1. Introduction: can’t we do it without patents?

Why should a start-up concern itself with intellectual property (IP)?

Here’s what we know: not all start-ups depend on IP protection; but many start-ups can fail if IP protection is not handled properly.

The importance of IP to a start-up depends on a number of factors, which are discussed in more detail in this chapter. One thing is certain, however: investors will want to know whether IP is a priority for a start-up in which they are considering investing. They will want to know whether everything has been done to ensure the economic value of the start-up and to minimize the risk to their investment through good and sustainable IP work.

Otherwise, a start-up may find itself in a difficult situation, as the following examples illustrate:

- The technology that is used is protected by a third-party patent.
- The start-up has acquired a licence to a third-party patent on which it depends, but the negotiated terms are unfavourable or the licence is endangered by the possible insolvency of the patent holder.
- The start-up develops a new technology, but fails to protect it. Financially strong competitors then copy the new technology and enter the market without the start-up’s involvement.
- The start-up’s chosen name or product name is already protected by
2 INTELLECTUAL PROPERTY STRATEGIES FOR START-UPS

A service offered by the start-up depends on data which may not be readily used (e.g., due to copyright or data protection laws).

You can avoid such problems by acting early enough and identifying which IP-related measures are absolutely necessary for your company – and which would at least be beneficial.

2. Types of IP

The following overview outlines the types of IP rights that exist, what each of them protects and which aspects require particular attention. We will then explore the details of:

- how to protect your own IP; and
- how to avoid infringing the IP rights of others.

This book is intended for persons with little prior knowledge of IP rights. For this reason, the following section attempts to explain the basics in a way that will be easily understandable to laypersons. The text aims to increase awareness of the protection of IP and to encourage vigilance. If you get the impression that action is required at your company regarding the protection of IP, it may be advisable to consult a patent attorney. Patent attorneys combine technical understanding (in many jurisdictions, qualification as a patent attorney requires the completion of a technical degree) with knowledge of the legal requirements and options. To provide comprehensive advice, your patent attorney should also understand how your business model works.

2.1 The main categories of IP rights

This book deals with the subset of IP that is relevant to commercial enterprises – also referred to as ‘industrial property’. Typical relevant IP rights include patents, utility models, industrial designs and trademarks. Copyright is not usually regarded as an industrial property right; but for the purposes of this book, it may be treated as such, as only certain aspects of copyright of particular importance to start-ups are discussed.
Table 1.1 outlines the most important types of IP rights. The various IP rights are explained below using the example of international and national IP rights in Europe (with Germany serving as an illustration). An introduction to the extension of protection to other countries (within or outside Europe), and to the development of a region-specific protection strategy, is set out in Chapter 3, section 7.

2.2 Patents

The European Patent Convention states as follows:

<table>
<thead>
<tr>
<th>Patent</th>
<th>Utility model</th>
<th>Design</th>
<th>Trademark</th>
<th>Copyright</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protects technical inventions</td>
<td>Protects technical inventions</td>
<td>Protects external appearances</td>
<td>Protects names, graphics and the like</td>
<td>Protects works of art, including software</td>
</tr>
<tr>
<td>Protection obtained by filing with an IP office</td>
<td>Protection obtained by filing with an IP office</td>
<td>Protection obtained by filing with an IP office</td>
<td>Protection obtained by filing with an IP office</td>
<td>Protection obtained by law – no filing required</td>
</tr>
<tr>
<td>Formal and substantive examination</td>
<td>Formal examination only</td>
<td>Formal inspection only</td>
<td>Formal and substantive examination</td>
<td></td>
</tr>
<tr>
<td>Term of up to 20 years</td>
<td>Term of up to ten years</td>
<td>Term of up to 25 years</td>
<td>Renewable indefinitely</td>
<td>Expires 70 years after the death of the last co-author</td>
</tr>
<tr>
<td>European Patent Office (EPO), national patent offices</td>
<td>Certain national patent offices</td>
<td>European Union Intellectual Property Office (EUIPO), national patent offices</td>
<td>EUIPO, national patent offices</td>
<td></td>
</tr>
</tbody>
</table>
Article 52

(1) European patents shall be granted for inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application …

Article 54

(1) An invention shall be considered to be new if it does not form part of the state of the art.
(2) The state of the art shall be held to comprise everything made available to the public by means of a written or oral description, by use, or in any other way, before the date of filing of the European patent application …

Article 56

(1) An invention shall be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art …

Section 1(1) of the German Patent Act and many other national patent acts of EU states mirror this language almost verbatim. Patents protect new technical inventions – for example, new products or improvements to products, as well as new processes. What is protected is specified in the patent claims by a definition in text form.

To obtain a patent, a patent application must first be filed with, and examined by, a patent office. During examination, the invention is compared with the prior art in the form of patents, technical articles and other information known to the public. A patent application may be filed with any national patent office in order to obtain protection for that country. Alternatively, in member states of the EPC, it is possible to submit a European patent application to the European Patent Office (EPO). Member states of the EPC include all member states of the European Union and certain other countries, including the United Kingdom, Switzerland, Norway and Turkey. A European patent filed with the EPO is not (necessarily) a unitary international protection right. A European patent application should be understood as a unified path to obtaining a set of national patents subject to the respective national regulations. However, a unitary EU patent conferring the same rights in all EU states
has been a longstanding goal, and the legal basis for such a right may enter into force in the near future (although some hurdles remain to be cleared).

The minimum official fees for an online application, examination and grant of a patent amount to €390 in Germany and €4745 at the EPO.\(^1\)

Once the patent has been granted, renewal fees are payable annually, which in Germany start at €70 per year for the third patent year and increase annually to €350 for the 10th patent year and €1940 for the 20th year, with a maximum possible lifetime of 20 years. In the case of a European patent, renewal fees after grant are due for each country in which protection is maintained and are payable to the respective national patent offices.

