Survey of Licensing Activities in Selected Fields of Environmentally Sound Technologies (ESTs)

A Joint Project by the United Nations Environment Programme (UNEP), the European Patent Office (EPO), and the International Centre for Trade and Sustainable Development (ICTSD)

FINAL REPORT-DRAFT

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"Sapere aude"
Epistle II of Horace's Epistularum liber primus

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I. BACKGROUND TO THE SURVEY

In 2009 the United Nations Environment Programme (UNEP), the European Patent Office (EPO), and the International Centre for Trade and Sustainable Development (ICTSD) launched a new project aimed at enhancing our understanding of the role that intellectual property plays in relation to the transfer, access and deployment of environmentally sound technologies (ESTs).[1]

As part of this study, the project partners asked this author to carry out a survey focusing on the licensing of ESTs by leading companies and organizations. For the purpose of this survey the term ESTs broadly referred to those technologies that protect the environment; are less polluting; use resources in a more sustainable manner; recycle more of their wastes and products; or handle residual wastes in a more acceptable manner than the technologies they substitute.[2]

While the concept of technology transfer is very broad in nature and scope, and is affected and determined by a wide range of factors, it is also understood that licensing activities represent a "real-life" manifestation of technology transfer.

It is therefore believed that the survey and its results could provide some important evidence-based insights into the general discussion about the relationship and linkages between intellectual property rights (IPRs) and technology transfer in the field of ESTs.

The process of creating and undertaking the survey was a highly collaborative process, including the active involvement and support of leading associations, such as the World Business Council on Sustainable Development (WBCSD), the Licensing Executive Society International (LESI), the International Chamber of Commerce (ICC), Fraunhofer Gesellschaft and others.

The survey was distributed among leading organizations that are active in the development, patenting, commercialization and transfer of ESTs. More than 160 organizations answered the survey, including companies from the private sector, academic institutions, governmental bodies, national research laboratories, consortiums, etc.

II. ABOUT THE SURVEY

This section provides some brief information about the structure of the survey, the types of questions that appeared in it, and the manner in which the results were analysed.

In terms of structure, the survey was composed of three parts.

The first part addressed the more general elements concerning licensing practices and activities of the responding organizations. Here the survey focused on: the proportion of ESTs-related patents in the overall patent portfolio of the responding organization; the importance of ESTs *out-licensing* and *in-licensing* activities; the presence of a shift in the organization's business strategy towards licensing of ESTs in the past three years; the existence of activities that are based on additional collaborative IP mechanisms (patent

1. The project was announced on 24 April 2009 and the World Intellectual Property Day. Further details about the project as a whole can be found at UNEP, EPO and ICTDS websites, for example, http://www.unep.ch/etb/initiatives/Patents_ESTs.php and http://ictsd.org/i/environment/iprs/51361/?view=document (accessed on 2 January 2010), A description of the project can be found here: http://www.unep.ch/etb/initiatives/pdf/ESTsProject%20Description1.pdf (accessed on 2 January 2010).
2. The above definition is based on Chapter 34 of Agenda 21 of the UN Program on Sustainable Development

pools, cross-licensing, joint ventures, strategic alliances, etc); and the extent to which different IP-related activities are being used and applied in the overall business strategy of the responding organization.

The second part of the survey focused on the licensing of ESTs in developing countries (or more specifically, non-OECD countries). Here the survey focused on: the extent to which the responding organizations are engaged in licensing activities in developing countries; the key developing countries with which the responding organizations have been most involved in licensing or other IP-based commercialization activities; the relative importance of different macroeconomic factors in deciding whether to enter into licensing agreements and other collaborative IP-based activities in developing countries (such as the protection of intellectual property rights, scientific capabilities, infrastructure and human capital, market conditions and investment climate); and the willingness (and ability) of the responding organization to provide for more flexible licensing terms (including monetary ones) to recipients that are based in developing countries and that may be more financially limited in terms of their ability to meet the original terms of the license.

The third part of the survey sought to obtain some basic information about the responding organizations by looking at the type of the responding organization (private company, academic institution, governmental body, national laboratory, consortium, etc); the location of its headquarters; the size of the organization; the ESTs fields it deals with (wind, biomass/ biofuels, solar, ocean/wave, waste, etc); and the intensity of its R&D activities.

