup>361</sup> European Union Scientific and technical research committee, CREST report Intellectual property, European Commission, Brussels, 2008, p. 27 f.

<sup>362</sup> The principles are used for patents but the author argues that they present a useful approach also when determining if remuneration for other intellectual assets should be disbursed.

<sup>363</sup> Bartenbach/Volz (2002) p. 366 f.

<sup>364</sup> For determining the size of the “income”, which in effect can also be a saving, the models presented in 5.1.7.1 – German models for value estimation of inventions, can be used.

<sup>365</sup> Bartenbach/Volz (2002) p. 365 ff.

<sup>366</sup> ArbEG §9



## 6 From the author's perspective – Wrapping up and answering the research questions

In this following and final chapter, the research questions provided in the initial chapter will be answered. In addition the methodological path that has been taken to reach the conclusions will be explained. The author takes the freedom to elaborate further on the information provided in the previous chapters in a less scientific but more comprehensible manner. This chapter will thus also contain the authors own viewpoints and conclusions.

As the alert reader can surely recall, the research question provided in the first chapter were; firstly the question if a gross or net revenue model should be applied when determining level of remuneration for the UR. The second question was if a general model for income distribution to the UR can be established for the case when incubation of and/or seed capital funding to start-up companies comprising a UR patent is supported by the university. The third and fourth question was if the UR should be compensated in accordance with the suggestions for patents, given by answering the first two questions, also if the utilized asset is a copyright or a trade secret. In relation to the third and fourth question, the Swedish principles of openness regarding documents held by public bodies were questioned.

### 6.1 Gross or net revenue model in the passive-university setting

The first question asked was how to remunerate the UR in the passive university setting. When this question was to be answered, as suggested in the method chapter, the Swedish prerequisites were firstly assessed. After doing so, mainly through assessment of preparatory works, it was clear that an increased utilization, primarily through commercial means, was desired. If the author's own terminology, where a distinction is made between a pure diffusion (knowledge diffusion which can be achieved through publication) and utilization which generally requires a more proprietary approach by the university, is applied, Figure 15 provides a clarifying framework. As can be seen, certain costs will have to be carried if utilization is to be managed in a setting where the university obtains rights to university inventions.

As costs will arise we will end up with the moral question of if the UR should really be remunerated if the invention has not generated a net revenue for the university and the society. The author argues that the answer to this question is "yes". The model has been taken from the German approach as