### 2.3 Utility models

In some countries (eg, Spain, Italy, Austria, China, Japan and Germany), utility models are in a certain sense ‘small patents’ (the application fee for electronic filing is just €30), which also protect technical inventions. German utility model protection is available for all fields of technology for which patent protection is also possible, with the exception of processes (ie, protection is available only for embodied objects). To obtain a utility model, an application must also be filed with the patent office; but this is examined only for formal requirements, and not for content. Unlike in the case of a patent, the inventor need not be named. A utility model is usually registered without further substantive examination, affording immediate protection. A utility model is cheaper to obtain and maintain than a patent; but it can only be kept alive for a maximum of ten years by paying annuities (€210 after three years, €350 after six years and €530 after eight years). Furthermore, the protectability of a utility model in terms of its subject matter is examined (by either the patent office or a court) only if the utility model is cited in legal proceedings against a competitor or tested in cancellation proceedings. In the meantime, the owner (and the competition) face a certain degree of uncertainty as to the validity of the IP right.

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\(^1\) All fees referenced in this chapter were effective as of 31 October 2021.
2.4 Design rights

The Community Design Regulation of the European Union states as follows:

Article 3

For the purposes of this Regulation

(a) “design” means the appearance of a whole or a part of a product resulting from the features of, in particular, the lines, contours, colours, shape, texture and/or materials of the product itself or its ornamentation ...

Article 4

1. A design shall be protected by a Community design to the extent that is new and has individual character ...

Article 6

1. A design shall be considered to have individual character if the overall impression it produces on the informed user differs from the overall impression produced on such a user by any design which has been made available to the public …

2. When assessing individual character, the degree of freedom of the designer in developing the design shall be taken into account.

A design right, such as the EU Community design and comparable national rights, protects a performance that manifests itself in the external appearance of an object. Unlike the European patent in its current form, the Community design is a unitary right – that is, it confers the same protection in all EU member states (please note that design protection in the United Kingdom can no longer be obtained by registering a Community design). To obtain a registered design, an application must include formally correct illustrations. These are only formally examined by the office. As with the utility model, the protectability of the design is examined only in the event of a dispute. The protection is comparatively inexpensive: the official electronic application fees for a single German design amount to €60; while registration and publication of a Community design with the European Union Intellectual Property Office (EUIPO) cost €350. In both cases, the renewal fees due every five years from the sixth year of protection increase from €90 to €180.
2.5 Trademarks

The EU Trademark Regulation states as follows:

Article 4

An EU trade mark may consist of any signs, in particular words, including personal names, or designs, letters, numerals, colours, the shape of goods or of the packaging of goods, or sounds, provided that such signs are capable of:

(a) distinguishing the goods or services of one undertaking from those of other undertakings; and
(b) being represented on the Register of European Union trade marks (‘the Register’), in a manner which enables the competent authorities and the public to determine the clear and precise subject matter of the protection afforded to its proprietor.

A trademark protects a sign which identifies to the relevant class of persons that the marked goods or services originated from a particular undertaking/enterprise. Trademarks can in most cases be represented graphically; but protection can also extend to names without limitation to a specific graphic representation. In addition, trademark protection is possible for sound signs, the shape of goods or their packaging and other perceptible forms. A trademark is registered by filing a trademark application with the EUIPO or a national patent office, such as the German Patent and Trademark Office (DPMA) (please note that trademark protection in the United Kingdom can no longer be obtained by filing a Community trademark). Before doing so, however, it is first examined whether the trademark is fundamentally eligible for registration – that is, whether it is suitable for the public to understand it as an indication of origin. The protection is comparatively inexpensive: the official costs of an EU trademark application (in digital format) amount to €850 and the renewal fee due every ten years is €850 (compared with a €290 application fee and €750 renewal fee for German trademarks).

2.6 Copyright

EU Directive 2009/24/EC requires all member states to protect computer programs under national copyright law. For instance, the German Copyright Act states as follows:
Section 69a(3)

1. Computer programs are protected if they constitute individual works in the sense that they are the result of the author’s own intellectual creation.
2. No other criteria, in particular no qualitative or aesthetic criteria, shall be applied to determine their protectability.

In principle, copyright law protects artistic achievements, but protectability also extends to software to the extent that it is represented by a program code (source code). In order to obtain protection, it is not necessary to apply for copyright registration or deposit the code. However, in the event of a dispute, it must be proven that the rights holder created the code itself or holds rights of use; and that in the case of a copy, this first legally substantiated code served directly as a model. The ideas and principles that underlie a computer program (cf Section 69a(2) of the German Copyright Act) are not protected by copyright. However, their application can in many cases be protected by patents.

3. **Ways to protect your IP**

It’s a nightmare for any start-up: a product has just been successfully launched on the market after intensive development work, when it turns out that a competitor is offering a very similar product. Or perhaps a foreign company that you have never heard of quickly adopts the solutions you have developed and offers copies of your product.

These scenarios will reveal whether your start-up is in good shape IP-wise. If protection measures were considered in good time, in many cases it will be easy to take action against copies with the help of protective rights. At the very least, you will be prepared for these scenarios and know your options.

The following sections outline good practices aimed at securing the best possible protection for your innovative solutions.

3.1 **Inventory: what is already there?**

The resources of a start-up are naturally scarce. Therefore, before thinking about what can be protected, it is worth taking stock of your existing
legal assets. Many may already exist and may thus be available at no extra cost.

