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PATLICE Survey

Survey on patent licensing activities by patenting firms

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Survey on patent licensing activities by patenting firms

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Executive Summary

The European Commission, DG Research and Innovation, contracted a consortium consisting of Incentim – KU Leuven Research and Development, KITeS - Università Bocconi and Technopolis Consulting Group as subcontractor to perform a study on the 'Measurement and analysis of knowledge and R&D exploitation flows, assessed by patent and licensing data'. Part of the study was the execution of a survey on patent licensing behaviour of European firms. This part of the study, performed by Technopolis and executed between March 2012 and April 2013, is the subject of this report. It constitutes deliverable D 2.3 as outlined by the Commission´s terms of reference.

This survey has been commissioned against the backdrop of a growing importance of patents, as indicated by the soaring number of patent applications (more than 50% increase in yearly applications at the EPO by comparison to 10 years ago) and a much broader use of patents today other than for protective purposes. Such reasons include also revenue generation through licensing or the usage of patents to conclude cross-licensing agreements with other partners. However, data specifically on patent licensing is hardly available and not regularly collected. The survey provided a means to collect very specific and detailed data on the scope of patent licensing activities, the rationales for engaging into patent and technology licensing, or the question that are the main regions for the "trade" of patents via licensing.

The survey used a combination of web surveys, postal surveys and interviews. The target population addressed were European firms with evidence of patenting activity, primarily those firms that applied for a patent between 2000 and 2009 with the European Patent Office and were part of a top-300 list of patent applicants in one of 35 technology fields for this timeframe. The survey was to enquire about different aspects of patent out-licensing and patent in-licensing activities between 2008 and 2011. 330 firms responded to the questionnaire.

The main findings are the following:

- The importance of licensing has increased over the years, as most firms report increasing licensing revenues over time and an increasing number of licensing deals. This can be observed with all major industries for which patenting is relevant. Patent licensing has to be mostly understood as technology licensing, as patents are rarely out-licensed on their own (i.e., licensing agreements usually cover more than just the patents).
- Based on a per-firm view analysis of European patent licensors, patents are predominantly out-licensed to firms not affiliated with the licensors. Trade in patents via (out-)licensing occurs predominantly within Europe. The second most important trading region is North America, leaving behind Asian regions to a considerable extent. Most licensing occurs among competitors, and only to a smaller extent between suppliers and (B2B) customers.
- The most important motives to out-license are revenue-generating motives, to ensure freedom-to-operate as well as stopping patent infringements. There are differences between SMEs and large firms, with SMEs placing more importance on revenue generating motives, while large firms out-license more to ensure FTO and stop (perceived) infringement.

- The by far most important barrier for patent out-licensing is the potential loss of their competitive/technological edge, followed by difficulties to identify the right partners. Another important barrier, in particular for micro-enterprises and small firms, is that the patented technology may not be developed enough. We find a considerable share of firms where the expectations they set into their out-licensing were seemingly not met in reality.
- The most important channels by which licensors get in touch with licensees are informal networks, followed by own research, being contacted by the licensee and events such as trade fairs. Intermediaries searching on the licensor´s behalf and technology/licensing exchange platforms are (currently) almost irrelevant. SMEs use all means to get in touch with licensees more intensely than large firms.
- We see a cascade of measures by which patents are shared/transferred to third parties. (Bilateral) out-licensing of patents is the means probably used most, followed by sale of patents and entering joint ventures. Patent pools are rarely used with the exception of groups of companies in specific technology fields where standards play an important role. Patent auction events are currently irrelevant for the majority of firms.
- The strongest motive to in-license patents is to ensure Freedom-to-Operate (FTO), followed by closing technological gaps and enabling rapid time to market. The most significant barriers are unacceptable terms of the licensor as well as the refusal of the potential licensors to grant licenses at all.
- Overall, many barriers to out- and in-licensing have not been judged to be of high importance, and we received feedback that licensing is not a big or the biggest problem area for the firms in the context of putting patents to use. Other issues, such as enforcement of IPR or litigation practices in jurisdictions abroad are often judged to be more problematic areas than licensing.
- There are considerable differences across industries when it comes to licensing behaviour. There are industries where patents are used mostly internally (such as in Industrial engineering), while particularly in a sector such as Health care patents are a currency for doing business with other firms and licensing is hence more commonplace. This is reflected in different motive patterns or in different perceptions of barriers to patent licensing.

Recommendations are drafted in report D 4.7, which takes account also of other methodologies to assess knowledge flows with patent-related data.

Introduction

This report presents the findings of the survey on patent-licensing firms, conducted within the scope of the study 'Measurement and analysis of knowledge and R&D exploitation flows, assessed by patent and licensing data', commissioned by DG Research and Innovation. It corresponds to deliverable D 2.3 as outlined by the Commission´s terms of reference.

This report D 2.3 has been commissioned against the backdrop of a growing importance of patents, as indicated by the soaring number of patent applications (more than 50% increase in yearly applications at the EPO by comparison to 10 years ago) (EPO 2012) and a much broader use of patents today other than for protective purposes. Such reasons include also revenue generation through licensing or the usage of patents to conclude cross-licensing agreements with other partners (see Blind et al. 2006). However, data specifically on patent licensing is hardly available and not regularly collected. It must be either inferred through secondary data that may serve to different extents as proxies for assessing the scope of patent licensing. As will be discussed later and in report D 4.7, such approaches have a rather large margin of error.

Alternatively, the scope of patent licensing activities can be determined through surveys with (patent holding) firms. Again, such surveys are not regularly conducted. There is currently a need to create such a source of data with up-to-date assessments of the scope of patent licensing activities and with a high level of detail. The emergence of business models of firms to establish markets for the licensing and trade of patents, and respective pressure on policy to create measures that facilitate the creation of such 'patent licensing' markets provides one major rationale for establishing such a survey. In addition, a high level of detail ensures that considerable more insights into the behavioural patterns (such as motives, barriers) of firms - which are confronted by the question of whether, how and to what extent they should engage in patent and technology licensing - can be gained.

This report and the underlying data set fill this gap. They provide an extensive data source on the scope of patent out-licensing (and to a lesser extent patent in-licensing) by European businesses, the main motives and barriers encountered or assessments of the ways licensors get in touch with licensees as well as organisational aspects. They are also the first data to enquire in detail into patent licensing flows by regions (i.e., to what world regions firms license their patents).

The report is structured as follows:

- Section 1 describes the methodology.
- Section 2 deals in detail with patent out-licensing.
- Section 3 presents the finding on patent in-licensing by patent-holding firms.
- Section 4 discusses the financial use of patents and outlines the extent to which firms are affected by patent infringements and disputes on licensing agreements
- Section 5 shows some qualitative feedback received.
- Section 6 presents a summary of the main findings.

- Appendix A and B present some additional charts whose inclusion in the main text would have lowered readability of the text.
- Appendix C displays the questionnaire employed.

Recommendations are drafted in report D 4.7, which takes also account of other methodological approaches to assess knowledge flows (such as by patent database data (citation data) or by trade data).

1. Methodology

1.1 General approach

1.1.1 Issues to be considered for a survey on patent licensing

The methodology of the survey was designed against the backdrop of the specifics of available data on patent licensing activities by firms. There are no general databases or statistics available on patent licensing activities. Some data is collected in the course of trade statistics. But trade data has a number of shortcomings, the most prominent being that it does not differentiate between the various types of licensing activities (some of which are not related to patenting).

Other than trade data, there are only patent databases available. However, these cannot be used directly to assess patent licensing activities. One possible way to utilise patent databases is to make inferences from bibliographic information stored in the databases. The simplest such inference is to assume that there is a correlation between the occurrence and intensity of patent licensing and the number of patents an applicant holds. However, as easily recognisable, such an inference is at best only indirect – patent databases do not store information on licensing – and is, consequently, prone to rather large error margins.

A second way to link patent with licensing data (and obtain licensing data) is to use the address data stored in the patent databases for surveys which enquire into the licensing activities of firms. However, as straightforward as this approach sounds, it poses a number of challenges:

- First, there is no 1:1 correspondence between patents and licenses. One licence can cover one or several patents or there can be overlaps between patents covered by different license agreements or patents may not be licensed at all. The unit of observation should be hence not the patents, but the firms.
- Secondly, one can assume that in most cases the persons responsible for licensing are not identical to the inventors (exceptions being mainly in a number of small firms). The said person in charge of licensing either needs to be researched or the questionnaire within the firm forwarded to him/her.
- The third problem is that only postal addresses – of varying quality – are available. Patent applications name only the inventors, the postal address of their place of work and the firm applying as well as the contact details (name and address) of the legal representative (i.e., the external patent attorney firm).

A final general problem for obtaining licensing data is data confidentiality. In many firms, licensing data is highly classified information of vital importance for the businesses.

1.1.2 Approach taken

Against the backdrop discussed above, the approach chosen aimed to maximise the quality of the returned questionnaires and the likelihood of response by researching the contact details of persons responsible for patent licensing in the firms. For this purpose, KU Leuven provided us in a first step with a list of the top-300 firm applicants for each of the FhG-35

[1]technology fields, having filed EPO applications between 2000 and 2009, derived from PATSTAT. From those we targeted the European firms, i.e. firms with an applicant address in Europe.

We researched the persons responsible for patent licensing via Google searches and, were feasible, with complementary telephone contacting, based on the company names provided by KU Leuven. Our approach was 'top-down', i.e. contacting firms with the largest number of patents first, the assumption being that we hereby obtain the most representative picture in terms of expectable volume and intensity of licensing activity. To identify the correct contact persons, we also referred to the Licensing Executives Society and used also social networks (most notably, xing.com and linkedin.com). If, in this search process, we were able to identify also patent-holding/patent-licensing firms that were not on the initial top-300 list, we included them also in the survey. This approach was particularly useful for the inclusion of very small firms.

We created two versions of the questionnaire: A long one, with around 12 pages, with in-depth questions on many aspects of the licensing strategies pursued for a first phase of the research, and a second shorter one, with around 6 pages. The short questionnaire contained a subset of the questions posed in the longer questionnaire, in order to increase the number of responses (and hence statistical representativeness) for the most important questions on licensing. Going beyond our initially proposed design, the questionnaires covered not only patent out-licensing, but also patent in-licensing.

The developed standardised questionnaires were translated into three languages (English, German, French). It was programmed into an online version where respondents could switch any time between the languages. It was also made available in the three languages as PDF and Word documents.

Survey deployment used a combination of web surveys, postal surveys and interviews.

- *Web survey*: In order to maximise responses, we created a specific domain name for the survey. Links to the survey sent out by e-mail were personalised, so that respondents could save their responses and return later to complete the questionnaire. E-mail invitations were also personalised and sent either in English, French or German. Firms that did not respond within three weeks received a reminder e-mail. Firms that did not react the second time were either sent another reminder e-mail or were contacted by phone.

  Researching e-mail addresses and sending out questionnaires was implemented as an iterative parallel process. E-mail addresses researched were subsequently entered into an address sheet for the e-mailing application. The e-mails with the survey invitation links were sent out once 30 to 150 e-mail addresses had been collected. While one batch of e-mails was sent, the next batch of e-mail addresses was researched and prepared. The survey was hence sent out in different

[1] The FhG-35 technology field classification was developed by Fraunhofer ISI of the Fraunhofer Group (hence its name) and provides a 35-tier classification system of patents based on their IPC (International Patent Classification) codes (see Schmoch 2008).

waves, at different points in time. Respondents who wished to have a printed version had the opportunity to obtain the questionnaires also in Word and/or PDF formats, and send them back either by fax or scanned by e-mail. For some e-mail addresses, it was not possible to identify a single contact, in which case we used more general addresses such as "office@" or "licensing@" addresses.

- *Telephone survey/interviews*: Because our identification process used telephone contacting with firms, we used, whenever possible, the occasion to fill in the questionnaire together with the respondent either 'on the spot' or arrange an appointment for an interview via phone later (the latter was our preferred mode of offer, given the need to prepare in advance some of the answers). In most instances respondents opted during the phone conversation to obtain the survey via e-mail, either as a link to the web survey or as PDF/Word document(s), and answer on their own.
- *Postal survey*: In addition to the online survey, we also sent out a printed version of the shorter questionnaire to postal addresses of patentees. This postal survey was an 'undirected survey', in the sense that we only used the addresses obtainable in PATSTAT without having a particular contact person. To increase the likelihood of response, we asked those who opened the letter, such as the postal departments, to forward the questionnaire to the person(s) in charge of patent licensing. The pool of addresses was created from all postal addresses available from the top-300 by FhG-35 patentee list provided to us by KU-Leuven (which amounted to, after erasing duplicates and addresses of low quality, 4,380 European firms), minus the addresses of firms that had already answered to our questionnaire. That way, we were also to contact also those firms where it was not possible to single out the contact details of persons in charge of patent licensing. Respondents had the opportunity to send back their responses by fax, e-mail (scanned), by regular mail via return envelop or by accessing a personalised link for our web survey, for which we provided them with their respective access codes.

For all means of deployment, we included a cover letter signed by the European Commission and explaining the background of the study, in order to increase the willingness to answer. The research was also supported by an email from LES Germany to its members. Survey execution was in the time from March 2012 to April 2013.

1.2 General response rates

We received 330 workable/valid questionnaires, all modes of survey deployment considered. Given that we contacted with the various means of survey deployment a total of 5,720 firms, the overall response rate amounted to 5.8%. 38.8% of the 330 questionnaires filled in were for the longer questionnaire, 61.2% for the shorter version.

While we do have 330 questionnaires, we nonetheless have to underline the fact that respondents typically do not answer all questions of a questionnaire, and some questions are only meaningful for certain subsets of respondents. Hence, in many instances answers will be based on a lower number than 330. However, as will be shown throughout the report, respondents that actually filled in the questionnaire did so mostly very thoroughly. We do only see a very slight drop in the number of answers to

questions towards the end of the questionnaire, an effect that is otherwise observable with (too long) questionnaires.

We faced a number of challenges:

- The process for identifying persons in charge of licensing was more difficult than anticipated and, hence, slow. Most companies do not flag out their patent/IP departments on their homepages, and there is a need to call the firm by phone and ask to be patched through to the person(s) in charge of patent licensing. In a number of instances, switchboard operators had limited knowledge of who was responsible at their firms for IP and patent licensing. In an even larger number of instances, the firms were unwilling to provide the "correct" contact details, but asked us to make any enquiries to general e-mail addresses (such as "office@" addresses) from which we received rather little response.
- If identified, we also found that while there might be a person in charge for patents and licensing, this person more often than not does not have the authority to answer questions like those posed in the questionnaire on patent licensing. As a result, the survey is often forwarded to other departments (such as the legal department) for crosschecking, resulting either in a delay of the responses or in a decision not to answer at all (see also next point).
- Data confidentiality is, in our experience, a very important reason for not answering the questionnaire. Many companies were reluctant to provide us with data on this questionnaire because many if not most of the questions tackled (too) sensitive matters within the firm.
- The length of the questionnaire was stated as reason for non-answer particularly in relation to the longer questionnaire. The shorter questionnaire led, unsurprisingly, to a higher response rate.
- The questionnaire asks very specific questions about patent licensing. We received feedback from several patent-holding firms that indicated that they would not participate *"…because after reviewing the questionnaire we have to say that we do not license patents and can hence not really contribute to the survey"* (statement of one potential respondent). While we were able to convince a number of such firms to participate, we still have to assume that our sample under-represents the share/amount of firms that do not license patents.
- One other reason for non-response, in particular with respect to very large diversified firms, is that such firms typically employ different types of licensing strategies for their various business units and divisions. While some of these firms were able to provide an "average" or "typical" approach within the firm (or provided the answers for a particular division), others were not able to give us an aggregate view or that of a particular division *"…as this would not reflect reality"* (potential respondent).
- Of course, we were also confronted with 'typical' reasons for non-response, such as general survey fatigue, no interest because there would be no real benefit for participating firms, no time (particularly an issue for SMEs) or no interest in general.

1.3 Sample characteristics

Fig. 1 provides a breakdown of our sample by firm size.[2] We can see that our sample is leaning towards larger firms: Almost two thirds of the firms (63.3%) had more than 250 employees in 2011. This is the result of the top-down approach taken. By looking primarily at the top-300 applicants in each of the 35 technology fields, we were bound to contact more large firms. The number of SMEs (all firms with less than 250 employees) in this sample amounts to 113. In this report, we will primarily distinguish between SMEs and large firms when performing analyses according to firm size.

Fig. 1 Firm size distribution in sample

Size class [2011]	Frequency	Share [%]	Cumulated [%]
Micro (less than 10 employees)	23	7.5	7.5
Small (less than 50 employees)	38	12.3	19.8
Medium (less than 250 employees)	52	16.9	36.7
'Mittelstand' (less than 500 employees)	41	13.3	50.0
Large (more than 500 employees)	154	50.0	50.0
TOTAL	**308**	**100.0**	-
Missing information on firm size	22	-	-

Source: Technopolis survey, n=330

The distribution of the firm respondents by country reflects the clear domination of Germany as a source country for patent applications in Europe (see Fig. 2). Around 34% of the responses are from German firms, which can be expected given the size of the German market and the important role German firms play as applicants for patents at the EPO. Second are Austria and France, each with 10.9%, followed by Switzerland (7.9%), Switzerland and the Netherlands (5.8%, respectively). We believe that the distribution is to a smaller extent also due to a selection bias, as we found, for example, that Northern European and Central European countries flagged out their IP departments and persons responsible for IP more often than firms from Southern Europe.

[2] We use the number of employees as the sole indicator/proxy for distinguishing between SMEs and large firms (i.e., firm size). This approach is in line with previous surveys on this subject matter and allows for comparability with surveys such as the one performed by the OECD ((Zuniga & Guellec (2009)).

Fig. 2 Country distribution in sample

Country	Frequency [n]	Share [%]	Cumulated share [%]
AT	36	10.9	10.9
BE	14	4.3	15.2
CH	26	7.9	23.10
CY	1	0.3	23.40
CZ	1	0.3	23.7
DE	112	34.0	57.8
DK	14	4.3	62.0
EE	1	0.3	62.3
ES	3	0.9	63.2
FI	16	4.9	68.1
FR	36	10.9	79.0
IRE	3	0.9	79.9
IT	16	4.9	84.8
LUX	3	0.9	85.7
NL	19	5.8	91.5
NO	2	0.6	92.1
PT	1	0.3	92.4
SWE	8	2.4	94.8
UK	17	5.2	100.0
TOTAL	**329**	**100.0**	-
Missing information on country	1		

Source: Technopolis survey, n=330

For breakdowns by industry, we developed an industry classification system on the basis of the ICB (Industry Classification Benchmark) classification system. The ICB system was created by Dow Jones and FTSE in 2005 and is now owned solely by FTSE. The ICB system is primarily used to classify stock-listed firms and is used, for example, by the NASDAQ, NYSE and several other financial markets around the world.

The major advantage of the ICB system is its approach to unambiguously assign a company to a particular sector *"…that mostly represents the nature of its business, which is determined by its source of revenue or where it constitutes the majority of revenue."*[3] By contrast, NACE-based classifications allow for a firm to be mentioned in several NACE sectors. In order to also provide an unambiguous class for firms which are in effect active in several fields, the ICB system has also created dedicated classes

[3]See ICB Structure, http://www.icbenchmark.com/Site/ICB_Structure, retrieved July 6, 2013.

for that purpose such as 2727 "Diversified industrials" or 7575 "Multi-utilities". The advantage of the ICB system, unambiguity, is also one reason why the Commission is also using the ICB classification in its R&D investment scoreboard (European Union 2013).

The ICB classification system distinguishes between 10 major "industries", which are broken down into 19 "super-sectors", furthermore into 41 "sectors" and 114 "sub-sectors". We classified the firms in a first step by comparing our list of respondents with the list published in the R&D investment scoreboard and copied the respective ICB classification where we found company matches with our sample.

In a second step, we classified the remaining firms that were not on the R&D investment scoreboard manually based on annual reports and company descriptions on homepages as well as the description of the industry provided by the respondents in the questionnaires.[4] With this approach, we were able to assign 324 firms in our sample to ICB industries, super-sectors, sectors as well as subsectors. In a final step, we developed a six-tier industry classification system by re-combining similar types of ICB industries, super-sectors, sectors and sub-sectors. This exercise was necessary to allow for the creation of a meaningful breakdown variable in our sample with a sufficient number of firms in each class for a statistical analysis.

Our final classification system is shown in Fig. 3. As can be seen, our classification largely follows the "industry"-level ICB classes. There are, however, three notable alterations to the ICB system to account for our sample characteristics:[5]

- We combined the industries 0001, 1000 and 7000 into one class.
- Because of the number of respondents in sector 2750 (industrial engineering), we created for these firms a class of their own.
- We formed a genuine "technology-ICT class" by combining the technology sector (which is mostly hardware and software) with the electrical/electronic equipment sector (ICB-sector 2730), a low number of consumer services firms that had clearly an ICT background (two firms), the sector telecommunications (such as fixed line and mobile phone providers) and consumer electronics (ICB sub-sector 3743).

As we had no respondents in ICB-industry 8000 (financial services; an industry which is typically much less involved in patenting than other industries), there was no need to consider this class for the industry classification used in this report.

[4] There was an open question in the questionnaire where respondents could state and describe the industry their firms were active in in their own words.

[5] The rationale for the industry classification system used was to obtain a workable number of well-sized sub-groups of firms active in different markets for the purpose of performing sub-group analyses/breakdowns.

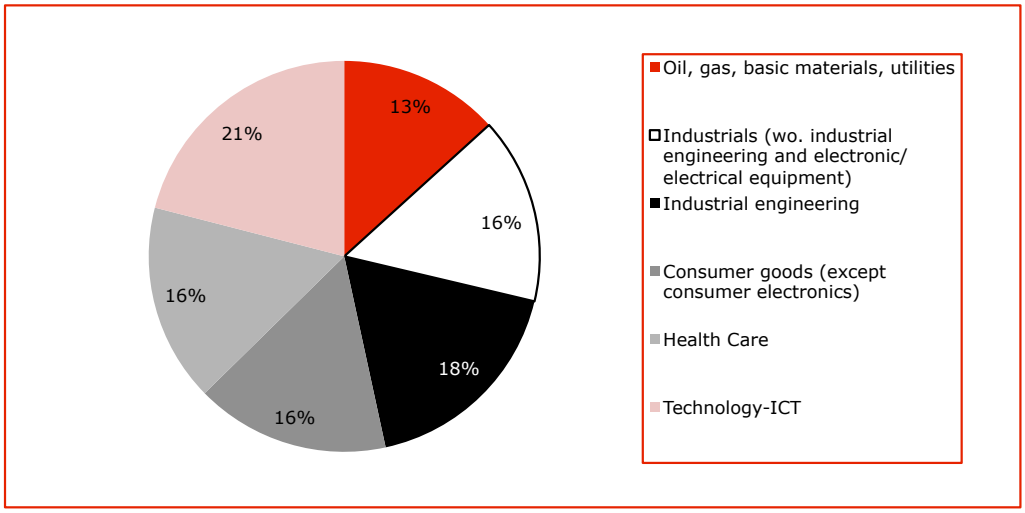
Fig. 3 Industry classification used and relationship with ICB classes

Nr.	Name	Description	ICB codes
1	Oil, gas, basic materials, utilities	Combines the sectors oil and gas (with alternative energy), basic materials (with chemicals, mining, paper & forestry) and utilities	0001, 1000 and 7000
2	General industrials (without industrial engineering)	Comprises the sectors industrials without electronic/electrical equipment and industrial engineering. This class hence contains sectors such as aerospace and defence, industrial transportation and business support services	2000 (without 2730 and 2750)
3	Industrial engineering	Contains the manufacture and distribution of commercial vehicles such as trucks/agricultural machines, etc. as well as industrial machinery (design, manufacture, installer of factory equipment, etc.)	2750
4	Consumer goods (except for consumer electronics)	Comprises a range of consumer goods, such as automobiles, food, beverages, personal and household goods, except for consumer electronics	3000 (except for 3743)
5	Health Care	Contains, amongst others, medical devices, biotechnology and pharmaceuticals	4000
6	Technology - ICT	This class combines all classes that are mostly associated with ICT. These are industries "Technology" (software and computer services, hardware, telecommunications equipment), telecommunications, media and gambling (from the industry "consumer services"), electronic/electrical equipment and consumer electronics	9000 2750 6000 3743

Source: Technopolis

Fig. 4 shows the breakdown of our sample by industry, using our industry classification system developed. The Technology-ICT class accounts for most of the firms (21%) in the sample, while the industries oil, gas, basic materials and utilities accounts for the least number of firms (13%). Firms in industrial engineering (which are part of the ICB 'industry' "industrials") make up 18% of the firms in the sample, which is why we made it a separate class (see also above).

Fig. 4 Sample break-down by industry



Source: Technopolis survey, n = 324

In a next step, we merged patent statistics data with the survey data. We sent KiTES/University of Bocconi the list of respondents who then matched the names with EPO patents listed in the database. This was done where a match was possible: In some cases, particularly those were answers were received by regular mail, there were some cases were the company name could not be unambiguously assigned to a specific firm. In other cases, answers were received for a subsidiary of a firm, but PATSTAT data was only available for the parent (it is not a valid approach to use the whole patent portfolio of the parent for the subsidiary).

In total, we matched 282 questionnaires with the respective PATSTAT data. The merged data file contains the priority years of the first patent applications, the number of patents filed in different technology classes as well as the status of the patents (applied for or granted). The 282 firms for which the match was performed held a total of 79,812 patents (status applied for or granted) at the EPO. The following Fig. 5 gives an account of the size distribution of the patent portfolios, broken down by firm size. As can be easily seen, one cannot necessarily expect that a small number of patents may be indicative that the applicant behind these patents is an SME.

Fig. 5 Size of patent portfolios by firm size, absolute numbers of firms

Total number of patents (status applied for or granted)	SMEs [n]	Large firms [n]	TOTAL [n]
1	6	6	12
2	8	4	12
<2 and <=5	12	4	16
>5 and <=10	20	14	34
<10 and <=30	32	35	67
>30 and <=80	9	46	55
>80 and <=300	4	38	42
>300 and <=1000	2	15	17
>1000	0	12	12
TOTAL	93	174	267

Source: Technopolis survey

The following Fig. 6 presents the total distribution of patent portfolio sizes among our sample, including those firms where company size information and patent statistics are simultaneously not available.

Fig. 6 Overall distribution of sizes of patent portfolios in sample

Total number of patents (status applied for or granted)	Frequency [n]	Percent [%]	Cum [%]
1	14	4.96	4.96
2	13	4.61	9.57
<2 and <=5	17	6.03	15.60
>5 and <=10	37	13.12	28.72
<10 and <=30	71	25.18	53.90
>30 and <=80	58	20.57	74.47
>80 and <=300	43	15.25	89.72
>300 and <=1000	17	6.03	95.74
>1000	12	4.26	100.00
TOTAL	282	100.0	

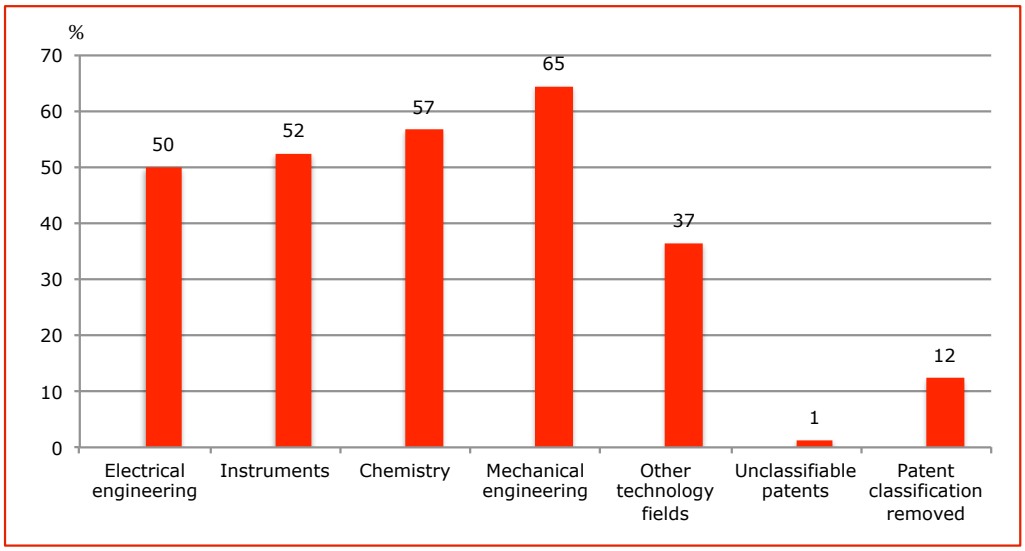
Source: Technopolis survey

To obtain a workable breakdown variable given our sample characteristics, we used a five-tier technology classification system that we built with the merged PATSTAT data. This system corresponds to the main five headings used in the FhG-35 technology classification system developed by Fraunhofer ISI and finalised in May 2008 (Schmoch 2008, pp. 9-10). In addition, there were two technology classes that contained patents that were either unclassifiable or non-assignable to a specific technology class because they, for example, covered multiple IPC classes.

The following Fig. 7 shows the extent to which firms in our sample have patents (status applied for or granted) in the different technology classes. This computation only counts evidence for patenting in a certain technology class, i.e. if one company has filed one patent in a technology class A, and 50 patents in a class B, the firm will be counted once in class A and once in class B. As can be seen from the figure, around 50% of the firms have at least one patent in the technology class "Electrical engineering", 57% at least one patent in "Chemistry" and 65% in "Mechanical engineering". Even at the high aggregation level of a five technology class system, patenting in multiple technology classes is commonplace. On average, and considering also the two classes with non-classifiable/not-classified patents, we find that the firms in our sample usually patent in two or three of the major technology classes.

Against this backdrop, it is not possible to classify the firms in our sample in an unambiguous and straightforward manner to a specific technology class. One should also not forget in this context that the unit of observation is the firm, and that it is not possible to create a direct link between the answers on licensing and particular patents, as the answers to the questionnaire refer to the whole patent portfolio.

*Fig. 7 Evidence of patenting among responding firms in different technology classes, firms with evidence of patenting in the respective class in % *)*



*) multiple responses/counts allowed

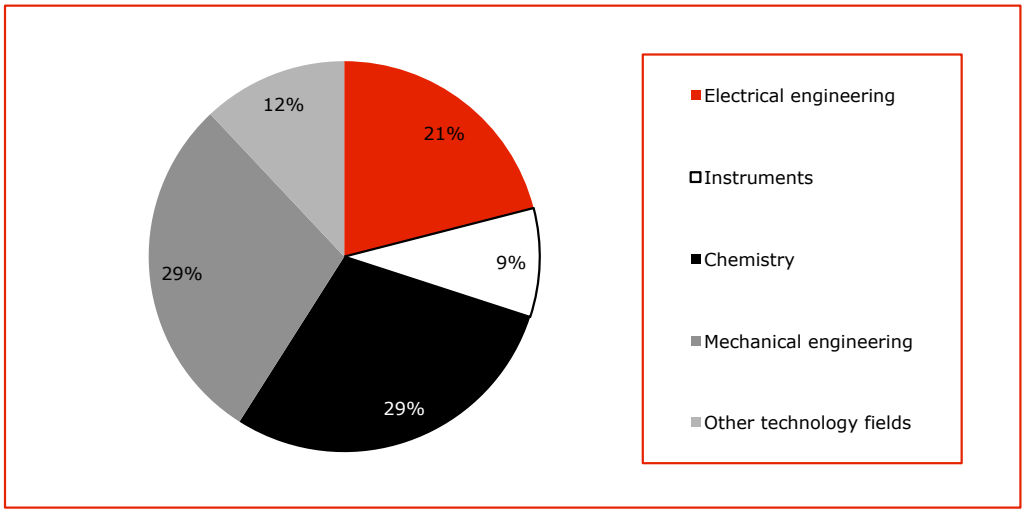
Source: Technopolis survey, n = 282

To mirror also the approach taken in the ICB classification system for sectors and industries (where turnover in a specific sector was used as a decision criteria for classification; see above), we assigned firms to those technology classes where they had the highest number of patents (status applied for only or already granted). Where this was not possible (because there was not one technology class outstanding), we dropped the

respective firm. We also treated unclassified, respectively unclassifiable patents as noise and did not consider them in our classification algorithm.[6]

With this approach, we were able to "unambiguously" assign 260 firms to one single technology class. Fig. 8 shows the resulting structural characteristics of the sample after classification. Most firms were assigned to "Chemistry" and "Mechanical engineering" (29%, respectively), 21% to "Electrical engineering", 12% to "Other technology fields" and 9% to "Instruments".

Fig. 8 Breakdown of sample by technology class



Source: Technopolis survey, n = 260

Further breakdown variables used in this survey report pertain to being part of an enterprise group (or not) or for having subsidiaries abroad other than pure sales representatives abroad (or not). Fig. 9 shows the respective structural characteristics of our sample.

Fig. 9 Further breakdown variables and respective structural characteristics of the sample

Break-down variable	**Yes**	**No**
Firm is part of an enterprise group	56%	44%
Firm has subsidiaries abroad other than trade/sales representatives	66%	34%

Source: Technopolis survey, n = 314

[6] This means that, in a hypothetical case, where one firm would have one patent in a classifiable patent class such as electrical engineering and 20 unclassifiable ones or with classification removed, it would still be assigned to electrical engineering.

2. Patent out-licensing

2.1 Scope of out-licensing activities

Our first initial question on patent out-licensing was to ask whether the patent-holding firms engaged in out-licensing at all, i.e. its current out-licensing status (see Fig. 10). Of the 325 companies with answers to this question, 181 (56%) indicated that they do currently out-license patents. 52 firms (16%) said that they currently do not out-license but would consider this for the future. 92 firms (28%) stated that they do not out-license and were not considering this for the future either.

Again, as stated in section 1.2, care should be taken when making inferences from this sample to the overall population of patenting firms. Because of this survey being a specialised one on patent licensing, non-licensing firms can be expected to be under-represented.[7]

We believe that a good way to obtain more representative figures on the proportion of licensing firms among the population of patenting firms is to include a very limited number of questions on licensing in a questionnaire for patentees that is otherwise mainly addressing issues that are relevant to all patenting firms. Such an approach has been taken in two of the EPO´s annual applicant surveys, which is conducted annually and aims mainly at creating forecasts on patent application activities:

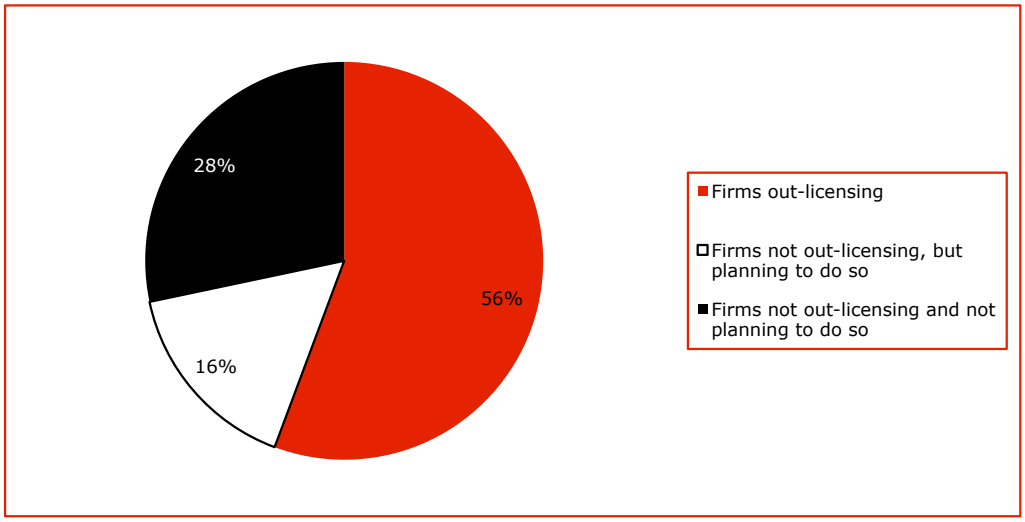
- In the applicant survey of 2007, the OECD cooperated with the EPO on the inclusion of licensing questions. In the corresponding OECD working paper authored by Zuniga & Guellec, the share of patent out-licensing firms was said to amount to around 35% in Europe (Zuniga & Guellec 2009). However, this figure needs to be interpreted with some caution.[8]
- In the applicant survey of 2011 (EPO 2012), the EPO included a differently worded question (compared to the 2007 survey) on the proportion/share of patents within the firms´ patent portfolios that were subject to out-licensing. It was found, depending on the sample sub-groups looked at and also subject to applying a weighting scheme, that around 17% to 35% of the patents in the patent portfolios of firms in the EP residence bloc (i.e., European firms) were the subjects of out-licensing agreements. It is important to underline that the figure in the 2011 survey shows the average shares of patent portfolios being out-licensed, not the share of firms that actually out-license patents.

We have to conclude that at this moment there is no reliable published indicator with respect to the share of patenting firms in Europe that out-license patents.

[7] This effect is largely independent of sample size.

[8] There was no specific question on the share of firms with and without out-licensing activities. The question that was actually used for making the 35% estimation, a scale question, had ambiguities with regard to the answer categories/scales used that make a distinction between non out-licensing firms and actually out-licensing firms difficult.

Fig. 10 Status of out-licensing activities of firms in the sample



Source: Technopolis survey, n=325

A breakdown of Fig. 10 by company size reveals statistically significant differences between SMEs and large firms. Whereas around 45% of the SMEs out-license their patents (and some 55% do not), almost two thirds of the large firms (63%) are engaged in out-licensing.[9] A more granular breakdown of the survey results by company size reveals also the "u-shaped" out-licensing pattern discovered by Zuniga and Guellec in 2007: Smaller SMEs (firms with in between 0 and 49 employees) tend to out-license more frequently than medium-sized SMEs (with in between 50 and 249 employees). In the group of large firms, we observe again a growth of propensity to out-license with company size (see Fig. 11).

Fig. 11 Breakdown of out-licensing status by firm size 2011

Size class	**Out-licensing**		**Not out-licensing**	
	n	%	*n*	%
TOTAL	*173*	56	*134*	44
…between 0 and 49 employees	*28*	47	*32*	53
…between 50 and 249 employees	*22*	42	*30*	58
…between 250 and 499 employees	*21*	51	*20*	49
…more than 499 employees	*102*	66	*52*	34
				Pearson's chi2, p = 0.005

Source: Technopolis survey, n = 307

There were no statistically significant differences of out-licensing status in the breakdown by enterprise group, i.e. firms being part of an enterprise group or not. However, we found statistically significant differences between firms that had subsidiaries other than trade/sales representatives

[9] Pearson´s Chi2, p = 0.002

abroad (share of out-licensing firms: 62%) and those who did not (share of out-licensing firms: 42%).[10]

Statistically significant differences were also present with respect to a breakdown by industry (see Fig. 12). In our sample, the industries 'Oil, gas, basic materials' and 'Health care' had the highest shares of patent out-licensing firms.