## Why meaningful diffusion (utilization) generates costs

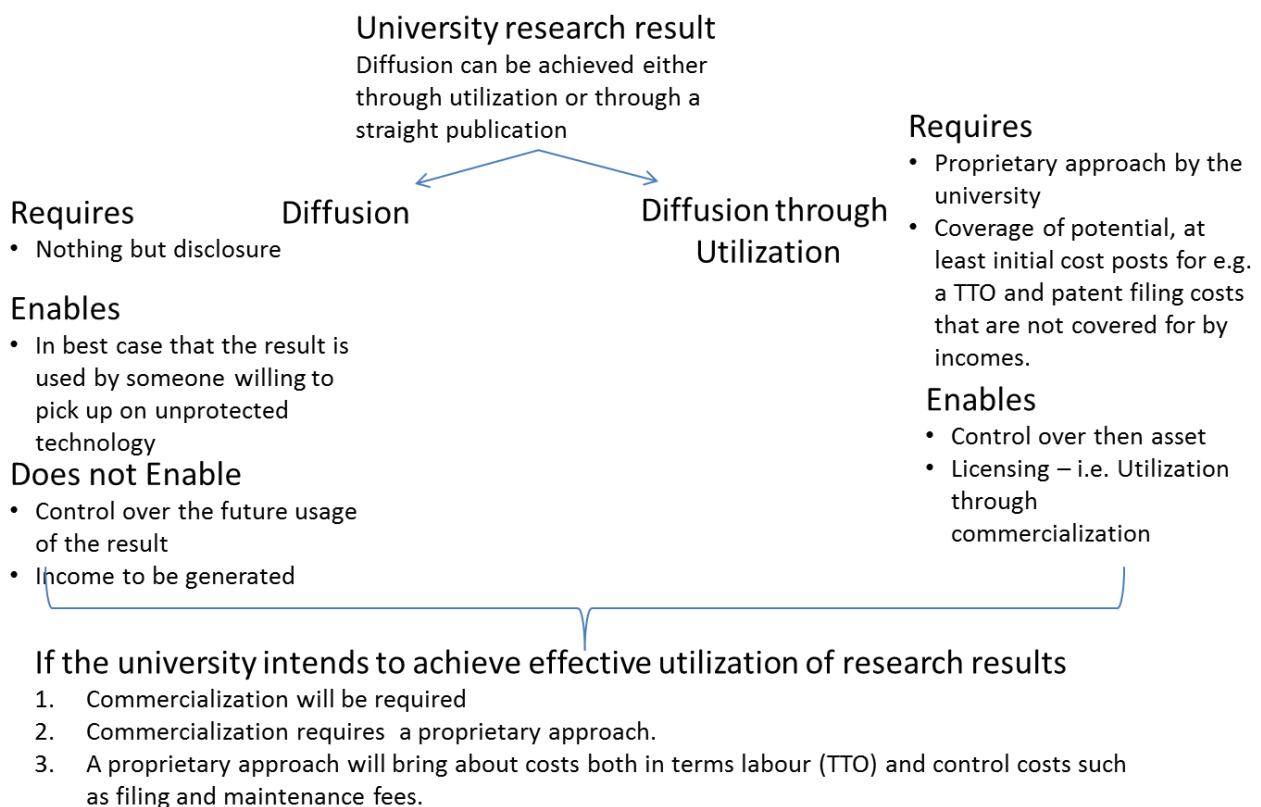


Figure 15: Comparison between diffusion through publication and diffusion through commercialization

presented in chapter 3. Limitations regarding the percentage applied as well as a degressive scale decreasing the UR's percentage for higher incomes are, however, suggested. The limitations will serve the purpose of providing an instant incentive for every UR while decreasing the amount obtained by the researchers inventing inventions which generate high levels of revenues. The author argues that opportunity to obtain extremely high remuneration is a less important driver than ensuring that the research will not be undertaken in vain. The solution is suggested as it leads to a maintained incentive for all researchers to comply with disclosure rules as well as it provides a reasonable incentive for the UR to collaborate during the following commercialization. As can be seen, the author has subdivided the incentives into "disclosure" and "continuous collaboration during the commercialization process". This distinction allows the incentives/sanctions required to be assessed for the two stages. The first action, being the disclosure, can be reached in two ways. Either a sufficient incentive is in place or else effective sanctions have to be available. Here it is argued that a substantial incentive is preferable to sanctions. This has to do with several factors. The UR in the Swedish setting has become accustomed to being able to obtain property rights to their inventions. If this privilege is removed and on top of that the employer forces her to disclose the inventions and if not sanctions will be used, it is reasonable to fear that the UR collective will be frustrated, turn averse and perhaps even hostile towards the employer as well as the employer's extension, the TTO. Sanctions may be effective when it comes to forcing disclosure but the price paid in terms of loyalty and commitment to the future development might be high. Frustration among the URs of the university will certainly not provide an incentive to assist the further fostering of the project. In the end this might lead to a situation where university ownership is ensured but for what good if the UR is not willing to provide the expertise which, as stated in the previous, the development cannot do without? In this paper it is argued that if a net model is applied, leading to a low rate of patents being remunerated, and this is combined with sanctions in order to force disclosures, a lower compliance in the second step, being the further commercialization, can be expected. Although the mentioned considerations have not been explicitly stated by KIT, it is the author's assumption that such contemplations have led to KIT's praxis of not undertaking any measures even when the UR applies for patents on their own. The author, however, believes that sanctions could be a complement to a gross revenue model adding further reason for researchers to comply. As long as a carrot (gross revenue model) is kept and the compliance does not rely entirely on a whip approach (sanctions) compliance can be obtained also during the commercialization process. A strong argument against sanctions is that an UR, who would not disclose in case there were no sanctions, will probably be a poor asset during the further commercialization leading to the IP being useless as it cannot be utilized without her. Perhaps this implies that there is no reason to force disclosures at any time.

### **6.1.1 Answering the research question "net or gross revenue model"**

A gross revenue model, modified with a degressive remuneration development is suggested. Given that a degressive remuneration is applied the author argues that the general setback with the gross revenue model, being the moral issue of transaction money to UR for inventions which do not pay their costs, can be handled sufficiently good.