Start-ups usually have a history. Often, the founders will already have been professionally active in the relevant field and will have collected ideas along the way. In many cases, a start-up emerges from activities at a university or research institute; in this event, it is possible that patent applications may already have been filed for the technical developments on which the start-up is based. The founders must clarify whether they are allowed to take the resulting patents with them, or at least to use them. Many universities greatly appreciate it when their research activities give rise to business opportunities that lead to spin-offs. Therefore, in many cases, the founders can hope for some support from the university. On the other hand, the university may want a stake in the business or to benefit from its financial success. It is therefore to be expected that either paid licences will have to be acquired for the patents or the patents will have to be bought from the university. This subject is discussed in detail in Chapter 4.

It is highly recommended that the start-up acquire the IP rights, if possible, in order to be able to use them freely. It is also desirable that any payments (eg, royalties) or profit-sharing due to the university in the event of economic success either be avoided altogether or at least be made manageable for investors.

Care should be taken where the founders develop their ideas while still working for a company as employees, even if no patent applications have been filed. In such cases, if the ideas developed contain technical inventions, it should be examined whether they legally belong to the former employer (see Chapter 3). If so, it is essential to find a legal solution with the former employer before the start-up takes off.

In some cases, software may have been programmed on an experimental basis before the start-up was founded. If so, the copyright may already be owned by the founders and should be entered on the credit side of the balance sheet. It is not absolutely necessary, but conceivable as a cost-effective option, to deposit the software with a notary as proof of the existence of the software and when it was created.
In many cases, open source software (OSS) may make economic sense, as it significantly reduces development time and powerful software libraries are available. On the other hand, the resulting programs will be very difficult to protect. It is in the interests of open source projects to make the resulting software available to the public. However, there are ways to keep the results of one’s own programming efforts proprietary, and avoid the so-called ‘copyleft’ effect of open source licences, if the proprietary software can be sufficiently separated from the OSS in one’s own product or if OSS is not used at all.

Perhaps a domain name has already been registered. This can be done with minimal financial effort and, in addition to direct ownership of the domain, can serve as a good starting point for the later registration of a trademark. For example, the future name of the company or a product can be protected in this way.

The founders may already be in possession of trade secrets on which they wish to build their business. Trade secrets are protected by national law in accordance with Directive (EU) 2016/943, provided that appropriate safeguards have been put in place (see also section 3.5.4). This protection is helpful, for example, if the trade secrets are unlawfully disclosed to a third party which uses them commercially. However, a trade secret provides no control over a situation where a third party independently develops and uses the relevant information.

An initial stocktake of your own IP helps to identify existing assets and weaknesses and forms the starting point for an IP strategy.

3.2 What does your business model look like?

The founders of start-ups no doubt appreciate that a mere idea or even a technical solution does not yet constitute a business model. By definition, a business model describes the logical functioning of a company and, in particular, the specific way in which it generates profit (see Morris et al 2012). ‘Fundamentally, the description of business models should help to understand, analyse and communicate the key factors of a company’s success or failure’ (see Business Model nd).

In particular, the key factors of business success should be examined to see whether they can be reserved or monopolized for the start-up. It is
not unusual for the business model to change during the development phase, or for another model to be chosen or added. Therefore, it should be clarified at the outset which alternative business models may potentially be viable, in order to consider them for possible protection. After all, competitors operating under different conditions may also try to compete with the start-up with a modified business model.

In some cases, it may even be worthwhile to adapt the business model to what is protectable for the start-up: if a claim can be staked using an IP right, it can later be used to ‘dig for gold’ – that is, to implement your business model in a protected manner. In some cases, this can be more promising than digging in another area alongside many competitors.

One key factor of success, which is sought after by many investors, is the scalability of the business model – in particular, the ability of the business to expand and grow its revenue with good operational cost efficiency. Scalability can and should be supported by a well-thought-out IP strategy.

Let us assume that you want to set up an online ordering and delivery service for food. This is not a completely new idea and you will probably struggle to find an aspect for which your start-up could obtain IP protection in this context. But you might consider asking users who place orders about the size of their households and the age of household members; on the basis of an order, you can thus calculate and indicate the ‘lifespan’ of the delivery – that is, how many calories the order contains and for how many days, if any, these will be sufficient. You can also take into account the shelf life of the food and give an estimate of whether it will be reasonably consumed before the expiry date. These calculations could give you a unique selling point, which you could try to protect with a patent (ie, the way in which the data is determined) or a design (eg, if results are displayed using a special traffic light design, with red indicating that too much has been purchased).

Finally, you should also consider whether the same business model will be adopted in all regions or countries in which your start-up wishes to operate. The protection that you can generate through IP rights is in most cases country-specific – that is, a separate IP right must be generated and paid for in each country. On the one hand, it can make sense – in the interest of scalability – to structure the business model in such a way that it is as homogeneous as possible and functions in the same way in many
countries. On the other hand, this can be difficult due to legal and social conditions, so regional adjustments may be necessary. Careful consideration should be given to selecting the countries in which it makes sense to acquire protection and to whether it is necessary to tailor protection specifically to individual countries. This is discussed in more detail in section 3.7.

The influence of different business models on available protection options is explained in more detail in Chapter 2, using further examples.

3.3 What can be protected?

3.3.1 Patentable inventions

Below is a list of items that may be patentable or may indicate patentable inventions. The list is neither comprehensive nor free from overlap; it is merely intended to give you a general idea of the types of subject matter that may potentially be patentable:

- Embodied objects:
  - mechanical constructions;
  - electrical and electronic circuits;
  - new arrangements of known components;
  - measuring circuits;
  - control circuits;
  - devices for data collection;
  - devices for image generation and speech processing;
  - data storage devices;
  - devices for data transport and communication;
  - materials, alloys; and
  - active ingredients, pharmaceuticals and molecules.