Fig. 12 Breakdown of out-licensing status by industry

Size class	Out-licensing		Not out-licensing	
	n	%	*n*	%
TOTAL	*175*	55	*144*	45
…Oil, gas, basic materials, utilities	*30*	71	*12*	29
…General industrials	*29*	58	*21*	42
…Industrial engineering	*31*	53	*27*	47
…Consumer goods	*23*	45	*28*	55
…Health Care	*34*	67	*17*	33
…Technology-ICT	*28*	42	*39*	58
				Pearson's chi2, p = 0.013

Source: Technopolis survey, n = 319

Fig. 13 shows the breakdown of out-licensing status by technology field. Perhaps the most striking finding is the share of 70% of firms in the "Chemistry" technology field that engage into out-licensing. The differences observed are statistically significant.

Fig. 13 Breakdown of out-licensing status by technology field

Size class	Out-licensing		Not out-licensing	
	n	%	*n*	%
TOTAL	*145*	54	*121*	46
…Electrical engineering	*27*	47	*30*	53
…Instruments	*12*	52	*11*	48
…Chemistry	*53*	70	*23*	30
…Mechanical engineering	*37*	47	*41*	53
…Other technology fields	*16*	50	*16*	50
				Pearson's chi2, p = 0.038

Source: Technopolis survey, n = 266

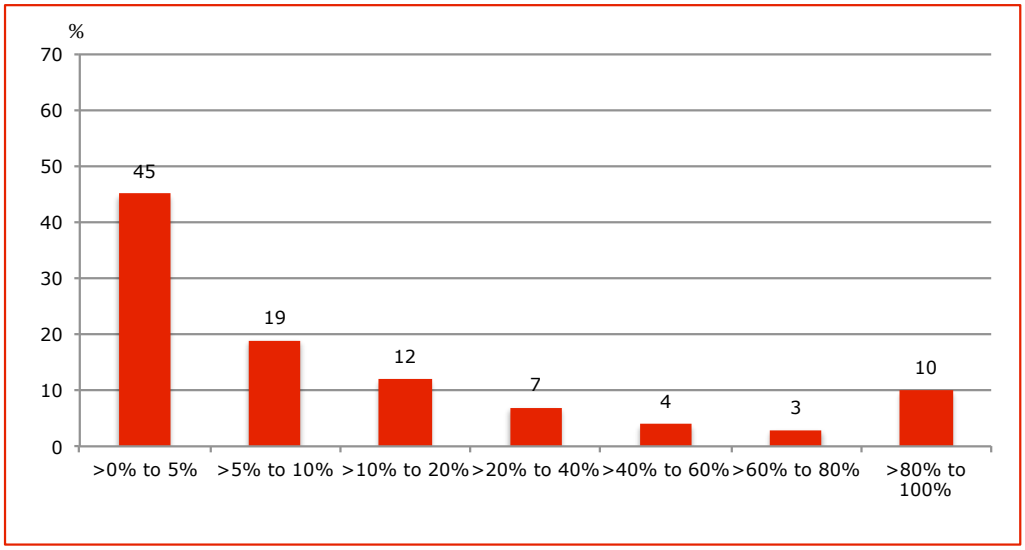
Next, we asked the firms about the share of patents in their patent portfolio which is currently licensed out. The corresponding figures are depicted in Fig. 14. It can be seen that in the majority of firms, only small parts of the patent portfolios are licensed out: For 45% of the firms at most 5%; and for another 19% between 5% and 10% of the portfolio. The distribution is

[10] Pearsons Chi2, p =0.001

decreasing, i.e. we find fewer firms in classes with higher shares of the patent portfolios being out-licensed.

The only exception is the last class (>80% to 100% of the patent portfolio being licensed out). These proportions are in line with the results of a survey of EPO patent inventors conducted within the InnoS&T project, according to which 6.6% of patents held by business enterprises are licensed. Moreover, business assignees are willing to license 6.8% of their patents (Giuri & Torrisi 2011; Gambardella et al. 2012).

*Fig. 14 Share of patents in the respondent´s patent portfolio currently out-licensed *)*



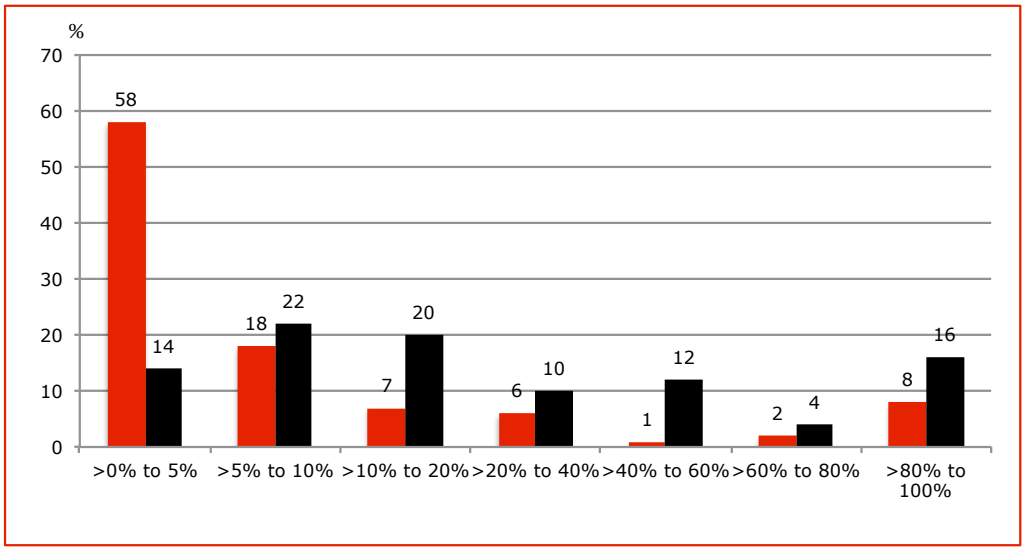
*) base (=100%): Answers only from firms which have indicated to currently out-license patents.

Source: Technopolis survey, n=173

Fig. 15 shows the breakdown of Fig. 14 by firm size. It can be seen that SMEs tend to out-license larger shares of their patent portfolio than large firms. This result is expected in a per-firm view, as large firms usually possess considerably larger patent portfolios than small firms. With SMEs, out-licensing of a few patent families can already result in a significant share of patents of the firm´s portfolio being out-licensed. This difference is, as could also be expected, statistically significant.[11] These results are in line with the InnoS&T survey which shows that 16% of patents held by firms with 10 to 19 employees are licensed (over 17% are willing to license). By contrast, only about 6% of patents held by firms with more than 250 employees are licensed (6-7% are willing to license) (Giuri & Torrisi, 2011). A reason for these findings is the different endowment of complementary assets.

[11] Fishers exact, p = 0.000

*Fig. 15 Share of patents in the respondents´ patent portfolio currently out-licensed, by firm size *)*

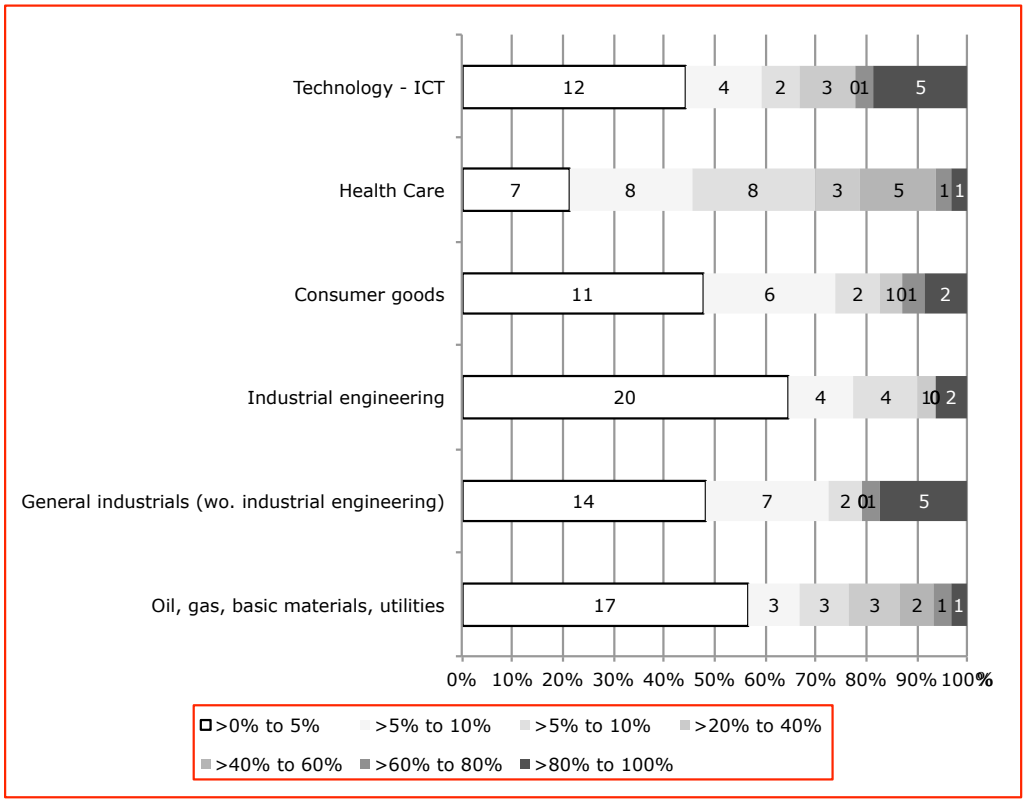


*) base (=100%): Answers only from firms which have indicated to out-license patents.

Source: Technopolis survey, n (large firms) = 122; n (SMEs)=49

Fig. 16 shows the breakdown of the shares of patents in the respondents´ patent portfolio being out-licensed by industry. We find that out-licensing of patents is commonplace in the Health care sector, which shows the smallest share of firms not engaged in patent out-licensing. Second in terms of out-licensing activity is the Technology-ICT sector. In this sector we observe a polarised picture, with one group of firms being rather intensely engaged in out-licensing, while the other group (12 firms) is not engaged. The sector with the least amount of out-licensing activities is Industrial engineering (more than 60% of the firms not out-licensing any of their patents).

*Fig. 16 Share of patents in the respondents´ patent portfolio currently out-licensed, by industry, firms in absolute numbers *) **)*



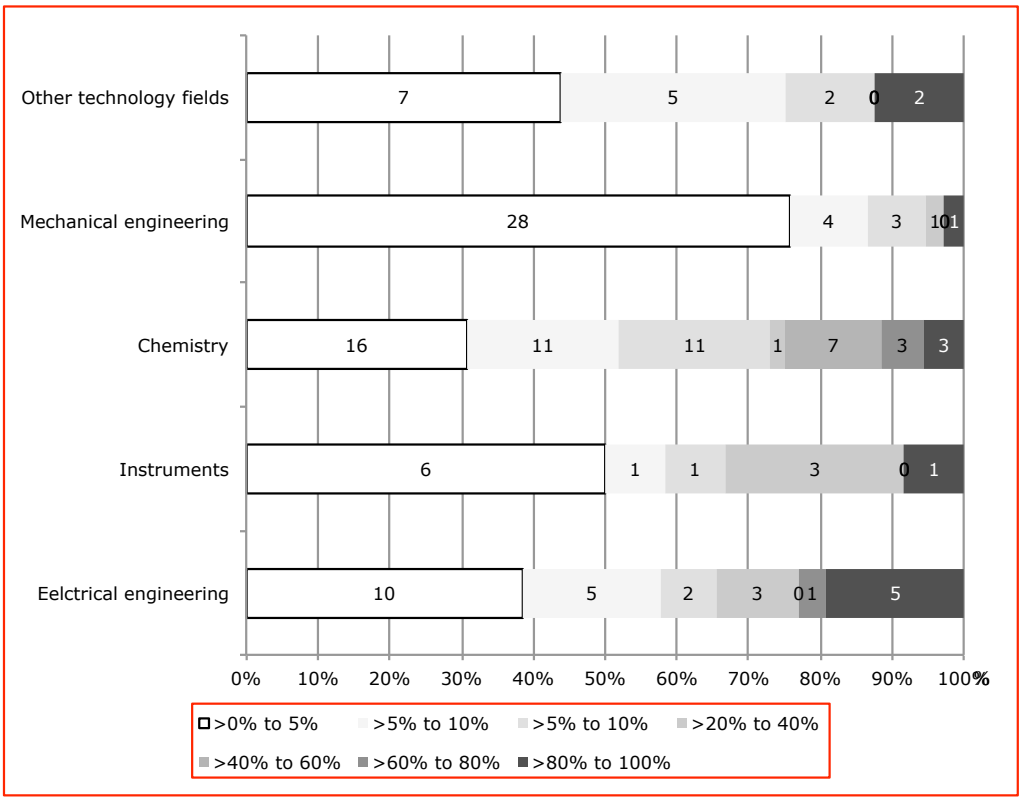
*) base (=100%): Answers only from firms which have indicated to out-license patents.

**) Note: The more grey-shaded the bars, the more out-licensing activity in the respective industry (per-company view)

Source: Technopolis survey

In line with the picture above, in the breakdown by technology field we find that the largest shares of patent portfolios are typically out-licensed by firms in the fields "Chemistry" and "Electrical engineering" (see Fig. 17). "Mechanical engineering" is the field where we observe the least amount of out-licensing activity.

*Fig. 17 Share of patents in the respondents´ patent portfolio currently out-licensed, by industry, firms in absolute numbers *) **)*



*) base (=100%): Answers only from firms which have indicated to out-license patents.

**) Note: The more grey-shaded the bars, the more out-licensing activity in the respective technology field, in the per-company view

***) Note: Interpretation for "instruments" (n = 12) and "Other technology fields" (n = 16) with care!

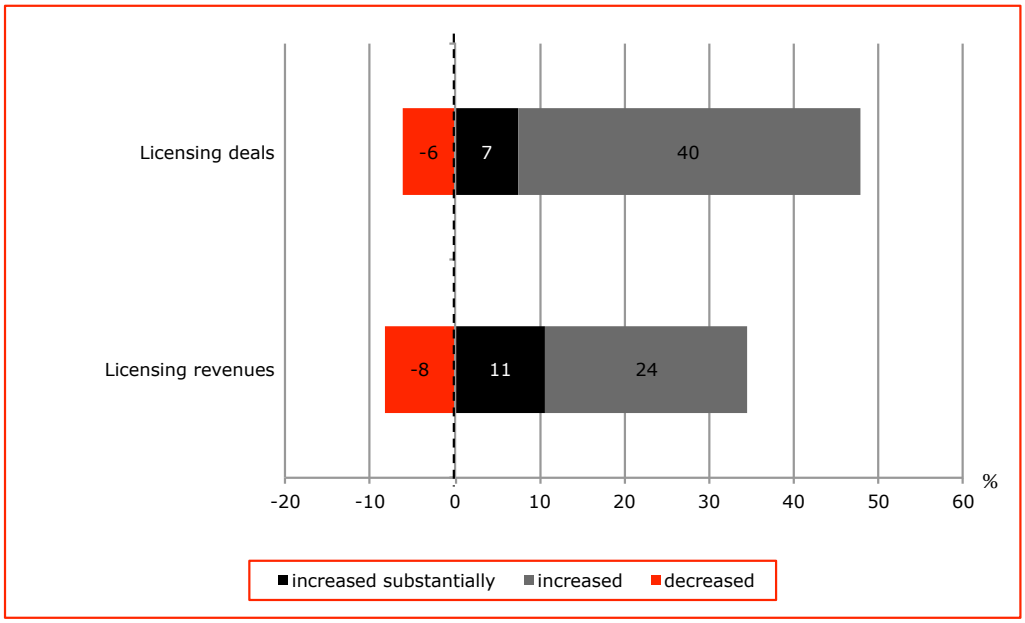
Source: Technopolis survey

Apart from enquiring into the current status of the licensing activities, we also asked respondents to report whether the number of licensing deals as well as the licensing revenues increased substantially, increased, stayed the same or decreased between 2008 and 2011 (see Fig. 18).

As can be seen, the net effect is that licensing deals and licensing revenue both increased in the timeframe under investigation: Whereas only 6% of the firms reported that the number of licensing deals decreased, 7% stated that the number of licensing deals increased substantially and 40% that they increased. As for the licensing revenues, 8% reported decreasing revenues, 11% substantially increasing and 24% increasing revenues.

This question was similarly phrased in the survey of Zuniga and Guellec (2009) for the period of 2003 to 2006, where a positive net effect (i.e., a general increase) was also observed. Notwithstanding the year 2007, for which there is no reason to believe there was a drop of licensing activities, we conclude that the trade of patents via licensing has further increased compared to the time period in which Zuniga and Guellec performed their survey.

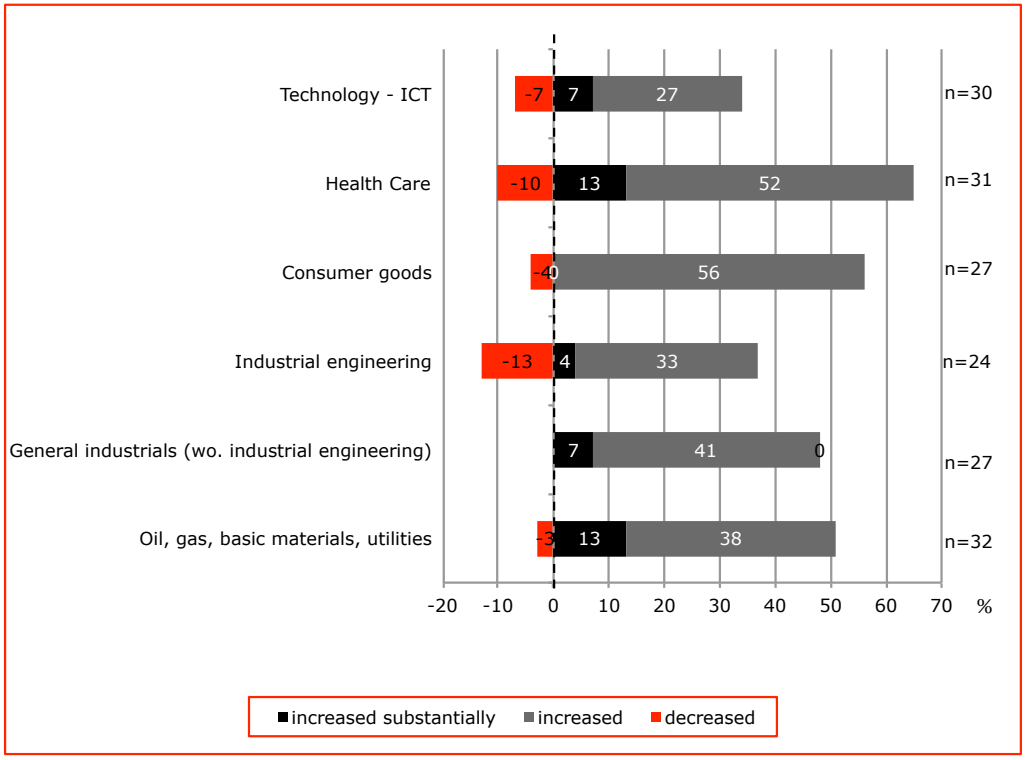
Fig. 18 Evolution of the number of licensing deals and licensing revenue between 2008 and 2011, firms in %



Source: Technopolis survey, n (licensing revenues) = 176, n (licensing deals) = 148

Fig. 19 shows the evolution of the number of licensing deals, broken down by industry. The growth in the number of licensing deals can be observed across all industries. Hence, we conclude that the growing significance of patent and technology licensing is not due to sectorial effects.

Fig. 19 Evolution of the number of licensing deals between 2008 and 2011, by industry, firms in %

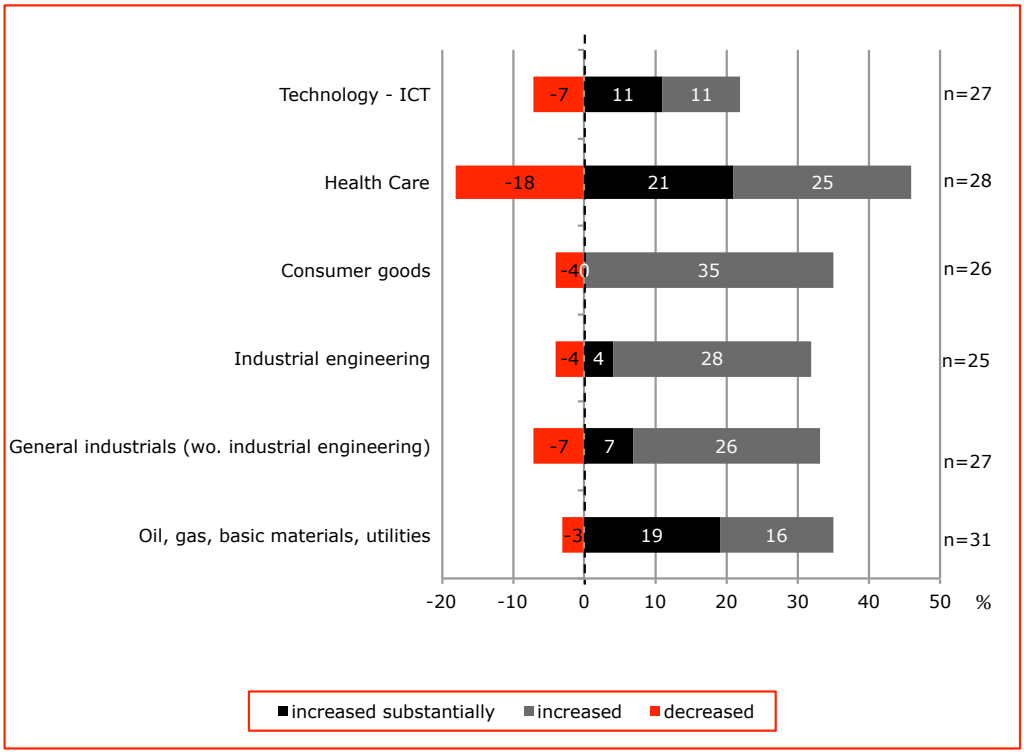


Source: Technopolis survey

The picture of the growing importance of patent out-licensing across all industries is also reflected in the chart on the evolution of licensing revenue obtained between 2008 and 2011 (see Fig. 20). However, in this figure we see a slightly more polarised picture, particularly in the Health care sector. In Health Care, a remarkable 18% declared to obtain less licensing revenue, while around 46% stated to experience at least "increasing" revenue streams (the largest combined share for all industries).

We theorise that this bi-polar picture may be the result of the long development times in the Health care industry, where some firms are faced with the expiry of patent protection for key technologies/drugs (without proper replacements in the pipeline) or with negative results in later clinical stage trials for technologies/drugs that proved promising in earlier development stages, while other companies by contrast were just able to develop such "blockbuster" drugs.

Fig. 20 Evolution of licensing revenue by industry, firms in %



Source: Technopolis survey

As regards a breakdown of Fig. 18 (development of licensing revenue and deals) by company size or by enterprise group (being part of an enterprise group or not), we did not find any statistically significant differences. However, there were statistically significant results reported between firms that have subsidiaries other than trade/sales representatives abroad and those who do not. The latter group reported to a larger extent an increase in volume of licensing revenue,[12] although there were no such statistically significant differences with regard to the number of licensing deals reported.

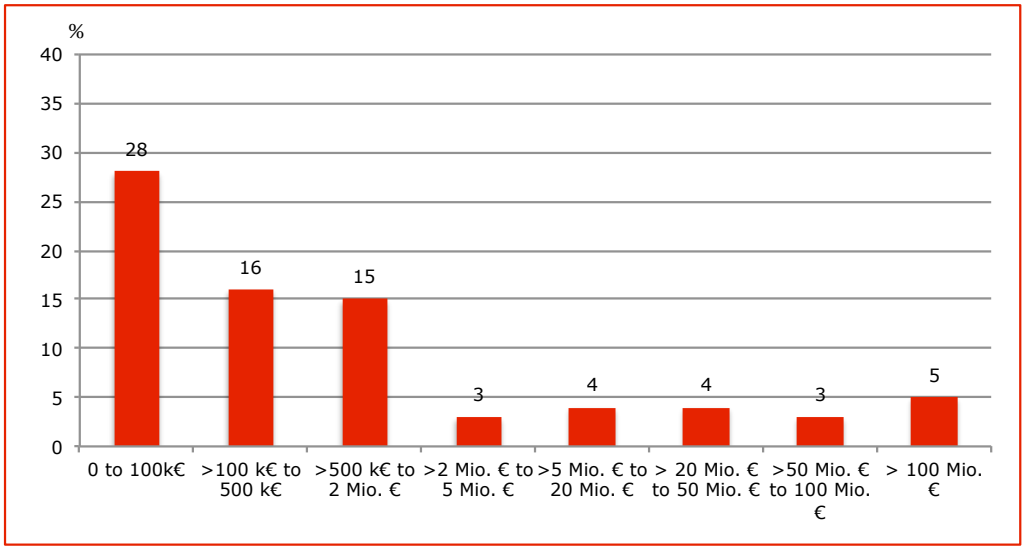
Eventually, we inquired into the approximate volume of the out-licensing transactions in 2011 in monetary terms. As can be expected, this is probably one of the most sensitive pieces of information a firm would forward in such a survey. In the end, 75 firms replied to this question. Of these, 13 (or around 17%) declared that this figure is confidential, and a further 4 (5%) reported this figure to be unknown. From the remaining 58 firms, we obtained the distribution of licensing revenues as indicated in Fig. 21.

It can be seen that the distribution of licensing revenue is skewed, with most firms receiving rather little licensing revenues. 28% obtained €0 to €100,000 in 2011, a further 16% in the sample between €100,000 and €500,000; only 5% (4 firms) declared to obtain more than € 100 Mio in 2011 in licensing revenues. The skewed distribution observed is a rather qualitative indication that this distribution may be also observed in the

[12] Fisher´s exact, p = 0.031

overall population of patent-licensing firms, but because of the low number of responses this finding is of rather little statistical representativeness.

Fig. 21 Licensing revenues generated in 2011 through patent out-licensing



Source: Technopolis survey, long questionnaire only, n = 58

2.2 Out-licensing flows

In this section, we provide an analysis of patent out-licensing flows. For this purpose, we asked respondents about the extent of out-licensing activities to various types of firm partners (affiliated with the company, not affiliated with the company) as well as the share of patents for which exclusive licenses have been granted and for which cross-licensing deals have been concluded. Extent of out-licensing activity is measured in the share of the patent portfolios out-licensed in the respective category (e.g., for exclusive licenses, firms stated what share of the patent portfolio was exclusively licensed). We only considered actively out-licensing firms for this analysis. In addition, among those firms that stated to out-license patents to non-affiliated partners, we also asked where these licensing partners are located (in terms of world regions) and positioned (in the value creation chain) as well as to what extent the licensing partners were SMEs and company spinouts. [13]

Care must be taken when interpreting the results, particularly because the analysis is on a per-company basis. When an SME states that it out-licenses 80% to 100% of its patents exclusively, it is included in the same manner in the analysis as a large firm that out-licenses 80% to 100% of its patent portfolio. However, 80% to 100% of a large firms patent portfolio typically includes substantially more patents than 80% to 100% of a small SMEs patent portfolio. Hence, in such an analysis, the figures do not allow for conclusions such as how many patents of the existing stock of patents are, for example, subject to licenses. This latter type of question can be answered if the share of patents out-licensed by one firm is linked to the

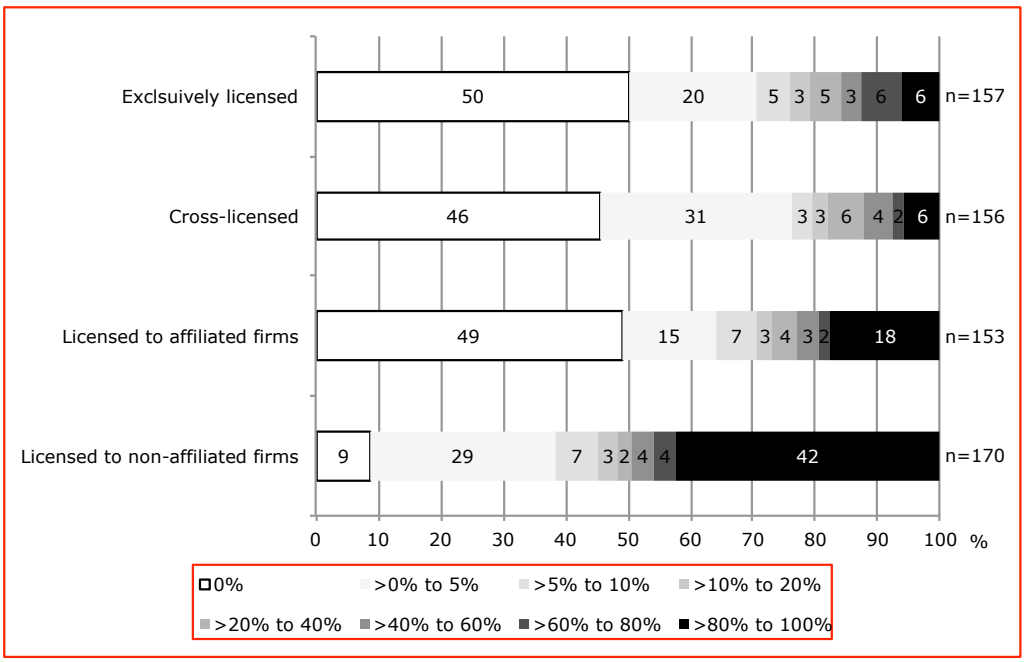
[13] We included the said questions in both the long and the short questionnaire. However, in the short questionnaire, we dropped the answer categories for SMEs and spinouts.

number of patents, i.e. the size of the patent portfolio of this company (per-patent view).

In the per-company view, a firm may state that it out-licenses 0% of its out-licensed patents to affiliated firms and >80% to 100% to non-affiliated firms. It may also indicate that >0% to 5% of its out-licensed patents are subject to exclusive licensing deals and >20% to 40% of the out-licensed patents are actually cross-licensed. The aggregate results of all such responses are depicted in Fig. 22.

At first glance, it can be seen that most out-licensing activity takes place between non-affiliated firms, as around 42% of the firms stated that they out-license >80% to 100% of its out-licensed patents to firms not affiliated with them. Only 9% of the firms stated that non-affiliated firms were not targets of their out-licensing activities. By contrast, 49% of the firms reported that they do not out-license to affiliated firms.

*Fig. 22 Shares of patents, among patents licensed out, which are exclusively licensed, cross-licensed and licensed to affiliated as well as to non-affiliated firms, firms in % *) **)*



*) Base (=100%): Firms which are out-licensing patents

**) The more a bar is grey-shaded or black, the more out-licensing (exclusive licensing, cross-licensing, licensing to affiliated firms, licensing to non-affiliated firms) takes place (per-company view).

Source: Technopolis survey

It can be argued that being part of an enterprise group influences the propensity to out-license to affiliated partners as well as to non-affiliated partners. As can be expected, firms which are not part of an enterprise group out-license higher shares of their patent portfolio to non-affiliated partners than firms which are part of a group (see Fig. 23). But even in the group of firms that are part of an enterprise group, 29% out-license >80% to 100% of their patents to non-affiliated entities.

Similarly, we see statistically significant differences for out-licensing to non-affiliated firms between firms that have subsidiaries abroad other than trade representatives and those firms that do not. Firms without subsidiaries out-license more of their patent portfolios to non-affiliated firms than firms with subsidiaries.[14] As can be expected, not least from the per-firm view, SMEs tend to out-license higher shares of their stock of out-licensed patents to non-affiliated parties than large firms.[15]

[14] Fisher´s exact, p = 0.002

[15] Fisher´s exact, p = 0.000

Fig. 23 Shares of patents, among patents licensed out, which are licensed to non-affiliated firms, by status of being part of an enterprise group or not, firms in %

Share of patents being out-licensed to non-affiliated partners	Firms being part of enterprise group [%]	Firms not being part of enterprise group [%]
0%	11	4
>0% to 5%	41	16
>5% to 10%	8	6
>10% to 20%	4	1
>20% to 40%	1	4
>40% to 60%	2	6
>60% to 80%	4	3
>80% to 100%	29	59
TOTAL	100	100
n	*93*	*68*
		Fisher´s exact, p = 0.001

Source: Technopolis survey

As for cross-licensing and exclusive licensing, we see in the per-firm view that, by comparison, relatively small shares of the patents out-licensed are exclusively out-licensed or cross-licensed. Only 6% of the firms license >80% to 100% of their out-licensed patents in an exclusive manner. The same share of the firms has >80% to 100% of their out-licensed patents cross-licensed. By contrast, 50% of the firms do not license out exclusively at all, and 46% of the firms out-licensing do not engage in cross licensing.

However, we do not want to talk about a relative unimportance of exclusive and cross-licensing, as such licensing is at the least very important in certain industries and for certain company groups. There are a number of statistically significant and interesting differences across various types of companies:

- As regards cross-licensing, SMEs engage less often in cross-licensing than large firms (whereas 70% of the SMEs have "o%" of their patent portfolio cross-licensed, this is only the case with 37% of the large firms).[16] This result can be expected, as the attractiveness of a firm as partner for cross-licensing depends on the size of its patent portfolio pertaining to a particular technology. Firms that have subsidiaries abroad other than trade/sales representatives are also more frequently cross-licensing than their counter-parts.[17]
- As regards exclusive licensing, we find that firms without foreign subsidiaries tend to out-license more often exclusively than those with

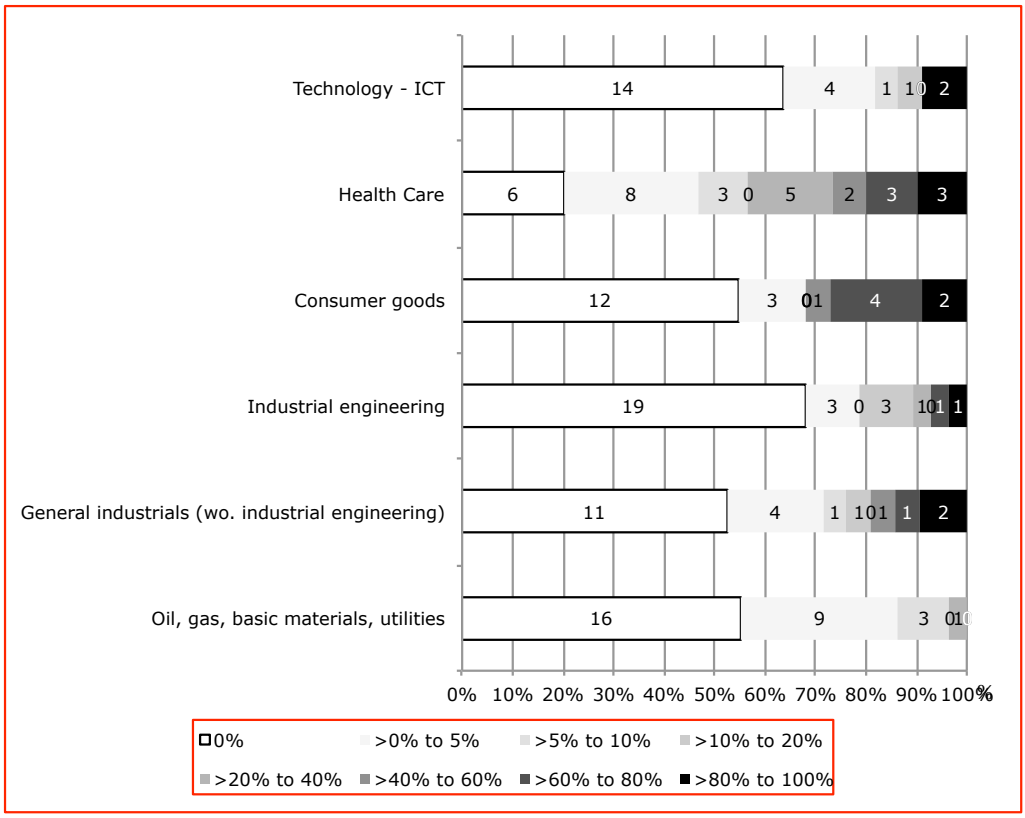
[16] Fisher´s exact, p = 0.006

[17] Fisher´s exact, p = 0.020

subsidiary.[18] This is potentially indicative of market entry/access strategies using exclusive patent licensing contracts.

A breakdown by industry reveals some distinctive patterns. With regard to exclusive licensing, we find that by comparison most exclusive licensing takes place in the Health Care sector (see Fig. 24). The usage of patents as currency in this industry, as well as the fact that this industry is characterised often as one-patent-one-product industry, may explain this result.

*Fig. 24 Shares of patents, among patents licensed out, which are licensed out exclusively, by industry, firms in absolute numbers *) **)*



*) Base (=100%): Firms which are out-licensing patents

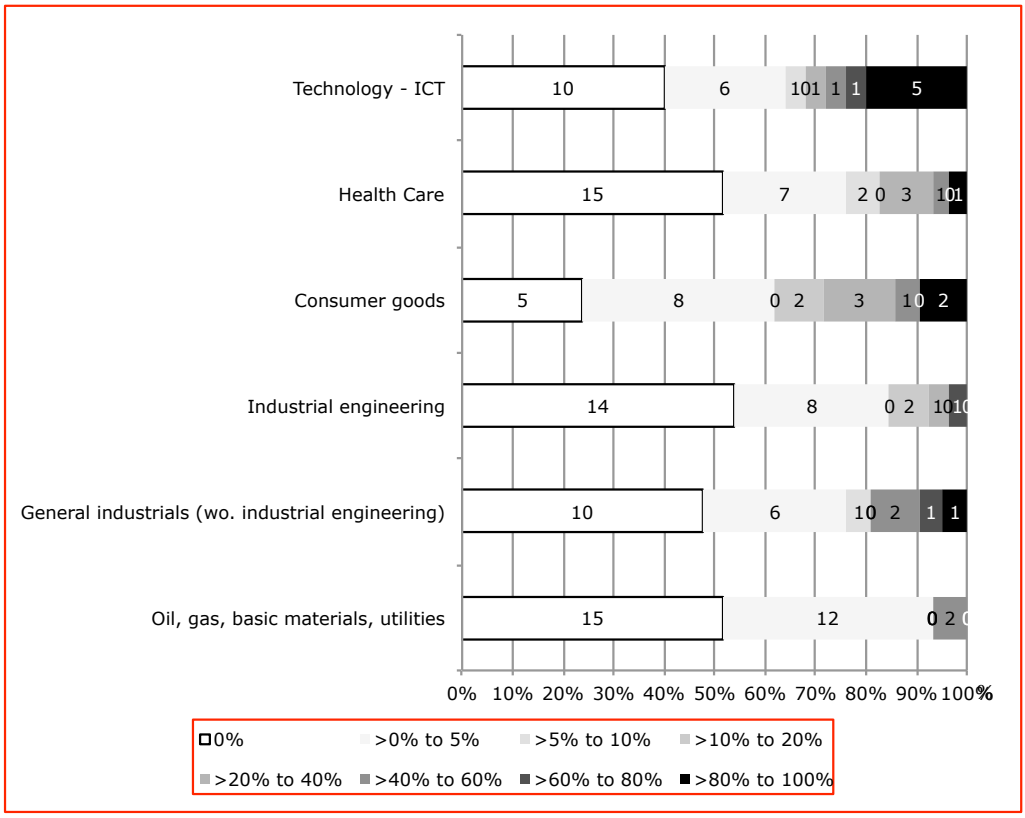
**) The more a bar is grey-shaded or black, the more out-licensing (exclusive licensing, cross-licensing, licensing to affiliated firms, licensing to non-affiliated firms) takes place (per-company view).

