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# **SECURITY IN INFORMATION TECHNOLOGY AND PATENT PROTECTION FOR SOFTWARE PRODUCTS: A CONTRADICTION?**

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## **SHORT EXPERTISE**

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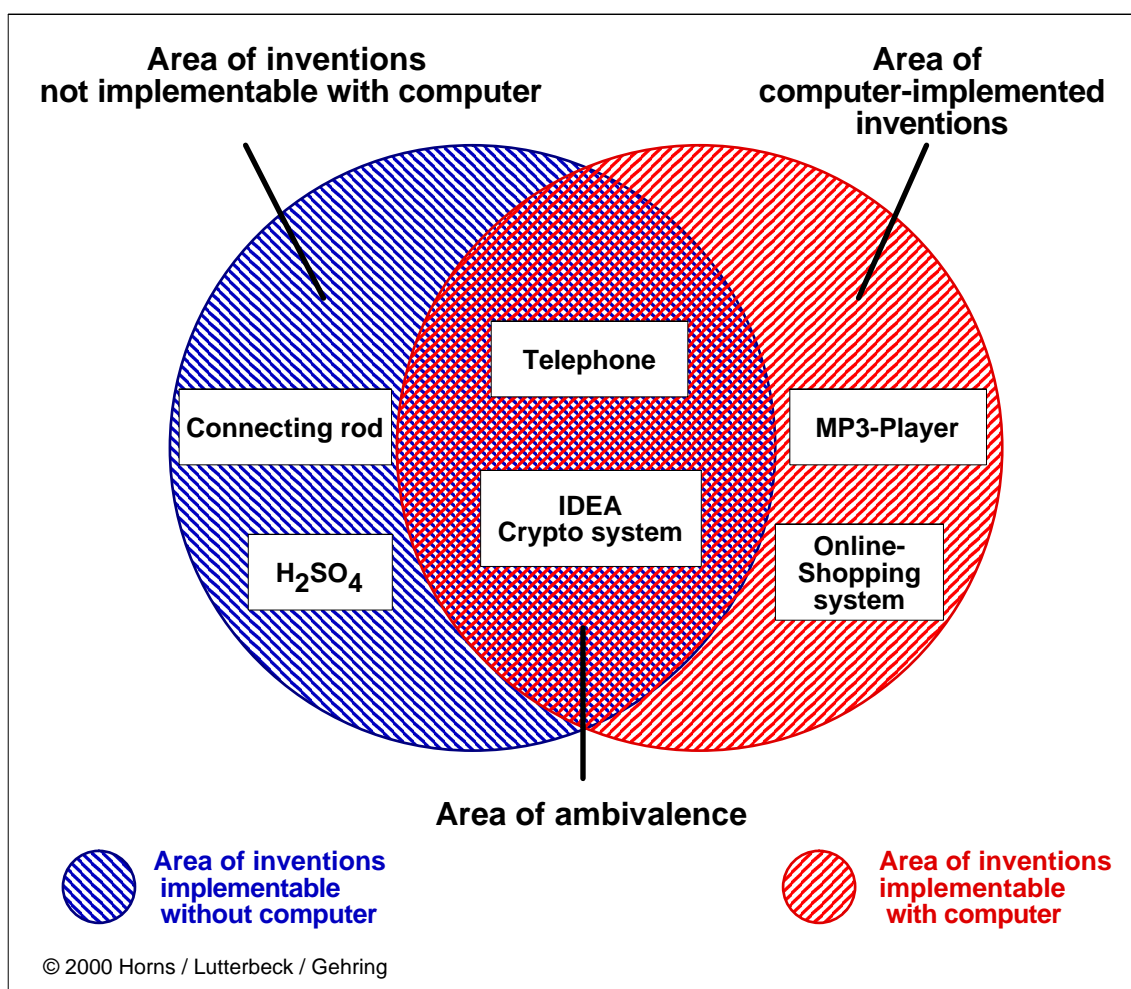
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## Recommendations for Policymakers

### "Software Patents" – a Matter for the History Books?

Some experts estimate the number of software patent approvals in Germany in the year 2000 to be roughly 1200;<sup>1</sup> the Patent Office Director in Washington speaks of 1000 for the United States.<sup>2</sup> It is impossible to judge the accuracy of these figures: there are neither universally recognized statistics for "software patents," nor is there a consensus on how to distinguish software patents from those in other areas. We are thus not able to explain the surprising divergence between the German and American figures.