#### **6.1.1.1 What about equity obtained instead of license fees and royalty?**

For a more thorough assessment of this topic the reader is referred to section 4.2. If however, the most central arguments are to be summarized, the following should be stated:

1. Equity should only be allowed as payment when monetary payment is not feasible due to liquidity limitations of the start-up.
  - a. This ensures that that the UR is not forced in to a high risk equity position. It shall be kept in mind that a consistent treatment of all URs should be strived for.
2. When equity is allowed, the equity shall be transacted to the UR instantly.
  - a. This is done to ensure that the UR is, although shareholding in a non listed company are rather illiquid investments per se, at least has the most extensive chances possible to sell shares and defend his ownership percentile in case of issuing of new shares.

The first benefit can be reached also by the usage of severe sanctions against discomplying URs. There are several arguments against such a solution:

1. The context change from complete UR control over inventions created by her implies that she suddenly finds herself in a situation where her employer starts suing her. Although it may lead to compliance, the solution can be expected to generate a lot of frustration among the URs of the university and certainly does not lead to an incentive to provide assistance in the further fostering of the project. In the end this would result in university ownership to a patent but for what good if the UR is rather hostile than willing to provide this expertise which, as stated in the previous, the development cannot do without?
2. If added to this a net revenue model is used in which the UR statistically can expect only one patent out of then to ever be able to generate remuneration to her, most likely the UR will feel averse to spending the precious time during which she could have applied for new research grants or undertaken a new research project, on fostering a patent which she was not interested in handing to the university in the first place.

## 6.2 The comparison with venture capital and the question of if the university should provide direct or indirect funding to the spin-offs on terms which are not market oriented – A General model for income distribution to the UR when incubation of and/or seed capital funding to start-up companies comprising a UR patent is supported by the university

In this paper it has been argued that the question requires two separate relations, being the relation between the university and the UR and the university and the company. The relations must be separated in order to determine how funding and indirect funding to the start-up from the university affects the relation between the university and the UR. The question of the university interaction and promotion should be considered out of a holistic societal perspective for which information has been obtained from chapter two. In the previous it has been argued that the university should apply more

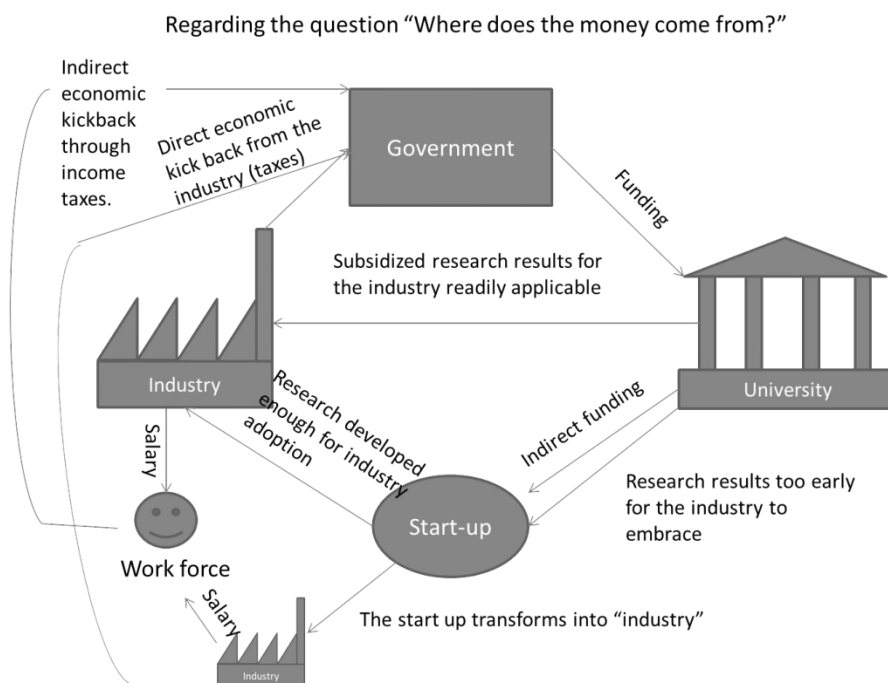


Figure 16: Displaying the origin of university funds.