Source: Technopolis survey

Looking at cross-licensing, we observe that this type of licensing activity is particularly an issue for a cluster of companies in the Technology-ICT sector and in Consumer goods (see Fig. 25). These results are in line with the observations from our interviews that cross-licensing is an issue mostly for a smaller number of firms which have to deal more with standards.

[18] Fisher´s exact, p = 0.032

*Fig. 25 Shares of patents, among patents licensed out, which are cross-licensed, by industry, firms in absolute numbers *) **)*



*) Base (=100%): Firms which are out-licensing patents

**) The more a bar is grey-shaded or black, the more out-licensing (exclusive licensing, cross-licensing, licensing to affiliated firms, licensing to non-affiliated firms) takes place (per-company view).

Source: Technopolis survey

We now turn our attention to patent out-licensing flows to different (world) regions (see Fig. 26). The flows indicated are only for out-licensing flows to non-affiliated licensees. It can be seen that such trade of patents is, in the per-company view, mostly a pan-European phenomenon for the European respondents in our survey. Only 13% of the respondents state that there are no licensees located in Europe, 21% license out >0% to 5% of their out-licensed patents to non-affiliated parties in Europe, 7% license out >5% to 10% of their respective portfolio in Europe and so on. Around 25% license 80% to 100% of their respective patent portfolio to non-affiliated partners in Europe – a figure which is 11%-points higher than the respective figure for North American licensees and for licensees located in the same country as the licensors, respectively.

The second most important 'patent out-licensing' trading region is, overall, North America. This finding clearly underlines the importance of the North American, particularly U.S., (IP) market in the global context, and also implies that European policymakers should give good consideration to European filing activity at the U.S. patent office and respective U.S. IP practices. Only 37% of the firms had no partner among their non-affiliated licensees in the U.S.

The third most important patent licensing trade region is the same country, that is, patent out-licensing taking place between non-affiliated partners within the same country. This result may be at first surprising. However, one needs to take the different country sizes into account. For German firms, for example, we find that only 17% have no licensee in Germany, 21% have no licensee in Europe and around 45% have no licensee in the U.S.

Interestingly, Asian countries fall back considerably as licensees for European technology. Ranked forth is Japan, which is only slightly ahead of China and 'other' Asian countries. For at least around 85% of the answering European companies, Korea, South America, other parts of the world and India are currently not the subject of patent out-licensing deals with non-affiliated partners. [19]

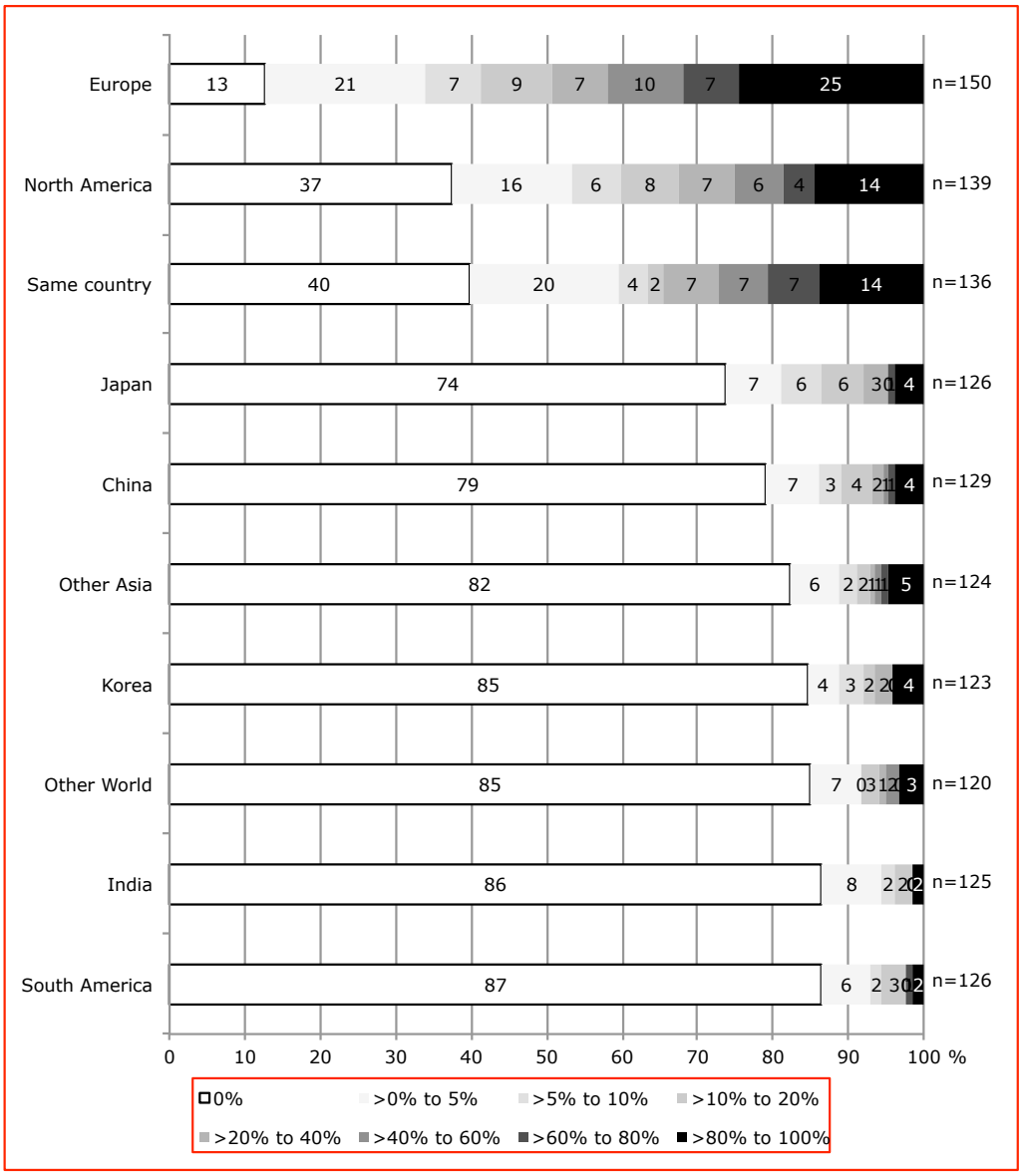
We did not find statistically significant differences in a breakdown of out-licensing regions by company size or by distinguishing firms with or without a subsidiary abroad other than a sales/trade representative. For firms that are part of an enterprise group, we only find that firms, which are part of an enterprise group, tend to have licensees in North America more often than their respective counterparts that are not part of a group.[20]

A breakdown by industry shows more intense licensing streams to North America in the Health care sector and a higher propensity to license out patents to non-affiliated partners in North America and in Asian regions (Japan, China, Korea, Other Asia) in the Technology-ICT sector. By contrast, out-licensing is much more confined to Europe than in the average view in Industrial engineering. In order to improve readability, we provide the charts for the breakdowns by industry separately in Annex A.

[19] As can be seen in Figure 26, a decrease of the number of responses in the answers relating to Asian regions and particularly the other parts of the world is visible, if compared to answers for Europe, North America and the 'same country'. That is, we found firms that ticked off answers for North America, Europe and the `same country' but not for the other regions. If we assume that most of these 24 to 30 respondents would have ticked off "0% of patent portfolio licensed" to the respective region – and simply chose for convenience not to fill in the answers -, the share of European firms NOT licensing to partners outside of Europe or North America would have been well above 95%.

[20] Fisher´s exact, p = 0.044

*Fig. 26 Shares of patent portfolios licensed to licensees located in different regions of the world, firms in % *) **)*



*) base (100% in the legend box): patents out-licensed to non-affiliated parties

**) The more a bar is grey-shaded or black, the more out-licensing takes place from Europe into the respective region in a per-firm view.

Source: Technopolis survey

In the next step, we have analysed out-licensing patterns to non-affiliated parties in the value creation chain. The respective data is provided in Fig. 27. It can be easily seen that the majority of patent trade via out-licensing concerns trade between competitors. Only 36% of the responding firms reported not to out-license to competitors, while about one out of five firms stated to license out >80% to 100% of their respective portfolio to competitors.

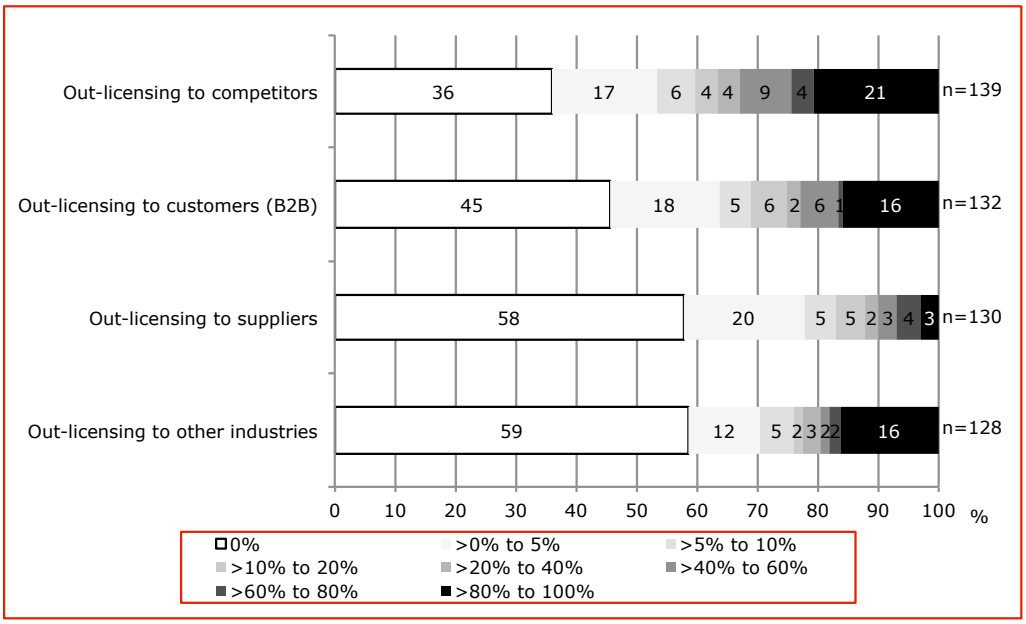
The second most important 'trade area' is out-licensing to customers in the course of business-to-business (B2B) relationships, i.e. suppliers licensing to their clients. In this category, 45% of the firms reported to have no

licensees, while 16% declared to license >80% to 100% of the respective portfolios. The flow from suppliers to clients seems to be more relevant in practice than the flow in the other direction towards the suppliers.

To note is also licensing flows to other industries and technology fields. A firm active in one industry may want to use its patents internally only for its own business activities and decide to license the patents to firms active in other business areas, increasing hereby the spectrum of usages of the patented technology and creating additional revenue. The resulting picture is rather polarised: While around 59% of the firms have no licensees in other industries, some 16% out-license >80% to 100% of their respective patents to companies active in other business areas.

Statistically significant differences in the observed patterns in the breakdowns by enterprise group, by foreign subsidiaries and by firm size concern the out-licensing to non-affiliated B2B customers. SMEs tend to out-license larger shares of their respective portfolios to customers (B2B) than large firms.[21] This is also true vis-à-vis their respective counterparts for firms which are not part of an enterprise group[22] and for firms which do not have a subsidiary other than a trade/sales representative abroad.[23]

*Fig. 27 Shares of patent portfolios licensed to licensees at different positions in the value creation chain, firms in % *)*



*) base (100% in the legend box): patents out-licensed to non-affiliated parties

**) The more a bar is grey-shaded or black, the more out-licensing takes place from European firms in the respective value chain categories in a per-firm view.

Source: Technopolis survey

A breakdown of licensing flows along the value chains by industry shows that in 'Oil, gas, basic materials and utilities' there are strong flows to B2B

[21] Fisher´s exact, p = 0.001

[22] Fisher´s exact, p = 0.015

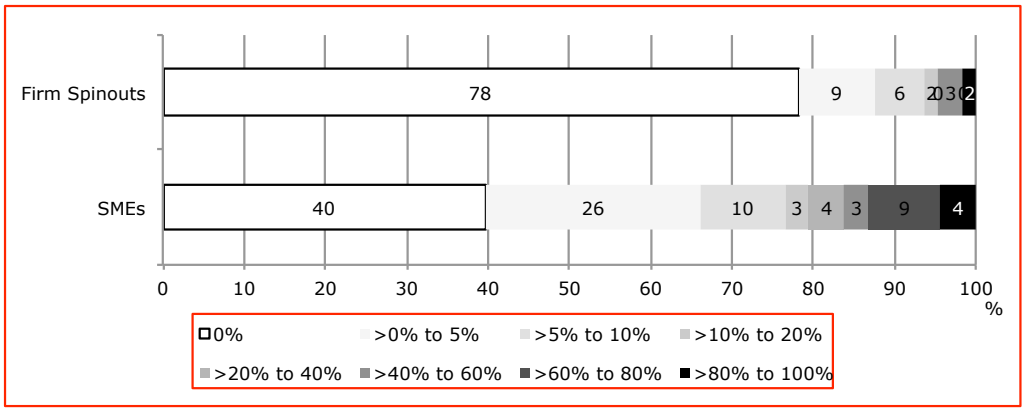
[23] Fisher´s exact, p = 0.004

customers: About one out of four license out 80% to 100% of their patents to such customers, while only around one out of ten license 80% to 100% of their patents to competitors and firms in other industries. In Health care, we also observe strong flows to B2B customers and very little licensing activity towards suppliers. The breakdowns of the value chain flows are presented, for reasons of better readability, in Annex B.

Eventually, we took a look at out-licensing flows to non-affiliated SMEs and spinouts from the firms (see Fig. 28). Licensing flows to non-affiliated spinouts seem to be a rare occurrence: 78% of the firms responding to this question had no such licensees. A possible explanation for this result is that spinouts may be either in some form affiliated with the company they have spun out of or the needed stock of patents is transferred completely to the spin-out (ownership transfer) rather than being licensed. Of course, many firms may not have spinouts after all.

As concerns licensing to non-affiliated SMEs, we note that 40% of the firms had no such SMEs as licensing partner (Fig. 28), and 26% had at most 5% of their portfolios licensed to SMEs. Only 4% have licensed >80% to 100% of their portfolio to SMEs. There are no statistically significant differences between large firms and SMEs in a breakdown of this question. Anecdotal evidence from phone interviews suggests that for large firms SMEs may often not be a viable target for the out-licensing of patents simply due to unfavourable cost/benefit considerations.

*Fig. 28 Shares of patent portfolios licensed to SMEs and own company spin-outs, firms in % *)*



*) base (100% in the legend box): patents out-licensed to non-affiliated parties

Source: Technopolis survey, long questionnaire only, n (SMEs) = 68, n (Spinouts) = 64

2.3 Motives for patent out-licensing

We asked respondents of the survey about their motives to engage in patent out-licensing. This question was open to all respondents who either out-licensed patents at the time of the survey, or were considering this for the future. The results are presented in Fig. 29 as averages (arithmetic means, on a scale from 1='unimportant motive' to 4= 'very important motive') below.

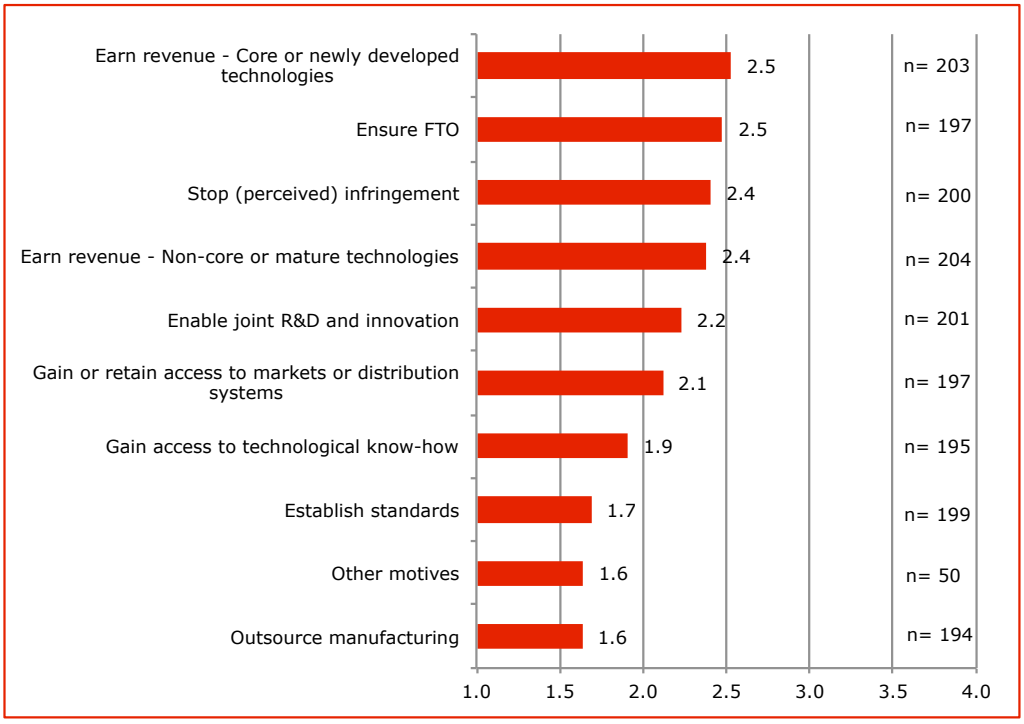
To date, the two most important motives to engage in patent out-licensing are to earn revenue from core or newly developed technologies and to ensure 'freedom-to-operate', with an arithmetic mean of around 2.5 on the 4-tier scale used. Almost as important are also stopping perceived

infringement and earning revenue from non-core/mature technologies (arithmetic means 2.4, respectively). Ranking fifth, with an average importance grade of 2.2, is 'enabling joint R&D and innovation'. Rather 'weakly important' are the motives to gain access to markets and distribution systems and to gain access to technological know-how. Establishing standards, outsourcing manufacturing are, on average, 'unimportant' to 'weakly important'.

While, on average, 'other' motives are also of rather little importance it is still noteworthy to look into what respondents mentioned to be 'other' motives. The 19 respective comments pointed to a variety of such motives, such as:

> *"Recognition of our development"* (respondent)
>
> *"Need on the side of key customers"* (respondent)
>
> *"Further development of the technology through licensee"* (respondent)
>
> *"Relationship management"* (respondent)
>
> *"Control of affiliates"* (respondent)
>
> *"Lowering costs of patenting"* (respondent)

*Fig. 29 Motives to out-license patents *)*



*) arithmetic means on a scale from 1='unimportant motive' to 4= 'very important motive'

Source: Technopolis survey

A comparison with other studies on patent out-licensing shows similar patterns, but there are also differences. Zuniga & Guellec (2009), for example, assessed that the revenue generating function of out-licensing was *"…by far…"* the most important motive in their survey, a finding that was said to be in line with a previous survey by Gambardella (PatVal

survey, 2005, cited by Zuniga & Guellec (2009)[24]. Another smaller scale survey conducted in the "Globinn 7FT" project, based on face-to-face in-depth interviews with IP and licensing executives of 22 firms in 6 different EU countries (Gambardella & Torrisi 2010), showed that a new source of revenue, freedom to operate and the lack of complementary marketing/manufacturing capabilities are important reasons for licensing.

Differences between our and earlier surveys might be, on the one hand, due to different methodological approaches. We used scales for a subjective assessment by the respondents in our survey, while Zuniga & Guellec estimated importance through shares of patents/patent portfolios licensed under the respective motive. On the other hand, at least five years have passed since Zuniga & Guellec conducted their survey, and we may also be seeing some changes in the motivational patterns.

Fig. 29 represents the average assessment of all respondents across all industries and business models employed. Different out-licensing strategies with different motives can define the core business models of entire groups of firms (however small these groups may be), and an average view will not do this heterogeneity justice. Hence, there is a need to look at the figures in greater detail.

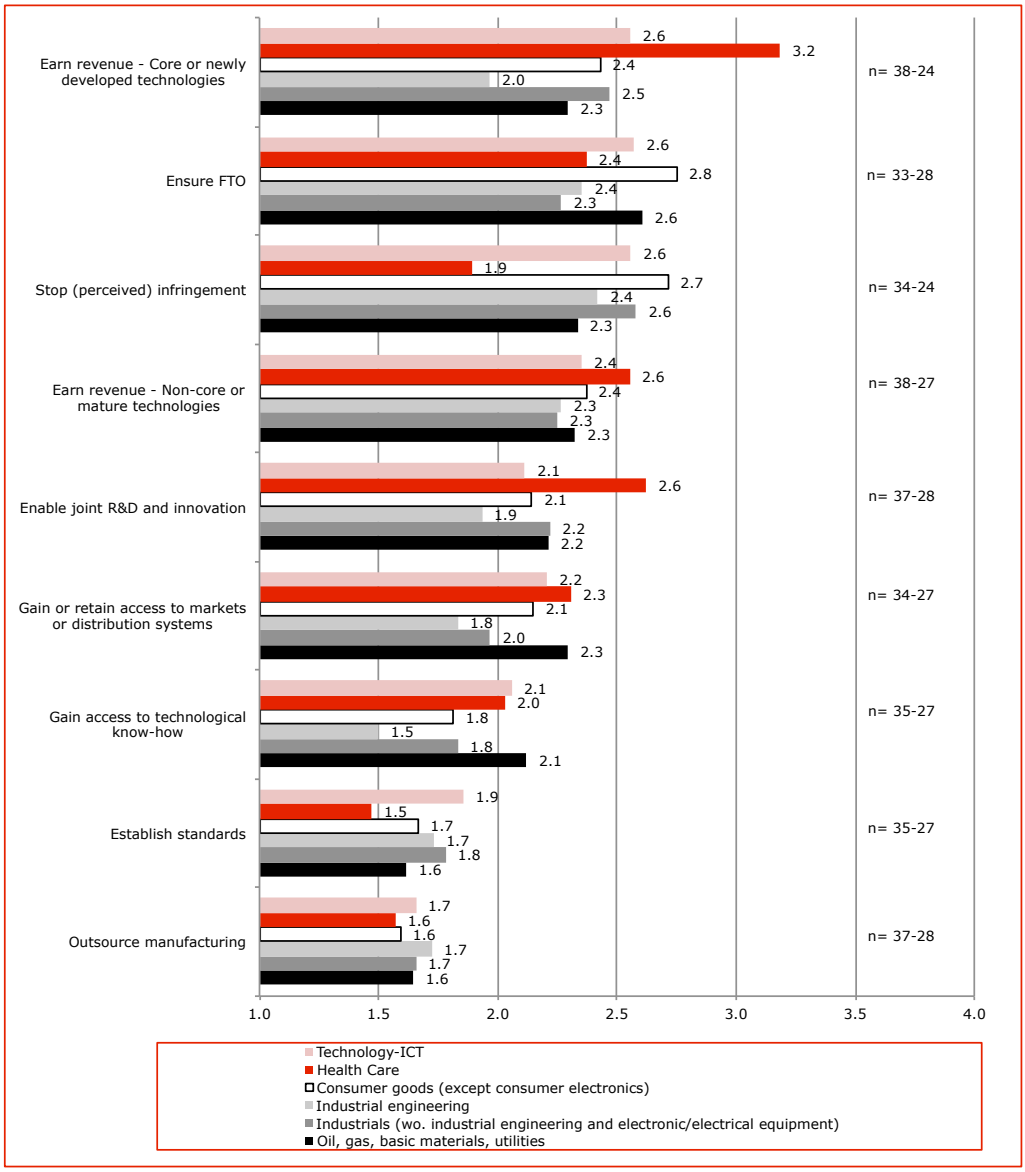
Fig. 30 shows the breakdown of motives to out-license by industry. We find a number of interesting differences. Specifically striking is a distinctive motivation pattern of firms in the health care sector. These firms are particularly motivated by earning revenue from core/newly developed products (average rating: 3.2), which is an importance rating at least 0.6 grade-points higher than in the other industries. The health care sector puts also more emphasis on the motive to enable joint R&D and innovation (average rating: 2.6, at least 0.4 grade points higher rated than in the other industries). By contrast, the sector places less emphasis on stopping perceived infringement (average rating: 1.9 and thus at least 0.4 grade-points lower than in the other industries) and it also tends to be the least concerned about establishing standards.

A different picture can be seen in the consumer goods sector. Here, the most important motive is to ensure freedom-to-operate (average rating: 2.8), followed by stopping perceived infringement (2.7). The revenue-earning motives are 'only' third and forth. Stopping perceived infringement is also the prime motive for firms in the 'industrials' sector (2.6) and of significance also for the 'industrial engineering' sector.

The ICT sector is noteworthy as it shows a number of motivations which are valued at almost the same importance level: Revenue earning motives, ensuring freedom-to-operate and stopping perceived infringement all achieved average importance rating of 2.4 to 2.6 on our four-tier scale. Establishing standards tends to be also more important than in many other sectors, although the differences are not that pronounced.

[24] The survey by Zuniga and Guellec was, as stated earlier, actually conducted in 2007.

*Fig. 30 Motives to out-license patents, by industry *)*

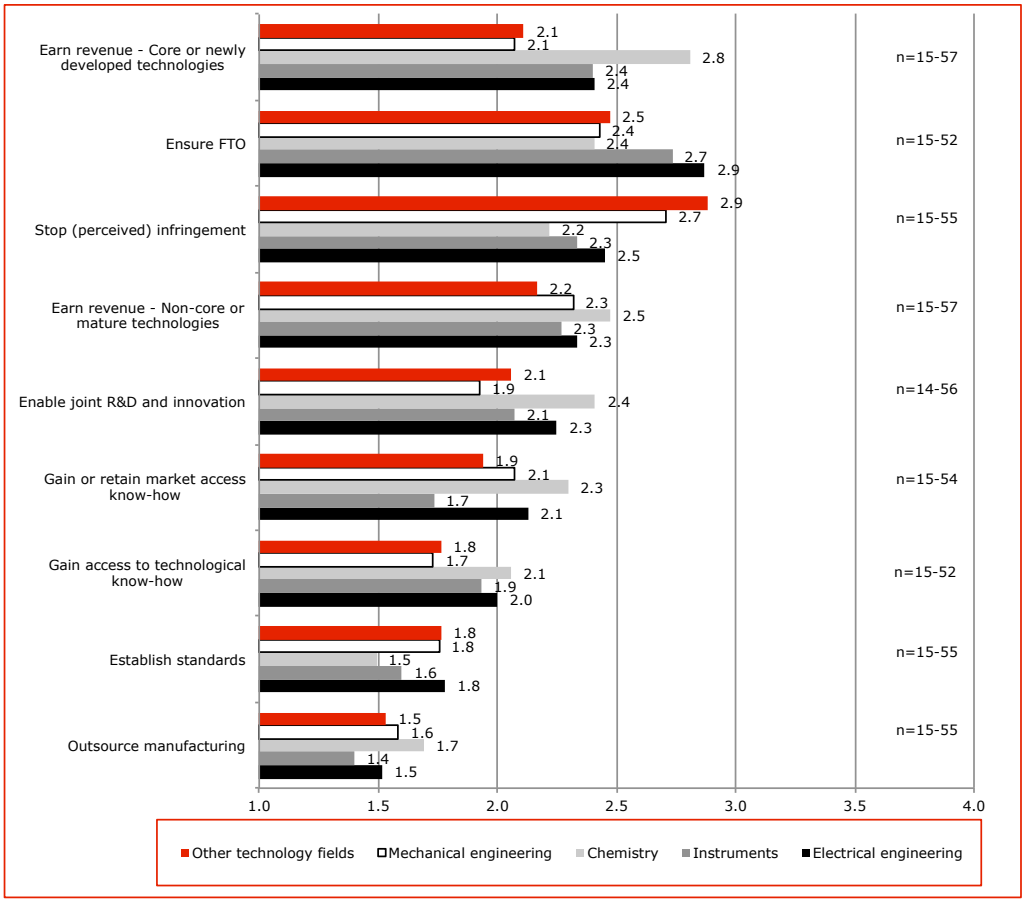


*) arithmetic means on a scale from 1='unimportant motive' to 4='very important motive'

Source: Technopolis survey

The breakdown by technology classes reveals also some notable differences (see Fig. 31). For example, ensuring freedom-to-operate seems to be a particularly important motive for firms who have patents predominantly in the field of electrical engineering (average rating: 2.9). This could be due to the fact that products based on electric components are often made up of many patented technologies, and in order to ensure that such products can be brought to market, FTO is very important. For 'chemistry' we find that the revenue-generating motive for new/core products is a particularly important motive (average rating: 2.8), considerably higher rated than in 'mechanical engineering' (average rating: 2.1). For firms with patents predominantly in mechanical engineering, the main motive is to stop perceived infringement.

*Fig. 31 Motives to out-license patents, by technology field *)*



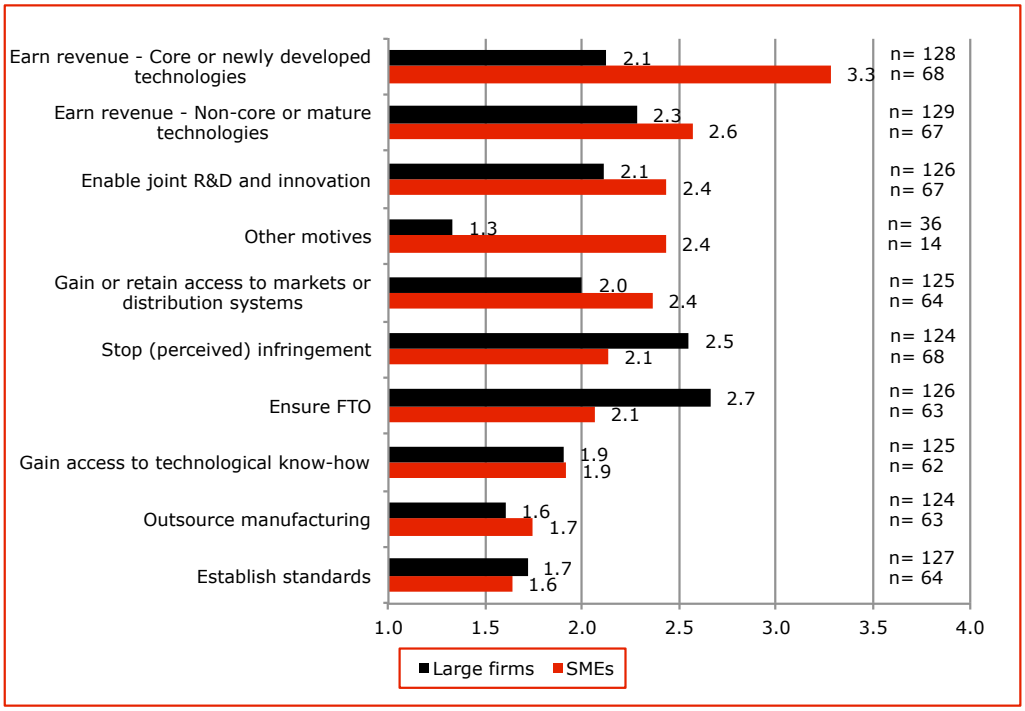
*) arithmetic means on a scale from 1='unimportant motive' to 4='very important motive'

Source: Technopolis survey

A breakdown by firm size shows that SMEs and large firms seem to have, on average, in many ways different motivation profiles. For SMEs, earning revenue from newly developed/core technologies is by far the most important motive (see Fig. 32). The same motive is, by contrast and on average, of rather low relevance for large firms. SMEs are also looking more to earn revenue from non-core/mature technologies and to use out-licensing as an enabler for 'joint R&D and innovation' and to 'gain market access/access to distribution systems'. This finding is in line with the SMEs higher need for complementary (access to) resources. Large firms motives are dominated by ensuring freedom-to-operate, followed by stopping (perceived) infringements and capitalising on non-core/mature technologies.

Interestingly, there are hardly any differences when it comes to the motives of establishing standards or to outsourcing manufacturing, which are assessed by both groups of firms to be of rather low importance. We conclude that these two motives might be only relevant for a small group of firms compared to the overall population of patent-out-licensing companies (again, this does not mean that for this small group of firms the respective motives are of utmost relevance).

*Fig. 32 Motives to out-license patents, by firm size *)*

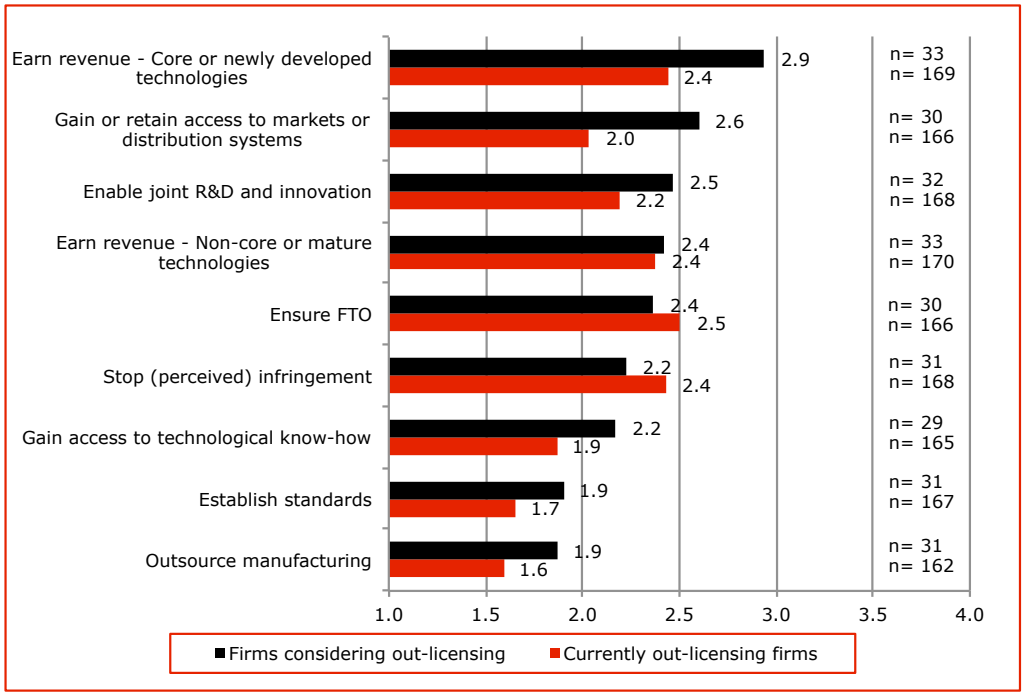


*) arithmetic means on a scale from 1='unimportant motive' to 4='very important motive'

Source: Technopolis survey

It is also interesting to look at differences in motive patterns between those firms that do already out-license their patents and those that consider doing so in the future but have no patents currently out-licensed (see Fig. 33). The latter group tends to value, in particular, the motives of earning revenue from new/core products, of obtaining access to markets and distribution systems and of enabling joint R&D and innovation more.

*Fig. 33 Motives to out-license patents, by status of out-licensing *)*



*) arithmetic means on a scale from 1='unimportant motive' to 4='very important motive'

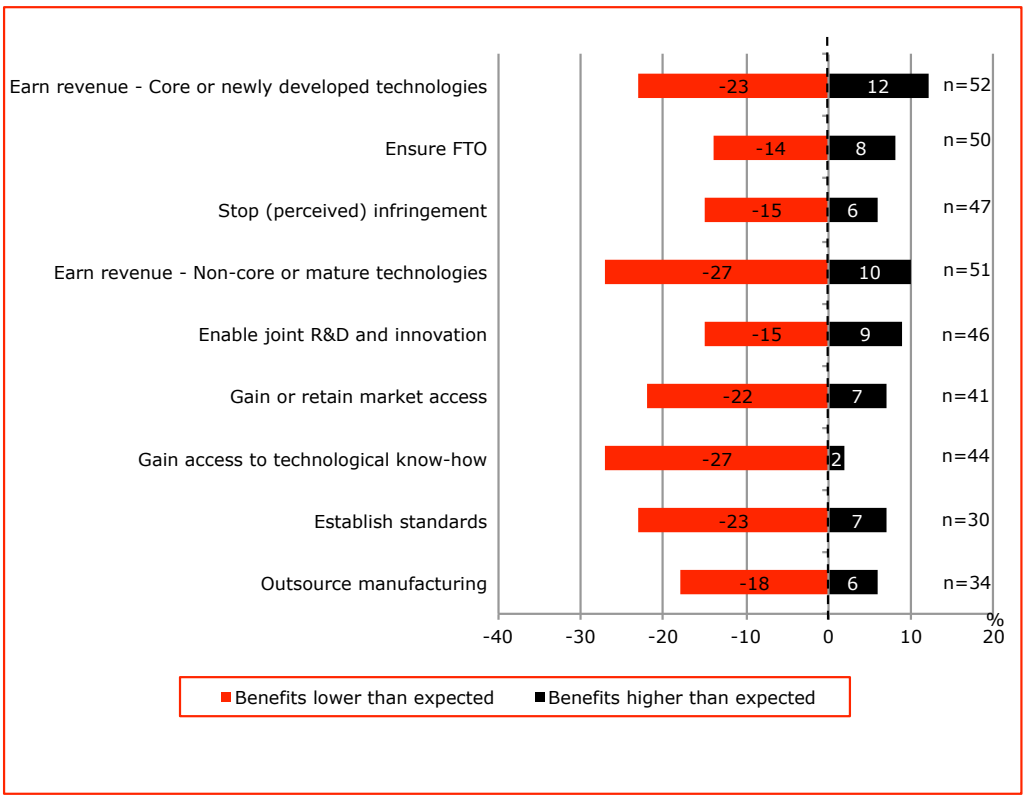
Source: Technopolis survey

For respondents of the larger questionnaire, we also enquired into the success of the out-licensing activities. Because of the multitude of motives (and the combinations hereof), we asked the respondents for each of the motives whether the benefits accruing from the licensing activities met their expectations or whether they exceeded or were lower than their expectations.