The following diagram attempts to provide an initial outline of the structure of this technology area:



<sup>1</sup> *Wolfgang Tauchert*, Head of the Data Processing and Information Storage Division at the German Patent Office, cited from **de Paole 2000**.

<sup>2</sup> Including software business-method patents, for which the Patent Office Director gives the figure of 553 for 1999; cited from **Gross 2000**; Additional figures at **Cohen/Lemley 2000 (2001)**, p 14 FN 31.

### Explanation of the Diagram

Following the diction of the EU Commission's paper,<sup>3</sup> we designate the amount symbolized by the circle on the left as patent inventions that can be *implemented without the computer*. By contrast, the circle on the right symbolizes patent inventions that are *implementable with the computer*.

The overlap comprises an *area of ambivalence* that covers patent inventions that can be *implemented either with or without computers*. Examples are inventions for telephones or data encryption equipment that can be designed either exclusively as hardware models or with software components.

The crescent on the left comprises the inventions *implemented exclusively without computers*. An invention to improve a connecting rod would, for example, fall within this area.

The crescent on the right represents patents that require a computer for implementation, the *computer-implemented inventions*. MP3 players, for example, which use the patented MP3 method for compressing sound data, are covered here.

When a patent is conferred, it is the patent claims that best allow us to distinguish the inventions implementable exclusively without computers from those that are computer-implemented.

In the case of the inventions assigned to the overlap, the patent claims on whose basis a given patent was conferred entail both pure hardware solutions as well as software-based approaches. This fuzziness makes it hard to determine clearly whether a given patent is a "software" patent.

The term "software patent" will be applied in this text when discussing contexts in which the word itself is used.

German, European, and American courts have long recognized the protection afforded software patents. The question "Can software be patented?" was thus settled long ago and can now be regarded as «a matter for the history books»<sup>4</sup>.

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<sup>3</sup> The Patentability of Computer-Implemented Inventions. Consultation Paper of the EU's Directorate General for the Internal Market of 19 October 2000 on the Internet at: [http://europa.eu.int/comm/internal\\_market/en/intprop/indprop/soften.pdf](http://europa.eu.int/comm/internal_market/en/intprop/indprop/soften.pdf) (October 24, 2000); on the same day, the Commission published a report on the same topic: **Hart/Holmes/Reid 2000**.

<sup>4</sup> **Cohen/Lemley 2000** (2001), p 1.

But the topic of "software patents" is currently the subject of widespread interest since, despite definition problems, all those involved on both sides of the Atlantic<sup>5</sup> are convinced of the topic's strong practical and economical relevance. In this connection, old arguments and some possibly novel developments have been thrown together and must now be distinguished:

- Well known are the arguments that use economic reasoning either to prove or deny (both in general and in relation to the development of software) the link between patent protection and innovation.<sup>6</sup>  
The responses given to old questions by the growing number of so-called free software developers are possibly new.<sup>7</sup>
- Well known is a specialist public that is working on practical and scientific treatment of the topic.  
Possibly new is the manner in which the Internet is being used to form opinions; this process is occurring without the influence of the specialist public at the initiative of protagonists who are almost never economists or jurists but often technology experts and specialists in the information sciences.<sup>8</sup>
- New and not yet discussed in Germany are the figures on the worldwide occurrence of open-source developers. They show that German developers form the second largest group. On the whole, European developers are predominant. These findings are so noteworthy that they are initially impossible explain using well known economic models.<sup>9</sup>
- Undoubtedly new are arguments offered by IT security experts for open source software.

The latter points in particular focus the present computer-implementable-inventions debate on the core of the matter. It is claimed that the new (Internet) economy stands and falls with the solution of problems in connection with networks' security and

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<sup>5</sup> In October 2000, two members of the U.S. House of Representatives from the Democratic Party introduced a bill aimed against the mushrooming patenting of Internet business models: 106th Congress, 2nd Session, HR5364 "Business Method Patent Improvement Act of 2000" dated October 3, 2000, on the Internet at: <http://www.house.gov/berman/HR5364.pdf> (October 31, 2000); cf. also Representative Berman's statement on the occasion of the bill's introduction, **Berman 2000**.

<sup>6</sup> An economic study of MIT, which denies the alleged connection, is presently under intensive discussion; cf. **Bessen/Maskin 2000**.