- Processes/methods:
  - methods with a new sequence of known steps;
  - manufacturing processes;
  - new operating procedures for known or new devices;
  - measurement procedures;
  - control methods;
  - methods for collecting, determining, analysing or processing data (under certain conditions); and
  - methods for the storage, output, representation or transport/communication of data (under certain conditions).
The conditions under which patents are actually granted are very complicated, fill entire patent law commentaries and cannot be explained exhaustively here. For a more reliable assessment or to elaborate on an invention, it is thus advisable to discuss the matter with a patent attorney in each individual case.

In some cases, where the items listed above are not protectable themselves, it is often possible to identify a protectable invention in connection with other components. This is especially true for inventions that are reflected in software. Although under the EPC and national patent acts, computer programs are not protectable *per se*, applications or computer-implementable processes containing a technical aspect may be protectable (cf Articles 52(2)(c) and (3) of the EPC).

Below are two examples of new application software that has been created as the basis for a business model, in an attempt to sound out useful protection options.

**Example 1**

**Software/computer-implementable method**

In a procedure performed by a computer, various icons arranged on the graphical user interface are rearranged on the screen according to a selectable prioritisation. For this purpose, the computer records or determines for a certain period the amount of processor capacity that the individual programs have used. The icons are then arranged, for example, according to the order of used capacity, with distance increasing from the start or home button.

This process may be patentable in principle if formulated correctly. In a further step, the patent office will still examine whether an identical or similar process is already known from the literature (ie, examination as to novelty and inventive step).
Example 2

Artificial Intelligence

In examining patentability, it is important to determine whether a so-called ‘technical contribution’ within the meaning of the Patent Act can be identified. In many cases, this is also the case when using artificial intelligence (AI). The European Patent Office’s 2019 examination guidelines on AI provide as follows (EPO 2019):

Artificial intelligence and machine learning find applications in various fields of technology. For example, the use of a neural network in a heart-monitoring apparatus for the purpose of identifying irregular heartbeats makes a technical contribution. The classification of digital images, videos, audio or speech signals based on low-level features (e.g., edges or pixel attributes for images) are further typical technical applications of classification algorithms... Where a classification method serves a technical purpose, the steps of generating the training set and training the classifier may also contribute to the technical character of the invention if they support achieving that technical purpose.

Applications for patents on AI are increasing, particularly in jurisdictions such as China.

3.3.2 Identification of protection options

Particularly in the case of innovative business models and start-ups with highly flexible work processes, the identification of new and protectable units can be difficult.

In the classic so-called ‘waterfall’ process of product development, which is applied in established companies, innovation runs in regulated – but also strictly limited – paths. In each case, a product is analysed in its current state; possible customer needs are then identified; and finally technical problems are solved or additional functions added by means of targeted development. Potentially patentable improvements can often be identified relatively easily. It is often a good idea simply to compare the existing product with the new product and go through the technical changes in search of inventions.
However, this procedure is not possible for completely new products and services, as is often the case with start-ups. That said, this allows for innovations to be designed or tailored at one’s own discretion and according to the protection requirements. This requires significant experience in dealing with innovations and protection options.

The following questions can be helpful in identifying protectable ideas:

- Who is the customer/purchaser/user of the product?
- Are several potential customer groups relevant?
- What benefits/advantages does the customer/various customer groups derive from the product?
- Through which (especially technical) measures is the benefit/advantage achieved?
- Is the benefit achieved through a single measure or through several interacting measures?
- Can a partial benefit already be achieved through a subset of the measures?
- Is a known problem solved in a new way?
- Is a technical or non-technical problem solved that did not previously occur or that was previously unknown?
- Are one or more of the measures to solve the problem of a technical nature?
- Can blocking one or more of the measures prevent the product from being used effectively by the customer?
- Are there other conceivable solutions or modifications of individual measures to solve the problem?

Examples of business ideas and the development of protection strategies are presented in Chapter 2.

3.4 Against whom and against which actions should protection be directed?

To answer this question, one should consider the scenario of a functioning business model and identify who the start-up would compete or cooperate with in this situation and who would be potential users of the product offered.

In most cases, IP rights entitle the owner to prohibit third parties from using them or to offer a licence in return for compensation.
According to Section 9 of the German Patent Act, a patent gives the holder the right to prohibit any third party from:

- manufacturing, offering, putting in circulation or using a product which is the subject matter of the patent, or either importing or possessing it for such purposes;
- using a process which is the subject matter of the patent or, if the third party knows or it is obvious under the circumstances that the use of the method is prohibited without the consent of the patent holder, offering it for use within the scope of the law; or
- offering, putting in circulation or using a product directly produced by a method which is the subject matter of the patent, or either importing or possessing it for such purposes.

However, the devil is often in the detail. A possible trap for patent protection – for example, for Internet or cloud-based services – is that only certain procedural steps of a patent claim are carried out by the end user; while other steps are carried out by a provider, platform operator or database operator. Only clever formulation of a patent can succeed in identifying a single person or company to which all steps of the patented process can be attributed.

Another potential problem is that not all method steps may be carried out within the territorial scope of the patent. If such cases are anticipated in good time, problems can often be avoided through the appropriate selection and formulation of the features to be protected.

The following rules are important when assessing the content of patent protection:

- The substantive protection is determined by the (granted) patent claims.
- The fewer features that the claims contain (ie, the fewer ‘limitations’ there are), the wider the scope of protection.
- Also of interest are several ‘independent claims’ of the same or different categories (eg, device, method).
- Similar protection options exist worldwide for most areas of technology.

There are, however, country-specific restrictions on protection, especially in the case of computer-implementable inventions and medical proce-
BASICS OF INTELLECTUAL PROPERTY RIGHTS

3.5 Resources and consultants

3.5.1 Budget

It makes sense for a start-up to establish a budget for IP rights and IP protection as early as possible. It is very difficult to make general statements about a reasonable amount that should be invested in IP. Large companies in innovative industries often have IP budgets that are linked, as a percentage, to total R&D spending. The IP budget of a start-up can vary considerably depending on the technology, size of product range, product maturity and environment.