In terms of the type of questions included in the survey, they are a result of a collaborative and multi-stage consultation process which involved the project initiators, the different partnering organizations (which also helped distributing the survey) and external experts. Overall, the questions (and the manner in which they were phrased) aimed to strike a balance between the desire to obtain meaningful empirical insights from the respondents and the need to respect their time constraints and to protect their confidential information.

With regard to the statistical nature of the questions, generally speaking the survey was based on an *ordinal scale*, with many questions consisting of four options, ranging from the least significant option to the most significant one. See for example the following question (Part A, Question 1 of the survey):

"What is the estimated proportion of ESTs-related patents in your overall patent portfolio?"

Negligible (<2%) ☐	Low (2-15%) ☐	Significant (15-50%) ☐	Substantial (>50%) ☐

Some of the questions were based on open-ended choices, for example, one which asked the responding organization where its headquarters are based (Part C, Question 3).

Finally, some of the questions allowed the organizations to choose more than one option, for example with regard to the extent to which the responding organizations are dealing with different fields of ESTs (Part C, Question 4), or the key developing countries with which the responding organizations have been most involved in licensing or other IP-based commercialization activities ((Part B, Question 4).

In terms of the analysis, for the reasons mentioned above the results of the survey are based on an aggregate analysis, without referring to individual replies. Also, in order to respect their data privacy and other sensitive commercial data, the names of the responding organizations are not disclosed.

In addition to the analysis of the general responses, the report provides a further drill-down analysis of the responses based on different classifications (EST-intensity, organization type, company size, and licensing-intensity). It is argued that these classifications provide additional insights about the views and attitudes of different respondents.

Finally, in terms of presentation, the survey's results are presented in the following manner. The report first provides a typology of the responding organizations (based on Part C of the survey). Subsequently the report provides an analysis of the responses to the general questions (based on Part A of the survey). Lastly, the report provides an analysis of the responses to questions that focused on licensing activities in the context of developing countries (Part B of the survey).

Each of the above sections begins with a short discussion about its key underlying themes, followed by an analysis of the responses. The analysis combines a textual discussion and graphical presentation via tables, figures, or both.

III. METHODOLOGICAL COMMENTS

This section provides some brief methodological observations about the survey – its strengths, weaknesses, and limitations.

Although there are numerous and different surveys that focus on licensing,[3] the current survey is the first to focus on licensing practices and other IP-related activities in the field of ESTs (at least to the best knowledge of this author). To this extent it is hoped that the empirical data stemming from this survey can provide meaningful and factual information to the discussion about technology transfer and IPRs in the context of ESTs and climate change in general.

As indicated before, the survey is a result of a highly collaborative process, including early stage consultations about the structure of the survey and the nature of the questions. Moreover, the support of the external partnering organizations (as indicated before) helped to secure responses from more than 160 leading organizations in the field (more than 20% of which were also identified by the EPO as leading patent owners and applicants in different fields of ESTs).

By its very nature, a survey of this kind also allows one to collect data that is based on "real-life experiences", i.e. to complement any analysis that is based on more general statistical data with the insights of people that deal with licensing and other IP-related activities on a daily basis.

Over the longer term, and provided that the right platform is found, the survey may also be circulated on a periodical basis (for instance, annually) and may be used as a future platform to collect more in-depth empirical data over time.

Naturally the survey also has some limitations and weaknesses.

3. See for example: Pluvia Zuniga, M. & Dominique D. *Who Licenses Out Patents and Why – Lessons from a Business Survey*. OECD STI Working Paper 2009/5, Statistical Analysis of Science, Technology and Industry (31 March 2009); Also see the annual surveys of the Licensing Executive Society Foundation, http://www.lesfoundation.org/survey/index.html

The sample of the survey is still relatively limited. Although it was possible to secure the participation of more than 160 key organizations in a very short time span (which overall represent a response rate of about 30% of the organizations that were approached), this number is still relatively small in scope (certainly compared to wide-scale surveys that collect data from thousands of respondents). Other than the fact that a larger sample could have made the results of this survey more conclusive, with a fewer number of replies it is also possible that some of the results, especially when providing an analysis that is based on sub-grouping, may be less statistically significant.