The respective analysis is shown in Fig. 34. Only 'positive' and 'negative' responses are depicted, with opposing algebraic signs and as shares of the firms responding. While for the majority (between 65% and 79%) of the respondents' expectations are in line with actual licensing success, Fig. 34 shows that firms with lower than expected benefits outnumber out-licensing firms who reported benefits higher than expected in all motivational aspects.

It is important to underline that the results described are based on a fairly low number of responses, ranging between 30 and 52. The large number of missing observations to this question is due to two reasons: First, many motives are not relevant as the earlier Fig. 29 clearly shows. Secondly, the respondents do not know whether the experience with licensing met the expectations.

Fig. 34 Success of out-licensing activities along the different motivational aspects, measured by comparing actual benefits with expected benefits, firms in %

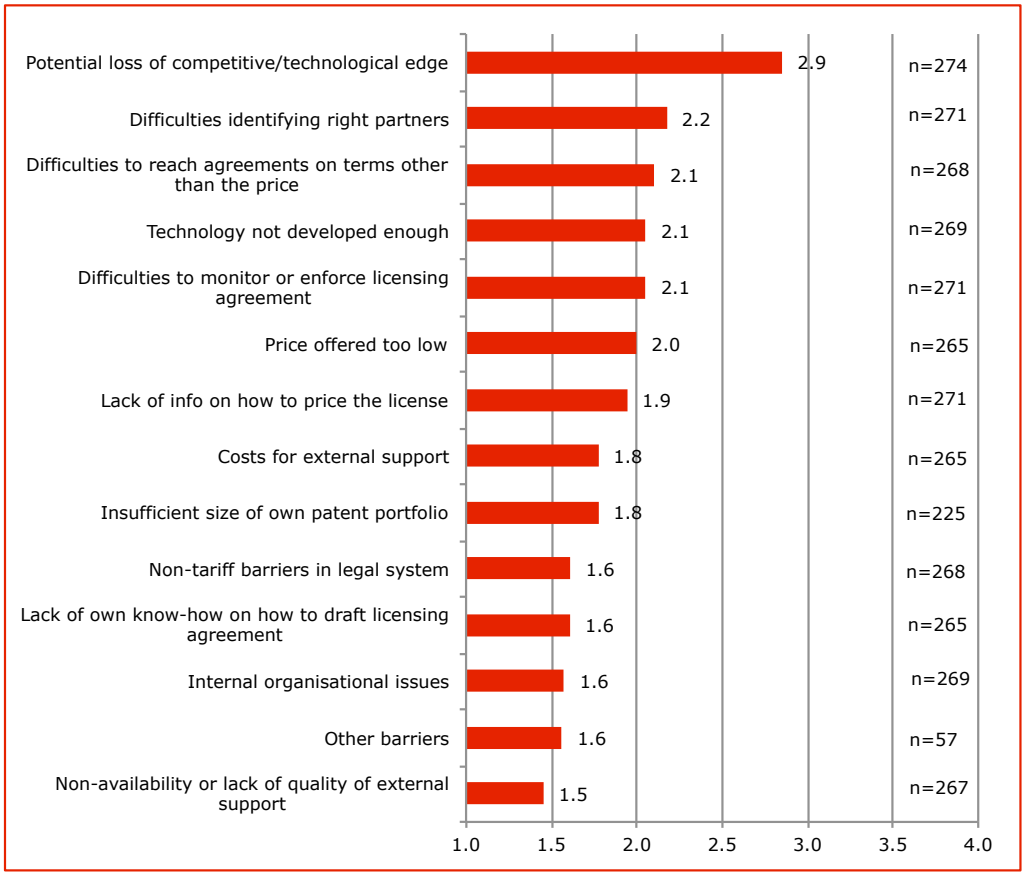


Source: Technopolis survey, long questionnaire only

2.4 Barriers for out-licensing patents

Fig. 35 shows the barriers to the out-licensing of patents, as assessed by the respondents of this survey. On average, the – by far – most important barrier is 'potential loss of competitive/technological edge'. This aspect received an average rating of 2.9 on the 4-tier scale from 1='unimportant' to 4='very important', 0.7 points more than the aspect ranked second, 'difficulties identifying the right partners'. In fact, all other barriers received ratings that indicate that they are blocking patent out-licensing activities, on average, only to a weak extent. Among the factors that have by comparison the highest 'barrier' function are difficulties to reach agreements on the licensing terms (both with respect to price as well as in relation to other terms) and that the technology for which a license is sought may be not developed enough for commercialisation. In our interviews with some of the respondents, we were on several occasions drawn to *"…the common misperception that obtaining a patent means that one is usually close to market introduction. In fact, there may be a long way to go until a product eventually hits the market"* (interview with large firm respondent)

*Fig. 35 Barriers to patent out-licensing *)*



*) arithmetic means on a scale from 1=unimportant barrier to 4=very important barrier

Source: Technopolis survey

A number of firms (28) provided us with some additional comments on barriers: Most of these comments specifically underlined that not engaging in out-licensing was the result of a specific company strategy or the result of the specific technology field/industry the firms were operating in:

"Company strategy: We produce ourselves." (respondent)

"Strategic decision not to license" (respondent)

"We have little competitors, and licensing is not common in our field." (respondent)

"Industry segment is too small." (respondent)

"Not our business model" (respondent)

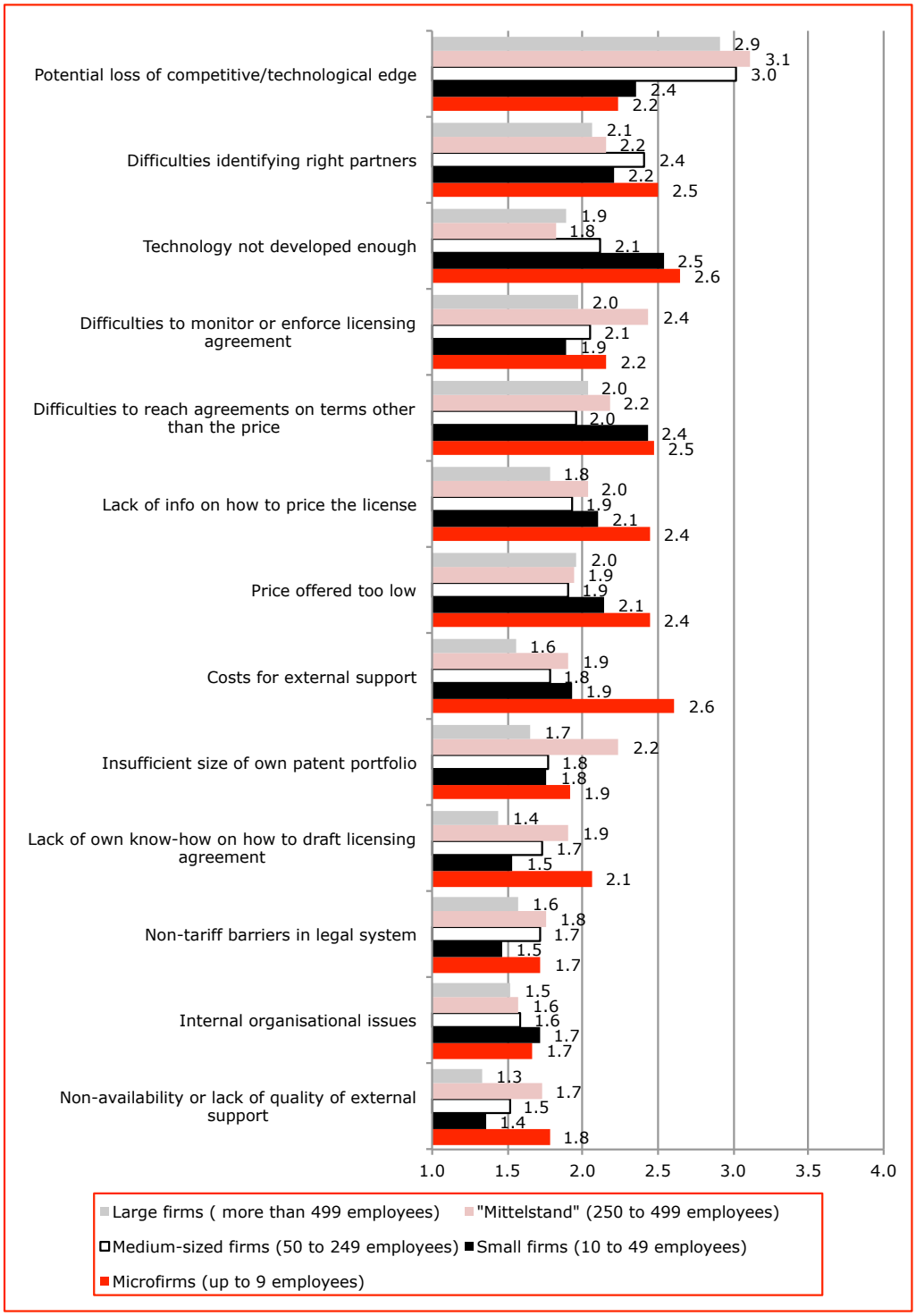
"Portfolio not very suitable for licensing" (respondent)

"Licensing is not part of our strategy." (respondent)

A, by comparison, smaller amount of firms commented that *"licensing was up till now not a topic the firm was considering"* or that there was *"lack of a culture"*. Another small set of comments referred to deficiencies and/or unclear regulations with respect to the legal framework conditions concerning patents in a number of (non-European) jurisdictions.

A breakdown by firm size reveals considerable differences in the perception of barriers between large firms and smaller firms (see Fig. 36). The barrier of the potential loss of technological know-how is primarily an issue for larger companies, that is firms with more than 50 employees. Small firms and micro-enterprise see this factor much less as a barrier. It may be argued that either small firms acknowledge more their limited ability to protect themselves against unwanted know-how flows (and have come to live with this fact, but need to out-license anyway) or that they rely also on additional tacit specialist know-how, such as know-how on how to apply the patented technology in a particular user setting, which is difficult to copy.

*Fig. 36 Barriers to patent out-licensing, by firm size *)*



*) arithmetic means on a scale from 1=unimportant barrier to 4=very important barrier

Source: Technopolis survey, n (micro-firms**) = 12-19, n (small firms) = 21-29, n (medium-sized firms) = 39-43, n ("Mittelstand") = 29-34, n (large firms) = 113-138

**) caution with interpretation, n between 12 and 19

For small firms (between 10 and 49 employees), the by comparison most important barrier is that a technology may not be developed enough. This is

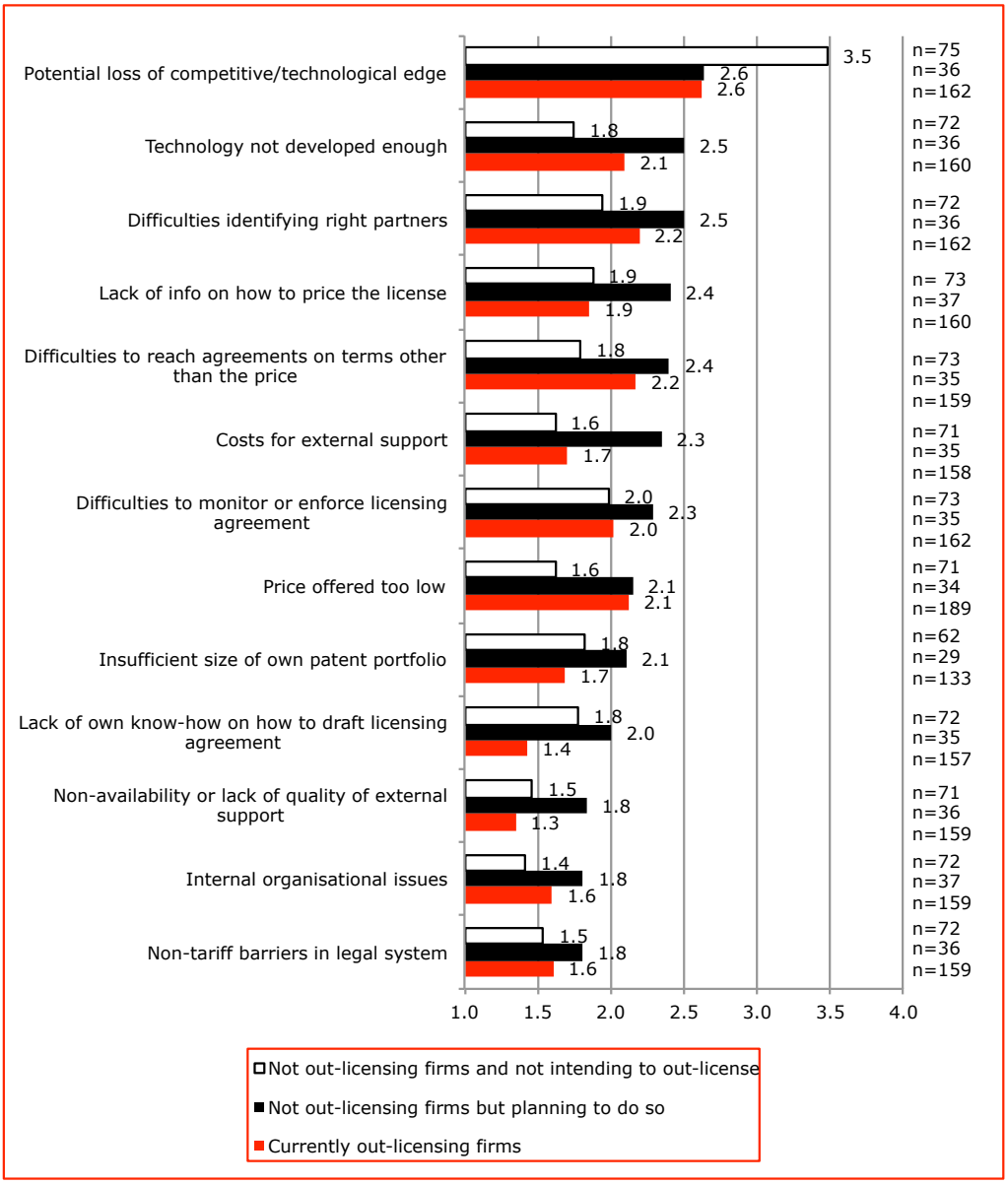
followed by difficulties to reach agreement on terms other than the price and by difficulties identifying the right partners. For micro-enterprises, there are a range of barriers that stand out almost equally: On top is, besides the fact that the technology may not be developed enough, the factor costs for external support (average rating: 2.6). This is intriguing as availability/quality of support was seen as factor of relatively minor importance by the same group of firms (average rating: 1.8). Other factors seen as "rather important" to "important" by micro-enterprises are difficulties identifying the right partners, difficulties to reach agreements other than the price, a too low price offered by the licensee and lack of information on how to price the license.

Another interesting breakdown is by status of out-licensing activities (see Fig. 37). Firms which do not out-license perceive a potential loss of technological know-how and, ultimately, competitive edge as the by far most important threat (average rating: 3.5, which is, hence, between 'important barrier' and 'very important barrier). All other types of barriers are, in this group of firm, rated between 'unimportant' to 'weakly' important'. Taking into account the number of comments that say that not engaging in out-licensing was either due to a strategic decision or to the features of a specific narrow-sized technology field the firms were operating in, we conclude that firms which do not out-license do so mostly because there are rational reasons not to follow this route.

More susceptible to policy interventions that aim to facilitate licensing is the smaller group of firms that does not currently out-license but considers doing so in the future. While in this group of firms, potential loss of technological know-how is still the leading barrier (average rating: 2.6), this is closely followed by technology that may not be developed enough and difficulties identifying the rights partners (average ratings: 2.5, respectively). Other notable and rather inhibiting factors are lack of information on how to price the license (2.4), difficulties to reach agreement on terms other than the price (2.4) or costs for external support (2.3).

As can be expected, already actively out-licensing firms see fewer barriers to out-licensing than those firms that have not yet succeeded to conclude licensing agreements. Potential loss of technological know-how is still the leading barrier (average rating: 2.6), but already the second-ranked barrier – difficulties to identify the right partners – is only rated at, on average, 2.2 on the 4-tier scale from 1=unimportant to 4=very important. Besides these two factors, only the following aspects have received an average rating of more than 2.0: 'technology not developed enough' (2.1), 'difficulties to reach agreements on terms other than the price' (2.2), and 'price offered too low' (2.1).

*Fig. 37 Barriers to patent out-licensing, by status of out-licensing activity *)*



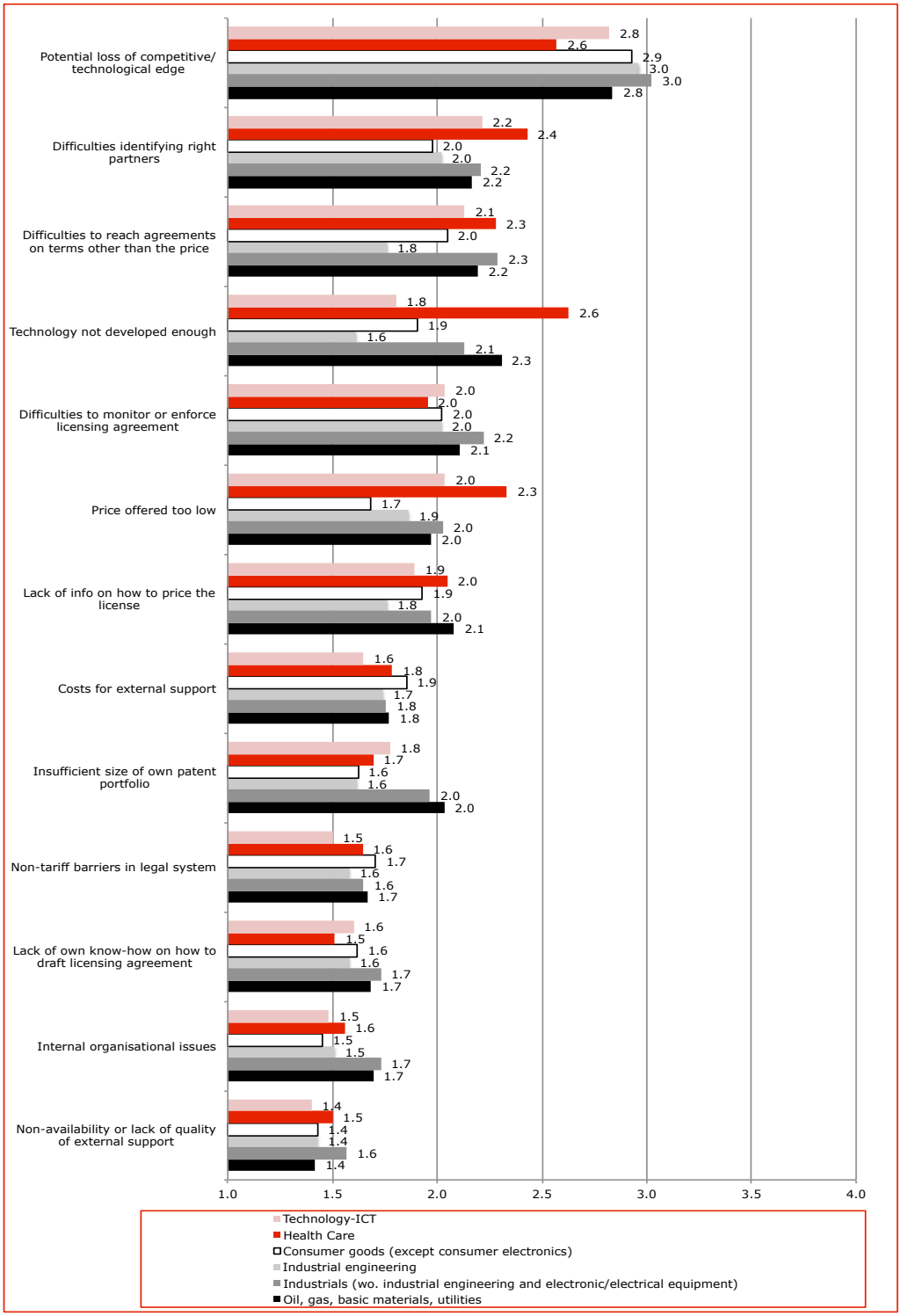
*) arithmetic means on a scale from 1=unimportant barrier to 4=very important barrier

Source: Technopolis survey

Next, we look at differences in the perception of barriers by industry. The respective results are shown in

Fig. 38. Some intriguing differences can be observed: Firms in Health care have a "barrier profile" which seems to be quite distinct from those of firms in other industries. In particular, we find that in this industry the factor "technology not developed enough" is, together with "potential loss of competitive technological edge", the most important barrier (rated at, on average, 2.6, respectively). This fact can be explained by the long development cycles in the pharmaceuticals industry that require, for example, clinical trials that take place well after the initial patent has been filed. Interestingly, potential loss of competitive edge, while still the most important barrier, seems to be feared less than in other industries. One possible explanation may be that patenting and patent licensing works particularly well in the health care industry.

*Fig. 38 Barriers to patent out-licensing patents, by industry *)*



*) arithmetic means on a scale from 1=unimportant barrier to 4=very important barrier

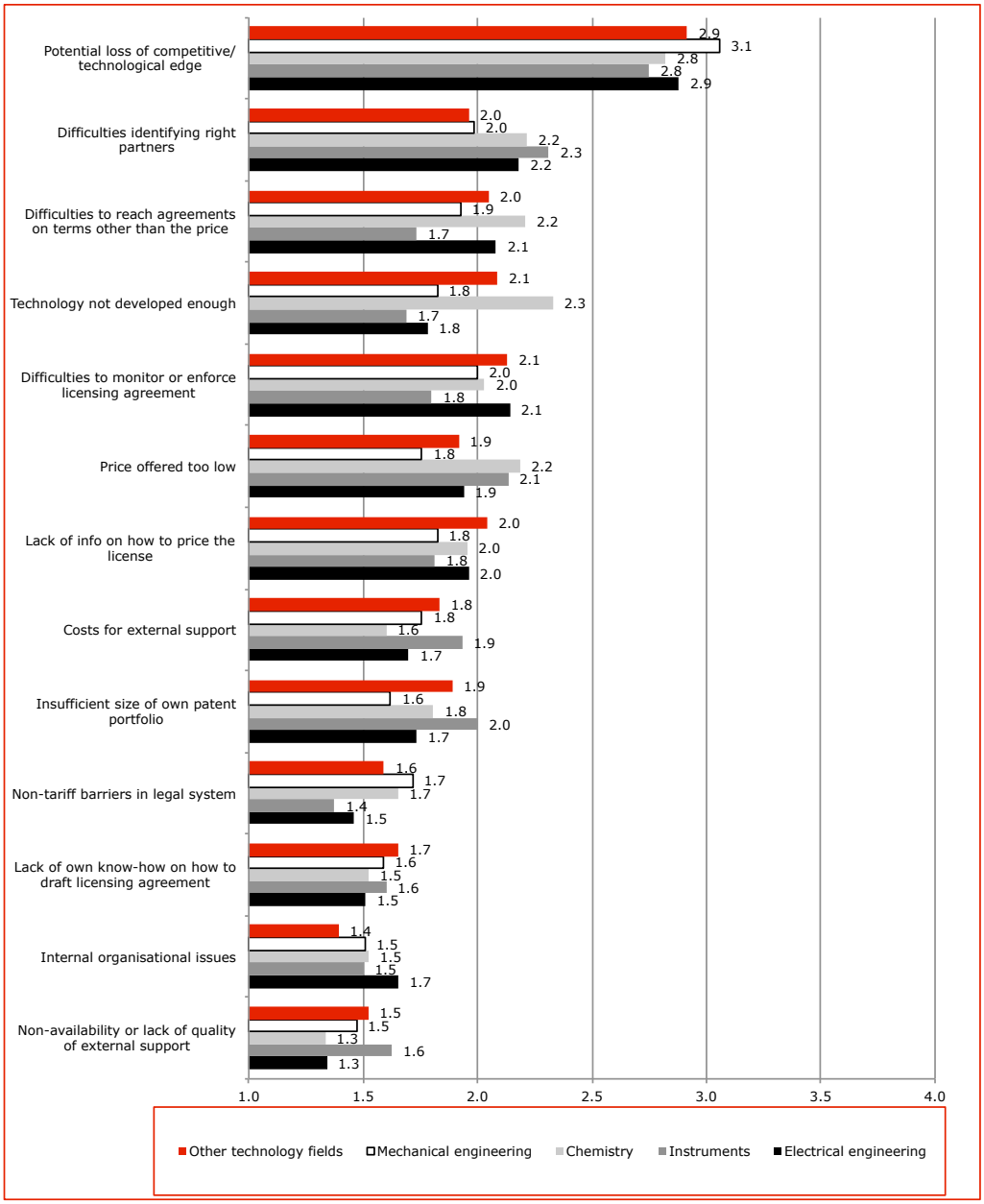
Source: Technopolis survey, n (Technology - ICT) = 52-54, n (Health) = 36-42, n (Consumer Goods) = 39-45, n (Industrial Engineering) = 40-52, n (Industrials) = 19-22, n (Construction) = 17-18, n (Oil, gas, basic materials, utilities) = 29-36.

A different barrier profile is found in the sectors "Industrial engineering" and "Industrials". Here, we see that potential loss of technological and competitive edge is by far feared most (on average, with a rating of 3.0). The factors ranked second are rated well below this factor: difficulties to reach agreements on terms other than the price (2.3 for "Industrials") and difficulties identifying the right partners (2.0 for firms in "Industrial engineering"). In fact, in Industrial engineering we find that all other beyond the two mentioned are rated, on average, between "unimportant" and "weakly" important as barrier.

Apart from these striking observations, there are few other large differences to report between industries. Firms in different industries seem to rate the generally less important barriers in a similar manner.

The results of the breakdown by technology sector are in line with those for industries (Fig. 39). Perhaps the most striking result in the breakdown by technology field is the field "Mechanical engineering" which sees potential loss of competitive/techno-logical edge among the industries as the most articulated barrier (average rating: 3.1), while this industry rates all other barriers with an average rating of 2.0 or less (which means all other barrier at most 'weakly' important as barrier). The "Chemistry" field has a more diverse barrier profile, with potential loss of competitive/technological edge still leading (average rating: 2.8), and the factor 'technology not developed enough' ranking second (2.3). Again, barriers of overall (very) low relevance are rated by firms across all technology fields to be of low importance.

*Fig. 39 Barriers to patent out-licensing patents, by technology field *)*



*) arithmetic means on a scale from 1=unimportant barrier to 4=very important barrier

Source: Technopolis survey, n (Other technology fields) = 21-25, n (Mechanical engineering) = 58-70, n (Chemistry) = 52-67, n (Instruments) = 15-16, n (Electrical engineering) = 45-50

The barriers described lead also to a sizable portion of firms that declare to have patents that they would be willing to license, but actually could not license out. In our sample, among all respondents, this share of unsuccessful licensors amounts to around 66% of the firms (see Fig. 40). This means that around two thirds of all firms which took part in our survey have at least one patent which they would like to license out to other firms but which is currently not being licensed.

There are differences according to licensing status. 80% of the firms, which are actively out-licensing stated to have at least one patent which would be available for potential licensees, while among non-licensing firms the same share amounted to 46%. One conclusion could be that the search for unused patents by any intermediary who wishes to make such unused technology available to other firms by brokering a licensing agreement should focus on firms that already actively license out their patents.

Fig. 40 Share of firms that have at least one patent available for out-licensing but no corresponding licensee, by out-licensing status, firms in %

Company group	Share of unsuccessful licensors
All firms	66%
…actively out-licensing firms	80%
…non-out-licensing firms	46%

Source: Technopolis survey, n (currently out-licensing)=159, n (non-out-licensing firms) = 119

In the per-patent view, we can also provide a rough estimate on the amount of patents which would be available for out-licensing by the surveyed firms and which are currently not used to this end, because we have asked the respondents to provide us also with estimates for the share of patents (in %) of their patent portfolio that they would be willing to license but up until now could not license. By multiplying this figure with the amount of patents on record for the firms in PATSTAT, we obtain a total number of some 3,400 of such unused patents. This corresponds to around 4% of the stock of patents applied for by the firms answering this survey.[25]

2.5 Strategies to find licensees

Fig. 41 shows various channels by which an out-licensing firm can get in touch with potential licensees, and the average importance assigned to each such channel by respondents who, currently or prospectively, engage in patent out-licensing. A clear ranking becomes visible. The most important channel is 'informal networks' which is rated with 2.7 (arithmetic mean on a scale from 1='unimportant channel' to 4='very important channel). Performing active research to identify potential licensees (such as in journals or on the web) ranks second (average rating: 2.3), and being contacted by a potential licensee ranks third (2.2). Taken together, these three factors show that considerable interaction must take place between licensors and licensees, on a bilateral and rather informal level. Another channel that is 'weakly important' to 'important' is 'events', such as trade fairs or conferences.

All other channels are, on average, at most 'weakly important'. These include formal networks (such as clusters or industry associations), but also research in patent databases (average rating: 2.0 and 1.8, respectively). The latter finding corresponds to the very few studies on usage of patent databases, which indicate that this information source is mostly under-used (see Hall et al. 2003).

[25] The answers are based on 239 firms for which the respective data was available.

We also find that 'chance' has some, on average, weak level importance (rating: 1.8), as has 'other channels' (average rating: 1.8). In the 'other channels' category, we frequently found firms that stated to identify their licensees particularly through discovery of infringement of the firm´s patents: Of 20 explanations what 'other' channels might be, 8 referred to this aspect such as by stating *"patent disputes"*, *"monitoring infringement"* or *"as part of a settlement agreement offer"*. Another set of comments hinted at existing relations with licensees:

"We know our potential licensees." (respondent)

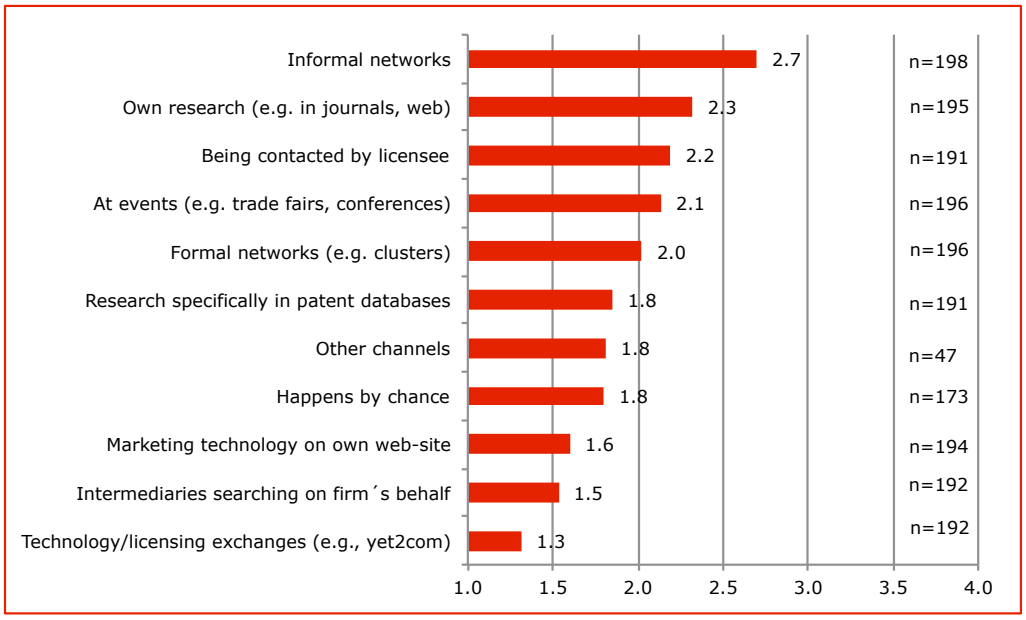
"Existing known business contacts" (respondent)

"Joint Venture partners" (respondent)

"Key customers" (respondent)

Simply putting the technology up on a webpage seems to be mostly of little value for reaching out to licensors. More astonishing, however, are the low ratings given to intermediaries and to technology/licensing exchange platforms, which hardly seem to play a role for matching licensees with licensors at the moment.

*Fig. 41 Importance of channels, by which patent licensors get in touch with potential licensees *)*

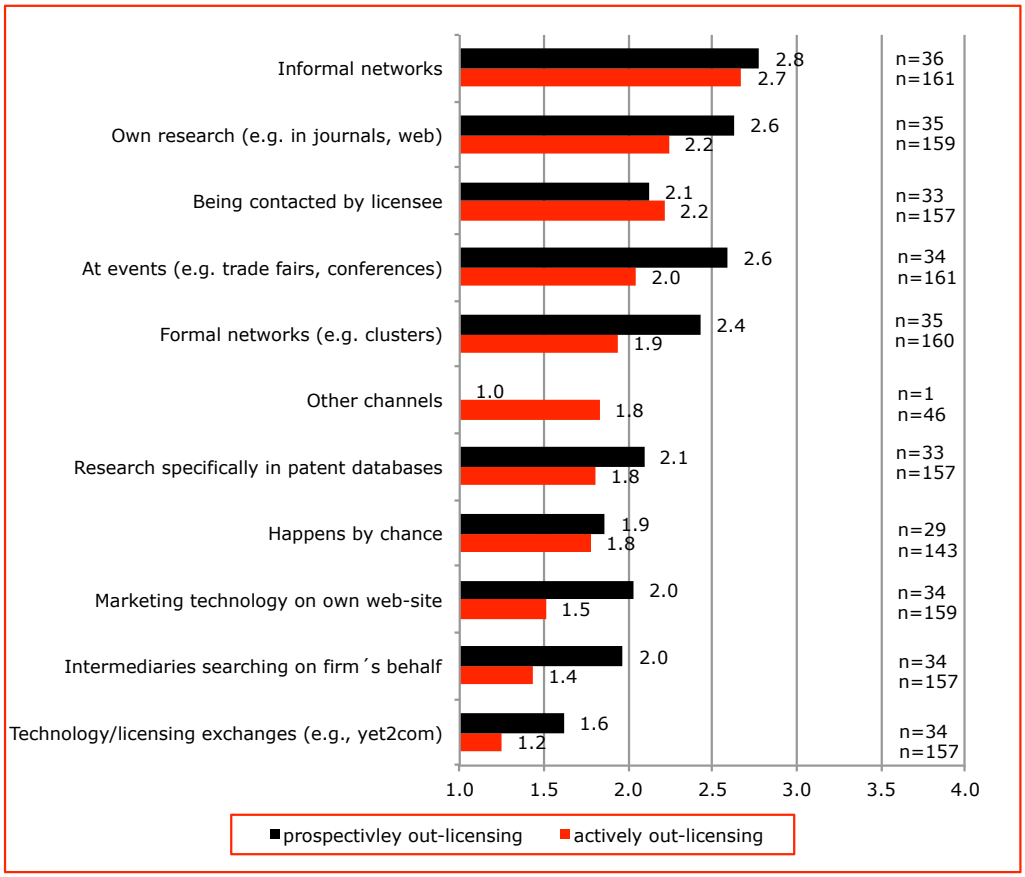


*) arithmetic means on a scale from 1=unimportant channel to 4=very important channel

Source: Technopolis survey

Fig. 42 shows that firms that do not currently out-license but plan to do so in the future try to reach out to licensees primarily via their own informal networks (average rating 2.8), but also through own research (2.6) and at events (2.6). These channels are given higher importance ratings than in the group of firms that do already out-license their patents and rely to a much larger degree on informal networks. Firms that are not currently out-licensing but plan to do so in the future try also to involve formal networks (such as clusters) more often.

*Fig. 42 Importance of channels, by which patent licensors get in touch with potential licensees, by out-licensing status *)*



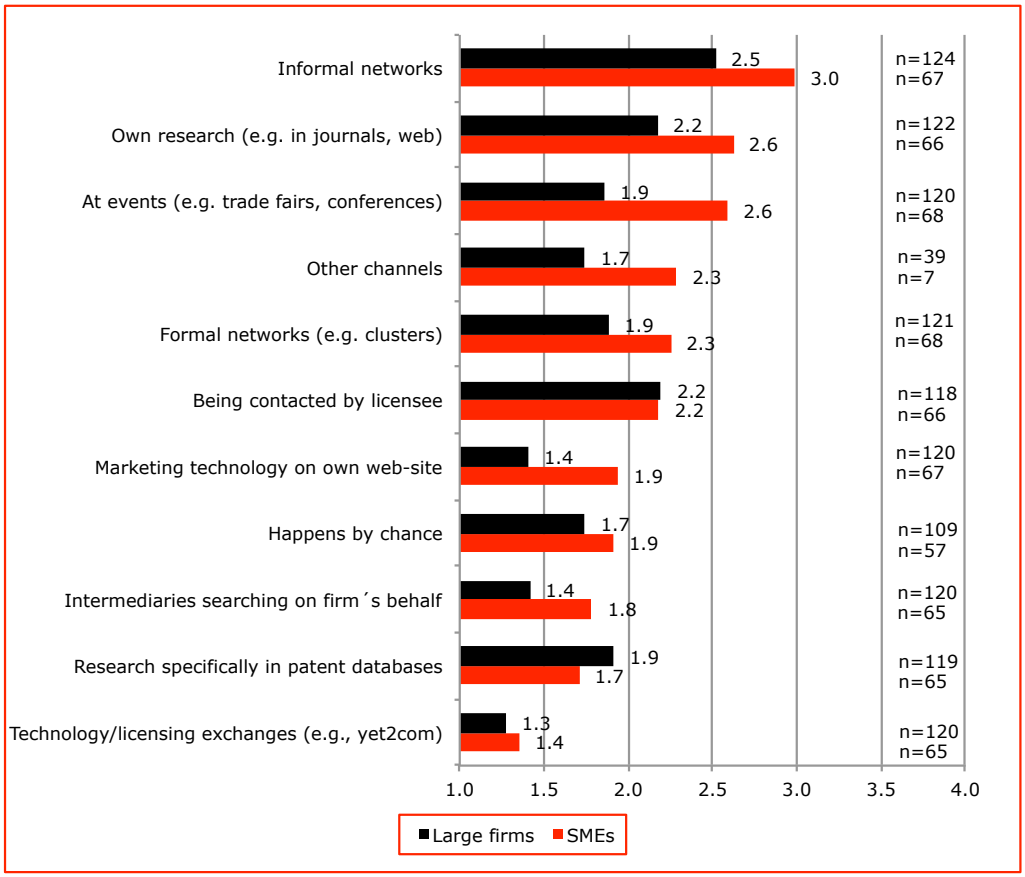
*) arithmetic means on a scale from 1=unimportant channel to 4=very important channel

Source: Technopolis survey

Fig. 43 shows the breakdown of the importance assigned to channels to reach out to licensees by firm size. One can immediately see that SMEs place, on average, a higher importance on most channels to reach out to potential licensees than large firms. The most important channel to reach out to licensees are, for SMEs, 'informal networks' (rated with 3.0; large firms: 2.5), followed by 'own research' (SMEs: 2.6; large firms: 2.2) and 'events' (SMEs: 2.6; large firms: 1.9). Similarly, even channels of overall lower importance are more relevant to SMEs than to large firms, with the exception of patent databases, which seem to be used slightly more often by large firms. For large firms, the most important channels for interaction are informal networks, and, interestingly, 'being contacted by licensees' as well as 'own research'.