favorable terms when providing indirect or direct funds to the spin-offs containing university technology than would have been possible if funding was to be obtained on the market. When suggesting this as a solution the author has considered several arguments. The first argument is that early stage research from the university often has not reached far enough to attract investors within the industry. If the indirect funding was not provided the company would thus not be able to obtain additional capital from the market after developing the technology further. In short the first argument is thus based on the fact that there is no available venture capital and hence the research would not be able to reach the market without the "unreasonably" generous help of the university. The second argument deals with the "unreasonable" character of the funding; being that the university would demand much lower compensation from the company than a venture capital firm would do. Here it can be argued that the university, after the second academic revolution, should be responsible for promoting the transaction of university technology in to the industry in order to benefit the society. In order to do so it occasionally becomes necessary to, as when parent rights are to be obtained, carry certain cost items which do not guarantee to present a kickback capable of covering the initial expenses. Furthermore, the author argues, that the university-

start-up- industry constellation should not be seen as a separate occurrence. On the contrary, as displayed in Figure 16, although revenue streams (licenses) from start-ups, industry and start-ups which have transformed in to industry will perhaps not be sufficient to generate a positive net result, this stream of revenues is just one of several (direct and indirect revenues for the university). As the intention is that increased rate of university research utilization should promote current industries as well as the funding of new ones, another stream of incomes will reach the government through taxes. This money will not directly accrue to the university but if the officials undertaking the legislation process are aware of the extra costs that might arise for the university due to its new tasks, additional funds should be ear-market in order to make this task possible. In the long run, if successful, these investments of the government will pay back indirectly through tax incomes. The author argues that these considerations would justify that the university applies a softer approach to start-ups than venture capital and that, to the extent this approach cannot be covered by the incomes which the university obtains from its commercialization activities, additional funds should be provided by governmental grants. According to the author it cannot be said clearly enough that the vast majority of the funds consumed before university research can be commercialized are consumed during the research phase and that it would be a terrible waste not to spend the additional costs required to reach utilization.

### 6.2.1 In relation to the company – Relation one university – Start-up

Now if such a soft approach is accepted, a dilemma occurs, similar to the one occurring if the “passive university” remunerates URs whose patents are not net yielders. In this case the question is, however, even more complicated. When money is invested in a patent held by the university then lion’s share of the upside in case of success will accrue to the university. In the suggestions previously presented to the university – start-up setting, the university will only be compensated enough to cover the direct expenses for e.g. incubator facilities. This limits the upside. Here a comparison can be made with how investments are made in individuals in a society.

If the comparison with investments in individuals undertaken by a society is applied, it can be concluded that if patenting and licensing activities are successful, the same theory can be used for patents held and licensed by the university. Now, this only works as long as substantial revenues can be extracted from some patents. If, instead a comparison is made with the author’s suggestion regarding direct and indirect funding of start-ups, the same model does not apply as the upside for the university according to the author’s suggestion is limited to covering the actual costs for the start-up along with a minor premium. In the previous it has been argued that the university should not take the role of a venture capital firm regarding demanded compensation. If however, the university would demand compensation in accordance with a VC calculation model where a hurdle rate of more than 30% would have to apply, due to the potentially long way the research still has to the market, then which effect would this have? On the