Funds must be spent not only on applications for new patents (i.e., official fees and patent attorney fees), but also on ‘prosecution’ – that is, the ongoing examination procedures at the patent offices. In these procedures, the prior art identified by the patent offices is analysed in the form of documents and compared with the relevant invention. Differences are discussed and reasons for and against a lack of novelty or lack of inventiveness of the claimed invention are exchanged.

It may be useful to file as few patent applications as possible, with each containing a plurality of ideas. Admittedly, this is not what the patent offices are looking for – which is why they will often object to such applications for lack of ‘unity’. However, a good patent attorney can still take advantage of this by dividing the application into several ‘divisional applications’ at a later date, if necessary, which can be pursued separately. For this purpose, separate fees must be paid to the patent office at the time of division; but this can be deferred into the future. This may fit into the financial planning of a start-up – for example, if a financing round or an exit is anticipated (see also section 3.6). A strong investor may still be able to develop a comprehensive patent portfolio from this.

3.5.2 Patent attorney

Patent filings and representation in the examination procedure before the EPO, the United States Patent and Trademark Office (USPTO),...
the United Kingdom Intellectual Property Office or the DPMA can be formally handled by the inventor or an authorised in-house person. However, it is usually helpful to hire a patent attorney who can draw on his experience in order to avoid any gaps in protection and achieve the broadest possible scope of protection by correctly formulating the patent claims. Since the protection depends as much on the wording of the patent claim as on the invention itself, much can be gained from a professional formulation. Even an ingenious invention must be perfectly defined in words; it cannot defend itself!

But remember: the patent attorney will usually be a stranger to the company. He will know only what he is told about the invention, the potential opportunities and risks, and the successes and challenges of the company. It takes time to keep the patent attorney updated and informed. However, if you involve him throughout the process on an ongoing basis, he can achieve the best possible protection for your company, adapted to your respective situation.

3.5.3 Patent workshops

Boring afternoons with no meaningful tasks are a rarity at start-ups! Employees seldom have the time (or the priority) to check for new developments at the company to see which might be suitable subject matter for a patent application. Moreover, it is not always easy to identify the most valuable ideas.

Therefore, it is both helpful and efficient to schedule half an afternoon (or longer) for a patent workshop from time to time. This is a well-known method of identifying the good ideas that have recently been developed and/or outlining initial ideas for solving tasks that lie ahead. When several ideas are considered together, it is also easier to compare them in terms of quality and to prioritize which should be selected for patent applications.

As part of this process, it is helpful to consult an independent person who can also lead the workshop. That person could be, for example, an innovation manager of the company, an external consultant or an experienced patent attorney.

Various methods can be adopted for the workshop, in terms of how best to search for and evaluate new ideas. Group work is generally recom-
mended, in order to generate momentum in the discussion. As the focus of the workshop is not the resolution of technical problems, but rather a search for protectable subject matter, the usual workshop methods should be modified accordingly. In doing so, the focus should be directed both to solutions that have already been realized and to challenges lying ahead. This is because not only concrete solutions, but also solution concepts at the drafting stage may be protectable.

A good starting point is often to analyse the characteristics of the planned product or service which will ultimately be appreciated by the end customer or which represent value. Another suitable starting point is to analyse a few exemplary patents of competitors in the same field of the business (eg, what do they do differently? Why? What can be protected?).

**3.5.3.1 SAILS method**

The SAILS method examines recognizable innovations to see whether they fall within the following categories:

- Standards: Are new standards set or existing standards met?
- Architecture of the system: Is it about an overall structure?
- Integration of components: Will existing elements be integrated into other elements in the course of the new development?
- Linkages of components: Are elements connected/coupled in a new way?
- Substitutions: Are elements replaced?

By discussing the above questions, protectable aspects can easily be identified in the workshop.

**3.5.3.2 Diamond structure**

In another possible workshop format, the diamond structure set out in Figure 1.1 is used systematically.

**3.5.3.3 Layer model**

In many other cases, the analysis and search for protectable objects in start-ups can be based on the following layer model (from bottom to top):

- Digital services;
- Data analysis;
- Connectivity;
- Sensors/actuators; and
- Product.

The treatment of inventions is often simplest at the lowest level, in the case of a technical product (hardware) which physically exists. The second level – the provision of sensors or actuators – can also still be treated through classical means; as can the third level, connectivity, which deals with data preparation and data transport or communication. Here, for example, communication protocols, transmission and reception processes and data transport paths play a role.

For the two upper layers – data analysis and digital services – the task of identifying patentable technical inventions is the most difficult. Various sub-processes or aspects can be extracted from the overall process, suitably delimited and defined; but this process requires keen insight into the approach of patent examiners to examination. Even if you feel that you can identify a patentable idea, a patent attorney will still try to identify alternatives, generalize concrete steps and find out a lot of information that should be disclosed in a patent application, should the solution to be protected need to be further narrowed down during the examination procedure.

In data analysis, methods of AI or methods for structuring and providing data suitable for analysis may be eligible for protection.
One potential problem with digital services is that intensive interaction with the customer may be required to provide the digital service. This means that the entire process is realized through cooperation between the provider and the customer. Therefore, in many cases, it may be useful to check the process steps undertaken by the provider and those undertaken by the customer separately for possible protectability.

### 3.5.3.4 ‘Scrum process’ in agile development

In traditional development processes utilized at well-established companies, process milestones are usually based on certain things that must be worked through; and the issue of protectable ideas can be linked to this. However, start-ups do not normally have such processes in place. For example, many work with ‘agile’ processes, rely on self-organization of teams and structure development work in ‘sprints’. Employees are under immense time pressure and everything that does not directly serve the achievement of the development goal is pushed aside.