We conclude that SMEs have to be much more active to get in touch with potential licensees and have to utilise all available means to reach out to licensing partners more actively than large firms. Because of their size and reputation, large firms may be in a better position to just 'sit and wait' for a potential licensing opportunity. For both groups, access to relevant informal networks is the most important channel for interaction, while intermediary work and especially exchanges currently play a marginal role only.

*Fig. 43 Importance of channels, by which patent licensors get in touch with potential licensees, by firm size *)*



*) on a scale from 1=unimportant channel to 4=very important channel

Source: Technopolis survey

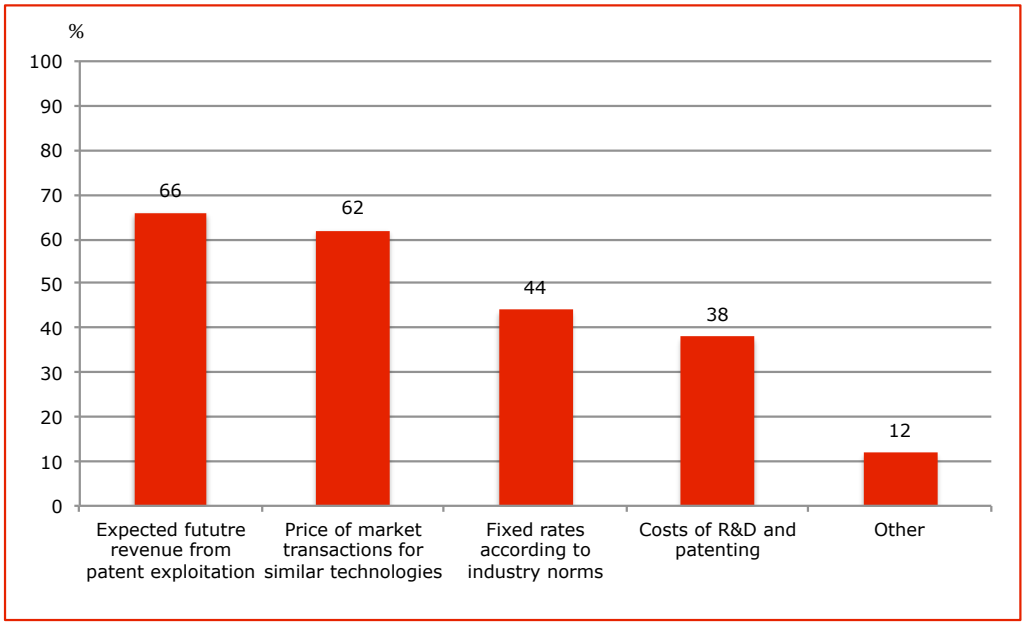
2.6 Specific types of out-licensing and out-licensing terms

We asked respondents of the longer questionnaire to provide us with details on common practices concerning the terms of patent licenses and organisational issues.

Fig. 44 shows what factors are commonly used to price a patent license. It can be seen that around 66% try to use as calculation base the expected future revenue from patent exploitation. Slightly less (62%) use as reference the price of market transactions for similar technologies. 44% of the firms responding to this question draw on fixed rates according to industry norms (such as 5% of sales or 25% of generated profits), and, 38% use the costs for the R&D undertaken and patenting in their calculations.

12% use (also) other methods: Items subsumed under this heading include mainly the factor 'free negotiations', but also size of installations (of plants), investments, patent positions (number of relevant patents owned by the licensing partners in the relevant technology fields) or pricing with real options. We did not observe any statistically significant differences in breakdowns by firm size, enterprise group or existence of subsidiaries abroad.

*Fig. 44 Factors used for pricing patent licenses *)*

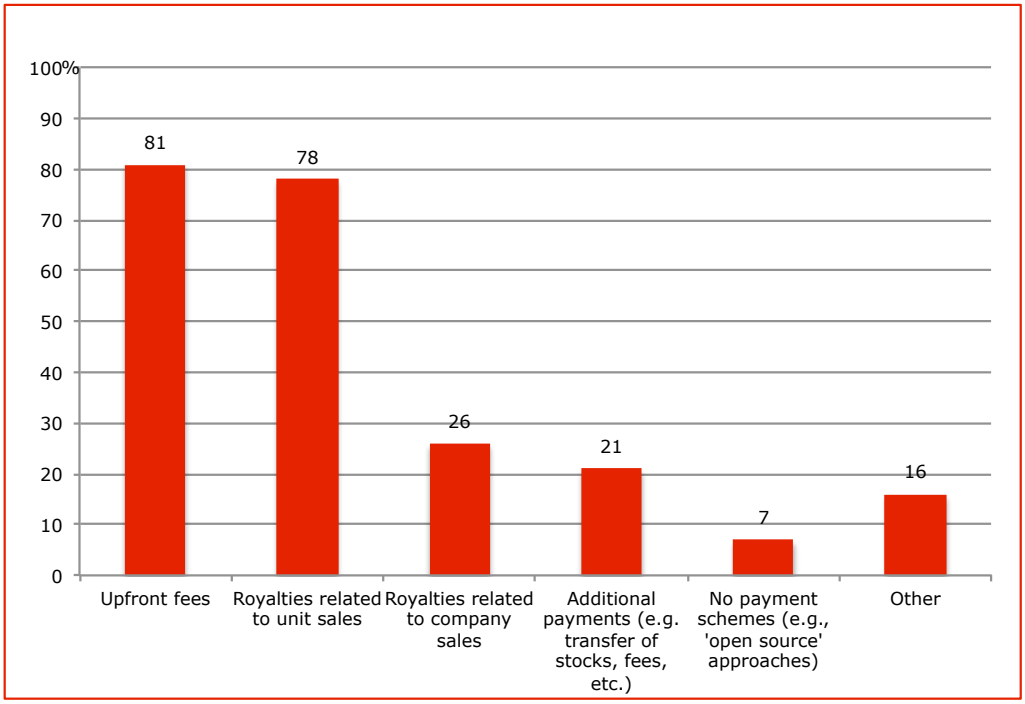


*) multiple responses allowed

Source: Technopolis survey, long questionnaire only, n = 85

Furthermore, we asked respondents to give us some indications on the terms of payments (i.e., payment schemes) commonly employed in patent (out-)licensing agreements. As can be seen in Fig. 45, most firms (81%) use upfront fees combined with royalties related to unit sales. 26% relate their licensing terms to company sales, and 21% have additional payments involved, such as the transfer of stocks. Only 7% have no payment schemes in place. 16% draw on 'other' means of payment, which is, according to the comments received, in most instances some form of milestone-related payment scheme (i.e., payments are made once certain sales or development milestones have been reached).

*Fig. 45 Common terms of payments in use for patent licenses *)*



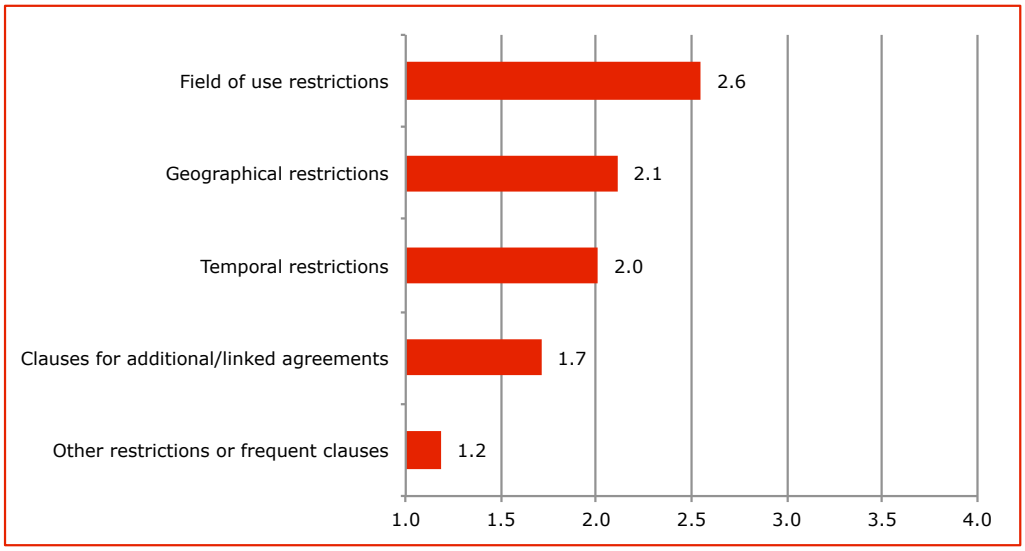
*) multiple responses allowed

Source: Technopolis survey, long questionnaire only, n = 87

Licensing agreements may include certain types of restrictions (such as restrictions for certain territories, temporal restrictions or field of use restrictions) as well as other additional/linked agreements. Therefore, we asked our respondents to give us an indication as to how frequently they use respective clauses in their licensing contracts. The analysis is provided in Fig. 46. As can be seen, the most common type of restrictions is field of use restrictions (average rating: 2.6 on a scale from 1=not used to 4= always used). Ranked second and third – almost on a par – are geographical restrictions and temporal restrictions, which are, on average, 'seldom' used.

The utilisation of additional clauses/linked agreements seems to be rare also. However, even without having formal additional agreements in place, we need to underline – and there have been several comments to this end by respondents – that patent licensing is rarely about the patents only, but about the technology which the patents can describe only partly. Therefore, a patent licensing agreement usually provides also access to company know-how of the licensors, such as trade secrets.

*Fig. 46 Frequency of usage of different types of restrictions and additional clauses in patent out-licensing agreements *)*

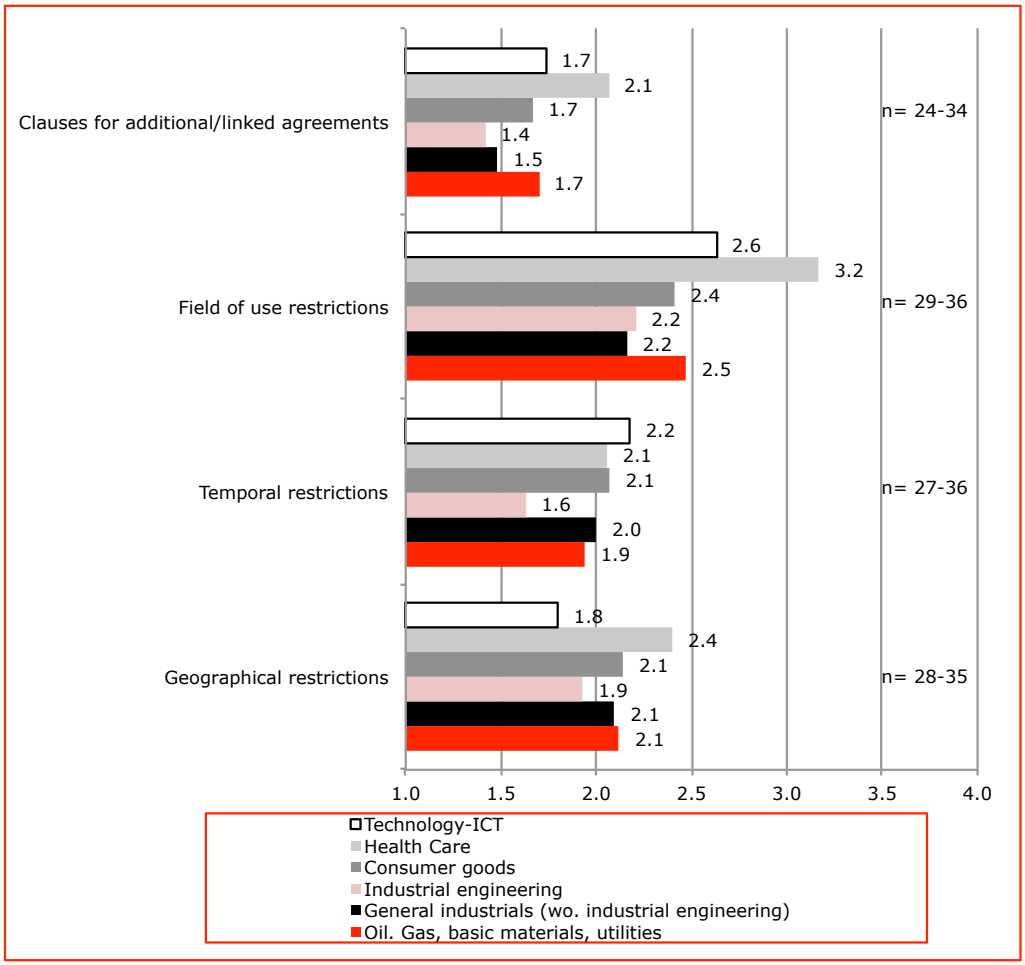


*) Frequency given as arithmetic means of answers on a scale from 1='not used' to 4='always used'

Source: Technopolis survey, n = 200

A breakdown by industry seems to indicate that the Health care sector uses particularly field of use restrictions more than the other industries (average rating: 3.2 and hence at least 0.6 points higher than in the other industries) (see Fig. 47). The health care sector tends to employ also more frequently geographical restrictions and additionally linked agreements. Generally speaking, industries which show less out-licensing activity seem to impose also less restrictions in their licensing agreements.

*Fig. 47 Frequency of usage of different types of restrictions and additional clauses in patent out-licensing agreements, by industry *)*

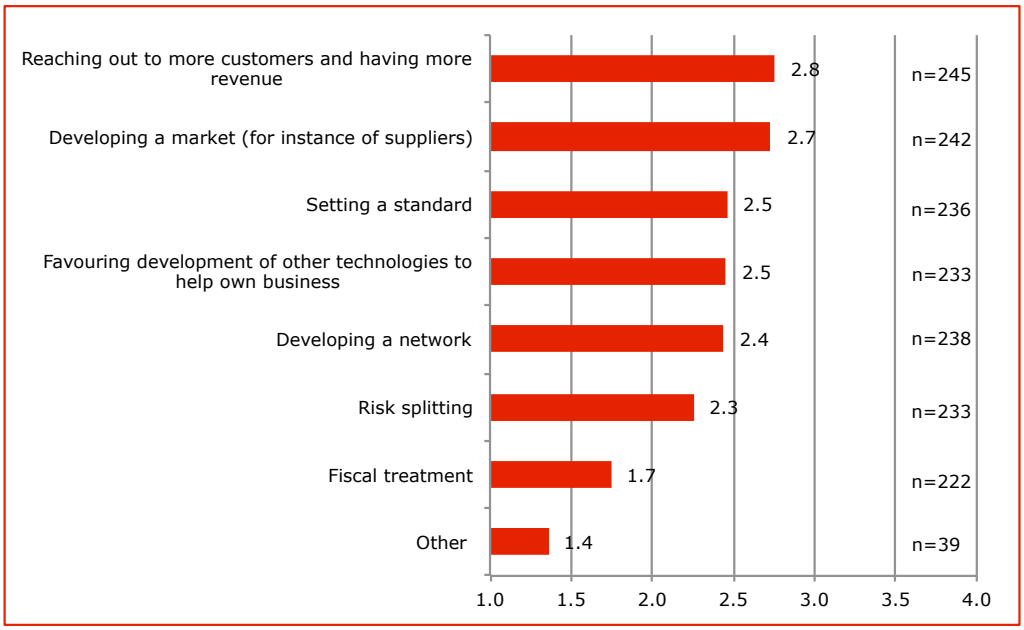


*) Frequency given as arithmetic means of answers on a scale from 1='not used' to 4='always used'

Source: Technopolis survey

In a next step, we have analysed the factors that favour non-exclusive licensing, i.e. factors where licensors choose to conclude non-exclusive license agreements with a licensee over an exclusive license. The respective figures are provided in Fig. 48.

*Fig. 48 Factors (motives) which increase the probability to conclude non-exclusive licensing agreements *)*



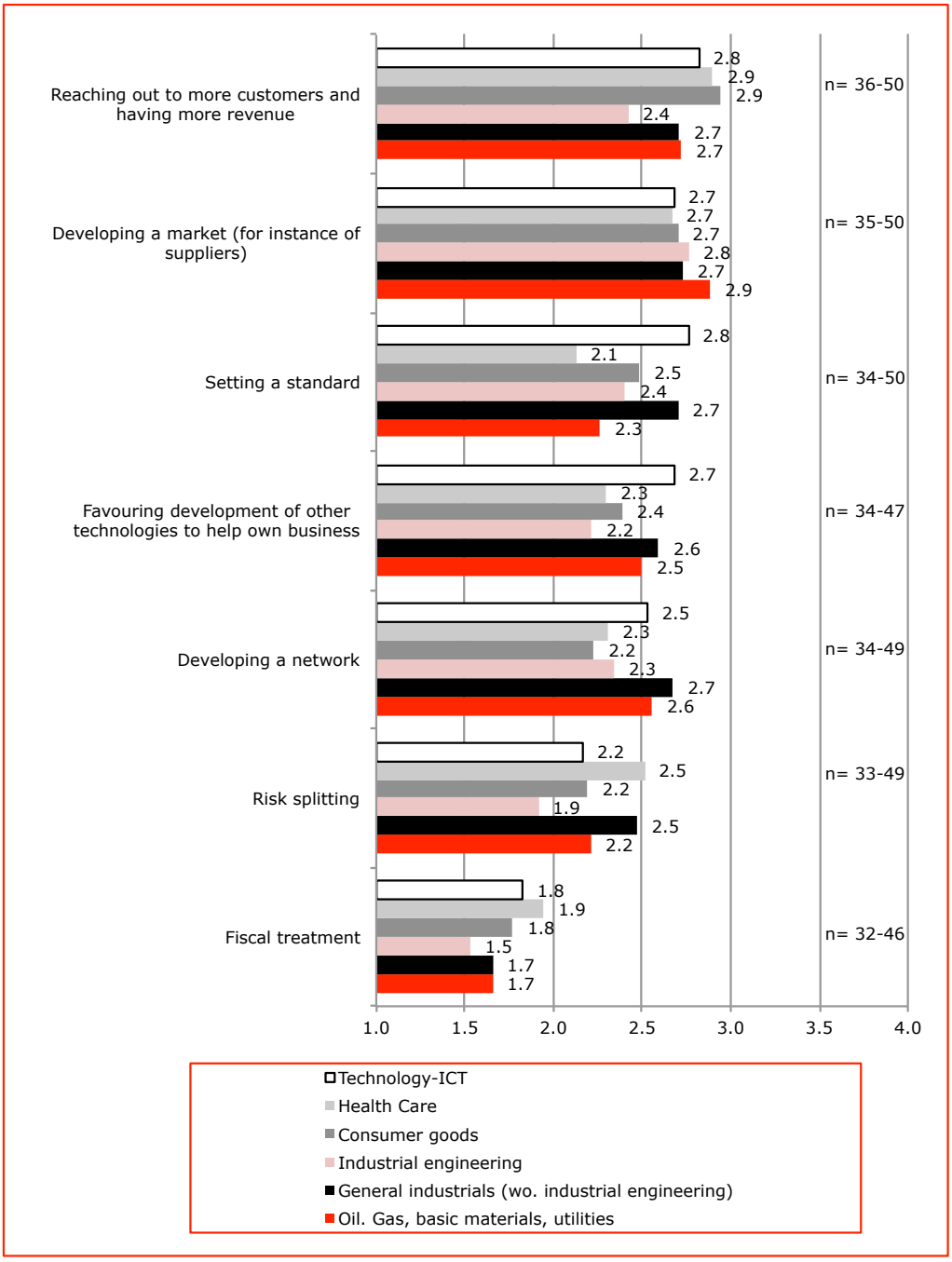
*) Rating given as arithmetic means on a scale from 1= 'not favouring' to 4 = 'strongly favouring

Source: Technopolis survey

It can be seen that, by comparison, the two strongest motives to opt for a non-exclusive licensing agreement are to increase revenues/reach out to more customers and to develop a market (average ratings: 2.8 and 2.7 in the 4-tier scale form 1='not favouring' to 4='strongly favouring', respectively). Ranked third is setting a standard and, on par, favouring the development of other technologies beneficial for the business (ratings: 2.5, respectively). This is slightly followed by 'developing a network' (rating: 2.4). Fiscal treatment (1.8) hardly motivates, on average, the conclusion of non-exclusive licensing agreements.

There seem to be rather little differences in a breakdown by industry. One of the more pronounced differences can be found in Technology-ICT, where "Setting a standard" seems to favour more the conclusion of non-exclusive licensing agreements than in the other industries (see Fig. 49). In Industrial engineering, we see that non-exclusive licensing is to a lesser degree a means to reach out to customers than in other sectors.

*Fig. 49 Factors (motives) which increase the probability to conclude non-exclusive licensing agreements, by industry *)*



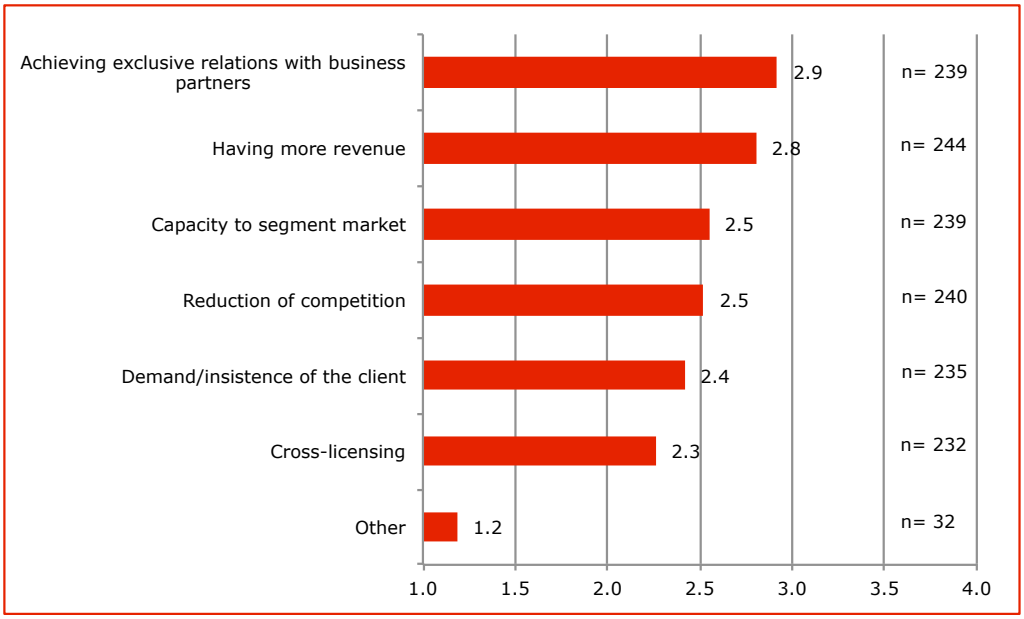
*) Rating given as arithmetic means on a scale from 1= 'not favouring' to 4 = 'strongly favouring

Source: Technopolis survey

Fig. 50 shows the respective picture for factors (motives) that lead more often to exclusive licensing agreements. The top two motives here are entering in exclusive partnership agreements and, again, the revenue-generating motive (average rating: 2.9 and 2.8, respectively). This is followed by the motives 'capacity to segment market' and 'reduction of competition' (average ratings: 2.5, respectively) as well as insistence of the

client (rating: 2.4). Cross-licensing as a motive in itself achieved a rating of 2.3. 'Other' motives are of low relevance.

Fig. 50 Factors (motives) that increase the probability to conclude exclusive licensing agreements

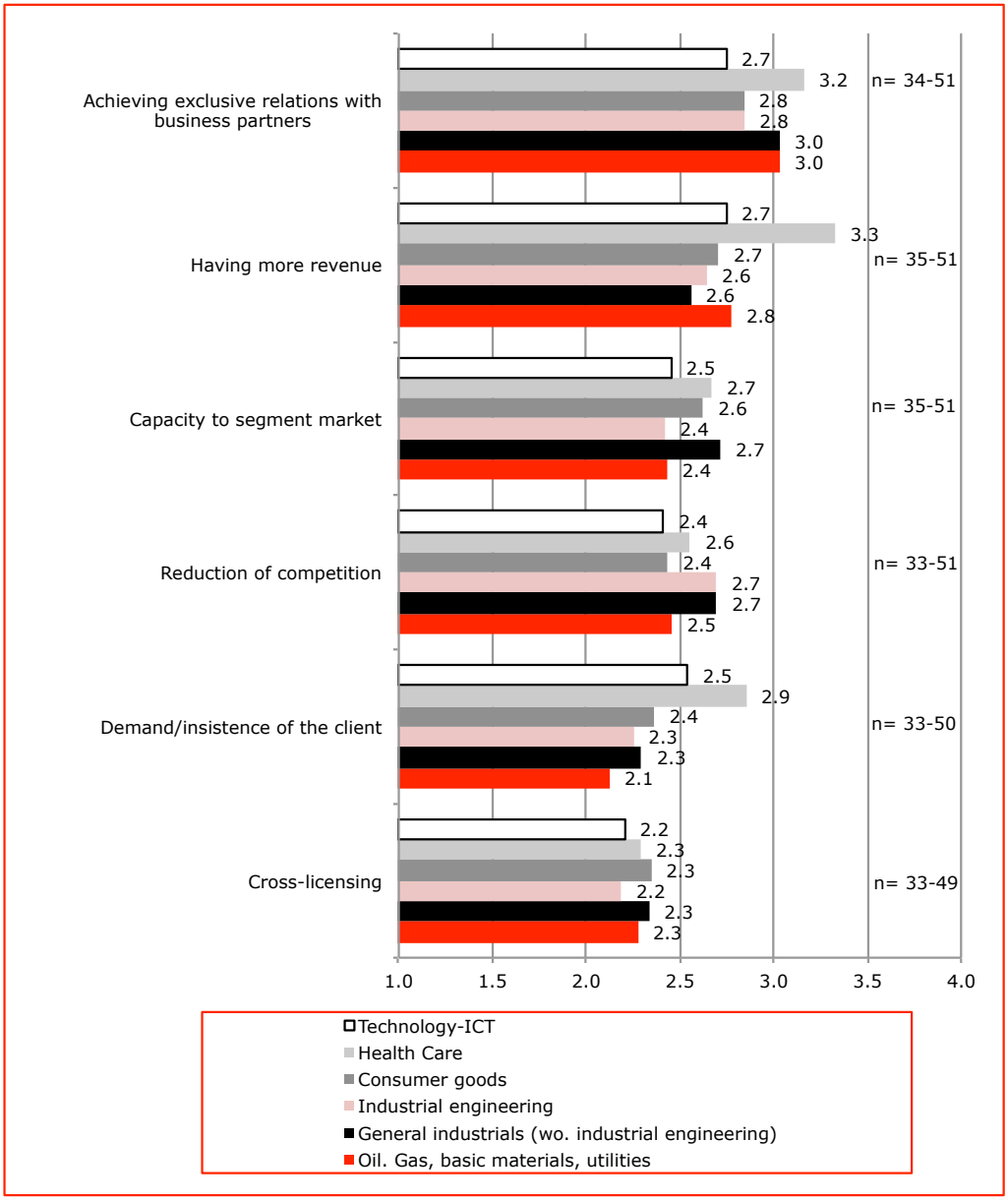


*) Rating given as arithmetic means on a scale from 1= 'not favouring' to 4 = 'strongly favouring'

Source: Technopolis survey

The breakdown by industry underlines the relatively higher importance of exclusive licensing for the Health care industry (see Fig. 51). In this industry, there is a stronger motivation to conclude exclusive licensing agreements for the reasons of obtaining more revenue (average rating: 3.3, at least 0.5 points higher than in the other industries), achieving exclusive relations with business partners as well as demand/insistence of the clients. Differences across the other industries are mostly not large.

Fig. 51 Factors (motives) that increase the probability to conclude exclusive licensing agreements



*) Rating given as arithmetic means on a scale from 1= 'not favouring' to 4 = 'strongly favouring'

Source: Technopolis survey

2.7 Alternatives to bilateral patent out-licensing for the transfer and share of patents

While the whole survey is focussed on licensing of patents, one should not forget that licensing between firms is only one of several means by which third parties can get access to technologies not developed and patented directly by them. Respective alternative transfer mechanisms include the (direct) sale of patents, the sale of firm departments (or even of whole firms), the creation of a spinout from the firm or entering joint ventures. Furthermore, firms may participate in patent pools, they may use patent

clearinghouses – which work in a manner similar to collective societies found for copyrighted works – or use patent auction events.

Fig. 52 shows the respective usage patterns of these means by the firms responding to our survey. It can be seen that the most important alternative to out-licensing patents are entering into joint ventures and the direct sale of patents:

- 7% of firms reported to use joint ventures to a 'large degree', and an additional 24% at least to a 'minor degree'. A further 32% have not made use yet of joint ventures but would be in principal interested. Consequently, only 37% of the firms would neither use nor be interested in entering joint ventures.
- Direct sale of patents is used by 7% of the firms to a 'large degree' and by 25% to a 'minor degree'. It is striking that 29% of the firms in our sample reported to be interested in selling patents, but have not yet done so. This leaves only 39% of the firms that are neither selling their patents nor are they interested in doing so.

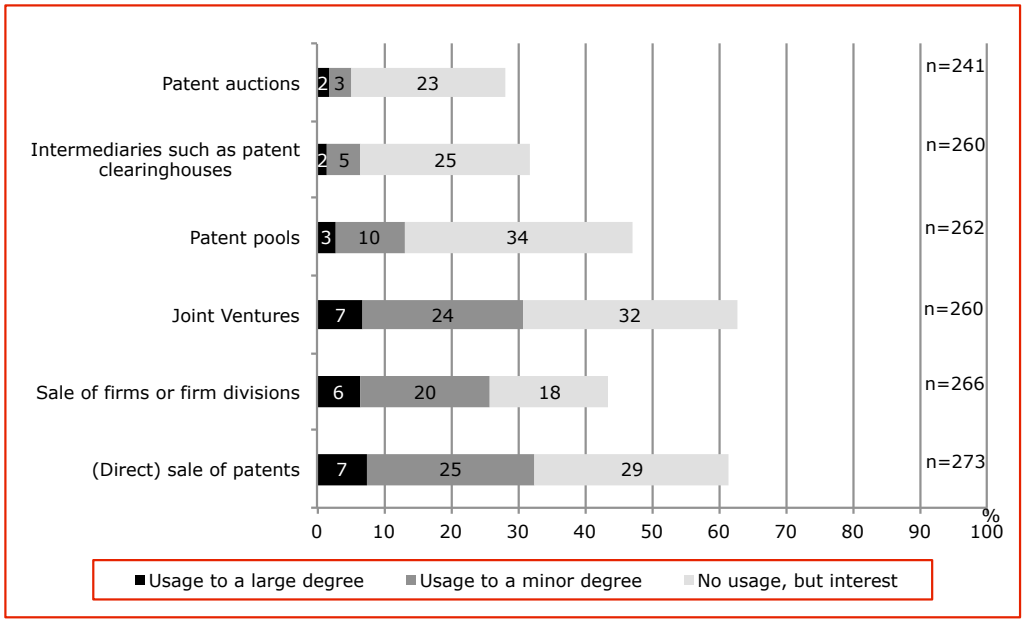
Ranked third, we find the sale of the whole firm or firm divisions, which around 1 out of 4 companies use to some extent. About 18% of the firms declared to be interested in (selling) part of their company together with the associated patents.

Ranking forth, and overall hardly in use, are patent pools. These are used to a 'large degree' by 3% of the responding firms, and by another 10% to a 'minor degree'. About one third of the businesses have not yet used patent pools but expressed an interest to do so. Only very few firms use patent auctions and intermediaries such as clearinghouses. However, about 23% of the firms (patent auctions) and one out of four firms (clearinghouses) were interested in such mechanisms for the transfer/sharing of patent rights.

We found statistically significant differences in our sample of the patterns observed in Fig. 52 in the breakdown by firm size. With regard to the direct sale of patents, entering joint ventures and the sale of firm or firm departments we find larger shares of big companies which do use these transfer channels to a 'minor' degree, than SMEs that do use the same channels to a 'minor' degree. This result can be expected, because in the case of SMEs such transfer arrangements may be to a much larger extent 'all or nothing' events.

There were statistically significant differences in the breakdown by status of out-licensing. Firms that were not out-licensing tend to be involved also less in the (direct) sale of patents, the sale of firm divisions or entering joint ventures. Firms that were part of an enterprise group, were more involved in joint ventures – which could be expected – than firms which were not part of a group. Eventually, for firms with subsidiaries abroad we recorded statistically significant higher usage rates for patent pools, joint ventures, sale of firms (parts of firms) and technology intermediaries.

Fig. 52 Mechanisms other than (direct) licensing between firms to share or transfer patents, firms in %



Source: Technopolis survey

The Commission asked us to specifically investigate interest in using patent pools, and also to enquire into possible environmental factors that could boost the use of patent pools. About one out of four respondents answered the former question in an affirmative way, i.e. they are potentially interested in using patent pools. Among out-licensing firms, this share amounted to 31% and among firms that do not currently out-license patents to about 16% – a difference that is statistically significant.[26] There were no statistically significant differences across other breakdown variables such as firm size, being part of an enterprise group, having subsidiaries abroad or industry. Respondents several times commented that for many firms patent pools may not be an issue, if they are active in technology fields that are hardly subjected to standards.

Fig. 53 shows how our respondents assessed various measures to increase the usage of patent pools, differentiated by firms that consider using out-licensing more and those which do not.[27] We can see that firms interested in using patent pools more are particularly interested in changes of antitrust laws (average rating: 2.8 vs. 2.1 in the group of firms not interested in higher usage of patent pools). Lower costs of patenting was rather important for both groups, while higher availability of trained staff stood out comparatively as factor in the group of patent-pool interested companies.

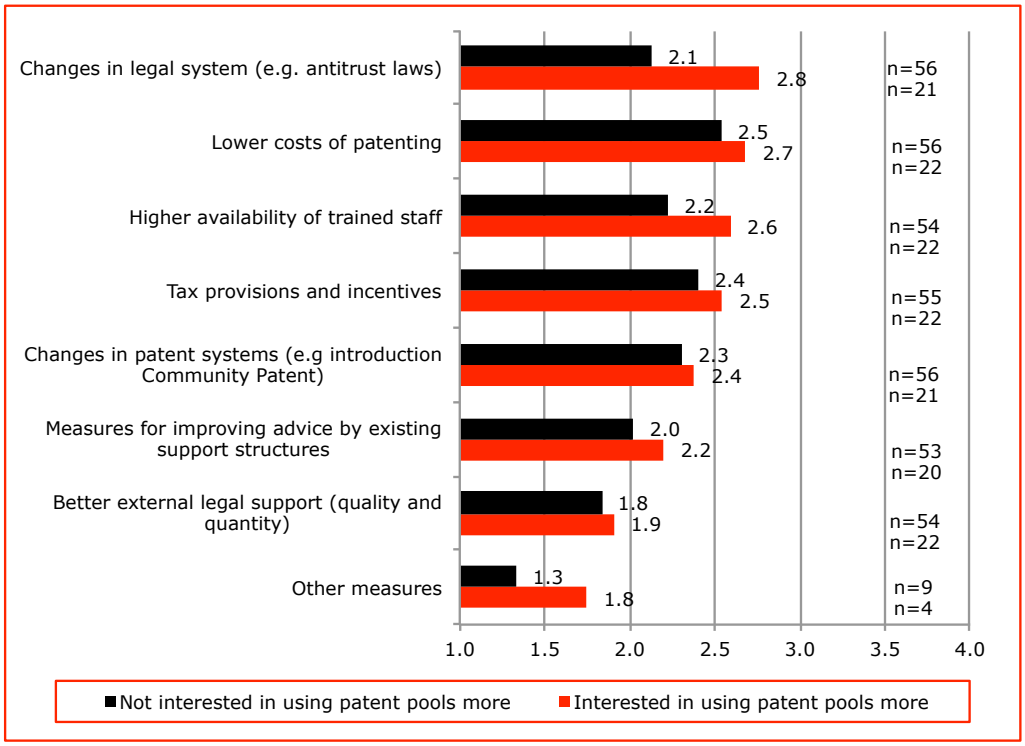
The feedback of the respondents to this question in their comments was mixed. Many respondents were not sure whether increasing the usage of patent pools would be desirable at all. As one respondent remarked: *"Nothing is needed, patent pools are a marginal phenomenon and should*

[26] Fisher´s exact, p = 0.006, n = 261

[27] This question was only posed in the long questionnaire.

stay as such". Respondents pointed also to the inherent potential conflict between the formation of patent pools and antitrust laws, i.e. the possibility that patent pools may be used to inhibit competition.

*Fig. 53 Assessment of measures which could boost usage of patent pools *)*



*) Rating given as arithmetic means on a scale from 1= 'unnecessary measure' to 4 = 'necessary measure'

Source: Technopolis survey, long questionnaire only

2.8 Intra-organisational aspects

We asked respondents of our longer survey (and of those, more precisely, those that engaged into out-licensing or are planning to out-license) questions on the internal organisation of their licensing activities. We were particularly interested in whether there were strategic considerations behind the licensing activities and whether there were certain specialised departments or persons in charge of out-licensing.

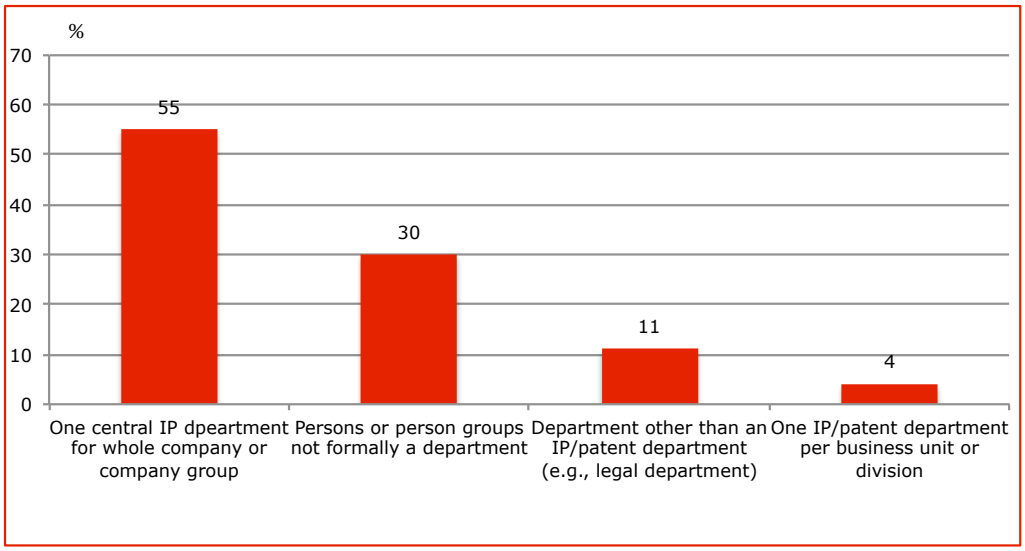
86 firms answered the question on whether they have such an out-licensing strategy. We defined having a patent and technology out-licensing strategy as 'existing specific guidance principles for decision making regarding technology and patent out-licensing'. 49% of the responding firms declared to have a licensing strategy that is part of the general business strategy. 22% reported to have a licensing strategy that is not part of the general business strategy. 29% stated not to have such a strategy in place at all. There are no statistically significant differences in breakdowns by company size, having a subsidiary abroad (or not) or being part of an enterprise group (or not).