Another weakness of the survey, relating especially to the analysis of different sub-groups, is the fact that it is not based on a "representative sample" of respondents. Clearly, the ability to have a representative sample, especially when doing an analysis that is based on different groups, could provide for more statistically significant results.

Yet in this case it was not practically feasible to carry out our survey on the basis of a pre-defined set of selection criteria. Arguably, the operational objective of the survey was more "statistically modest" – it had the aim of reaching out to leading organizations that deal with patenting and other IP-related activities in the field of ESTs. Specifically, the distribution of the survey was based on the collaboration of leading organizations and trade associations (WBCSD, LESI, ICC and Fraunhofer), which circulated the survey among their members (with the objective of securing a sufficient rate of response). Supplementary to this approach was the effort to identify leading organizations that are active in the patenting of ESTs and to contact them directly.[4]

It follows that even though this survey does provide an analysis of responses on the basis of different sub-groups, it is important to note that these groups are not equal in their size and that in some cases the size of a particular group may be rather limited (and thus may be less statistically valid). As a result, in some cases we could not provide for an analysis of different sub-groups on account of the sample being too small to be of statistical significance.

Finally, from a more theoretical point of view, this survey targets ESTs rights' owners. In other words, it targets organizations that represent the "supply-side" of the equation. However, in order to obtain a more comprehensive view about the relationship between IPRs, technology transfer and ESTs, it would also be desirable to seek information from organizations that represent the "demand-side" of the equation, i.e. those entities that may fall under the category of ESTs users.

Nevertheless, taking all the limitations and constraints into account, it is argued that the analysis below provides meaningful and, indeed, important insights about the nature of licensing and other IP-related activities in the field of ESTs, not least given its pioneering and evidence-based nature.

IV. MAIN FINDINGS

The detailed findings of the survey are provided in section V below and readers are encouraged to review these findings in detail.

Nevertheless the following findings may be highlighted.

4. This was done in collaboration with the EPO team by looking at leading patent applicants of ESTs using the EPO databases.

General findings

1. Licensing is an important instrument in the transfer of and utilization of ESTs.
73% of the responding organizations consider *out-licensing* activities to be an important part of their commercial activities.

Moreover, compared with the overall population of the survey, *EST-intensive* organizations[5] address an even greater importance to *out-licensing* activities. 84% of *the EST-intensive* organizations attach importance to this type of activity.

Public bodies and academic institutions attach the greatest importance to *out-licensing* activities. 94% of the responding public bodies and 86% of the responding academic institutions replied that this activity is important to them. Private companies also attach importance to *out-licensing*, though to a lesser degree. 65% of the responding companies confirmed the importance of this type of activity.

Conversely, when it comes to *in-licensing*, private companies attach the greatest importance to this type of activity, compared with other organizations. 67% of *the responding* companies noted the importance of this activity.

On the other hand, only 29% of the responding public bodies and 26% of the responding academic institutions reported that *in-licensing* is important to them.

These results may not come as a surprise. Generally speaking, public bodies and academic institutions lack the financial resources and infrastructure needed to undertake the entire process of R&D (especially in its more advanced stages), not to mention the manufacturing, marketing and distribution of these technologies once they have been introduced to the market. As such, *out-licensing* is considered a more viable and practical option with regard to the ability of such organizations to transfer and commercialize their proprietary ESTs to entities (mostly private companies) that have the means to develop these technologies and bring them to the market. On the other hand, private companies would be the most likely candidates to "assimilate" different technologies, inter alia by *licensing-in* ESTs from academic institutions and public bodies.

2. There seems to be a growing support towards the use of licensing over time.

Over a third of the responding organizations (39%) reported that their business strategy has become more supportive of licensing, compared with 3% of the organizations reporting the opposite trend.

The trend towards the use of licensing is also visible among *EST-intensive* organizations, although to a slightly lesser extent compared with the sample as a whole (34%).

Public bodies reported the most visible shift towards licensing (54%), followed by academic institutes (44%) and private companies (33%).

Interestingly, 40% of the responding multinational companies reported a positive shift in their business strategy towards licensing, while only 25% of the responding SMEs reported the same shift.

5 . This term refers to the responding organizations that have reported that ESTs-related patents constitute either a substantial or significant part of their overall patent portfolio.