It is then the responsibility of management to create room to discuss protectable inventions. Ideally, this should happen at the end of a sprint, when the achievement of objectives is discussed. It may also be useful to put an ‘IP hat’ on an employee during the sprint, so that he stays on the lookout for possible inventions.

### 3.5.4 Trade secrets

In certain cases, instead of filing a patent application, it may make sense to keep developed technology secret if it is not immediately recognizable from the product or service. To this end, the first step is to determine what the valuable ‘secret’ is; while the second is to ensure its actual secrecy – that is, to actively prevent the technology from being made accessible to outsiders. These are the basic criteria that must be met to qualify as a trade secret.

It also makes sense to make the technology a trade secret in a formal sense. To this end, it is necessary to take relevant concrete measures to ensure its secrecy in accordance with Directive (EU) 2016/943 of the European Parliament and of the Council of 8 June 2016 on the protection of confidential know-how and confidential business information (trade secrets) against unlawful acquisition, use and disclosure, and its implementation.
into national law. These measures should be well documented should it subsequently become necessary to invoke the trade secret. To do so, it is recommended to use a company-owned IT network; train your employees on the subject of confidentiality; and draw up proper documentation. This is the only way to ensure that an unlawfully ‘leaked’ trade secret can be traced and a third party can be prohibited from using it. This also applies, for example, where cooperation partners or the start-up’s own employees take secrets with them when they move to a new employer.

3.6 Timescales, financing rounds and exit

The timescales for the examination of patent applications are often frightening for start-ups, as it can take several years before a patent is granted. However, this can also have its advantages. Once the initial costs of a patent application have been paid, peace and quiet is restored for a while. During this time, all rights are reserved as a result of the filing, on the one hand; and almost no further costs arise, on the other.

It is important for the start-up to synchronize the ‘patent track’ with its broader schedule. Essentially, most start-ups are keen to defer costs into the future, wherever possible. At the same time, however, rights must be reserved as early as possible. There are a number of options to achieve this – for example, a centralized international application procedure under the Patent Cooperation Treaty (PCT) (see current version WIPO 2019a). This procedure involves the issue of a preliminary opinion on protectability by a single central office once an application has been filed; for a few thousand euros, a period of at least 30 months can then be bought before attorneys must be retained and documents filed in all countries in which patent protection will potentially be sought.

Where only a German patent is sought, the patent application can be filed with the DPMA and the request for examination of patentability can be postponed for up to seven years. During this period, only annual fees are payable – and then only after the examination procedure has commenced. The disadvantage of this lengthy postponement is that during this period, it is not clear whether a patent will in fact be granted and to what extent it will offer protection.
Another advantage of delaying the examination procedure for as long as possible is that it affords some considerable time in which to shape the wording of the patent claims (within the boundaries set by the original disclosure). If the actual solution changes, one should examine whether it is reasonable to adapt the patent claims accordingly within the scope of what was initially disclosed.

It could be even more exciting to keep an eye on competitors’ products while your own patent application is under examination at the patent office and then, at the appropriate time, ‘tailor’ your own patent claims as far as possible to those competing products (again, within the scope of what was originally disclosed in the patent application).

One particularly suitable way to pursue this approach is through the filing of divisional applications. In most countries, a pending patent application can be divided during the examination procedure (against payment of an additional fee). Of the resulting two patent applications, one (the parent application) can quickly lead to the grant of a patent; while the other (the divisional application) goes through the patent office examination process again. This saves time; and the options for shaping the divisional application largely correspond to those of the parent application, with the only condition being that the two granted patents must be different in the end.

Through this procedure a divisional application can be kept alive for quite a while – for example, until the exit of the start-up – with all options kept open, so that an investor/buyer can then still fully exploit the desired protection possibilities.

It may also be extremely useful for an upcoming financing round if the start-up can show that it has been granted a patent. At the EPO and the DPMA, for example, a free-of-charge request for acceleration is possible. Close cooperation between the patent attorney and the patent office is often helpful in this regard – for example, by requesting telephone or personal interviews with the patent examiner instead of relying on correspondence.

In some cases, the patent office proceedings can be accelerated even faster if desired. For example, the USPTO offers a ‘Track One’ procedure,
through which a US patent can be granted within about a year (albeit at additional cost) (see also USPTO 2019).

The Patent Prosecution Highway (PPH) offers further possibilities for acceleration, especially if the examination is being conducted in parallel in several countries (eg, if an invention is to be protected in the US, Europe and China). Under the PPH, in order to reduce their overall workload, certain patent offices will at least partially adopt the results of another patent office. This should lead to faster grant and more uniform patents.

Several PPH agreements have been established for different groups of countries; a good overview can be found on the homepage of the World Intellectual Property Organization (WIPO) (see WIPO 2019b). The best known is the IP5 PPH, which includes the EPO, the Japanese Patent Office, the Korean Intellectual Property Office, the State Intellectual Property Office of the People’s Republic of China and the USPTO.

3.7 Region-specific protection strategy

An IP right such as a patent offers protection only in the countries for which it has been granted. Patents are usually granted for individual countries/states; but there are also international agreements that allow for regional validity, such as the planned unitary patent of the EU (as noted above, the current EPC aims to secure the country-by-country validity of patents and merely centralizes the examination and grant process independently of EU member state membership).

The first filing of a patent application with a single patent office (eg, the DPMA) will suffice to establish the date that will be regarded as the date of filing worldwide, provided that the relevant documents are subsequently filed with other patent offices in the following 12 months. The decision on the countries in which protection will be sought must therefore be made just a few months after the first filing (in extreme cases, shortly before the 12-month period expires).