In general, IP practitioners recommend implementing a dedicated IP/licensing strategy and making it part of the general business strategy, not least due to the significance IPRs and patenting have today.[28]

Next, we asked the same set of respondents whether they have specialised departments/persons in charge of patent licensing. Around 64% of the respondents stated to have a specialised department in place, while 36% had no such specialised staff in their firms. We observed no statistically significant differences in breakdowns by most of our breakdown variables. As expected, firms with a licensing strategy (in particular with a licensing strategy as part of their business strategy) tend to have more often a licensing department with specialised staff in place than firms with no strategy.[29]

Among the firms with dedicated licensing departments/staff for licensing we found the distribution depicted in Fig. 54. It can be seen that most respondents had a central IP department (55%), followed by individual persons in charge of technology and patent commercialisation (30%) and a department other an IP/patent department (11%). Only few firms (two, which amounted to 4% in the sample) had a more sophisticated structure with patent/IP department per business unit or division.

*Fig. 54 Types of departments or person(s) specifically in charge of IP/licensing, base: firms who have specific departments/persons in charge of patent/technology commercialisation *)*



*) multiple responses allowed

Source: Technopolis survey, long questionnaire only, n=53

[28] See, for example, *Wilson, K.* (2012): How to develop an IP strategy, retrieved Sep 25, 2012, http://ipstrategy.com/2012/09/13/how-to-develop-an-ip-strategy-outline-of-steps/

[29] Fisher´s exact, p = 0.000

3. Patent in-licensing by patenting firms

3.1 Scope and motivation

In order to avoid a too long questionnaire, we made the questionnaire section on patent in-licensing considerably shorter than the respective section(s) for out-licensing. We included only questions on scope (whether the company engages in in-licensing), motives and barriers.

For the interpretation of the results – especially when doing side-by-side comparisons with patent out-licensing activities – we need to underline that the sample of firms questioned consists only of businesses that have applied for a patent. This means that our sample is only able to provide insights into in-licensing practices of patenting firms. Hence, the analysis can only in parts portray patent in-licensing activities of all firms practicing patent in-licensing. It stands to reason that motives, barriers and scope of in-licensing activities in the group of non-patenting enterprises are different from patterns found for patenting companies. By comparison, the analysis on patent out-licensing provides a full(er) picture as patent out-licensing firms must be in possession of the respective patents.

In our sample, around 54% of all respondents reported to engage in in-licensing, approximately 13% were not (yet) in-licensing, but considering to do so while 33% reported not to have any in-licensing activity and also not to consider in-licensing patents and technologies in the future.[30] As in the case of out-licensing, we believe there is bias towards firms which practice (in-)licensing (see also section 2.1), so these answers should not be used to make inferences on the share of in-licensing firms among the overall population of patenting firms.

Larger firms tend to in-license more than SMEs do (61% vs. 44% in our sample).[31] Statistically significant is the difference between firms, which have subsidiaries other than trade/sales representatives abroad, and those companies that do not have such subsidiaries (63% in-licensing firms in the former group vs. 40% in the latter group).[32] By contrast, there were no statistically significant differences between firms, which were part of an enterprise group, and their respective counterparts. There were also no statistically significant differences in the breakdowns between in-licensind and not in-licensing firms by industry[33] and by technology field[34].

Fig. 55 shows the motives for the respondents of the survey overall to in-license patents. The most important motive to in-license patents is to ensure freedom-to-operate. This motivational factor was rated with an average of 3.2 on a 4-tier scale from 1='unimportant' motive to 4='very important' motives. Together with the finding for out-licensing motives, where ensuring freedom-to-operate was also, and only by a low margin, the second most important motive we conclude that a large part of the trade in patents (among patent-holding firms) through licensing is because firms want to ensure freedom-to-operate.

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[30] Basis: 284 responses to this question

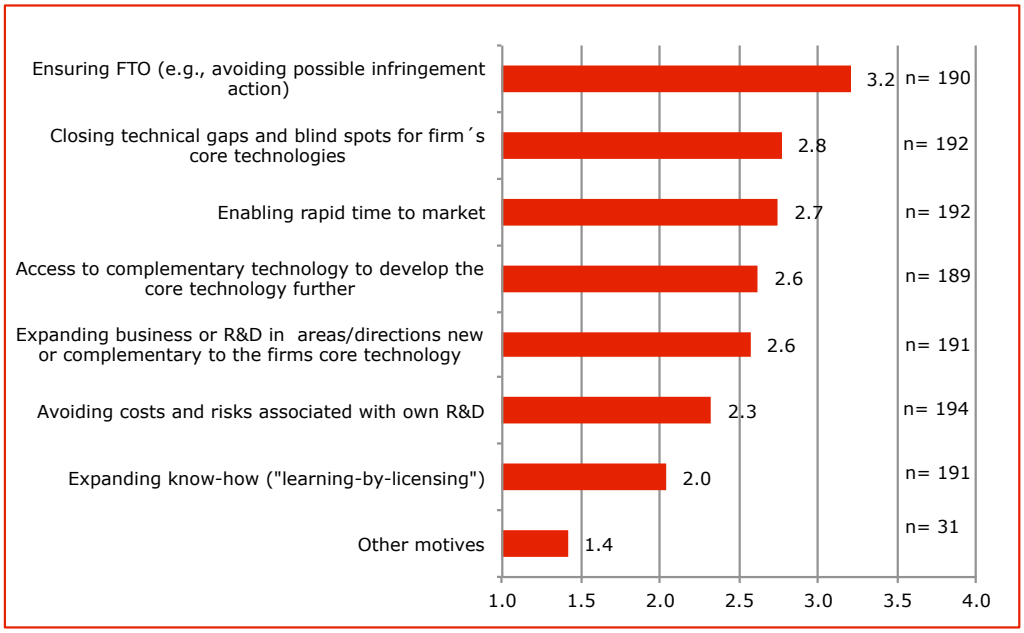
[31] Pearson´s Chi2, p = 0.021

[32] Pearson´s Chi2, p = 0.002

[33] Pearson´s Chi2, p = 0.051

[34] Pearson´s Chi2, p = 0.390

*Fig. 55 Motives for patent-holding firms to in-license patents *)*



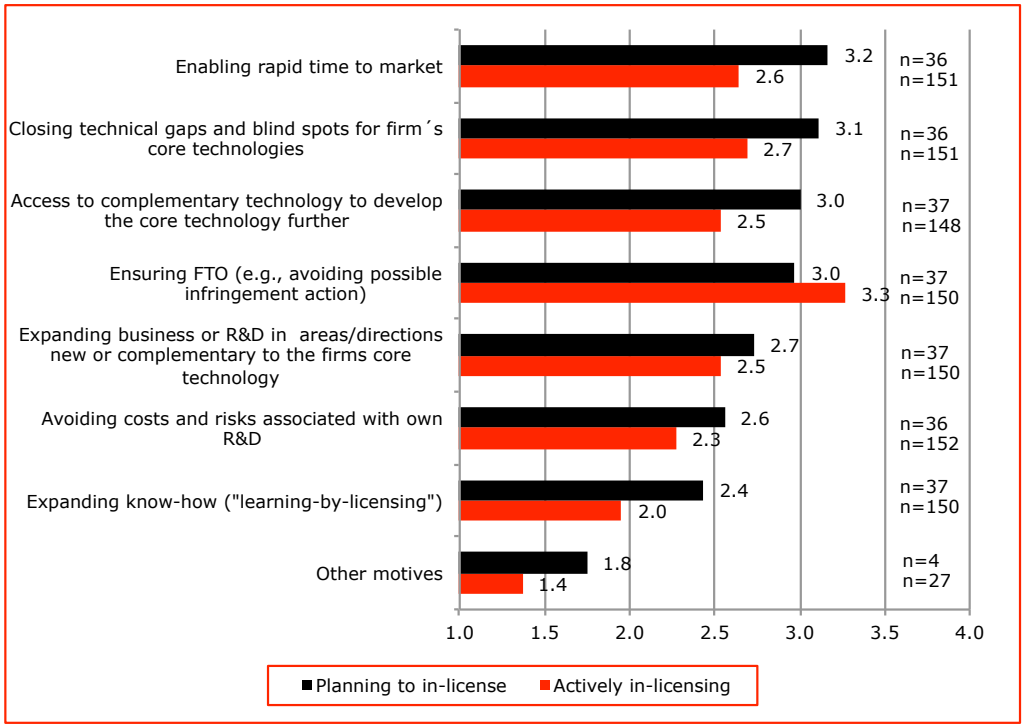
*) arithmetic mean on a scale from 1='unimportant motive' to 4='very important motive'

Source: Technopolis survey

The second-most important reason to license in is 'closing technical gaps and blind spots for the firm´s core technology' (average rating: 2.8), followed closely by the factors 'enabling rapid time to market' (average rating: 2.7) as well as 'access to complementary know-how to develop the core technology further' as well as expanding the business or R&D in new directions (average ratings 2.6, respectively). Interestingly, avoiding costs and risks associated with ones own R&D is among the factors that play, on average, less of a role. 'Learning-by-licensing' is rated on average as a rather weakly important factor, while other motives are, on average, gauged to be 'unimportant' to 'weakly important'.

It is noteworthy that those firms which are planning to in-license patents (but currently do not do so) have a different, more "pro-active" profile of motives with, for example, enabling rapid time to market as the leading factor followed by closing technological gaps and access to complementary technology to develop the core technology further (see Fig. 56). The group of currently in-licensing firms seem to be, by contrast, more in a "reactive" mode, where ensuring freedom-to-operate and avoiding being drawn into patent disputes plays much more of a role to engage in in-licensing.

*Fig. 56 Motives for patent-holding firms to in-license patents, by in-licensing status *)*

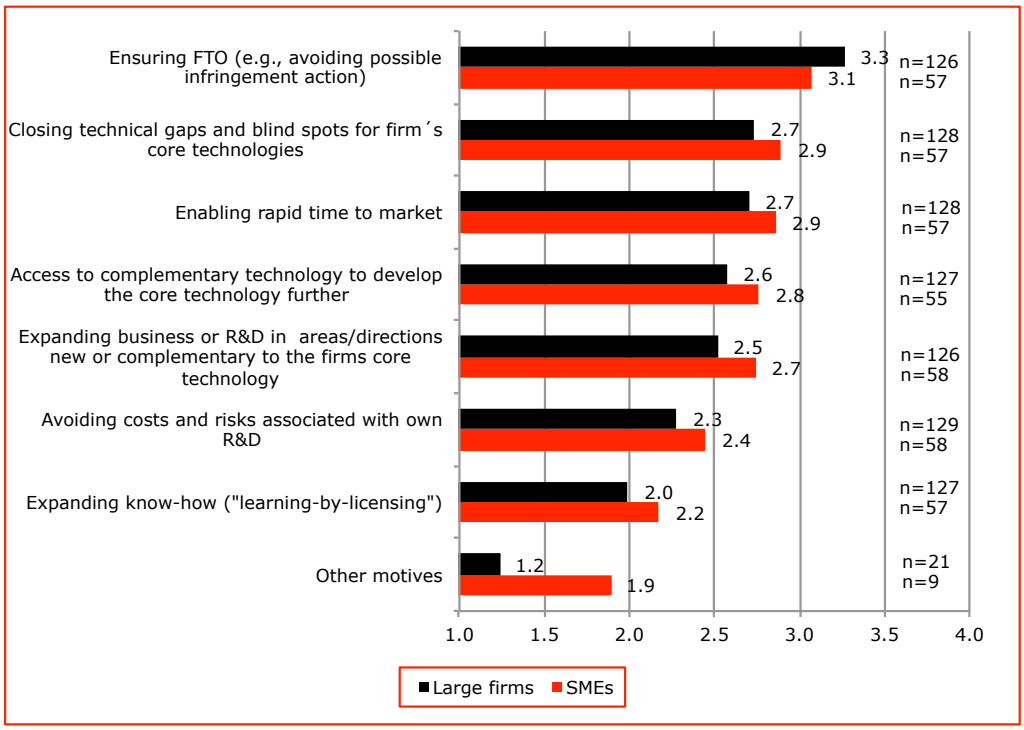


*) arithmetic mean on a scale from 1='unimportant motive' to 4='very important motive'

Source: Technopolis survey

Similarly, we find that SMEs tend to have more frequently pro-active motives to in-license, while with large firms the rather reactive motives to ensure freedom-to-operate and avoid litigation are considerably more dominant as reason for in-licensing (see Fig. 57).

*Fig. 57 Motives for patent-holding firms to in-license patents, by firm size *)*



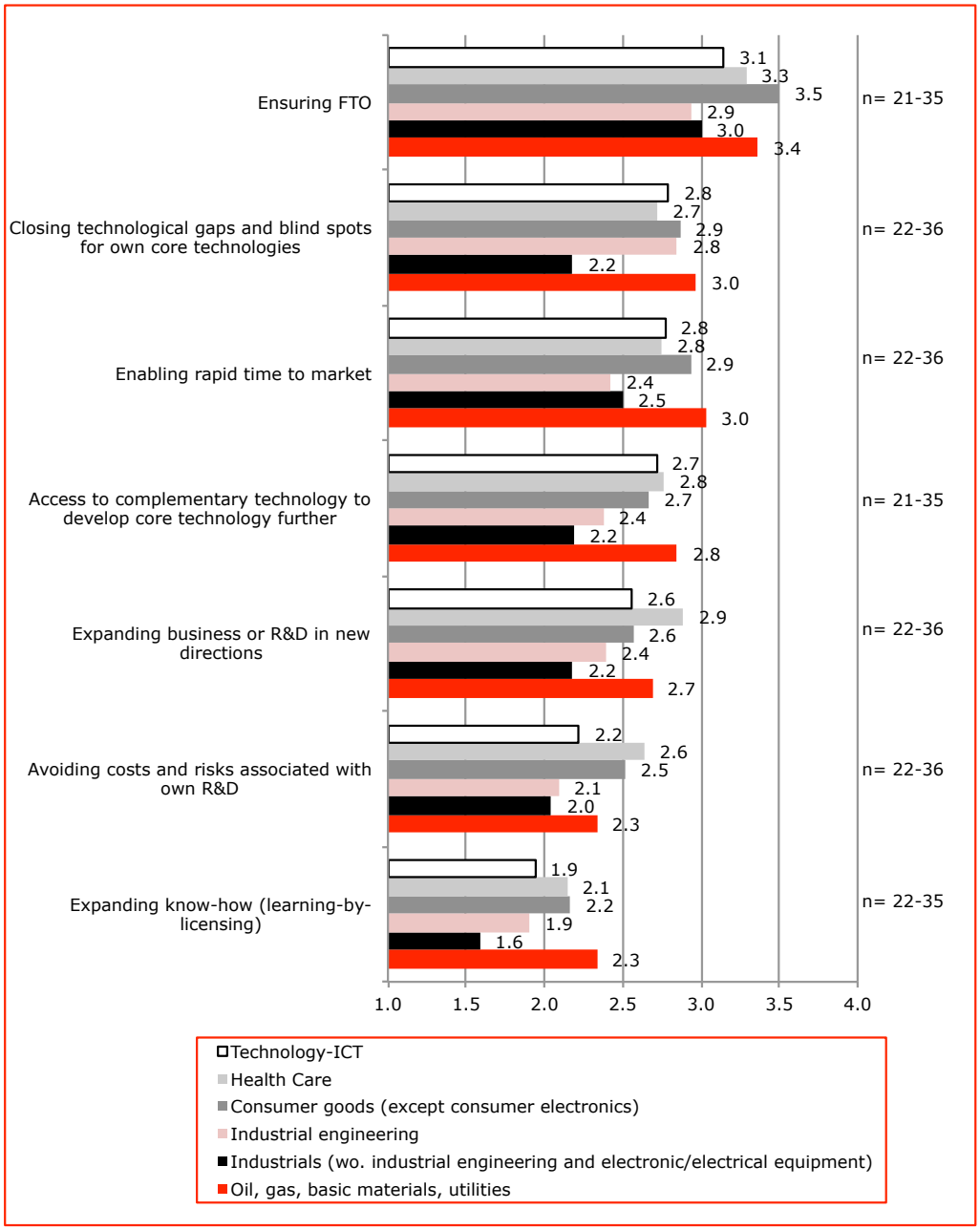
*) arithmetic mean on a scale from 1='unimportant motive' to 4='very important motive'

Source: Technopolis survey

In a breakdown by industry, we notice that firms in "Industrials" (in particular General Industrials, and to a lesser extent Industrial engineering) seem to have a smaller set of rather important motives to in-license: This motivation is primarily ensuring freedom-to-operate, and – in general industrials – also closing technological gaps. All other motivational aspects are rated, on average, lower than in the other industries.

Ensuring FTO is also the prime motive for firms in the consumer goods industry to license-in (average rating: 3.5, which is the highest among all industries, and some 0.6 grade-points higher than the aspect ranked second in this industry). We also notice particularly high interest in the health care sector to expand business or R&D in new directions (this is the aspect ranked highest in that industry, after ensuring FTO).

*Fig. 58 Motives for patent-holding firms to in-license patents, by industry *)*

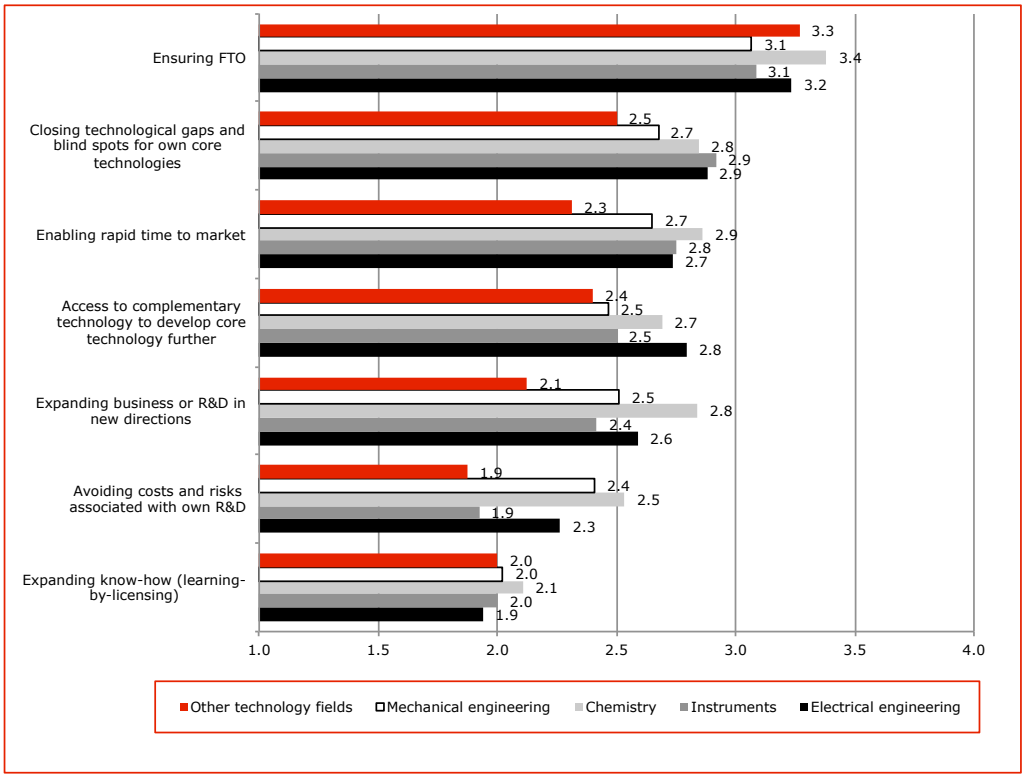


*) arithmetic mean on a scale from 1='unimportant motive' to 4='very important motive'

Source: Technopolis survey

The breakdown by technology field for the motives shows again a more diversified motive profile particularly for the field "Chemistry" which places more importance to most motives than the firms predominantly active in the other technology fields (see Fig. 59). In general, however, differences across the fields are not very pronounced.

*Fig. 59 Motives for patent-holding firms to in-license patents, by technology field *) **)*



*) arithmetic mean on a scale from 1='unimportant motive' to 4='very important motive'

**) Attention: technology field "Instruments" with only 13 observations for this question – interpretation with care

Source: Technopolis survey, n (Other technology fields) = 15-16, n (Mechanical engineering) = 43-44, n (Chemistry) = 55-58, n (Instruments) = 12-13, n (Electrical engineering) = 33-34

3.2 Barriers

Fig. 60 shows the barriers to in-licensing, as reported by firms holding patents and responding to this survey. The findings indicate that, on average, many barriers we enquired into were rated as 'unimportant' to 'weakly important' (arithmetic means less than 2.0 on a 4-tier scale from 1='unimportant' to 4='very important'). Most strikingly, low relevance is given in particular to aspects such as 'lack of experience with in-licensing' or 'lack of model contracts', which are topics usually at the heart of policy interventions. In fact, the aspect 'lack of model contracts' received the lowest score with an average rating of 1.5.

We can only conclude that for the average patent holding firm these barriers are in practice no obstacles to conclude in-licensing agreements. If there are barriers to speak of, they are found on the supply side of technologies: too high prices charged by the licensor (or other unacceptable terms) – assessed with 2.5 as 'weakly important' to 'important' –, as well as outright refusal of the potential licensor to grant a license or no need/interest to license in (both assessed with an average rating of 2.3, respectively).

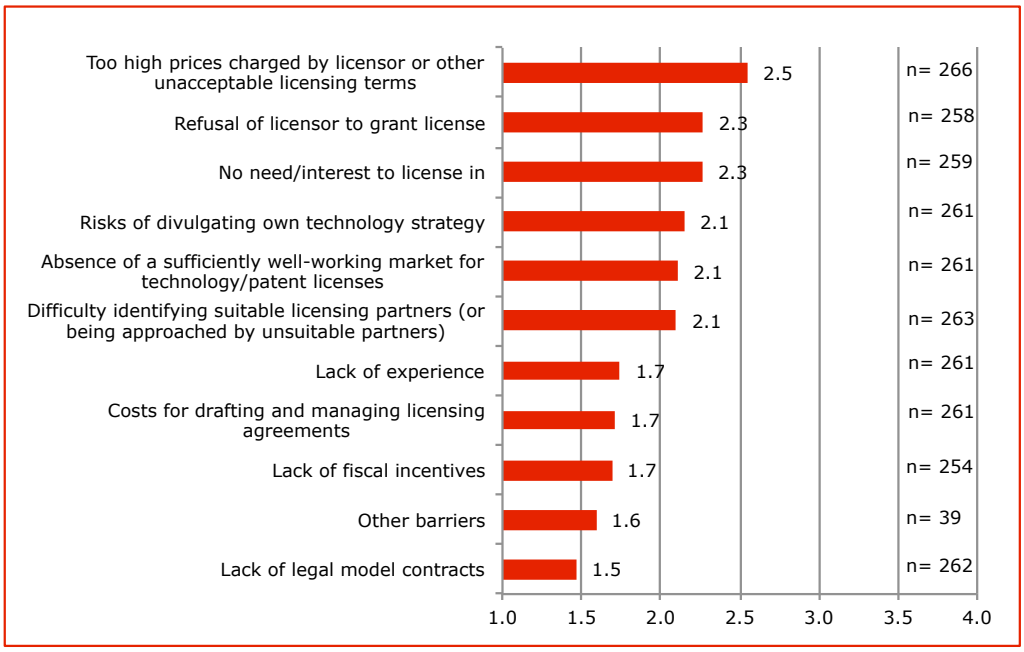
While 'other motives' were gauged, on average, to be somewhere between 'unimportant' and 'weakly important' barriers, we received some noteworthy comments on the nature of such other motives. These reasons were rather diverse: Two comments noted on the 'not-invented-here' syndrome, whereby knowledge created outside the scope of the firms is less valued than know-how created within the firms. One comment was that in-licensing would decrease their own creativity and create more dependence on external organisations. One other very specific comment was that the respective answering firm would only accept exclusive licenses and that *"…universities are often problematic in this respect."* Two further interesting comments were in fact additional comments to the category of being approached by an unsuitable licensor:

"A barrier is non-understanding of the licensor of our business. Sometimes, the technology is OK but does not fit into our needs." (respondent)

"Quality of the IP underlying the license." (respondent)

A breakdown of the barriers by status of in-licensing reveals that the group of actively in-licensing firms (and that of firms which intend to in-license but currently don´t) perceive supply-sided barriers in a more pronounced way than firms which do not in-license and do not plan to do so in the future (see Fig. 61). Actively in-licensing firms rate, for example, 'too high prices and other unfavourable terms' with, on average, 2.7 (not in-licensing firms with no plans for future in-licensing activity: 2.3) and 'refusal of licensor to grant license' with 2.5 (not in-licensing firms which have no plans for in-licensing: 2.0).

*Fig. 60 Barriers to patent in-licensing, as anticipated by firms holding patents themselves *)*



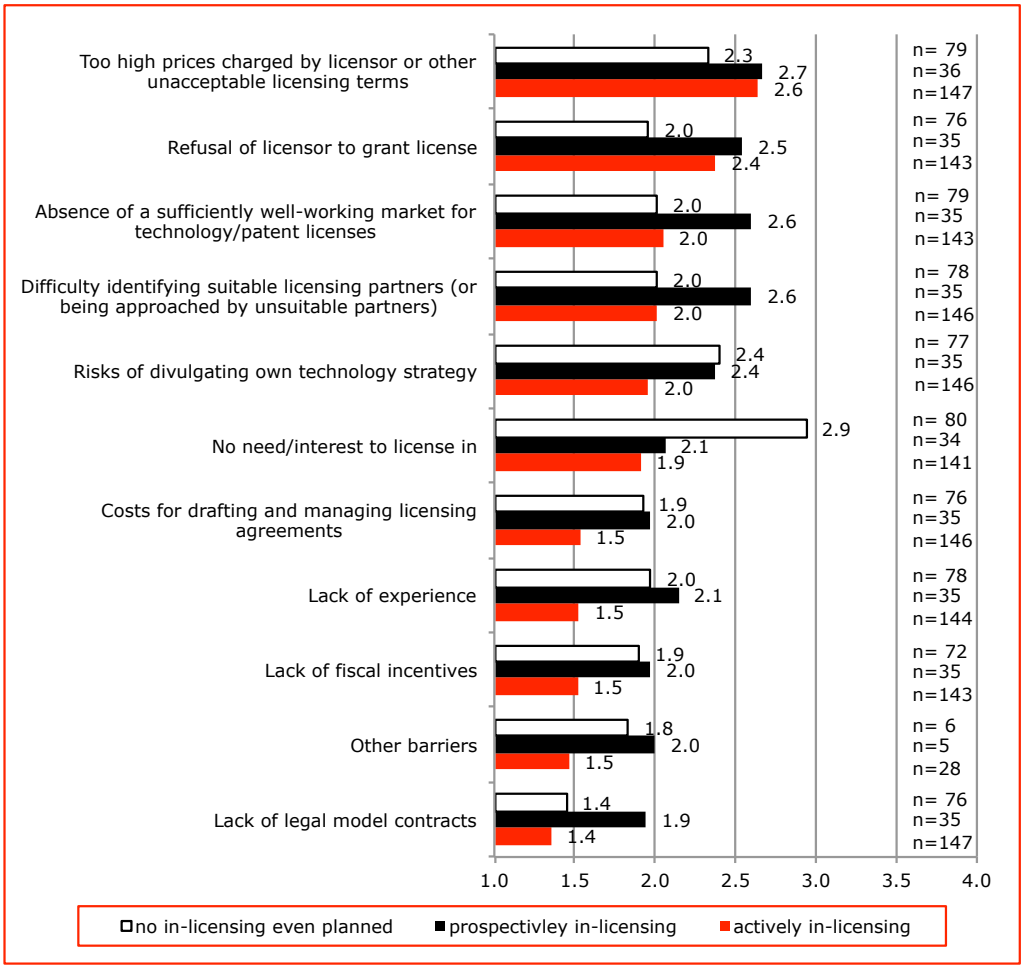
*) arithmetic means on a scale from 1='unimportant barrier' to 4='very important barrier'

Source: Technopolis survey

Firms which are not in-licensing (and have no future plans in this direction) state as the most important barrier simply that they do not want or need to

in-license patents. We theorise that these firms have a sufficiently large patent portfolio, in the case of large firms, to cover their technology needs. In the case of SMEs, we anticipate that such firms may be so highly specialised in their field, and the respective technology less reliant on other/complementary technologies, that there may be hardly a need for in-licensing.

*Fig. 61 Barriers to patent in-licensing, as reported by firms holding patents themselves, by status of in-licensing activities *)*



*) arithmetic means on a scale from 1='unimportant barrier' to 4='very important barrier'

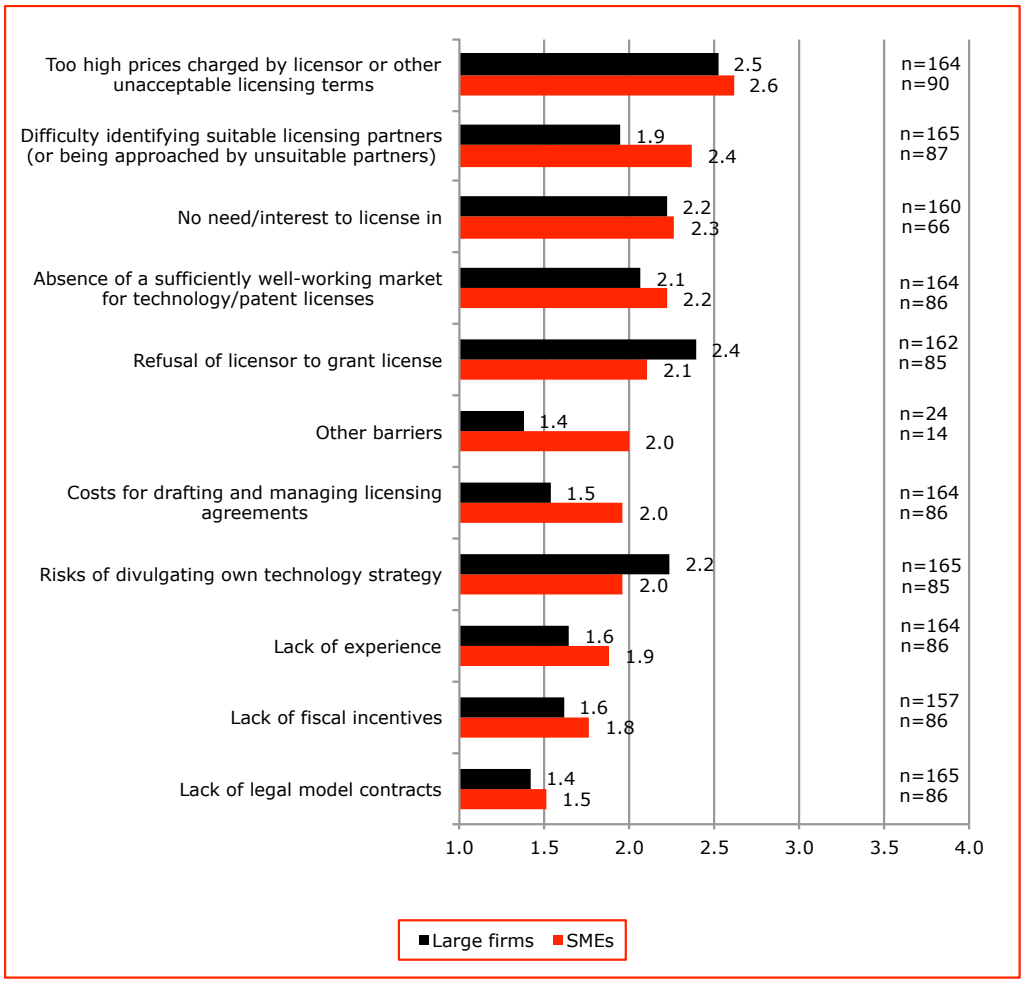
Source: Technopolis survey

One may expect that firms that do not in-license patents but plan to do so anticipate higher barriers in the factors 'lack of experience' and 'lack of legal model contracts'. While it is true that these barriers are given higher attention by this group of firms – if compared to actively in-licensing firms – , we nonetheless note that these aspects are still gauged, on average, as rather 'unimportant' to 'weakly important'. However, prospectively in-licensing firms complain to a larger degree about a not sufficiently well functioning market for patent/technology licenses and about difficulties finding suitable licensors (gauge on average at 2.6, respectively).

In a breakdown by company size, we find that SMEs complain to a larger degree about unsuitable licensing partners and the costs associated with

drafting and managing licensing agreements (see Fig. 62). In turn, large firms seem to be confronted more often than SMEs by firms that refuse to license their technologies.

*Fig. 62 Barriers to patent in-licensing, as reported by firms holding patents themselves, by firm size *)*



*) arithmetic means on a scale from 1='unimportant barrier' to 4='very important barrier'

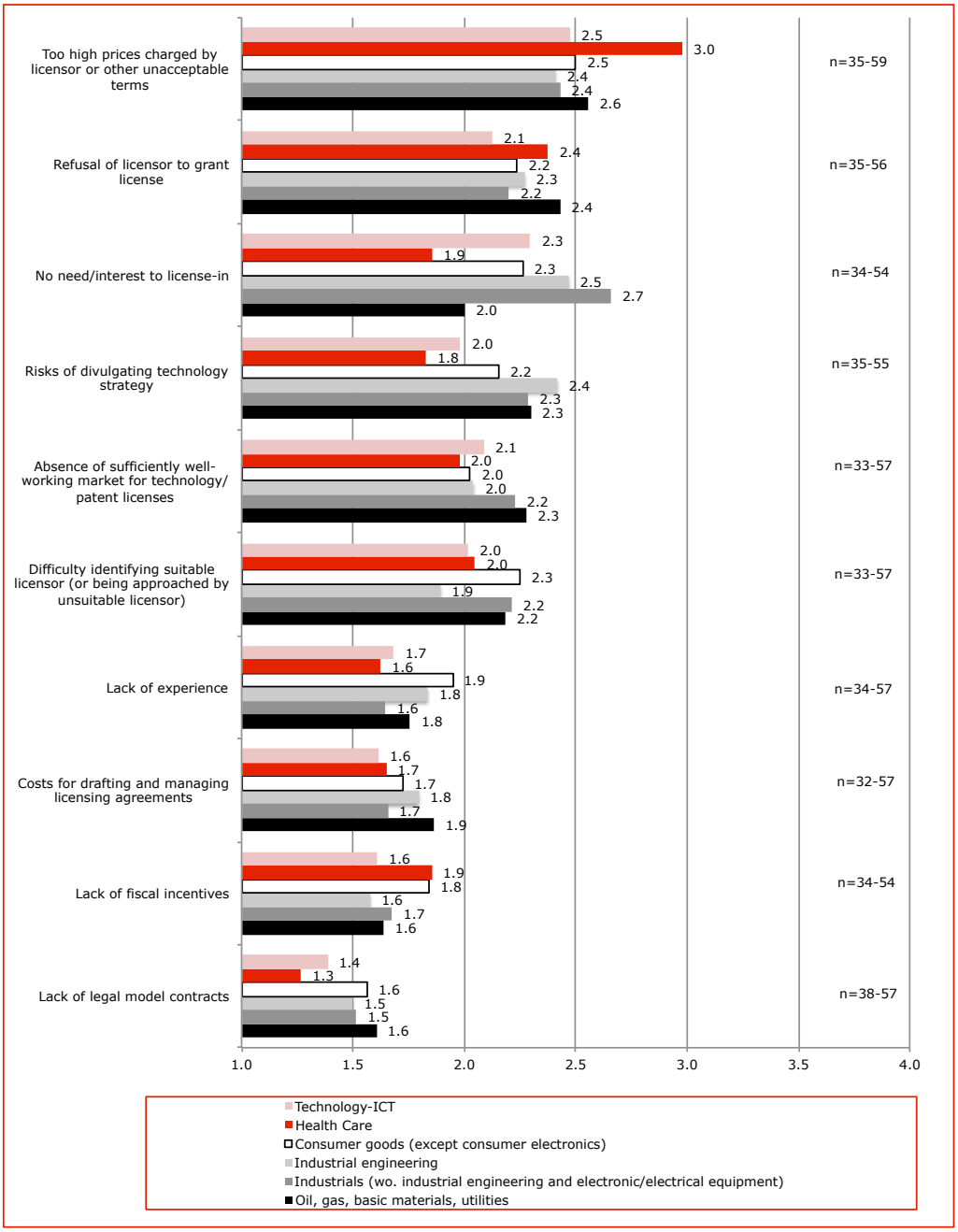
Source: Technopolis survey

Fig. 63 shows the breakdown of barriers to in-licensing by industry. As in the case of patent out-licensing, there are some interesting differences. These are mostly in line with the observations and conclusions drawn for the corresponding question on patent out-licensing.

Again, we observe a specific barrier pattern for the firms active in Health care in our sample. For these firms, 'too high prices charged by the licensor or other unacceptable licensing terms' were the most important barrier (average grading: 3.0, which is some 0.5 grade-points higher than in the other industries). The 'Health care' industry is also the one that expressed the least that 'no need/interest' would be a barrier to in-licensing, and the firms were also the industry least concerned with the lack of legal model contracts. We interpret these results as showing an industry that is open and experienced in patent in-licensing.

Reflecting the patterns of the answers to the patent out-licensing questions, we see that firms in the industrial sector (Industrial engineering and (General) Industrials) place considerable emphasis on 'no need/interest' as a barrier (average rating: 2.7 for industrials and 2.5 for industrial engineering). These firms tend to be also more afraid of divulgating their technology strategy. For us, this pictures industries that the respective businesses use their patents mostly internally, for protective purposes.