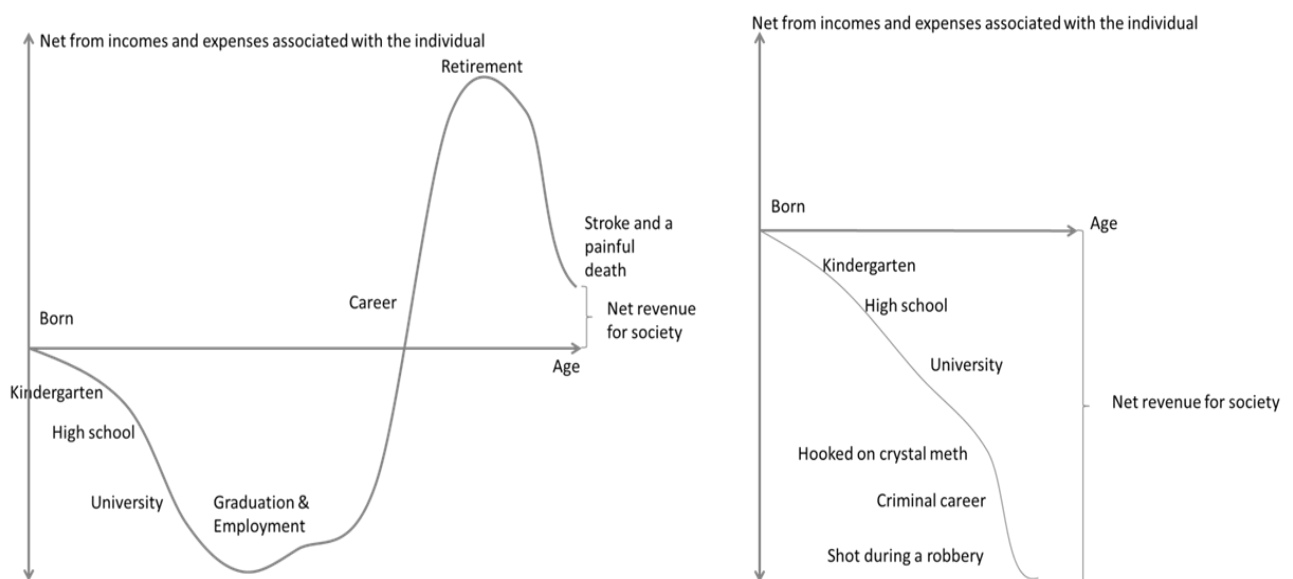


Figure 17: Costa and revenues for a successful investment (individual) contra a poor investment (individual). The presumption is applied that the aggregated revenues from successful individuals generates enough for the collective to achieve net revenues notwithstanding the aggregated losses generated by the less successful individuals.

pro side the university could through such a model potentially manage to be able to use a model similar to the one which applies for individuals in the society. Reversed however, as most start-ups will fail generating any revenues instead generate some costs while a few will be successful generating substantial revenues. For individuals the relation is generally the reversed as some generate large costs and the bulk generate moderate incomes. On the con side it can be concluded that the university will have to obtain a substantial amount of shares as the hurdle rate applied will run over the yeast the technology will need to the market, often many years. Substantial ownerships are generally avoided by universities, se in the previous, and if this approach is to be applied in Sweden along with a high, but justifiable, hurdle rate, the math does not add up.

### 6.2.2 Answering the research question “a general model...” in relation to the start-up

As revenues will accrue to the public bodies (comprising university and Government) through two separate channels, being licensing revenues and equity sales (direct) as well as through taxes (indirect), the author argues that a strict VC approach does not and should not be applied by the university. Instead it is reasonable that the start-up covers the costs which it has caused the university. This can, as handled in chapter 4 be done through several measures e.g. considering the indirect funding a loan or increasing the license fee. In addition a premium can be added in order to, to some extent, cover for funding to start-ups which will fail as well as to provide resources to develop the incubation or seed-capital activities. The premium can be obtained either through increased license fees or shareholding. Estimating the increased fee/royalty rate or the amount of shares that will have to be obtained in order to reach the premium will have to be done individually for each funding project.

By isolating and handling the university start-up relations separately, it becomes possible to isolate the university – UR relation as well as assessing it more clearly.

### 6.2.3 In relation to the UR – Relation two university - UR

Whether or not university investments in a start-up should affect the UR’s remuneration rate from patents licensed to the company is a complex question. As has been assessed in the previous, after founding of the company, the UR, the start-up as well as the university contribute to the improvements required to commercialize the technology. The UR contributes through work undertaken without remuneration from the university, the university through funding the start-up,<sup>367</sup> and the start-up through work not financed by the university. This all boils down to the central question of is if and how the contributions should affect the status quo remuneration to which the UR is entitled. Question must be answered individually for each constellation and is dependent on several factors such as:

#### UR

1. Active involvement in the company
2. Compensation for work is provided by the university, the start-up or neither
3. Shareholding

#### Start-up

1. Level of funding from the university
2. Additional funding obtained elsewhere
3. The ratio between the two previous
4. Additional essential assets and improvements derived from elsewhere
5. Character of the license agreement for the initial patent (P)

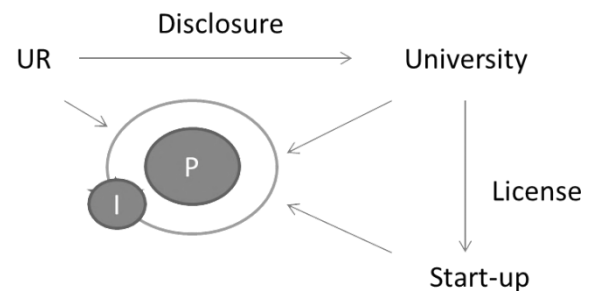


Figure 18: Snapshot after the granting of a license to the start-up. For a more thorough discussion on this figure see section 4.3.