For the subsequent enforcement of patents, it is also important that the patent law allows the patent holder to prohibit the unauthorized activities
of third parties. For example, Section 9 of the German Patent Law provides as follows:

The effect of the patent is that only the patentee is entitled to use the patented invention within the limits of the applicable law. Any third party shall be prohibited, without his consent

to manufacture, offer, put in circulation or use a product which is the subject-matter of the patent, or to import or possess it for those purposes to use a process which is the subject-matter of the patent or, if the third party knows or it is obvious in the circumstances that the use of the process is prohibited without the consent of the patent proprietor, to offer it for use within the scope of this Act;
offering, putting in circulation or using a product directly obtained by a process which is the subject-matter of the patent, or either importing or stocking it for these purposes.

Thus, the holder of a German patent can prohibit not only the use of an infringing product in Germany, but also the import of infringing products from abroad. The holder can also prohibit the manufacture in Germany of products that are intended for export.

The question of in which countries protection should be sought will depend on the budget, the markets in which the start-up wishes to be active and the countries in which possible competitors are based and/or competing products sold.

However, this does not necessarily mean that all eligible countries must be covered by national IP rights. If it is possible to protect some important markets, a competitor will be left with only the remaining markets and thus correspondingly reduced potential sales; so a good competitive position can be secured in the case of economies of scale.

The following issues are important in considering a region-specific patent protection strategy:

• Worldwide protection is seldom useful. Depending on the company and its products, individual geographic coverage (‘footprint’) will usually make more sense. This should be considered before each patent application.
• A patent prohibits both the unauthorized manufacture and the unauthorized sale of a product. Therefore, it is often sufficient to have a patent either in potential ‘manufacturing countries’ or in target ‘consumer countries’.
• In the case of technically complex products, registration in only a few countries (eg, Germany, the US and China) will often suffice to block the world market for competitors.
• The costs of granting and maintaining a patent vary from country to country (eg, in the US, obtaining a patent is expensive; but maintaining a granted patent is comparatively cheap year on year).
• The costs of enforcing rights in case of patent infringement should also be considered (these are comparatively low in Germany, but usually high in the UK).
• Consideration of the formal requirements is very important, but is often overlooked:
  ♦ Many countries require that an invention which is made in the home country also be registered in that country first (eg, the US, China, India, Italy, Spain). A good overview is provided by the World Intellectual Property Organization (see also WIPO 2019c).
  ♦ The laws of some countries impose a general ‘obligation to file’ (eg, Chapter 3 of the Law on Employee Inventions in Germany; and Russian law).
  ♦ Transnational joint developments in groups of companies may prove problematic. In this case, an application for a foreign filing licence is often the only available option. But remember: non-compliance with the regulations will also be apparent to third parties!

What is stated above in relation to patents also applies analogously to other types of IP rights, although the costs for these are typically much lower than for patents. The DPMA provides a good overview with useful further links (for trademarks, see DPMA 2019a; for designs, see DPMA 2019b).

As previously mentioned, international protection for an invention may be obtained by initially filing an application for a patent or utility model in one country (or with the EPO) and subsequently, within a ‘priority interval’ of 12 months, extending the territorial scope of protection by filing subsequent applications for the same invention in one or more additional countries. This priority right also exists for designs and trademark rights filed either nationally or with the EUIPO (with a shorter priority interval of generally six months).
This procedure may be quite costly and cumbersome if protection in many countries is desired. An alternative mechanism – which is often simpler and more cost effective – is available in the form of ‘bundled’ international filings which are submitted to a central authority and allow respective national protection to be obtained in multiple member states. For patents, this mechanism – known as an ‘international patent application’ – is made possible by the PCT (which was previously mentioned above in connection with timing considerations). For designs and trademarks, international registration under the Hague System (for designs) and the Madrid System (for trademarks) serves a similar purpose.

3.8 Employees, freelancers and cooperation partners

A start-up usually has scarce resources, little time and often limited experience. To keep costs low, the number of permanent employees is kept to a minimum. It is therefore often helpful to be able to rely on freelancers, development cooperations and ‘business angels’ (see Business Angels Netzwerk Deutschland eV (2020)) for certain tasks.

However, in case of such arrangements two important considerations with regard to the IP protection should be borne in mind:

- The start-up must keep track of protectable work results and encourage external partners to communicate protectable results; and
- The start-up must ensure that it is entitled to both rights to use all work results and rights to all emerging IP.

This applies to research and development cooperations; development contracts and supply contracts for the development or adaptation of products; and cooperations with freelancers.

Example

A start-up produces temperature sensors for heating systems that will be connected via radio. For the radio connection, a cooperation partner is commissioned to design and manufacture an application-specific integrated circuit (ASIC) with a transmitting and receiving device. A written contract is not concluded. In this case, the cooperation partner supplies the work results and ASICs, but can also freely dispose of
the results and utilize the developed component in cooperation with other sensor manufacturers. As the development is paid for once, the device can even be sold to the start-up's competitors at a lower price.

A contractual arrangement under which the start-up would secure all or part of the IP rights to the development would enable it to obtain this component exclusively, at least for a period of time.

A similar problem can arise when freelancers are employed. Unless otherwise agreed, all inventive ideas that freelancers may have will remain their property, and patent or utility model applications may be filed in respect of those ideas. Such persons usually have an insight into the technical problems at hand and thus have a good starting position from which to file for patents and grant licences. It is not difficult to regulate cooperations with freelancers by means of a contract which includes provisions on the assignment of rights to inventions; you just have to think about this in time!

If external persons are invited to cooperate – for example, by participating in a workshop to discuss solutions to problems and perhaps also inventions that could lead to a patent application – there is a twofold danger:

- Formally, every idea discussed becomes known to a person outside the company who is part of the public. Thus the idea becomes formally public and cannot be the basis of a patent application; and
- Contributions to solutions made by external persons are legally owned not by the start-up, but rather by their respective providers. Only those external persons can apply for the corresponding IP rights to those ideas – or transfer them to the start-up (eg, in return for monetary compensation).