*Fig. 63 Barriers to patent in-licensing, as reported by firms holding patents themselves, by industry *)*



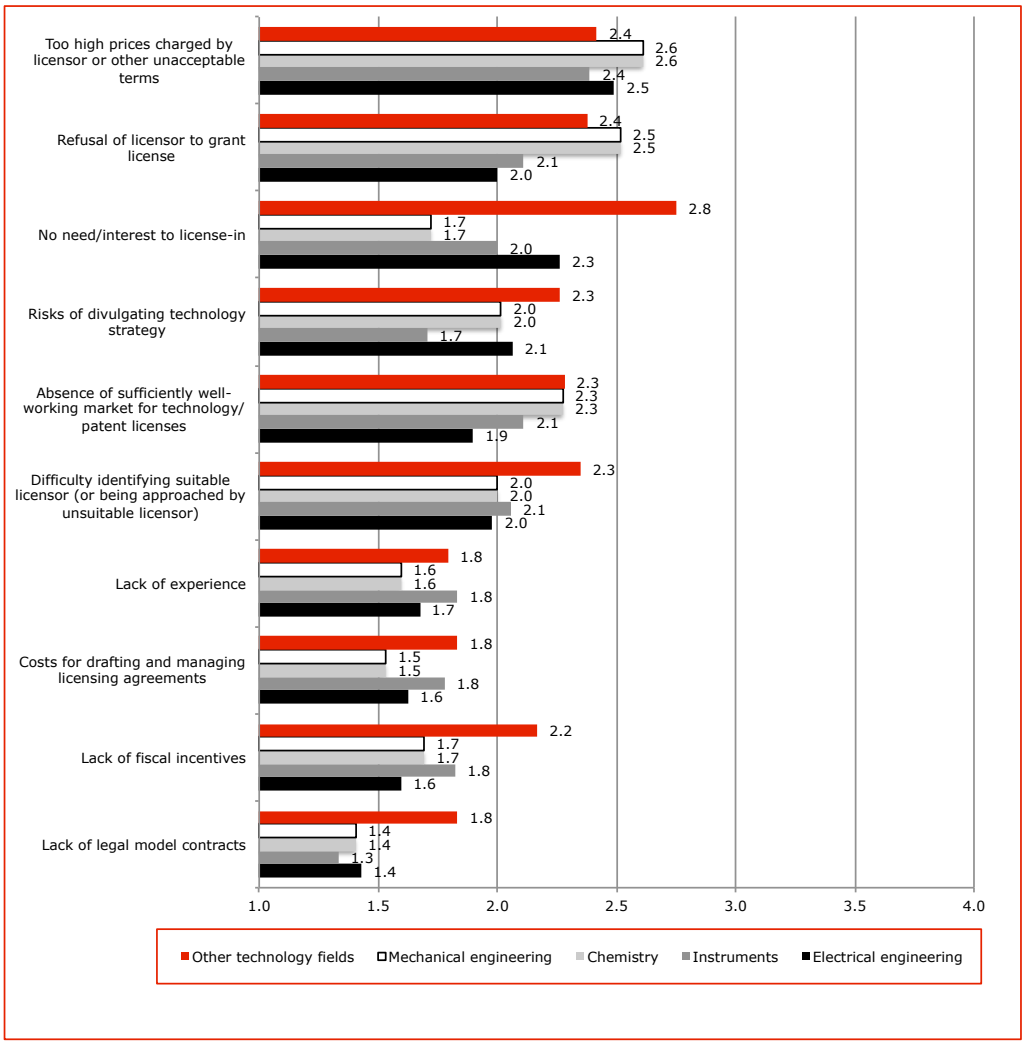
*) arithmetic means on a scale from 1='unimportant barrier' to 4='very important barrier'

Source: Technopolis survey

There were rather little differences across the other industries notable, and barriers of overall rather low relevance were also rated by all industries to be of rather little relevance.

A similar picture emerges when investigating barriers to in-licensing by technology field (see Fig. 64). Perhaps most interesting are the results for the 'other technology fields' class, where we see in particular a high barrier in 'no need/interest' to in-license and also elevated levels of importance given to barriers such as identifying the right partners. Other than that, there are few larger differences to speak of.

*Fig. 64 Barriers to patent in-licensing, as reported by firms holding patents themselves, by technology field *)*



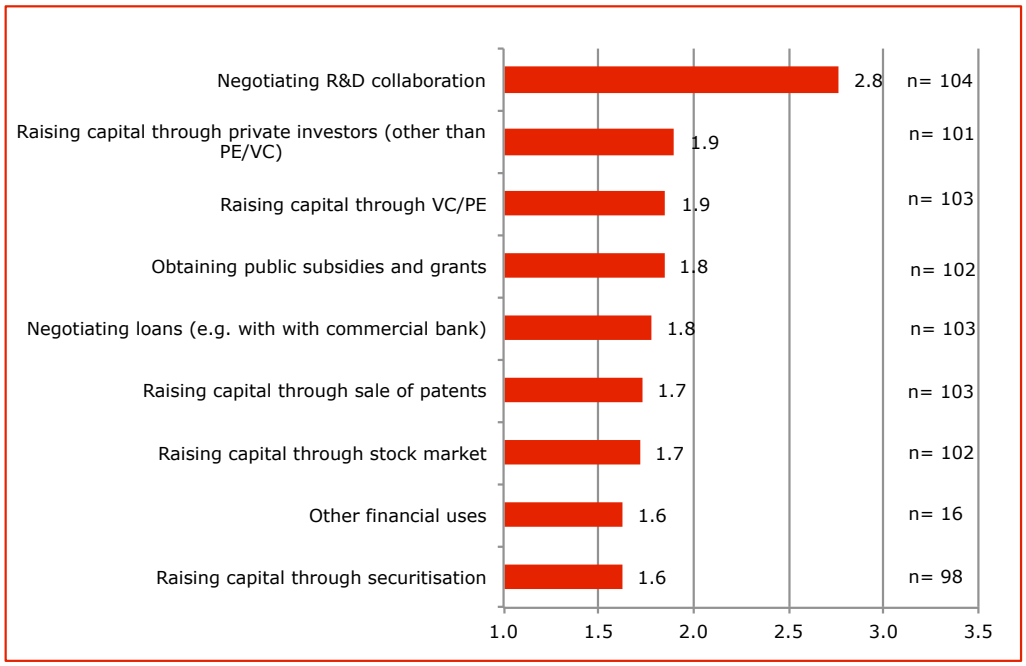
*) arithmetic means on a scale from 1='unimportant barrier' to 4='very important barrier'

Source: Technopolis survey, n (Other technology fields) = 23-25, n (Mechanical engineering) = 60-65, n (Chemistry) = 60-65, n (Instruments) = 17-18, n (Electrical engineering) = 47-49

4. Using patents for finance and funding and extent to which firms are affected by disputes concerning patent infringements or licensing agreements

We also included a question on funding and finance uses of patents in the long questionnaire (see Fig. 65). As can be seen, the most important financial use for firms in our sample is – by far – to use patents in negotiating R&D collaboration agreements. This aspect received, on average, a ranking of 2.8 on the 4-tier scale from 1=unimportant to 4= very important. The use ranked second – raising capital through private investors – received only an average rating of 1.9, on par with the use of patents to obtain public subsidies and grants. Overall, all funding/finance uses we analysed, except the R&D collaboration use, had average ratings in between 1.6 and 1.9 which means that these aspects were rated, on average, between 'unimportant' or 'weakly important' on our 4-tier scale.

*Fig. 65 Importance of patents for funding and financing purposes *)*



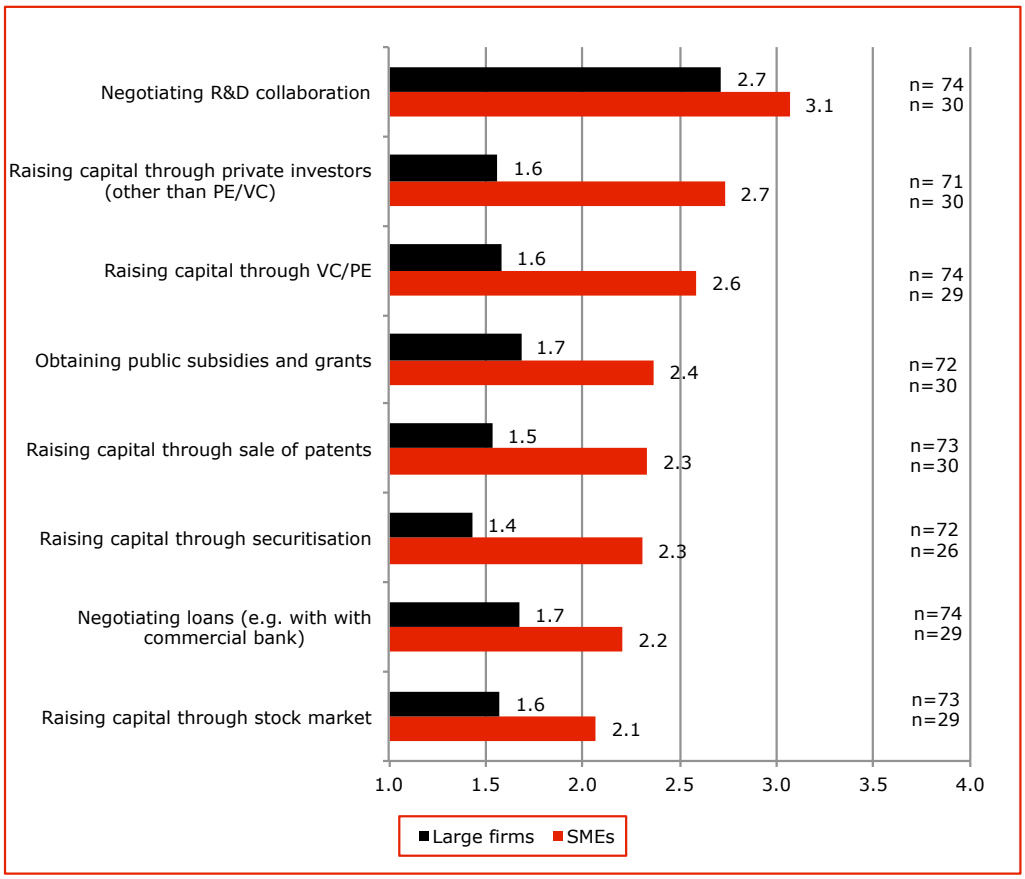
*) arithmetic means on a scale from 1='unimportant' to 4='very important'

Source: Technopolis survey, long questionnaire only.

This does not mean, however, that using patents for funding/finance purposes is not important per se. In fact, for certain company groups it is of rather high importance. From other studies (such as Blind et al. 2006) it is, for example, very well known that patents may be in particular essential for start-ups to attract Venture Capital.

A breakdown of Fig. 65 by firm size in our sample clearly shows all types of finance/funding uses we inquired into are much more important for SMEs than for large firms (see Fig. 66). The difference in the ratings is particularly large with respect to the uses 'raising capital through private investors (other than PE/VC)' and 'raising capital through VC/PE'.

*Fig. 66 Importance of patents for funding and financing purposes, by firm size *)*

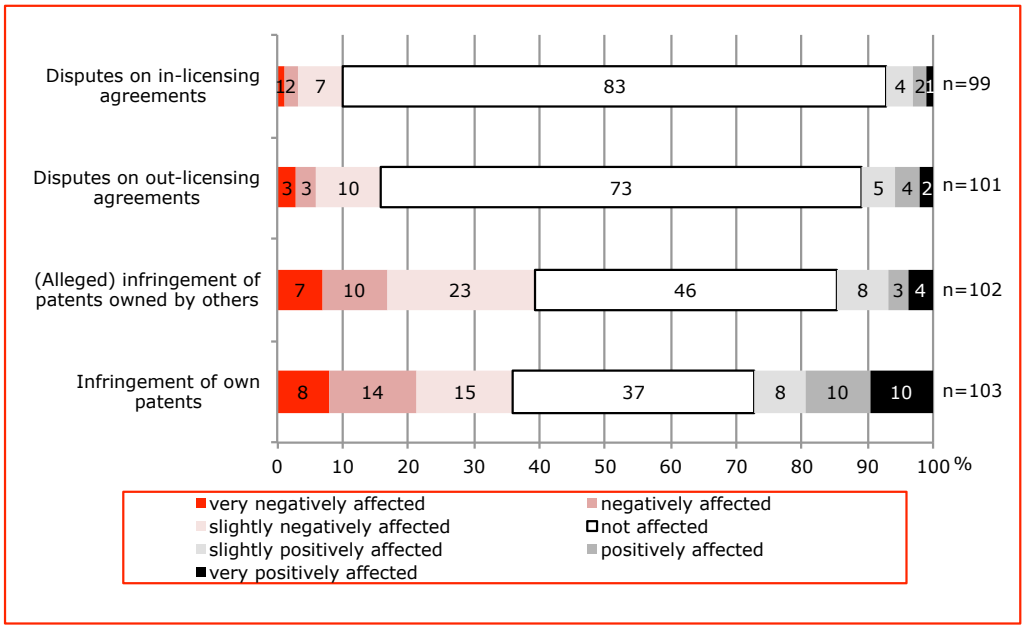


*) arithmetic means on a scale from 1='unimportant' to 4='very important'

Source: Technopolis survey, long questionnaire only

Our last question, for respondents of the long questionnaire, dealt with the impact of disputes on patent infringement and on licensing agreements on the firms (see Fig. 67). As can be seen, only 37% of the firms have not been affected in some form by infringement of their patents, and only 46% were not impacted by (alleged) infringement of third party patents. As can be expected, there are considerably fewer firms affected by disputes on licensing agreements. Licensing agreements by definition require that two parties reach an agreement, and it stands to reason that parties mostly conclude such agreements faithfully with the intention to stick to them. In addition, settlements of patent infringements usually end up in some form of a licensing agreement.

Fig. 67 Shares of firms affected by disputes on licensing agreements and patent infringement cases, firms in %



Source: Technopolis survey, long questionnaire only

5. Other feedback received

In the course of the survey and interviews, we received also some general feedback on the topic of licensing. Perhaps most striking is feedback that indicates that licensing as such may not be so much of a problem when compared to other issues in the patent system, in particular enforcement of patents, litigation practices outside Europe as well as granting practices abroad:

> *"We are a very active in-licensor and out-licensor in multiple fields. The willingness of countries to enforce patents is highly important to us from a strategy perspective. Many countries do not have legal systems making licensing attractive."* (respondent)

> *"Slave-like imitation and unfair competition practices are for us much more of a problem than licensing." (respondent)*

> *"We are producing in 21 countries on all continents and know the patent system in our field of work. For the Commission, it would be much more important to deal with the deterioration of IP protection which in practice happens in many jurisdictions. There are good and correct international agreements on all levels for the protection of IP. Their application is, however, very different and partly lacking completely. To give some examples: The patent office in Brazil is so slow that it takes 10 years till a first examination is completed. In Turkey, there are no courts trained in technological matters, so courts rely on private experts. These experts are paid so badly that they do not have the time to study the respective cases adequately. In the U.S., prior public usage of a technology harms the novelty criterion for patentability only if such usage has taken place in the U.S.[35] The patent office in the U.S. grants patents for almost everything, because there is the belief that the business of the office is to grant patents and not to reject them. There is still no independent possibility for an appeal at a senate that is independent from the examination. Today, the whole patent system is more of a barrier than an enabling factor for innovation, also because the flood of patents makes research in patent databases difficult. This flood is caused by the depreciation of the patentability criterion 'inventive step' and the over-focus on 'novelty'."* (respondent)

> *"My answers are based on our portfolio of just* […] granted *patents and* […] *patent applications. In our field, plant breeders rights are far more important to protect IP. My general experience is that for SMEs, patent applications are not at all suitable for doing business. Even SMEs with 200 employees are too small to effectively play the game against big players such*

[35] *Note by the authors*: This peculiarity of U.S. patent law has been recently changed. With the implementation of the Leahy-Smith America Invents Act (AIA) in March 2013, *"…if an event or activity occurs that meets the definition of prior art, it is within the prior art for U.S. patent law-regardless of where it occurs."* (Merges, R.P. (2012): Priority and Novelty under the AIA, Berkeley Law Scholarship Repository 10-1-2012, p. 1027).

as Bayer, Monsanto, etc. The patent world is too complex, too expensive, too sneaky to operate in effectively without a highly costly group of patent specialists." (respondent)

6. Conclusions

This report has led to a number of findings concerning patent out-licensing and patent in-licensing performed by European businesses. The most important findings are the following:

- The importance of licensing has increased over the years, as most firms report increasing licensing revenues over time and an increasing number of licensing deals. This can be observed for all industries. Patent licensing has to be mostly understood as technology licensing, as patents are rarely out-licensed on their own (i.e., licensing agreements usually cover more than just the patents).
- Based on a per-firm view analysis of European patent licensors, patents are predominantly out-licensed to firms not affiliated with the licensors. Trade in patents via (out-)licensing occurs predominantly within Europe. The second most important trading region is North America, leaving behind Asian regions to a considerable extent. Most licensing occurs among competitors, and only to a smaller extent between suppliers and (B2B) customers.
- The most important motives to out-license are revenue-generating motives, to ensure freedom-to-operate as well as stopping patent infringements. There are differences between SMEs and large firms, with SMEs placing more importance on revenue generating motives, while large firms out-license more to ensure FTO and stop (perceived) infringement.
- The by far most important barrier for patent out-licensing is the potential loss of their competitive/technological edge, followed by difficulties to identify the right partners. Another important barrier, in particular for micro-enterprises and small firms, is that the patented technology may not be developed enough. We find a considerable share of firms where the expectations they set into their out-licensing was seemingly not met in reality.
- The most important channels by which licensors get in touch with licensees are informal networks, followed by own research, being contacted by the licensee and events such as trade fairs. Intermediaries searching on the licensor´s behalf and technology/licensing exchange platforms are (currently) almost irrelevant. SMEs use all means to get in touch with licensees more intensely than large firms.
- We see a cascade of measures by which patents are shared/transferred to third parties. (Bilateral) out-licensing of patents is the means probably used most, followed by sale of patents and entering joint ventures. Patent pools are rarely used with the exception of groups of companies in specific technology fields where standards play an important role. Patent auction events are currently irrelevant for the majority of firms.
- The strongest motive to in-license patents is to ensure Freedom-to-Operate (FTO), followed by closing technological gaps and enabling rapid time to market. The most significant barriers are unacceptable terms of the licensor as well as the refusal of the potential licensors to grant licenses at all.
- Overall, many barriers to out- and in-licensing have not been judged to be of high importance, and we received feedback that licensing is not a

big or the biggest problem area for the firms in the context of putting patents to use. Other issues, such as enforcement of IPR or litigation practices in jurisdictions abroad are often judged to be more problematic areas than licensing.

- There are considerable differences across industries when it comes to licensing behaviour. Perhaps most interesting is that there are industries where patents are used mostly internally (such as in Industrial engineering), while particularly in a sector such as Health care patents are a currency for doing business with other firms and licensing is hence more commonplace. This is reflected in different motive patterns or in different perceptions of barriers to patent licensing.

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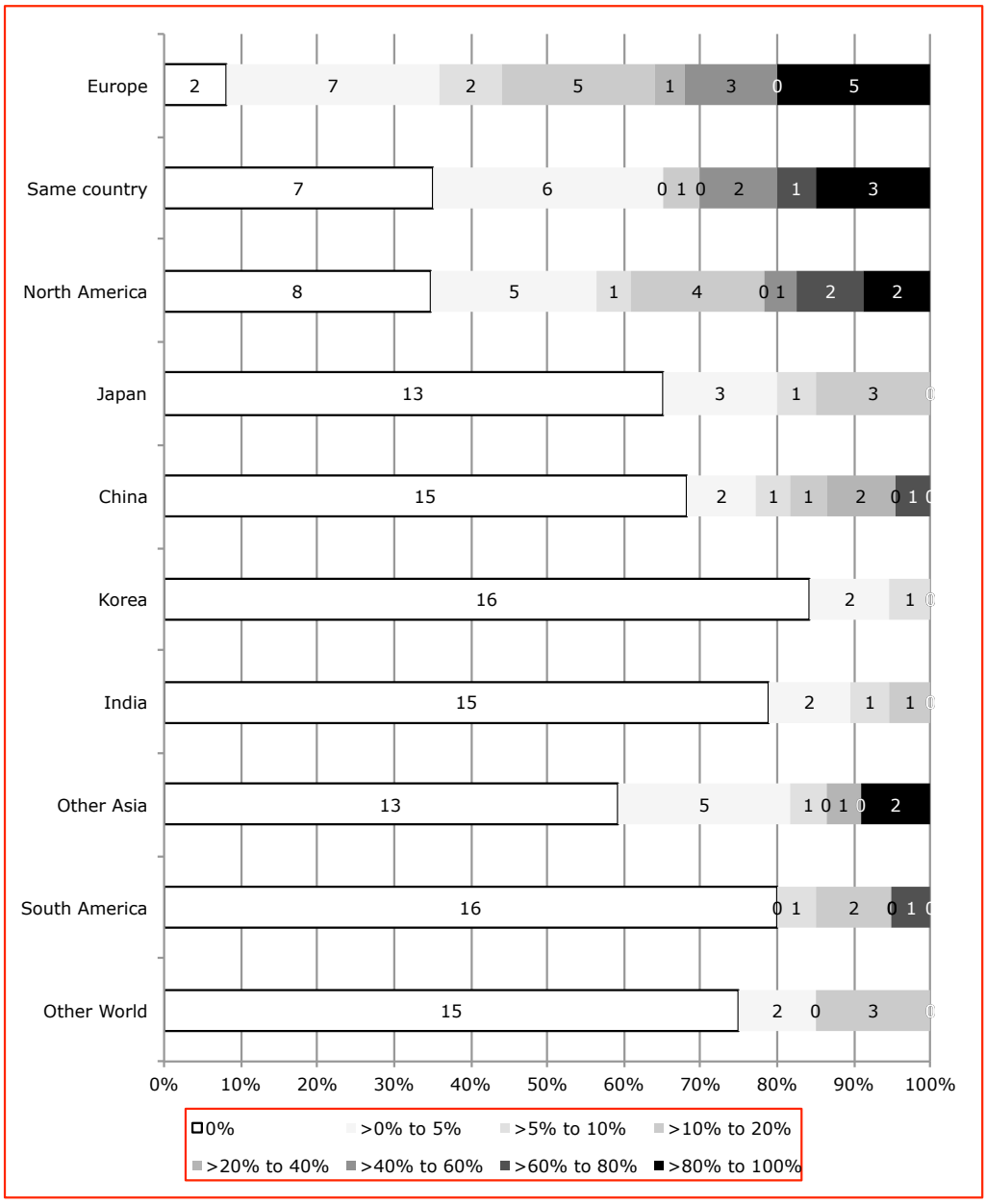
Appendix A – Breakdowns of out-licensing flows to non-affiliated partners to different regions by industry

*Fig. 68 Shares of patent portfolios licensed to licensees located in different regions of the world, industry: Oil, gas, basic materials, utilities *) **), firms in absolute numbers*

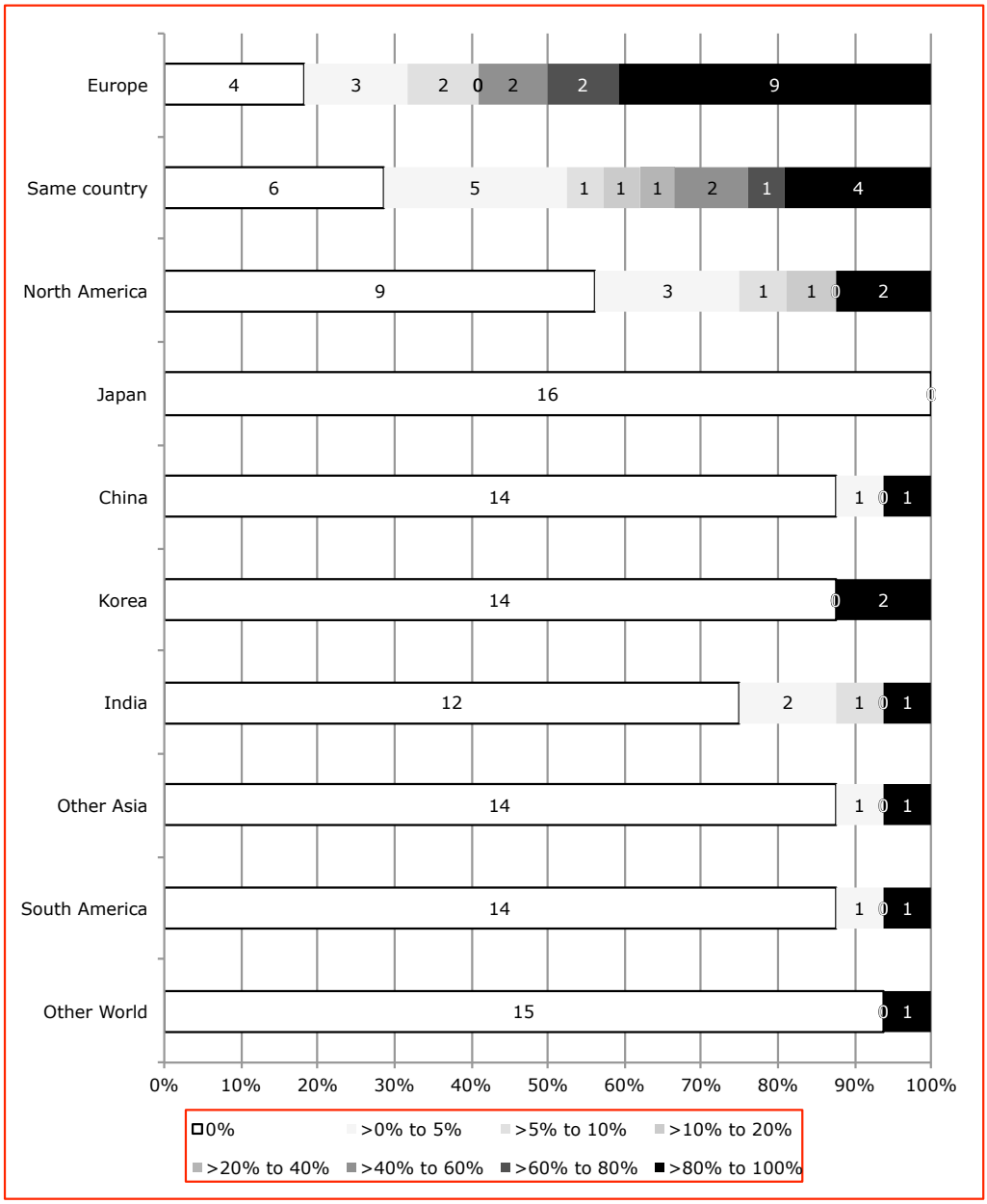


*) base (100% in the legend box): patents out-licensed to non-affiliated parties

**) The more a bar is grey-shaded or black, the more out-licensing takes place from Europe into the respective region in a per-firm view.

Source: Technopolis survey

*Fig. 69 Shares of patent portfolios licensed to licensees located in different regions of the world, industry: General industrials (without industrial engineering) *) **), firms in absolute numbers*

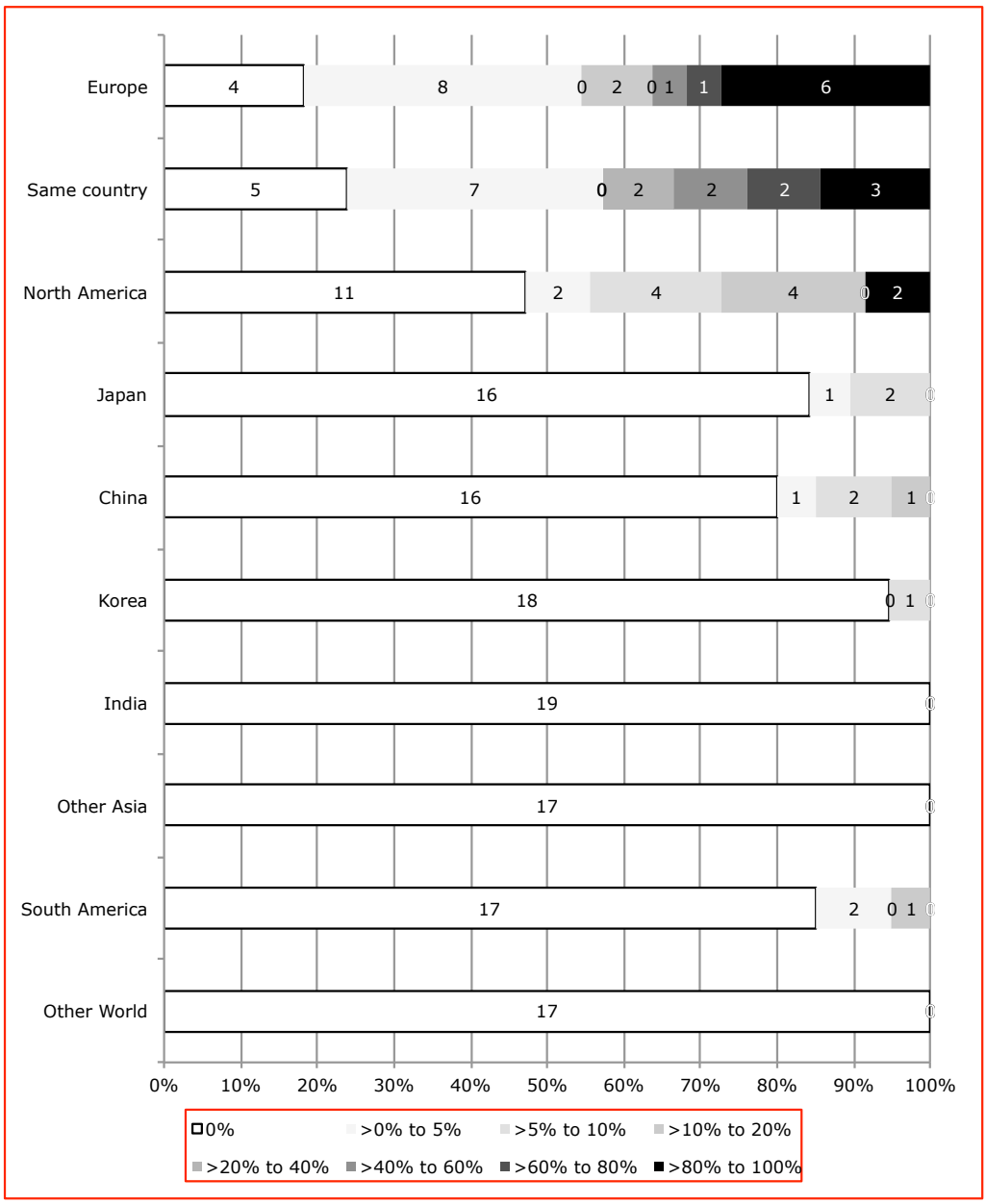


*) base (100% in the legend box): patents out-licensed to non-affiliated parties

**) The more a bar is grey-shaded or black, the more out-licensing takes place from Europe into the respective region in a per-firm view.

Source: Technopolis survey

*Fig. 70 Shares of patent portfolios licensed to licensees located in different regions of the world, industry: Industrial engineering *) **), firms in absolute numbers*

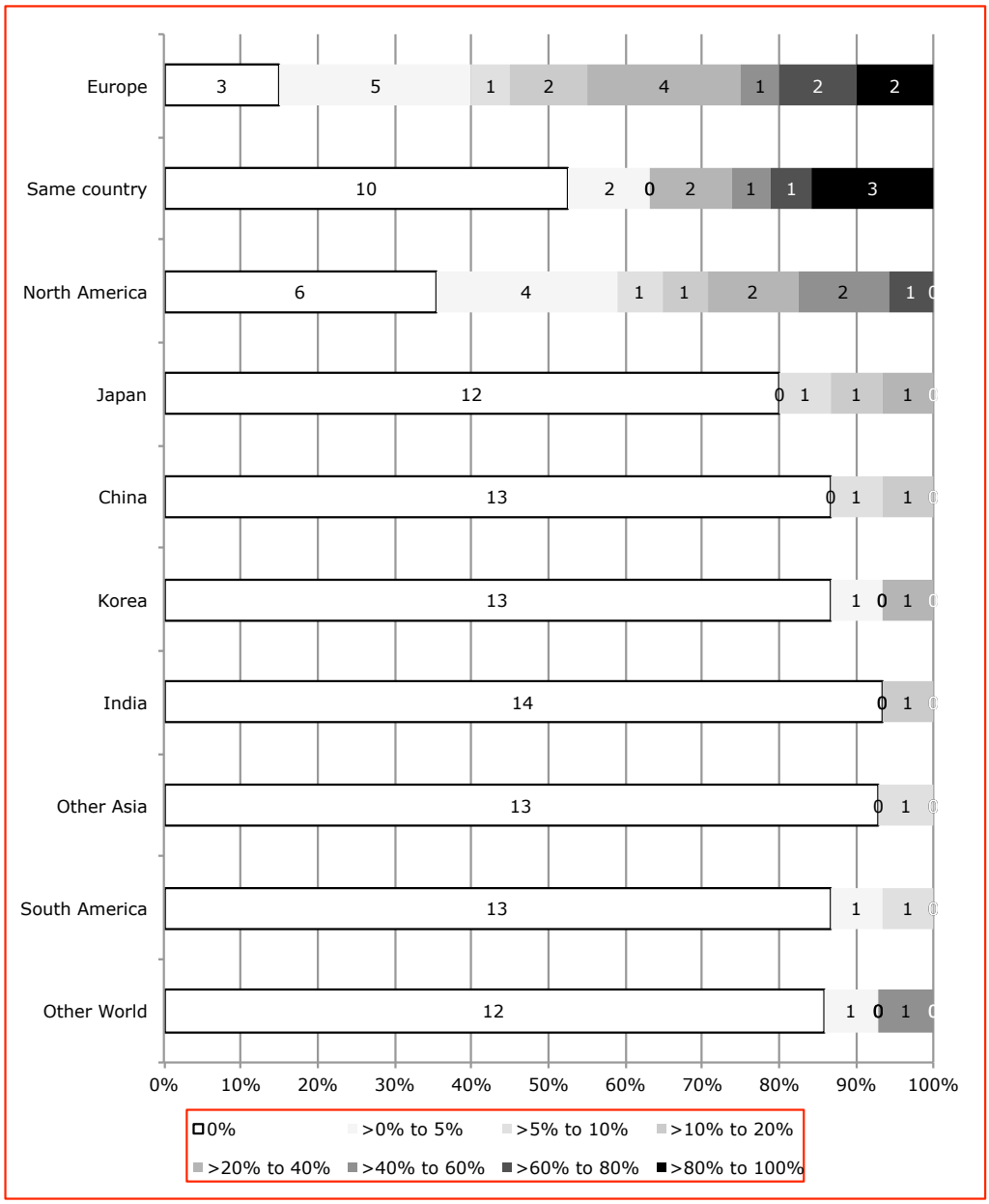


*) base (100% in the legend box): patents out-licensed to non-affiliated parties

**) The more a bar is grey-shaded or black, the more out-licensing takes place from Europe into the respective region in a per-firm view.

Source: Technopolis survey

*Fig. 71 Shares of patent portfolios licensed to licensees located in different regions of the world, industry: Consumer goods *) **), firms in absolute numbers*

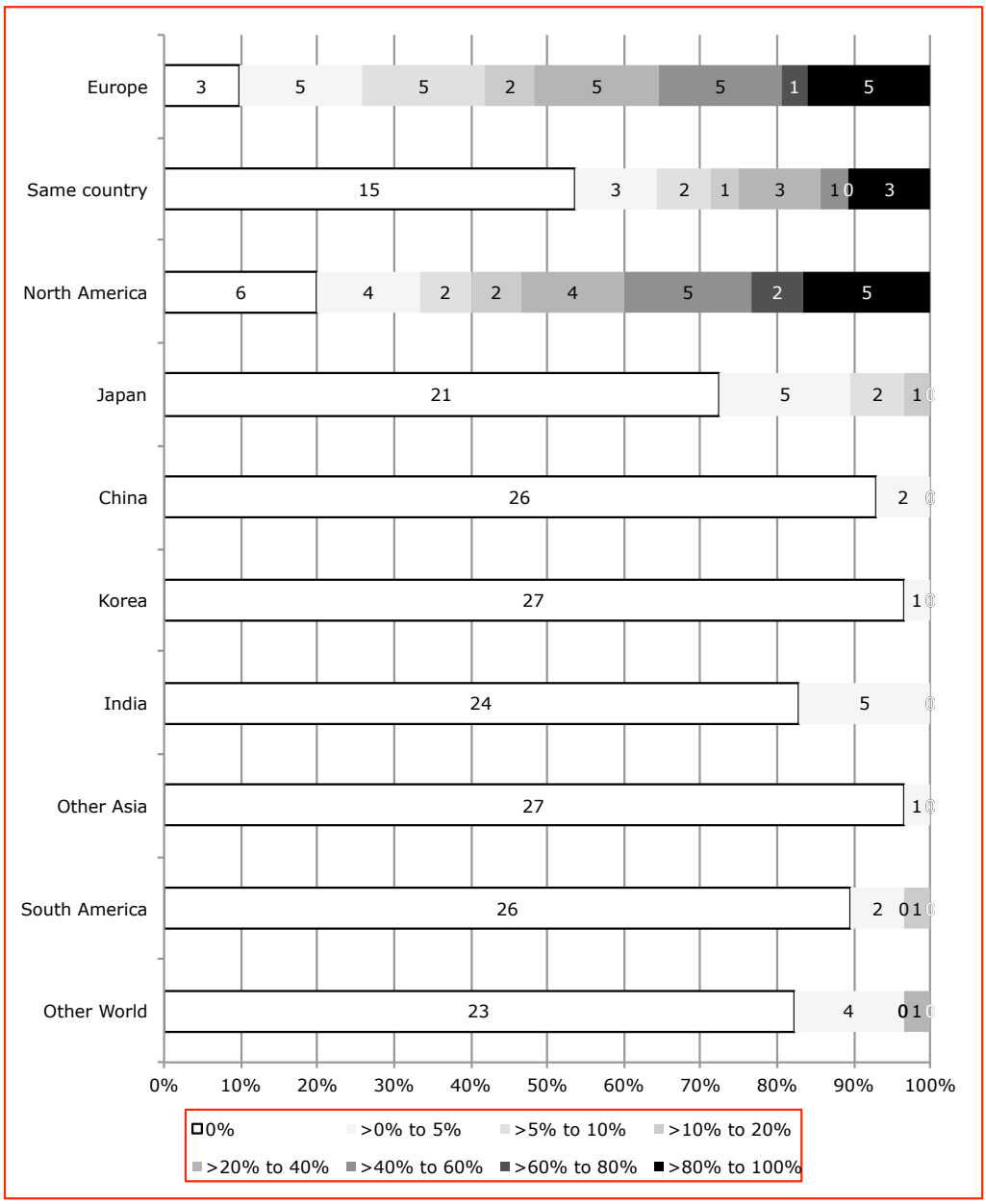


*) base (100% in the legend box): patents out-licensed to non-affiliated parties

**) The more a bar is grey-shaded or black, the more out-licensing takes place from Europe into the respective region in a per-firm view.