<sup>367</sup> For a more thorough discussion on this topic please see section 4.3. The contribution intended from the university is primarily the funding (mainly indirect through incubation) granted the start-up. Hence the picture is to some extent misleading as it indicates that the university is directly contributing.

## University

1. Level of funding (all forms, indirect and direct intended)
2. Character of the license agreement for the initial patent (P)
3. Shareholding

At the very center lies, in other words, the desire to quantify the contributions by the three actors facilitating the required improvements and additional assets (I). In addition to this, ownership ensuring right to future compensation should affect the assessment as investments in an enterprise in which equity is an investment in one's own cause.

This paper has not examined all potential constellations and instead focuses on the following common setting. The UR is involved in the start-up in which he holds equity, the university provides additional funding (potentially also a minor amount of equity is held) and the start-up is has gathered sufficient funds to keep the enterprise afloat.<sup>368</sup> In this setting the main argument for decreasing the remuneration level of the UR as well as increasing the license fee, or otherwise subtracting providing compensation for the university from the start-up, is that the university has contributed in the development of I and thus enabled the future success for the company. The relation to the company has been handled in the previous and the remaining question is thus how the relation between the university and the UR should be handled. The author's main arguments not to undertake any changes of the UR's remuneration percentage are:

1. The researcher has provided additional contributions allowing utilization of the initial patent P required for the university to generate revenues from the same.
2. In order to ensure consistent remuneration the rule should not be made too detailed. If all parameters were to be taken into consideration, the risk of arbitrary usage and inaccurate calculations would be obvious. Thus, a stiffer rule will even ensure a higher degree of "just" treatment than a flexible one trying to achieve perfect justice by taking every single parameter into consideration.

If the coin is flipped, it can be argued that the university benefits from the UR's additional contributions, for a closer assessment see 4.3.3.1, to an extent which exceeds the benefits the UR can draw from the university's funding.<sup>369</sup> Perhaps the researcher rather should obtain further compensation/remuneration for this contribution than be deprived of remuneration? In fact, the researcher often works without an hourly salary<sup>370</sup> on behalf of the company in order to enable the usage of the initial patent P through adding the additional assists and improvements (I) required for the commercial viability of the enterprise.<sup>371</sup> Could this perhaps be considered contract research on behalf of the university? The author argues that this should not be the case. This mainly based on the following arguments:

1. The UR has made the deliberate decision to pursue the potential upside of enrolment in the start-up and generally an equity position in the same. The agreement between the UR and the start-up as well as her shareholding should thus be the primary sources of compensation.
2. Foreground to the work she undertakes accrues to the start-up and it is thus reasonable that she is compensated by the company and not the university for this. The company in turn does not undertake the required development of (I) as an act of charity but in order to make money.

As can be seen the active university setting comprises contributions of monetary and non-monetary character, contributions which, if perfect justice is to be reached, must be quantified and measured against each other. This task is hard not to say impossible. This is also the reason why the author has chosen to allow simplifications, i.e. in order to make usage of the rules feasible.

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<sup>368</sup> Friends family and fools (FFF) can be expected.

<sup>369</sup> Probably, the enterprise cannot do without both. The issue is highlighted in order to shed light on the fact that not only the university contributes with essential components.

<sup>370</sup> And certainly not from the university.

<sup>371</sup> This is to some extent an assumption which turns out completely wrong in case the UR is not involved in the company.

#### **6.2.4 Answering the research question “a general model...” in relation to the UR**

To conclude, the parameters to take into consideration if perfect justice is to be reached are abundant and it is the author’s viewpoint that taking them all into consideration to reach perfect justice will be impossible. Thus, a simplified solution in which the “passive university percentage presented in the previous should apply without alteration also in the active university is suggested.