Both problems can be solved through relatively simple contractual arrangements: in the first case above, a non-disclosure agreement; and in the second, a cooperation agreement. The two can also be combined.

By contrast, in the case of permanent employees of the start-up, the rights to their ideas are normally assigned to the employer. Here, the relevant legal conditions and the automatic consequences thereof should be kept in mind. In Germany, the right of employee inventors to inventor’s remuneration is particularly worth mentioning. This should be settled contrac-
tually by the start-up with its employee inventors for each invention as early as possible – not least so that the inventors’ claims are transparent for investors. These issues are explored in more detail in Chapter 3.

4. How to avoid infringing third-party IP rights

In 2017, more than three million patents were registered worldwide (see WIPO 2019d). These must be observed by third parties which are commercially active in the respective countries. Fortunately, both granted patents and published patent applications are easily accessible online (on various platforms provided by IP offices and third parties), organized by technical fields according to a very granular patent classification system.

Of course, it is a lot to ask to be aware of all granted patents in one’s field of work; but ignorance is not a valid excuse. All companies have a legal obligation to monitor patents in their respective field of activity with ‘due care’.

To this end, you can either conduct your own regular research or have a service provider do this for you. Either way, a well-informed employee of the start-up should examine all IP rights that the research turns up. The analysis of whether a third-party IP right may affect your own product is simple in many cases: if the patented solutions are obviously completely different from your own, they will present no problems.

In other cases, however, the analysis may be more difficult, and only a patent attorney can interpret the patent claims and identify with a degree of certainty which solutions fall within and which fall outside the scope of protection.

Such analyses should be carried out in detail only once a route to a marketable product has been determined. At that point, investment decisions will be taken that require legal certainty regarding technical feasibility and freedom from third-party rights.

The following procedure is a pragmatic way of dealing with third-party IP rights at moderate cost.
First, monitor your own field of activity by signing up for internet alerts (see EPO 2019b). These provide regular news about technical innovations in your field of activity and, depending on your search profile, about published patent applications and patents.

**NOTE**

At least in principle, submitted patent applications are not published by patent offices worldwide until 18 months after the first filing. Before that date, applications are not visible to third parties. This gives the patent applicant a lead time for implementation or further development. Often, the applicant will not inform the public of its invention, even in technical articles, until the corresponding patent applications have been disclosed.

Patent searches should also be commissioned at certain development milestones (e.g., several times in the course of product development), in order to obtain an overview of the evolving IP rights situation. Depending on the complexity of the product, you will then be provided with several or even several dozen patent documents to deal with.

A search service offered by the Swiss Federal Institute of Intellectual Property (IGE) has proved to be a practical and (comparatively) inexpensive option in this regard. ip-search is a company affiliated with the IGE (see IGE 2019). The scope of the search, the depth of the analysis and the extent of the preparation can all be specified by the client. The price is based on the amount of work that can be determined in advance. The search yields results of a standardized and recognized quality to facilitate risk management at a comprehensible level, which can also be easily explained to investors.

In principle, the search for third-party IP rights in the field of software development is particularly challenging. It is often difficult to determine whether one’s own process steps fall under one of the multitude of existing patents – especially since these are often formulated in a relatively abstract way.
Complete certainty is thus an unrealistic aspiration. However, a strategic approach may be useful: it should be gauged which stages of software development are on the one hand costly and on the other hand solve problems which in all probability must also be solved or may have been solved by competitors in the same or a neighbouring area. At this point, it is worth taking a closer look at whether relevant patents already exist. If such solutions also concern interfaces for the transfer of data or communications, the risk of patent infringement increases, as for such purposes certain boundary conditions or standards must be observed, which will probably make it more difficult to modify the software at a later point in order to avoid patent infringement.

**NOTE**

Where an important third-party patent has been identified, the start-up has the option of taking a licence if possible or seeking to modify its own product to circumvent the patent. To make this more difficult for competitors, patent attorneys usually try to find terms for all features that are as comprehensive as possible, in order to ensure that the scope of protection is as broad as possible. On the other hand, during the patent examination, patent offices will take care to ensure that the protection is not unduly extended. In any case, when it comes to developing around the scope of protection of a patent, a patent attorney should be consulted to help with the interpretation of the patent and with finding ideas for design-around.

Even the use of OSS cannot ultimately protect against patent problems. Where OSS is described as ‘free’, this is true only to a limited extent, since the users involved license their copyrights on a reciprocal basis. Where a software solution falls under the patent of a third party, that third party is not obliged to license it.

For this reason, initiatives have been established by OSS users – such as the Open Invention Network, established by Google, IBM and Microsoft, among others – through which their own patents are collected and made available for joint use in order to provide a counterweight against possible future patent lawsuits (see OIN 2019).
5. Use of third-party patents as a source of information

Patent applications and patents are published, in part, to make them available to society as a source of information on innovation. As patent publications are generally available free of charge online, they can and should be used as a source of information. For example, they can provide information on:

- what solutions have been found for specific problems (these solutions may be freely available);
- which players are utilizing those solutions (these could be approached as cooperation partners or avoided as potential competitors); and
- which inventors have been involved in achieving those solutions (these could be poached).

6. Conclusion

IP rights exist to fulfil a social function: monopoly rights are granted to individual innovators to reward investment in technology development. This is intended to promote innovation. However, protection can be obtained only against payment and only for a limited time. After that, the new development becomes free for all to use. As a rule, information on protected new developments is publicly accessible at the latest 18 months after submission of the patent application.

IP rights also ensure that an inventor is rewarded and (if he so wishes) is identified as such to the public. This is part of the inventor's right of personality.

Irrespective of the social functions of IP protection, IP rights must be used as strategic instruments in competition. An understanding of the possibilities for such use helps those companies that innovate most.