Here it is plausible that the growing use of licensing by multinational companies may be associated with the overall shift in the manner in which these companies conduct their R&D efforts, most notably the current shift from relying mostly on in-house capabilities towards collaborative models that involve external partnerships.[6]

3. Cooperative R&D efforts seem to be the most common form of technological development and transfer of ESTs.

The vast majority of the responding organizations (83%) indicated that they are involved in *cooperative R&D efforts*, such as strategic partnerships, joint ventures, etc[7].

On the other hand, less than half of the responding organizations (48%) indicated that they are involved in collaborative IP-based mechanisms[8], such as patent pools and cross-licensing.

Overall in terms of activities that lead to the creation and transfer of proprietary ESTs, 68% of the responding organizations identified collaborative R&D agreements, as having the highest intensity in terms of using this mechanism in their overall activities. Additional IP-related activities that were identified as having high intensity include patent out-licensing (35%), joint ventures or alliances (33%), consulting and services(33%), and technology out-licensing (31%).

These results remain broadly consistent when looking at different sub-groups, although some elements do differ from one group to another.

Findings relating to the licensing of ESTs in developing countries

4. Despite the above trends, it would seem that the majority of responding organizations have yet to enter into licensing agreements with entities that are based in developing countries.

58% of the responding organizations indicated that they have never entered into licensing agreements that involve recipients from developing countries. Thus, while licensing (especially *out-licensing*) plays an important part in the overall commercial activities of the responding organizations, the scope of using this tool in developing countries is still quite limited.

Nevertheless, China, India and Brazil were identified as the countries with which the responding organizations have been most involved with regard to licensing agreements or other IP-based activities involving ESTs.

5. Overall, the survey finds that, together with other macroeconomic factors, the protection of intellectual property is an important factor affecting the decision to enter into licensing agreements with recipients that are based in developing countries. That being said, the report also suggests that IPRs should be treated as one of many factors affecting licensing decisions. Favorable market conditions, a favorable investment climate, existence of scientific capabilities,

6. See Dieter Ernst. *Innovation Offshoring:Asia's Emerging Role in Global Innovation Networks,* East West Center Special Reports, Number 10, (July 2006)

7. Such efforts are broadly aimed at jointly creating new knowledge and technologies by two entities or more

8. Broadly speaking such mechanism are aimed at preventing legal disputes between entities on the basis of possible violation of IPRs and/or by creating a space for the use of IPRs that are owned by different entities for the purpose of further technological development

infrastructure and human capital and protection of IPRs, all seem to have a similar weight in the decision to enter into licensing agreements.

82% of the responding organizations indicated that the protection of IPRs is an important factor in their decision, with 54% arguing that the protection of IPRs is either a "significantly attractive" condition that would encourage negotiation of licensing agreements or a "compelling reason" toward an agreement.

The survey also finds that the other three categories – existence of scientific capabilities, infrastructure and human capital, favorable market conditions, and a favorable investment climate – seem to weigh even more when deciding to enter into licensing agreements with recipients in developing countries (between 85 to 87% of the responding organizations indicated that these categories are important to their licensing decisions).

That being said, the protection of IPRs seem to carry a slightly greater weight among *licensing–intensive* respondents[9] (89% confirming its importance) compared with the other macroeconomic factors (scientific capabilities, infrastructure and human capital - 87%, favorable market conditions - 86%, and favorable investment climate - 87%).

In other words, when controlling for the group *licensing–intensive* respondents, the protection of IPRs seem to take a slight priority over other macroeconomic factors in to the decision to enter into licensing agreements with recipients that are based in developing countries.

6. Most of the responding organizations (70%) indicated that they would be willing to provide more flexible licensing terms to recipients that are based in developing countries and that may be more financially limited in terms of their ability to meet the original ("standard") terms of the license.

An even greater share of *licensing-intensive* respondents (78%) indicated that they are willing to make their licensing terms more flexible vis-à-vis recipients from developing countries with more limited financial resources.

This is an important finding, not least because the group of licensing-intensive respondents represents organizations that indicated they are already more frequently engaged in licensing activities with entities from developing countries. In other words, it is possible that in cases where licensing deals are already taking place, in practice the terms of such licenses are more accommodating towards recipients with more limited financial resources that are based in developing countries.