<sup>7</sup> There are still no genuinely hard figures. The statistics from the empirical study of **Demsey/Weiss/Jones/Greenberg 1999** are likely to be somewhat reliable. They estimate the number of open-source developers at 250,000 persons worldwide.

<sup>8</sup> German jurists often overlook the fact that the most important license for open-source software was developed by the computer scientist *Richard Stallmann* and not by jurists.

<sup>9</sup> **Glascocock 2000**, on November 1, 2000, was the first to report on the **Demsey/Weiss/Jones/Greenberg 1999** study. Under the caption «Germany Leads In Open-Source Development,» he quoted one of the study's authors with the words «We knew the Germans were really active, but we didn't know how active. We were really knocked out when we saw the Germans were the second largest contributors.»

reliability and the software employed for such purposes. Only software that has been disclosed and may be examined and further developed by anyone who chooses facilitates the achievement of an acceptable security level - this according to these experts.

If this view is accurate, it would appear to be necessary to put even the well known arguments back on the testing platform.<sup>10</sup>

In this Short Expertise, we will not be able to look at the various arguments in the detail that would otherwise be necessary. Our goal is merely to develop plausible arguments for the following recommendations to policymakers. We hope that it will thus be possible to view an old - we are almost tempted to use the word outmoded - topic from a different perspective. We should begin with a more exact approach to speaking about the topic "software patents." In a lengthy essay, two leading American academics in the field of intellectual property hit the nail on the head when they wrote:

*«It is wrong to speak of a commercial program as being "patented" in the same sense that we might say it is "copyrighted". More properly, the software vendor has patents that cover certain inventions contained in the program. Many parts of the program, however, are unpatented.»<sup>11</sup>*

In the political decision on smaller and larger issues, it may be helpful to recall the words of one of the great patent law scholars. Summing up an economic discussion of the patent system, *Fritz Machlup* asserted in 1958:

*«[...] if we did not have a patent system, it would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting one. But since we have had a patent system for a long time, it would be irresponsible, on the basis of our present knowledge, to recommend abolishing it.»<sup>12</sup>*

We propose that the attitude expressed in this statement be adopted for policy today: on the one hand, it is necessary to think beyond the bi-polar commercial patent protection system,<sup>13</sup> for it is a child of the 19th century. On the other hand, it should not

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<sup>10</sup> But *Bruce Schneier's* warning against logical short circuits should not be ignored: «I'm a fan of open source, and believe it has the potential to improve security. But software isn't automatically secure because it is open source, just as it isn't automatically insecure because it is proprietary.» (*Schneier 2000*, p 345). *Schneier* is a worldwide recognised expert on IT security.

<sup>11</sup> *Cohen/Lemley 2000* (2001), p 41.

<sup>12</sup> *Fritz Machlup* quoted from *Kitch 1998* in his passage on "patents," an entry in *Palgrave: Dictionary of Economics and the Law*, 1998.

<sup>13</sup> Since the symposium held at Columbia University in 1994, this insight is no longer in dispute within the academic world in the United States. Cf. *Manifesto 1994* and *Reichman 1994*; similar but more reserved is the report by the National Research Council of 2000, see *Digital Dilemma 2000*. Natürlich stellen sich auch ganz schwierige verfassungsrechtliche Fragen. Extremely difficult

be abandoned overnight - without having any notion of what the result will be. And this is the perspective from which the Berlin essay on "Open Software Patents" was written.<sup>14</sup>

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constitutional issues naturally arise. The Federal Constitutional Court recently treated this matter in detail for the first time, in connection with copyrights; see **Bundesverfassungsgericht 1 BvR 825/98 dated June 29, 2000** [Brecht heirs v. Kiepenheuer & Witsch], on the Internet via: <http://www.bverfg.de> (October 31, 2000).

<sup>14</sup> **Gehring 2000**; in a series of new essays, *Axel H. Horns* introduced contours of modern patent policy; cf. **Horns 2000, Horns 2001**.

## Recommendations

In accordance with international systems and technical standards, we distinguish three types of recommendations.<sup>15</sup>

### Symbols

Various symbols have been placed at the left of each of the recommendations to indicate their classification.

★★★ **Risk (must)**

This recommendation points to the key situations for formulating and enacting patent policy. Care must be taken in implementing this recommendation since problems might otherwise arise and mistakes be made, with the consequence that rash measures could well have serious results.

★★ **Value / Importance (should)**

The recommendation associated with this symbol designates important information of decisive significance for the implementation of patent policy. In all cases, the recommendations described here should be followed.