Source: Technopolis survey

*Fig. 72 Shares of patent portfolios licensed to licensees located in different regions of the world, industry: Health care *) **), firms in absolute numbers*

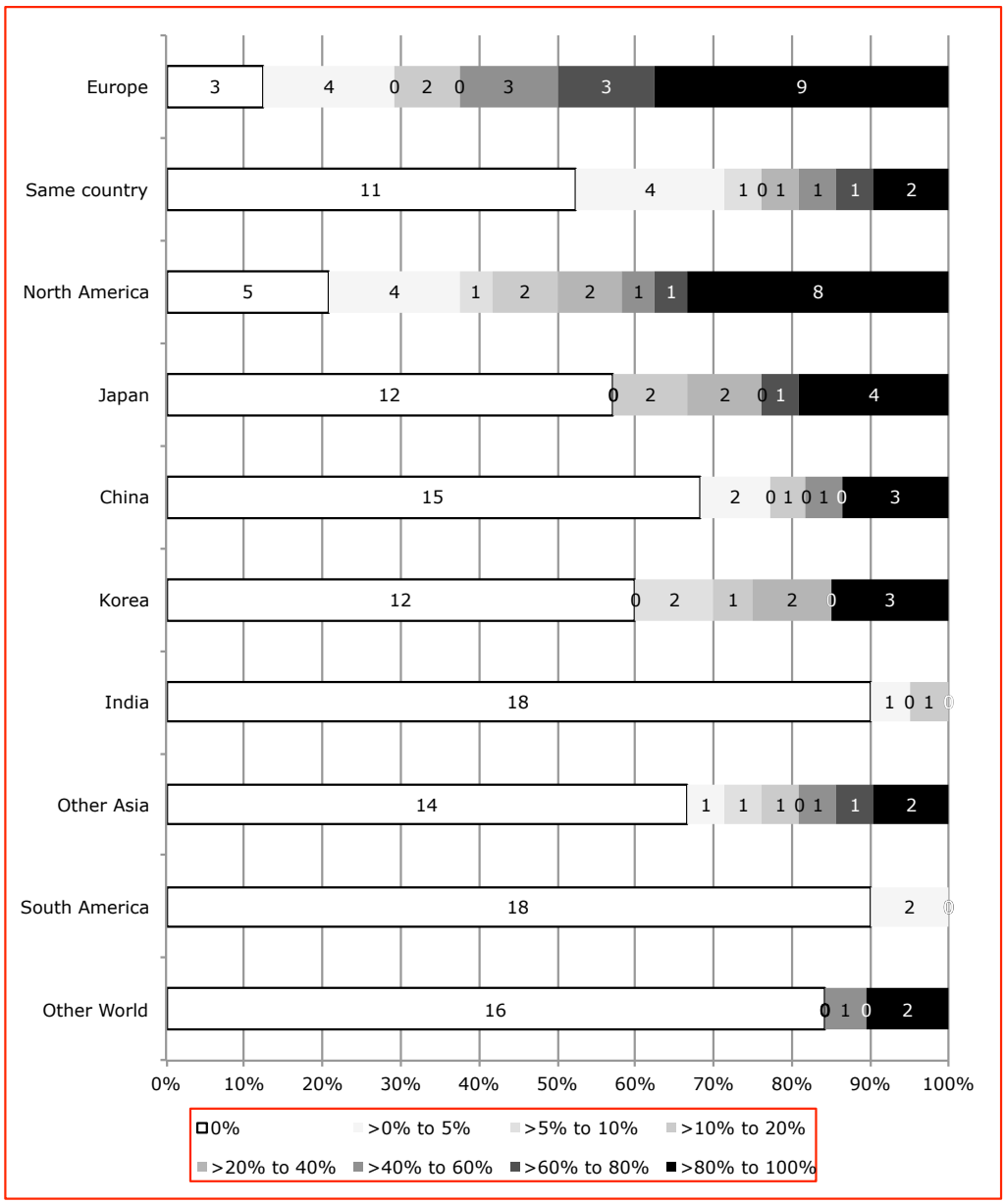


*) base (100% in the legend box): patents out-licensed to non-affiliated parties

**) The more a bar is grey-shaded or black, the more out-licensing takes place from Europe into the respective region in a per-firm view.

Source: Technopolis survey

*Fig. 73 Shares of patent portfolios licensed to licensees located in different regions of the world, industry: Technology - ICT *) **), firms in absolute numbers*



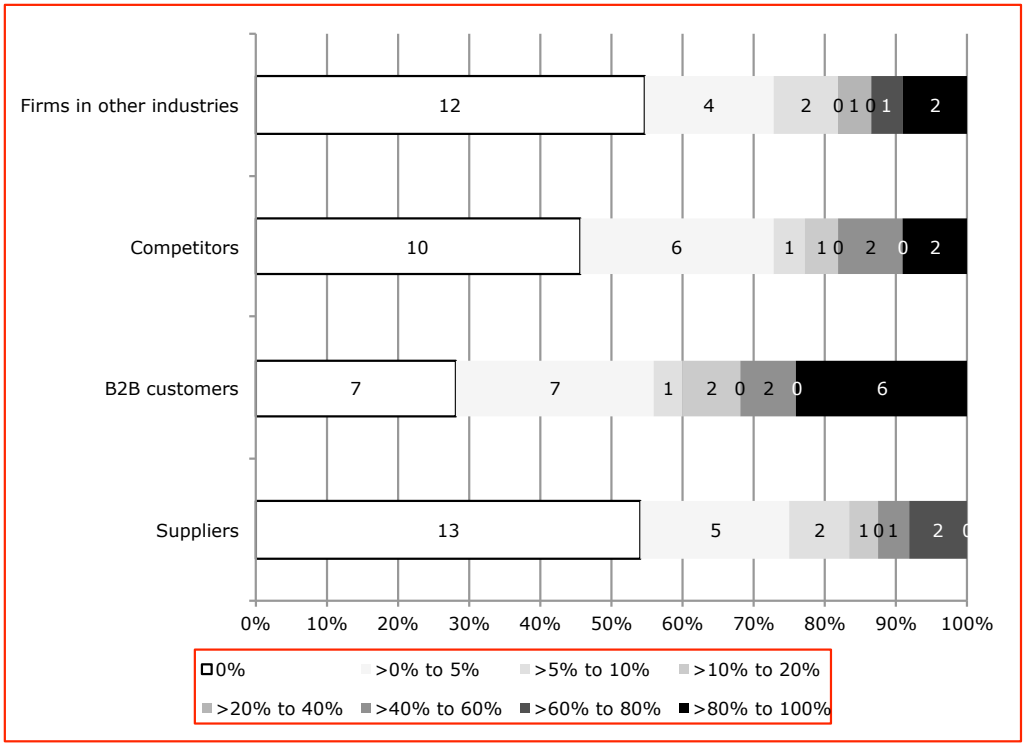
*) base (100% in the legend box): patents out-licensed to non-affiliated parties

**) The more a bar is grey-shaded or black, the more out-licensing takes place from Europe into the respective region in a per-firm view.

Source: Technopolis survey

Appendix B – Breakdowns of out-licensing flows to non-affiliated partners located at different points in the value chain, by industry

*Fig. 74 Shares of patent portfolios licensed to licensees at different positions in the value creation chain, industry: Oil, gas, basic materials, utilities *) **), firms in absolute numbers*

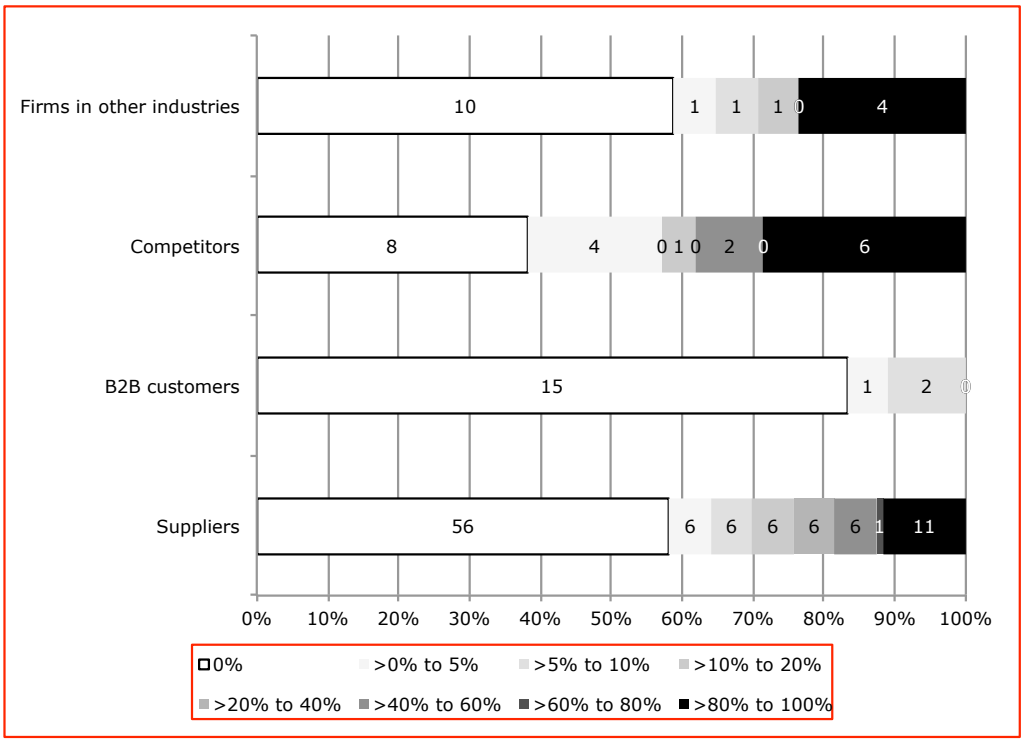


*) base (100% in the legend box): patents out-licensed to non-affiliated parties

**) The more a bar is grey-shaded or black, the more out-licensing takes place from European firms in the respective value chain categories in a per-firm view.

Source: Technopolis survey

*Fig. 75 Shares of patent portfolios licensed to licensees at different positions in the value creation chain, industry: General industrials (without industrial engineering) *) **), firms in absolute numbers*

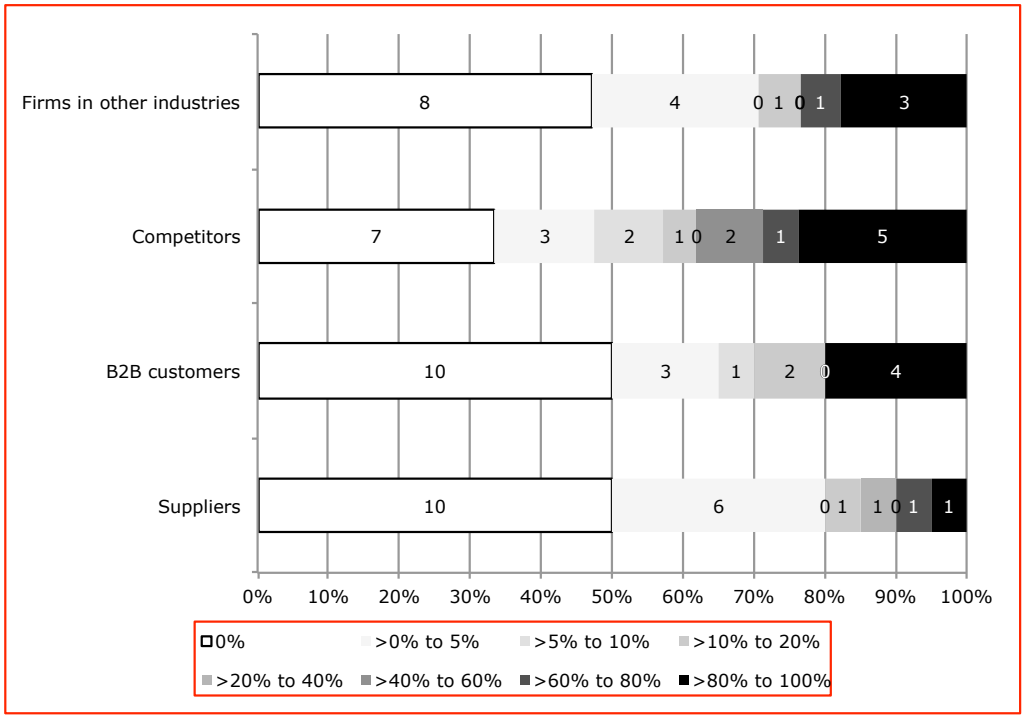


*) base (100% in the legend box): patents out-licensed to non-affiliated parties

**) The more a bar is grey-shaded or black, the more out-licensing takes place from European firms in the respective value chain categories in a per-firm view.

Source: Technopolis survey

*Fig. 76 Shares of patent portfolios licensed to licensees at different positions in the value creation chain, industry: Industrial engineering *) **), firms in absolute numbers*

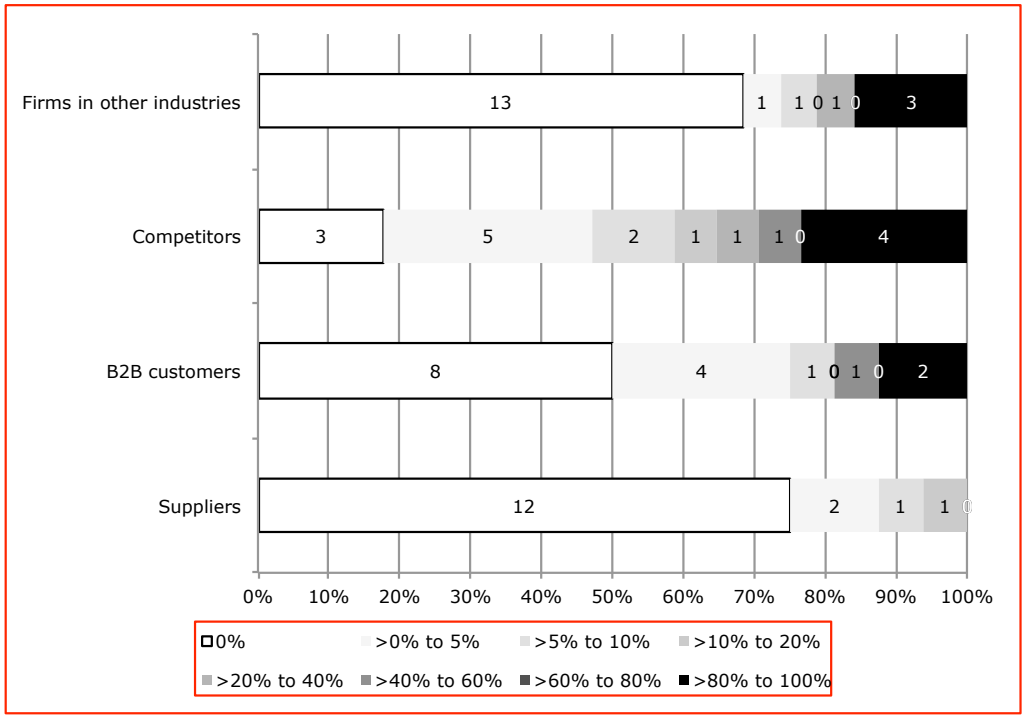


*) base (100% in the legend box): patents out-licensed to non-affiliated parties

**) The more a bar is grey-shaded or black, the more out-licensing takes place from European firms in the respective value chain categories in a per-firm view.

Source: Technopolis survey

*Fig. 77 Shares of patent portfolios licensed to licensees at different positions in the value creation chain, industry: Consumer goods *) **), firms in absolute numbers*

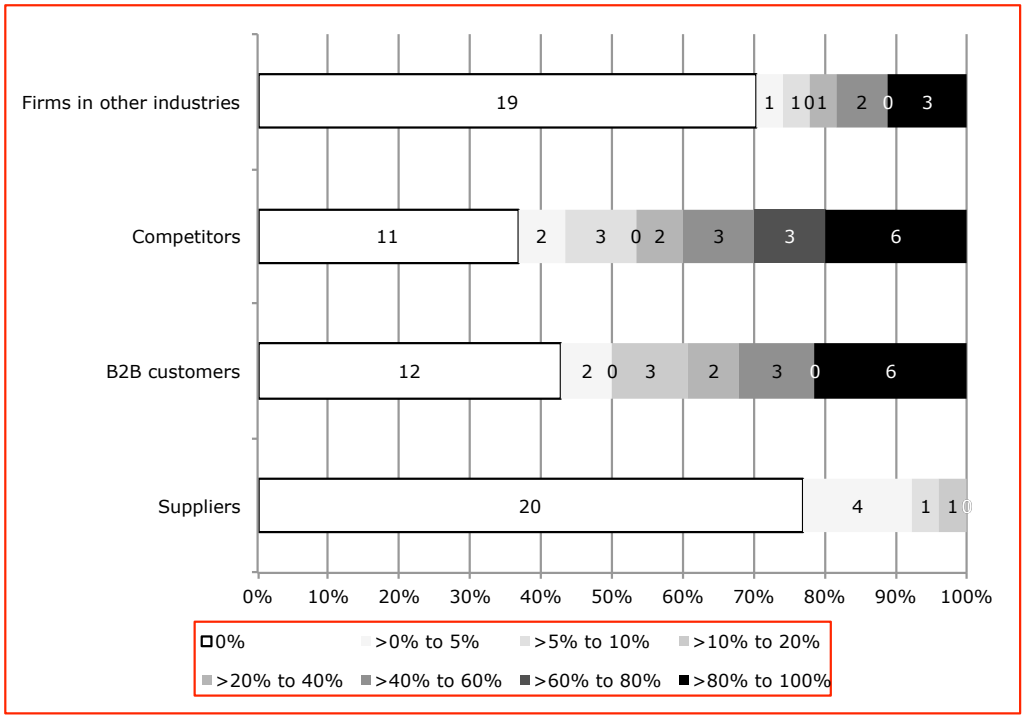


*) base (100% in the legend box): patents out-licensed to non-affiliated parties

**) The more a bar is grey-shaded or black, the more out-licensing takes place from European firms in the respective value chain categories in a per-firm view.

Source: Technopolis survey

*Fig. 78 Shares of patent portfolios licensed to licensees at different positions in the value creation chain, industry: Health care *) **), firms in absolute numbers*

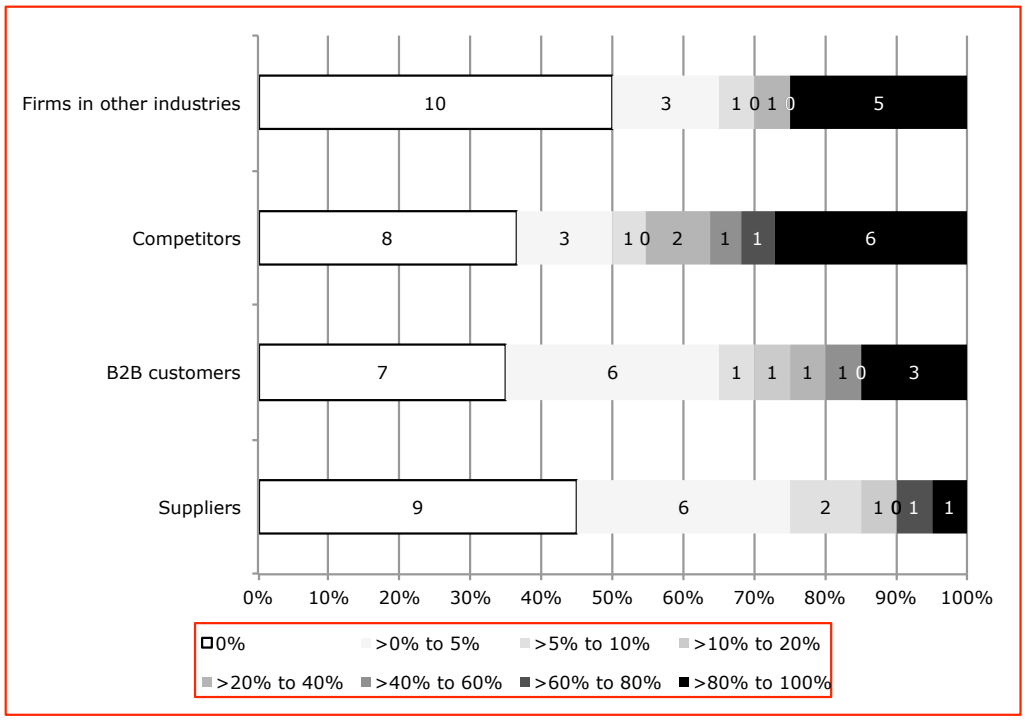


*) base (100% in the legend box): patents out-licensed to non-affiliated parties

**) The more a bar is grey-shaded or black, the more out-licensing takes place from European firms in the respective value chain categories in a per-firm view.

Source: Technopolis survey

*Fig. 79 Shares of patent portfolios licensed to licensees at different positions in the value creation chain, industry: Technology - ICT *) **), firms in absolute numbers*



*) base (100% in the legend box): patents out-licensed to non-affiliated parties

**) The more a bar is grey-shaded or black, the more out-licensing takes place from European firms in the respective value chain categories in a per-firm view.

Source: Technopolis survey

Appendix C - Questionnaire

Questionnaire on patent licensing activities

A. COMPANY DATA

1. Key figures and information

Company data	Answers
Name of firm	……..
Name of respondent	……..
Function of the respondent within the firm	……..
Number of employees 2011 [FTE][1]	……..
Number of employees 2008 [FTE]	……..
Year of establishment of firm	……..
Is your firm part of an enterprise group?	O yes O no
Is your firm a spin off from a university or other public research organisation?	O yes O no
Is your firm a spin-off from another private sector enterprise?	O yes O no
Does your firm have subsidiaries in other countries other than sales/trade representatives?	O yes O no
Turnover 2011 (if no exact figures available rough estimate)	……..€
Turnover 2008 (if no exact figures available rough estimate)	…….. €
R&D expenses of your firm as share of turnover (2011)	……..% of sales
Exports as share of turnover (2011)	……..% of sales
Industry sector or technological field of activity	……..

B. PATENT OUT-LICENSING ACTIVITES

2. Does your firm currently license out patents or is it considering to license out in the future?
   O yes, we are currently licensing out patents
   O yes, we are considering this for the future but do currently not license out patents
   O no, we are not licensing out patents and are not planning to do so in the future
   → if your answer is no, please go to question 16

[1] *Definition*: Full Time Equivalent (FTE) equals 1 for a full-time employee, 0.5 for part-time employee

3. What is the share, in your patent portfolio, of patents, which are currently licensed out?

0%	>0% to 5%	> 5% to 10%	> 10% to 20%	> 20% to 40%	>40% to 60%	>60% to 80%	>80% to 100%
O	O	O	O	O	O	O	O

4. What is the share, among patents licensed out, which are...

	0%	>0% to 5%	>5% to 10%	> 10% to 20%	>20% to 40%	>40% to 60%	>60% to 80%	>80% to 100%
... licensed out to companies and parties not affiliated to the same group as yours?	O	O	O	O	O	O	O	O
...licensed out to companies affiliated to the same group as yours?	O	O	O	O	O	O	O	O
...cross-licensed?[2]	O	O	O	O	O	O	O	O
...exclusively licensed?[3]	O	O	O	O	O	O	O	O

5. What is the share of patents licensed out (among patents licensed to non-affiliated companies and parties) to…

	0%	>0% to 5%	>5% to 10%	> 10% to 20%	> 20% to 40%	>40% to 60%	>60% to 80%	>80% to 100%
Parties according to firm size								
...SMEs?[4]	O	O	O	O	O	O	O	O
Parties according to geographical location								
...parties in the same country as your own?	O	O	O	O	O	O	O	O
...parties in Europe?	O	O	O	O	O	O	O	O
...parties in North America?	O	O	O	O	O	O	O	O
...parties in China?	O	O	O	O	O	O	O	O
...parties in Japan?	O	O	O	O	O	O	O	O
...parties in Korea?	O	O	O	O	O	O	O	O
...parties in India?	O	O	O	O	O	O	O	O
...parties in other Asian countries?	O	O	O	O	O	O	O	O

[2] *Definition*: A cross-licensing agreement is a contract between two or more parties where each party grants rights to their intellectual property (e.g., patents) to the other parties.

[3] *Definition*: Exclusive license is a form of license where the party licensing out (e.g., the patent owner) agrees neither to license out to other licensees nor to compete directly with the licensee with respect to the scope for which the license was granted.

[4] *Definition*: SMEs are generally considered as firms with less than around 250 employees (for the exact definition of the European Commission, see http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm).

	0%	>0% to 5%	>5% to 10%	> 10% to 20%	> 20% to 40%	>40% to 60%	>60% to 80%	>80% to 100%
...parties in South America?	O	O	O	O	O	O	O	O
...parties in other parts of the world?	O	O	O	O	O	O	O	O
Parties according to position in the value creation chain								
...to parties not active in your business area (e.g., in other technology fields/industries)?	O	O	O	O	O	O	O	O
...to suppliers?	O	O	O	O	O	O	O	O
...to customers (business to business)?	O	O	O	O	O	O	O	O
...to competitors?	O	O	O	O	O	O	O	O
Other distinctive entities								
Spin-off[5] firms of your company	O	O	O	O	O	O	O	O

6. Evolution of your patent licensing activity with non-affiliated parties

In the period from 2008 to 2011	Licensing revenue has...	Licensing deals have...
...increased substantially	O	O
...increased	O	O
...not changed	O	O
...decreased	O	O

7. Please indicate the amount of revenue received overall from out-licensing of patents in 2011:
   O €0 to € 100,000
   O €100,000 to €500,000
   O €500,000 to € 2 Mio
   O €2 Mio to € 5 Mio
   O €5 Mio to € 20 Mio.
   O €20 Mio to €50 Mio.
   O €50 Mio to €100 Mio.
   O more than € 100 Mio.
   O Figure is confidential
   O Figure is unknown

8. Which of the following factors are used by your firm to determine the value of the licensed technologies and the royalty rates set? *(multiple responses possible)*
   O Cost of R&D activities carried out by our company for this invention (including

[5] *Definition*: A spin-off, also known as a spin-out or a starburst, refers to a type of corporate action where a company "splits off" sections of itself as a separate business. The common definition of spin-off is when a division of a company or organization becomes an independent business.

patenting costs)
O Price of market transactions for similar technologies
O Expected future revenue from the exploitation of the patented technologies
O Fixed rates according to industry norms (e.g., 5% of expected sales or 25% of expected profits generated by use of the technology)
O Other methods of assessing value (please specify):
……
……
……

9. Which payment schemes are used by your company? *(multiple responses possible)*
O Upfront fees
O Royalties related to unit sales (e.g., percentage of unit sales, price per unit sold)
O Royalties related to company sales
O Additional payments (e.g., transfer of stocks, maintenance fees, etc.)
O No payment schemes (e.g., 'open source' approaches)
O Other (please specify):
……..
……..
……..

10. Do you include the following restrictions or additional clauses in your licensing agreements for patented technologies?

Restrictions	Not used	Seldomly used	Frequent-ly used	Always used
Geographical/territorial restrictions	O	O	O	O
Temporal restrictions	O	O	O	O
Field of use restrictions	O	O	O	O
Clauses for additional/linked agreements (e.g., service agreements)	O	O	O	O
Other restrictions or frequently recurring clauses (please specify):				

C. LICENSING-OUT STRATEGY

11. Does your company have a strategy (i.e., specified guidance principles for decision making) for technology and patent out-licensing?
O yes, as part of our general business strategy
O yes, but not as part of our general business strategy
O no

12. Do you have a dedicated department (or person) which (who) is responsible for technology and patent commercialisation? (*multiple answers in the 'yes' categories possible*)
O yes, an IP or patent department within each business unit or division (reporting to the business unit or product line manager)
O yes, a central IP or patent department for the whole company group
O yes, a department other than an IP/patent department (e.g., legal department, general affairs department, etc.)
O yes, in the form of a person or a group of persons who are assigned this task (but who are not organized as a formal department)
O no

13. *Motivations for licensing out patents:* What are your motives to engage in patent out-licensing? Please rate according to the given scale.

Motivation	Unimportant	Weakly important	Important	Very important
Earn revenue from core or newly developed technologies	O	O	O	O
Earn revenue from non-core or mature technologies	O	O	O	O
Ensure freedom-to-operate[6] (e.g., avoid legal disputes through cross-licensing agreements)	O	O	O	O
Gain or retain market access or access to distribution systems	O	O	O	O
Gain access to technological know-how	O	O	O	O
Enable joint R&D and innovation (including "open innovation")	O	O	O	O
Establish standards	O	O	O	O
Outsource manufacturing	O	O	O	O
Stop (perceived) infringement of some of your patents and/or avoid further patent litigation	O	O	O	O
Other (please specify):				

14. Did the benefits of patent out-licensing activities meet your expectations, in terms of the following aspects?

	Benefits lower than expected	Benefits as expected	Benefits higher than expected	No answer possible
Earn revenue from core or newly developed technologies	O	O	O	O
Earn revenue from non-core or mature technologies	O	O	O	O
Ensure freedom-to-operate (e.g., avoid legal disputes through cross-licensing agreements)	O	O	O	O
Gain or retain market access or access to distribution systems	O	O	O	O
Gain access to technological know-how	O	O	O	O
Enable joint R&D and innovation development (including "open innovation")	O	O	O	O
Establish standards	O	O	O	O
Outsource manufacturing	O	O	O	O

[6] *Definition*: Freedom to operate (FTO) is usually used to mean determining whether a particular action, such as testing or commercialising a product, can be done without infringing valid intellectual property rights of others.

	Benefits lower than expected	Benefits as expected	Benefits higher than expected	No answer possible
Stop (perceived) infringement of some of your patents and/or avoid further patent litigation	O	O	O	O
Other (please specify):				

15. How have you been identifying your partners for patent out-licensing? Please rate the following means/channels according to their importance

	Un-important	Weakly important	Important	Very important
Through our informal networks	O	O	O	O
Through formal networks (industry associations, clusters, etc.)	O	O	O	O
Marketing of our technology on our webpage	O	O	O	O
Through research by ourselves, e.g. on the web or in journals	O	O	O	O
Through research specifically in patent databases	O	O	O	O
Usage of technology/licensing exchange platforms (e.g., yet2com) where licensors/licensees can place ads	O	O	O	O
Through intermediaries who search actively on our behalf or on that of the licensee	O	O	O	O
At events, such as trade fairs or conferences	O	O	O	O
Contacting through the licensee without explicit search activity on our side	O	O	O	O
It happens by chance	O	O	O	O
Other (please specify):				

D. BARRIERS, ALTERNATIVE TRANSFER MECHANISMS AND POLICY

16. What are the barriers to license out patents?

	Un-important	Weakly important	Important	Very important
Difficulties identifying the right partners	O	O	O	O
Lack of information on how to price the license	O	O	O	O
Price offered too low	O	O	O	O
Difficulties to reach agreements on terms other than the price	O	O	O	O

	Un-important	Weakly important	Important	Very important
Difficulties to monitor or enforce the licensing agreement	O	O	O	O
Potential loss of technological/competitive edge	O	O	O	O
Non-tariff barriers in the legal system (such as legal obligations to disclose information or regulatory requirements)	O	O	O	O
Technology not developed enough (lacking prototype etc.)	O	O	O	O
Insufficient size of our own patent portfolio (to answer only if cross-licensing agreements are of principle relevance for your firm)	O	O	O	O
Lack of experience/know-how on our side to draft licensing agreements	O	O	O	O
Internal organisational issues (e.g., between business units and IP department)	O	O	O	O
Non-availability or lack of quality of external support	O	O	O	O
Costs for external support	O	O	O	O
Other (please specify):				

17. What is the share of your patent portfolio that you would be willing to license but could not actually license?

0%	>0% to 2%	> 2% to 6%	> 6% to 15%	>15% to 30%	>30% to 70%	>70% to 100%
O	O	O	O	O	O	O

18. Do you use any of the following mechanisms to share/transfer patents?

	Yes, to a large degree	Yes, but only to a minor degree	No, but there would be interest	No, and there would be also no interest
(Direct) sale of patents to third parties	O	O	O	O
Sale of firm or firm departments with transfer of patent ownership (including spin-off creation)	O	O	O	O
Joint Ventures	O	O	O	O

	Yes, to a large degree	Yes, but only to a minor degree	No, but there would be interest	No, and there would be also no interest
Patent pools[7]	O	O	O	O
Technology intermediaries (e.g., patent clearinghouses)[8]	O	O	O	O
Patent auction events	O	O	O	O

19. Do you consider using patent pools more than you currently do?
    O yes O no

20. In case there are measures which could increase the usage of patent pools: Which of the following measures do you believe would be necessary to improve usage of patent pools for your firm? Please rate according to the given scale.

	Unnecessary	Rather unnecessary	Rather necessary	Necessary
Changes in the legal system (e.g., antitrust laws, etc.)	O	O	O	O
Changes in the patent system (e.g., introduction of Community Patent or central patent court)	O	O	O	O
Lower costs of patenting (e.g., discounts on renewal fees)	O	O	O	O
Tax provisions/incentives	O	O	O	O
Higher availability of trained personnel	O	O	O	O
Better external legal support (quality and or quantity)	O	O	O	O
Measures enabling existing support structures to provide advice on patent pools (e.g., support to clusters)	O	O	O	O
Other (please specify):				

[7] *Definition*: A patent pool is a consortium of at least two companies agreeing to cross-license patents relating to a particular technology and thus creating a pool which provides access to the set of protected technologies under controlled terms.

[8] *Definition*: A 'clearinghouse' is any agency that brings together seekers and providers of goods, services or information, thus matching demand and supply. A patent clearinghouse functions in much the same way as a copyright collective--it administers the rights of several patent owners; authority would be granted by the patent owner to the collective to set license terms to others who would be permitted to work the patent.

21. (Financial) use of patents: How important are patents for you for the following operations?

	Un-important	Weakly important	Important	Very important
Raising capital through Venture Capital (VC) or Private Equity (PE) firms	O	O	O	O
Raising capital through the stock market	O	O	O	O
Raising capital through private investors (other than VC/PE firms and stock market)	O	O	O	O
Raising capital through securitisation	O	O	O	O
Raising capital through sale of patents	O	O	O	O
Negotiating loans (e.g., with a commercial bank)	O	O	O	O
Obtaining public subsidies and grants	O	O	O	O
Negotiating R&D collaboration agreements	O	O	O	O
Other (please specify):				

22. What are the factors that would favor exclusive licensing over non-exclusive licensing for you?

	Not favouring	Weakly favouring	Moderately favouring	Strongly favouring
Factors favouring non-exclusive licensing				
Developing a market	O	O	O	O
Developing a network (for instance of suppliers)	O	O	O	O
Favouring the development of other technologies that will help your own business	O	O	O	O
Setting a standard	O	O	O	O
More clients and more revenues	O	O	O	O
Splitting the risk	O	O	O	O
Fiscal treatment	O	O	O	O
Other factors (please specify):				
Factors favouring exclusive licensing				
Higher revenues	O	O	O	O
Capacity to segment market	O	O	O	O

	Not favouring	Weakly favouring	Moderately favouring	Strongly favouring
Exclusive relation with a partner	O	O	O	O
Demand of the client	O	O	O	O
Reduction of competition	O	O	O	O
Cross-licensing	O	O	O	O
Other factors (please specify):				

E. IN-LICENSING

23. Does your firm currently license in patents or is it considering to license patents in in the future?
O yes, we are currently licensing in patents.
O yes, we are considering this for the future but do currently not license in patents
O no, we are not licensing in patents and are not planning to do so in the future
→ *if answer is 'no', please go to question 25*

24. Motivations for licensing in patents: What are your motives to engage in patent in-licensing? Please rate according to the given scale.

Motivation	Un-Important	Weakly important	Important	Very important
Avoiding the costs and risks associated with own R&D	O	O	O	O
Enabling rapid time-to-market	O	O	O	O
Closing technological gaps and blind spots for our core technologies	O	O	O	O
Access to complementary technology to develop the core technology further (e.g., for products based on multiple technologies)	O	O	O	O
Expanding our business and or R&D in areas/directions new or complementary to our core technologies	O	O	O	O
Expanding our know-how base ('learning-by-licensing')	O	O	O	O
Ensuring freedom-to operate (e.g., avoiding possible infringement action)	O	O	O	O
Other (please specify):				

25. What are the main obstacles for your firm to license-in more or to license-in at all?

	Un-Important as barrier	Weakly important as barrier	Important as barrier	Very important as barrier
Absence of a sufficiently well working market for technology/patent licenses	O	O	O	O
Lack of legal model contracts	O	O	O	O
Difficulty identifying a suitable licensing partner (or: being approached by wrong unsuitable licensors)	O	O	O	O
Costs associated with drafting and managing licensing agreements	O	O	O	O
Too high prices charged by licensor or other unacceptable licensing terms	O	O	O	O
Refusal of the licensor to grant licence	O	O	O	O
Lack of experience	O	O	O	O
Lack of fiscal incentives	O	O	O	O
Risks of divulgating your technology strategy	O	O	O	O
No need and/or interest for licensing-in technologies	O	O	O	O
Other (please specify):				

26. Has your firm been affected by disputes over infringement of patents or by disputes over existing licensing agreements on patents? Please rate on the given scale

	Negatively affected			Not affected |		Positively affected	
	-3	*-2*	*-1*	*0*	*+1*	*+2*	*+3*
Infringement of our patents	O	O	O	O	O	O	O
(Alleged) infringement of patents owned by competitors of our firm	O	O	O	O	O	O	O
Disputes on licensing agreements, where we licensed out patents	O	O	O	O	O	O	O
Disputes on licensing agreements, where we licensed in patented technologies	O	O	O	O	O	O	O
Other (please specify):							

F. ADITIONAL COMMENTS

……
……
……

Thank you very much for your cooperation!

European Commission

EUR 26114 - PATLICE Survey - Survey on patent licensing activities by patenting firms (by Technopolis)

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The European Commission, DG Research and Innovation, commissioned a survey on patent licensing behaviour of European firms as part of the larger study 'Measurement and analysis of knowledge and R&D exploitation flows, assessed by patent and licensing data'. The survey conducted by Technopolis addressed the need for a current and detailed data source on patent licensing by businesses given the growing importance of patents and IPR in general, and technology/patent licensing in particular. Based on responses of 330 patent-holding firms, the results show that the importance of licensing has increased considerably across all major patent-affine industries between 2008 and 2011.

The most important motives to out-license are revenue-generating motives, to ensure freedom-to-operate as well as stopping patent infringements. The by far most important barrier for patent out-licensing is the fear of potential loss of the firms' competitive/technological edge, followed by difficulties to identify the right partners. In a per-firm view, most trade via patent licensing takes place within Europe, followed by North America as 'trading partner'.

The report discusses a range of issues related to patent out- and in-licensing (such as the occurrence of exclusive and cross-licensing or channels by which licensors get in touch with licensees) and explores differences found across company characteristics such as firm size, industry or technology field.

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