Academic institutions seem to be the most willing to provide more flexible licensing terms to recipients with limited financial capabilities that are based in developing countries. 83% of the responding academic institutions indicated that they are willing to provide more flexible licensing terms, followed by public bodies (75%) and private companies (64%).

Finally, it would seem that a similar share of multinational companies and SMEs (64% and 69% respectively) indicated their willingness to provide more flexible licensing terms to recipients with limited financial capabilities that are based in developing countries.

9.This term refers to the share of responding organizations reporting that during the last three years they have occasionally or frequently entered into licensing agreements which involve recipients based in developing countries.

V. ANALYSIS OF THE SURVEY'S RESPONSES

This section provides detailed analysis of the responses to the survey.

The analysis begins with a typology of the responding organizations (Part C of the survey). It then focuses on the general practices and perceptions of the responding organizations towards licensing, as well as other forms of IP-related activities in the field of ESTs (Part A of the survey). Finally, the report provides an analysis of responses relating to the transfer, access and deployment of ESTs in developing counties, inter alia also looking at licensing activities (Part B of the survey).

Each section begins with a general outline describing the nature of the questions. For each section the report provides an analysis of the general responses coupled with the relevant tables and figures, followed by a more detailed analysis on the basis of sub-grouping and classifications (for Parts A and B of the survey).

When needed, further methodological clarifications and discussion are provided.

V.1 TYPOLOGY OF RESPONDING ORGANIZATIONS (PART C OF THE SURVEY)

This section provides a typology and analysis of the responding organizations, based on the following elements:

- Type of the responding organization (i.e. private company, academic institution, governmental body, national laboratory, consortium, etc);
- Geographical location of the responding organization's headquarters (i.e. where it is based);
- Size of the responding organization (i.e. multinational entity, large organization focusing primarily on domestic markets, SME, not-for-profit, etc);
- ESTs fields the responding organization deals with (i.e. wind, solar thermal, solar PV, geothermal, biomass/biofuels, ocean/wave, hydro, waste-to-energy, etc); and
- Intensity of the responding organization's R&D activities (i.e. focused on full scale R&D activities or more limited capacity and focus on R&D activities).

V.1.1 Type of responding organizations

As Table 1 demonstrates, the majority of the responding organizations were private companies (66%), followed by academic institutions (18%) and governmental bodies (10%).

Table 1 – Type of organization (Part C, Question 1)*

Type of responding organization	% of total respondents
Private company	66%
Academic institution	18%
Governmental body (including national research institutes or laboratories)	10%
Others (including research bodies, consortiums, etc)	6%

* This table represents an aggregate analysis of the different sub-categories that appeared in the survey.

V.1.2 Size of responding organizations

In terms of their size (Table 2), more than half of the responding organizations are either multinational companies or large companies that are focused on domestic activities (54% in total, of which 47% are multinational companies and 7% are large companies with domestic focus). 24% of the responding organizations are either SMEs or very small companies (with less than 10 employees). Finally, 22% of the responding organizations have been categorized as not-for-profit (these were largely academic institutions and governmental bodies).

Table 2 – Size of organization (Part C, Question 2)*

Type of responding organization	% of total respondents
Multinational companies	47%
Large companies (mostly focused on domestic markets)	7%
SMEs & very small companies (less than 10 employees)	24%
Not-for-profit organizations (including academic institutions and governmental bodies)	22%

* This table represents an aggregate analysis of the different sub-categories that appeared in the survey.

V.1.3 Headquarters of responding organizations

As described in Table 3, most of the responding organizations in the sample reported that their headquarters are based in developed countries, primarily in Germany (28%), USA (21%), Japan (14%), UK (6%), France (5%), and the Netherlands (5%).

Table 3 – Headquarters of responding organizations (Part C, Question 3)

Location of respondents' headquarters	No. of respondents	% of total respondents*
Germany	42	28%
USA	31	21%
Japan	21	14%
UK	9	6%
France	8	5%
Netherlands	7	5%
Belgium	4	3%
Denmark	4	3%
Australia	3	2%
Canada	3	2%
Italy	3	2%
South Africa	3	2%
Austria	2	1.4%
Finland	2	1.4%
Korea	1	0.6%
Brazil	1	0.6%
Hong Kong	1	0.6%
Luxemburg	1	0.6%
Switzerland	1	0.6%

Chile	1	0.6%
Uruguay	1	0.6%

* The values in this percentage column are slightly rounded.