★ **Indication (desirable)**

This recommendation is subordinate in nature since a higher classification is possible only after corresponding changes in patent policy (or copyright law) have already been implemented and sufficient experience gained with the new practice. We mention it, however, since it must be integrated into the approach to a solution at this early stage so that, after an analysis of the potential of the technical concepts that are aimed for, the risks and outlook may be assessed in detail on the basis of our present knowledge.

## General Recommendations

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<sup>15</sup> We adopt the systematic of the just recently completed project report of the European Academy Bad Neuenahr - Ahrweiler on "Elektronische Signaturen. Kulturelle and moralische Beherrschbarkeit." (**Electronic Signatures. Cultural and Moral Control.**) [Langenbach 2001] Bernd Lutterbeck is one of the authors of the report.

★★★ **GE-1:** Future patent policy must strike an appropriate balance between patent law, copyright law, and above all constitutional law. Overlooking this relationship brings the danger of improper **economic** management of the core of the future information society.

### Reasons:

Knowledge in all of its forms and appearances is the most important resource for the information society's economy. Classic patent and copyright law in some respects **withdraws this resource from the influence of market forces**, a fact that would appear to be appropriate from a social and economic standpoint in view of resource shortages, i.e. knowledge shortage. But the development of an entire knowledge economy, without the self-regulating forces of the market is neither desirable nor possible at present levels of knowledge.

★★★ **GE-2:** The traditional patent system favors large companies. Policymakers must structure the competitive environment to ensure that small and midsize companies have a fair chance of taking part in competition.

### Reasons:

Small and midsize companies can, perhaps, compete in registering patents. But the market follow-up costs and items such as the expense of prolonging patent protection far exceed the possibilities of most affected companies. This is particularly relevant for the Federal Republic, but also for other European Union Member States where software is largely developed by small and midsize companies.

Competition law must ever ensure that a general principle is not forgotten: Those **who prefer to have** patents must prove that such a monopoly is in the overwhelming interest of the public. Open-source companies must not prove that patents obstruct their commercial activities.





**GE-4:** The creative potential in terms of open-source developers in Germany and Europe is a **economical** advantage in the information technology sector and should be protected. Software development in the open-source process takes optimal account of the IT industry's structure in Europe –many small and midsize companies without market leadership, considerable shortage of trained experts– and should be comprehensively supported.

### Reasons:

Present figures on the worldwide distribution of free software developers (cf. note 9) allow us to assume **that in terms of creative developers Germany has a particularly high potential at its disposal**. These persons are embarking on new paths and thus decisively strengthening the competitiveness of the German economy. The figures show, incidentally, that it is wrong to designate this group of persons as "fools," "naive dreamers," or even "anarchists" who want to eliminate the property system. The opposite is true – and, as is often the case, the exception confirms the rule.

The potential that is available in the open-source area should be **encouraged**. Appropriate assistance measures in the public sector could be the:

- goal-oriented integration of open-source processes in IT training at colleges and in vocational training
- creation of the conditions for taking appropriate account of open-source alternatives in software procurement by the public sector, e.g. by adjusting the tender procedures and by the provider-neutral tendering of public contracts
- financial support for pilot projects, and for primer-financing and interim financing of ongoing projects of public interest.

Appropriate assistance measures **in the private sector** could be:

- cooperative, liberal conduct in the exchange of information with open-source developers, for example by publishing product specifications on the Internet
- the establishment of contact points for open-source developers in companies
- the development of suitable briefing information for industry, initiation of an ongoing exchange on the application and development of open-source software
- greater consideration of open standards in the development of new products
- partial financing of open-source projects by several companies.

## Allgemeine Empfehlung zur IT-Sicherheitspolitik

★★★ IT-1: Future (patent) protection for computer-implemented and computer-implementable inventions must take appropriate account of the need for IT security. The economic interest in software whose security can be examined, i.e. open-source software, should not be allowed to be neglected merely by **referencing the needs of the legal system**.

### Reasons:

The more software is used at influential points in the private sector, the more care must be taken in selecting and employing **that** software. The public interest in secure software must take priority over individual software manufacturers' commercial interest in universal patent protection. Patent law's reward mechanism has thus far offered no incentive for developing secure software. But security must be one of the decisive criteria in society's future approach to software.