##### **6.2.4.1 Brief on seed-capital**

In the case of seed capital to projects which are not incorporated i.e. a development project is undertaken within the university in collaboration with a company (industry partner), the author suggests that the company – university relation is affected by an increase of the license fee for the initial patent (P)<sup>372</sup>. In turn, this will increase the revenues obtained by the university leading to an increase of the remuneration obtained by the UR. The author argues, based on the importance of UR involvement when it comes to finding industry partners, that the researcher’s percentile remuneration should not be affected as this incentive is worth fostering. Furthermore the university can, and should, compensate for the costs through the increased license fee from the industry partner.

#### **6.3 Regarding remuneration for trade secrets and copyright**

This section does not take into consideration the limitations provided by the Swedish legal framework due to the limiting options regarding confidentiality and secrecy. This topic will be handled below. Instead, this section will argue that, in essence, the level of remuneration should be the same for copyright and trade secrets (although, limited to technical know-how which is feasible trade secret matter to be licensed from the university in the Swedish setting) as for patents. This suggestion/conclusion has been drawn from the third chapter which has proven that intellectual assets, which do not generate initial costs related to obtaining IP, can provide black figures allowing the total net to end positive, and should thus be encouraged. Thus, the same levels of remuneration should apply as the ones suggested regarding patents, in the active as well as in the passive university setting.

#### **6.4 Additional questions assessed**

During the development of the paper, additional difficulties have been highlighted in this final section those will be touched upon below.

##### **6.4.1 Extended secrecy in the university**

Balancing the interests of openness and capacity to utilize university research is a hard task. One should thus be cautious when suggesting changes. The author would however venture to say that current legislation kills flies with cannons. To continue the metaphor it can be said that other animals which are not pests but beneficial cattle are killed in the process. Through current legislation, openness is ensured at the expense of utilizable university research results. If the current limitations regarding exceptions for the university remain, certain benefits are maintained in terms of transparency, allowing extensive public access to the results which the public has paid for through taxes. In the context of a teaching or researching university with the main objective obtain and spread knowledge without regards to how or which form this knowledge diffusion takes (diffusion without demand on utilization), such a solution is satisfying. If however, the starting point is taken that an entrepreneurial university is required to society beneficial diffusion (utilization) of university research results, this approach is obsolete. Thus the author suggests extended options for secrecy allowing trade secrets in general and databases to be commercialized. The author certainly understands the value of and honors the principles of openness and considers it important to apply limitations to which information that can be kept secret. A suggestion is to demand that certain prerequisites, such as commercial viability and plans to utilize the asset, must apply for secrecy to be allowed. Such a solution would perhaps sort out the useful animals from the flies. In practice one or several individuals at each department should be assigned responsibility to inform the department URs on when they are entitled to keep certain information secret.

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<sup>372</sup> As clarified previously this increase is undertaken to compensate the university for the expenses the university has had after the point when the industry partner has announced that it wants the development to be undertaken. The setting is rather close to contract research with the exception that the university is not paid by the industry partner to undertake the development.

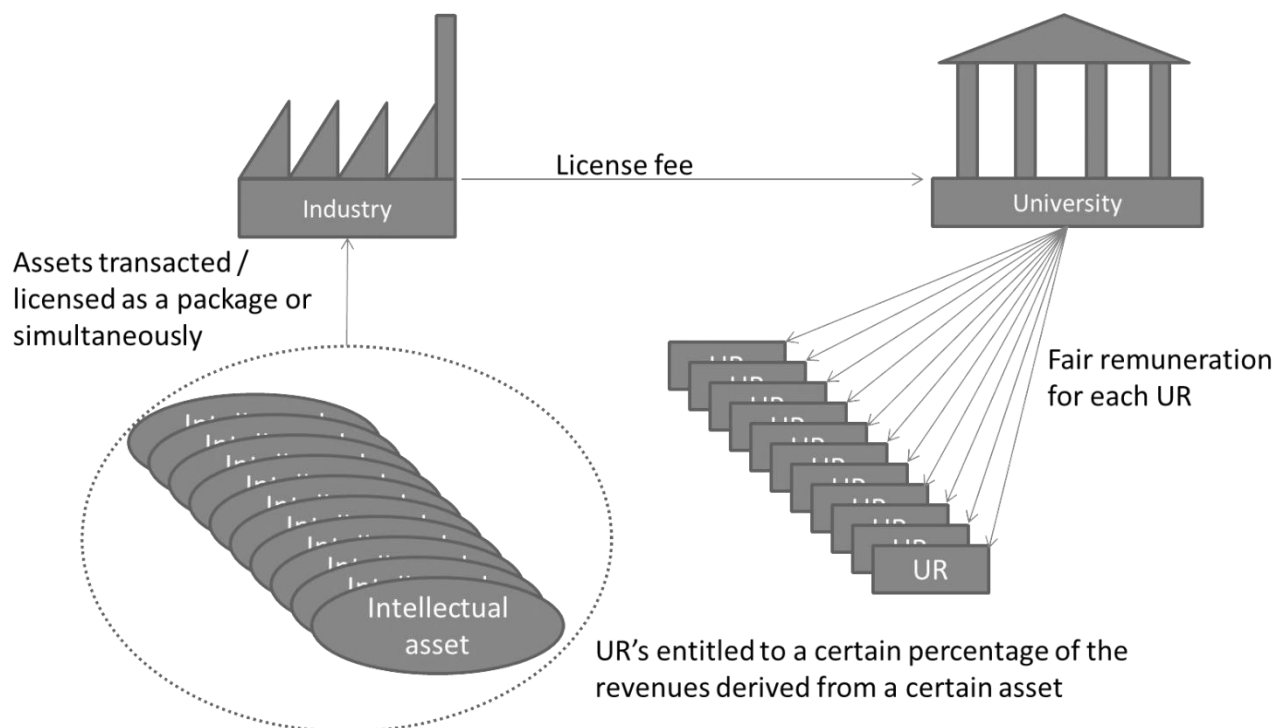
Regarding non patentable matter however, it would be reasonable to apply time limits. This as the character of trade secrets, in comparison to the patent which will become public per se when applied for, is extremely contradictory to the principles of openness. A time limit would serve as a safety valve ensuring that the exemption is not abused to serve unjust purposes such as keeping the information from the public. (Compare the section on scientific freedom 2.3.3) The author furthermore suggests that this time limit should start counting from the date the document would have become public when applying the current rules.

#### 6.4.1.1 Answering the question of what the author thinks about access to public documents in the university

Secrecy should be extended to also cover trade secrets and databases (which must be kept as trade secrets for the value to be preserved). Restriction shall however apply regarding time of secrecy as well as which matter that is allowed to be exempted from the principles of openness.

#### 6.4.2 Remunerating individual assets when a complex package of assets are simultaneously licensed

One issue which becomes relevant as soon as several assets are simultaneously licensed / licensed as a package is determining the percentage of the total license fee that is derived from each patent. If this is



**Figure 19: Displaying the transaction of incomes from the contraction partner, its origin, the asset package, and the distribution of incomes from the university through remuneration.**

not done properly, the UR's right to a certain percentage of the incomes derived from her asset will be nothing but a chimera as it will be up to university representatives to determine which assets that should be entitled to which percentile of the incomes. If no guidelines are available, the risk of arbitrary distribution of the incomes over the UR collective concerned is obvious. (See Figure 19) The author is aware of that also here, perfect justice is a utopia, but at least guidelines can be suggested in order to reach a reasonable accuracy.

In the previous, a framework established and used in Germany has been suggested to reach this reasonable accuracy. (5.2.6.1) The framework suggests solutions which all try to determine the actual current value of a certain asses. As a complement to the valuation techniques, previously used rates for assets which have already been licensed out can be used to start unwinding the asset package. The risk however when using previous values is that the previous value is not representative for the current value



of the asset. As an example, assets in a field in which much research is undertaken which had a high value due to their novelty several years ago. At today's date this valuation might be completely obsolete.<sup>373</sup>

*6.4.2.1 Answering the question of how to remunerate separate assets in a complex package*

Establishing an exact model for calculation of the separate assets in a package is hard, not to say impossible. It is, however, the author's standpoint that models such as the German can provide guidelines ensuring that the process does not become completely arbitrary.

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<sup>373</sup> When referring to value, the price a licensee is willing to pay for the asset is referred to.

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#### **7.10 Visualizations and graphs that have been copied and for which permission has been obtained**

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