- The process of open-source software development opens up concrete possibilities for the public and private sectors and for the scientific community to foster the creation of secure software. When systems are designed, the findings of IT security experts can be taken into account from the very outset.
- Well tested concepts such as the principles of orderly data processing as are known from commercial law furnish suitable approaches for security-conscious handling of software and data.
- The open nature characteristic of the software **appears** to be an appropriate instrument to foster public confidence in this basic technology on the road to the information society.
- The fact that the software can be examined forces its manufacturers to take security concepts into greater account when developing their products.
- The comparability of open-source software makes security a **demand-controlled** quality characteristic on the software market. The development of secure software can thus be rewarded through the market mechanism.
- Software whose security can be examined is an essential condition for meeting the needs of modern data protection.

## Recommendations for Patent Policy

★★★ **PP-1:** The use of the source codes of computer programs must be granted privileged status under patent law. The creation, offering, marketing, possession, or introduction of the source code of a computer program in its various forms must be exempt from patent protection (**source code privilege**).

### Reasons:

As the highest and indispensable principle, this recommendation must guide all efforts toward formulating future patent policy. This suggestion sets the proper economic incentives above and beyond the security gains: Diese Empfehlung muss als oberster, schlechthin unverzichtbarer Grundsatz alle Bemühungen um die künftige Patentpolitik leiten. Über den Sicherheitsgewinn hinaus setzt dieser Vorschlag die richtigen ökonomischen Anreize:

- The developers of open-source software avoid the risk of patent infringement.
- The non-commercial users, in the course, for example of private use, may utilize the source codes made available under privileged status by the developers and distributors and are not subject to patent restrictions.

The commercial users are subject to patent restrictions and must seek the approval of the patent holder in order to use the program.

- Software companies are given an incentive to reveal the source code to receive privileged status at least for development and distribution.

★★ **PP-2:** Patent law should make no distinction between conventional patents and software patents. Neither the issuance nor the term of a patent should depend in any way on such differentiation.

### Reasons:

In practice, the potential impact on the software market of patent claims on inventions in the overlap area (see illustration) cannot be clearly determined. There **would be a threat of** considerably legal uncertainty whenever legal consequences are associated with the classification of a patent into the category of "software patents."

★★ **PP-3:** Future patent law should facilitate a collective licensing and enjoyment of rights.

**Reasons:**

In the area of exercising copyrights, it has long been recognized that acts that officially require approval, such as the reproduction or distribution of working copies in certain areas of life, such as the private sphere, could not be controlled or at best only at the expense of excessive law enforcement effort. To solve this problem, companies were created with **the purpose of looking after** third-party rights and **enabling** the collective licensing of copyrights; such companies undertake a collective type of settlement of remuneration, thus relieving both the holder and user of the rights of the need for an individual contract for every single use of the right.

Patent law knows no parallels to this mechanism. **Nowadays in the area of information technology, the decision as to whether a patent license is necessary** no longer depends on the properties of physical products but on the characteristics of a computer program. But **a** computer program can, in fact, be duplicated at no **reasonable** cost and to a nearly unlimited extent – and **lawful** in the case of open-source software. **The problem of adequate flat-rate licensing procedures now also needs to be dealt with from the patent law's point of view.** [Original: The problems associated with licensing rights thus override the contingencies of patent law in procedures involving mass elements.]

★★ **PP-4:** The Council directive on legal protection for computer programs (91/250 EEC of May 14, 1991) should be amended to provide general approval for reverse engineering of software, in particular decompilation.

**Reasons:**

The present general prohibition of decompilation is **harmful**.

- It is an anachronism when the party that fails to disclose the source code is rewarded with a twofold privilege under patent law:

- On the one hand, the ideas and principles built into the code are not accessible to the public, making a patenting of these ideas and principles possible even when the object or binary code is already generally available.
- On the other hand, the patent holder who attempts to prove a patent violation by decompilation must expect immediate counter claims from the violator as the result of the decompilation prohibition under copyright law.
- The present prohibition of decompilation prevents an effective review of the security of software marketed as binary code. Only by reverse engineering can adequate account be taken of the public interest in information technology security (see recommendation IT-1).

★★ **PP-5:** A 12 month novelty grace period should be (re)introduced into patent law.

### Reasons:

An inventor who receives patent protection for his invention within the scope of the European patent agreement is forced to keep the invention secret from the public until he submits the patent application to the patent office.

Such a secrecy obligation is not compatible with the ethics and practice of many open-source software developers. The process of software development in the open-source area is regularly conducted in open working groups formed on the Internet. Patentability is thus doomed **from the beginning of development process on** – at least in Germany and Europe, although not in the United States.

If the fostering of patent activities by the protagonists active in the open-source area is deemed beneficial, the developers must be given the possibility of keeping their inventions in a patentable **state** without departing from **the open nature of their development process**. The introduction of an innovation grace period would seem to be indispensable for this purpose.

★★ **PP-6:** The German Patent and Trademark Office should make disclosure and printed patent specifications available free of charge for inspection on the Internet. The same applies for the content of official **files** and other relevant information.

## Reasons:

**Internet** access to patent information should be simple, complete, and free of charge:

- **By paying the registration fee, the patent applicants have already payed an remuneration** for publication of the application and the printed patent specification. Under these circumstances, free publication in the Internet is an appropriate *quid pro quo*.
- Free-of-charge access to patent information eliminates an **outdated** barrier for informing the public about **the state-of-the-art in** technical development. Small and midsize companies, as well as open-source developers would not longer be **dis-advantaged** by **prohibitively high** information procurement costs.

★ **PP-7:** It is desirable to create an institution that operates a public digital time stamping service –as outlined in the Digital Signature Act– for **the source code** of open-source software.

## Reasons:

The certificate, which includes the time of issuance and is equipped with a digital signature later can be used by parties filing objections or **trying to invalidate other's claims** to prove that the source code was publicly accessible for a certain period of time. This provides infrastructural help in averting harmful effects of unjustified patents.

★ **PP-8:** It is desirable for the federal government to work to ensure that the **source code privilege** called for in recommendation **PP-2** is also introduced internationally.

## Reasons:

**In the case that** computer software is distributed via the Internet, difficult problems arise in terms of the law to be applied when **a download** is possible in a **multitude** of countries in which patents have been registered on computer-implementable inventions. **In the age of the Internet economy**, the broad international introduction of a source-code privilege under patent law should be aimed for in order to rule out national differences in the application of law and **thus to guarantee** legal security.

By agreement at the WIPO level during the upcoming consultations in the framework of the WIPO Standing Committee on the Law of Patents, a solution to these problems would in principle be possible.

## Recommendations for the Scientific **Investigation** of the Topic

- ★ **WI-1:** Studies to determine the interaction between patent protection and interoperability are desirable.

### Reasons:

In copyright law for computer programs, the general prohibition of decompilation has been **superseded** in certain cases **with respect to the needs of** interoperability\*. This desired effect, however, can be prevented by **application of** patent law, thus creating considerable market-access barriers. **The economic impact of such measures extends** far beyond the actual object of patent protection.

The difficult weighting of the interests of the patent holder against the interoperability interests of the software developers and users **requires** a macro-economic understanding of the structures in developed information societies; such understanding, however, is not yet available.

The compulsory license **as known from** copyright law possibly offers a suitable approach to a solution that would **recognise the** public interest in interoperability. This possibility must be examined.

- ★ **WI-2:** Disputes over patent policy suffer from the fact that the respective positions are almost never empirically supported. And there are no serious data on the new software markets. A scientific study of the influence of patents on software development and the development of the economy in general would therefore be desirable.

### Reasons:

Decisions should be made on the pros and cons of software patents only on the basis of sound macro-economic data. This thought is not yet very widespread in

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\* Interoperability is a program's ability in terms of a mutual exchange and use of information.

Germany, unlike the United States. The unsatisfactory data situation forces us to fall back on American studies in many cases.

It would be desirable to **stimulate** studies that do not treat the problems in a one-sided manner – whether this be from a legal, a mere technical, or a purely economic viewpoint.

★ **WI-3:** According to the present state of our knowledge, overwhelming grounds support the assumption **that software available as source code** decisively improves security in information technology. It would be desirable to study the relationship claimed by computer science experts more closely.

### Reasons:

Looking at patent law from the perspective of information technology security leads to questions that have almost nowhere been investigated.

Studies from the following areas should be fostered:

- What instruments of patent law can we expect to contribute to the further **[market-driven]** development of data protection? Data protection in its modern form is no longer feasible without a high level of information technology security.
- According to today's state of knowledge, real success in e-commerce particularly depends on the creation of reliable forms of communication. These often will make use of digital signatures. It is to be doubted whether the signature procedure, whose source code has not been disclosed, will create the confidence needed in business transactions.



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