V.1.4 Focus on ESTs fields

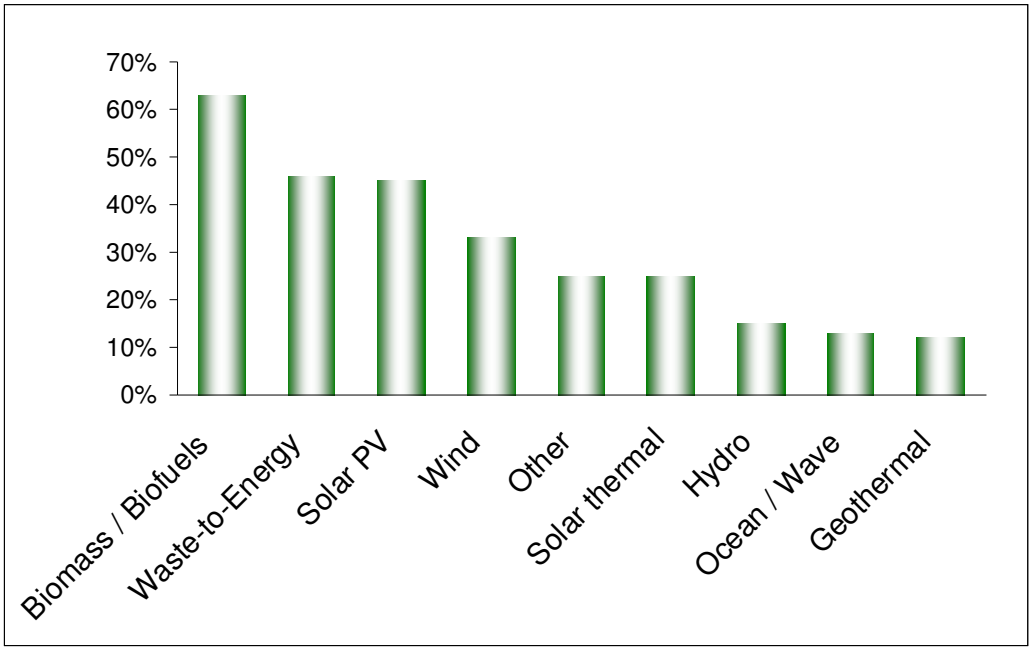
Most of the responding organizations are dealing with following EST-related fields: biomass/ biofuels, solar PV and wind, followed by solar thermal and hydro-based technologies (Table 4).

Table 4 – Focus on ESTs according to different fields (Part C, Question 4)*

EST field	**% of responding organizations that indicated they are dealing with the corresponding EST field**
Biomass/Biofuels	63%
Waste-to-Energy	46%
Solar PV	45%
Wind	33%
Other	25%
Solar thermal	25%
Hydro	15%
Ocean/Wave	13%
Geothermal	12%

* In this question, the responding organizations were able to select one or more of the above fields of ESTs in which they deal with. Accordingly, the values corresponding to each of the above ESTs fields represent the share of organizations that indicated that they deal with a particular field. In other words, the values in this table represent the frequency of organizations dealing with different ESTs fields.

Figure 1 – Focus on ESTs according to different fields (Part C, Question 4)



V.1.5 Level of investment in R&D

As Table 5 demonstrates, most of the responding organizations (42%) are oriented towards full-scale R&D activities – from the early stages of research up to the final stages of development, including the ability to introduce new and innovative products to the market.

About a third of the respondents (32%) categorized themselves as having significant R&D capabilities, though mostly focusing on the early and middle phases of R&D.

The rest of the responding organizations categorized themselves as either having limited R&D capabilities (18%), engaging mostly in R&D activities aimed at improving existing technologies, or as having low R&D capabilities (8%), reporting that their business models are not based on R&D.

Table 5 -Level of investment in R&D of responding organizations (Part C, Question 5)

Type of R&D	**% of total respondents**
Low – the organization's business model is not based on significant internal R&D	8%
Limited – the organization primarily engages in R&D activities aimed at improving existing technologies	18%
Significant – the organization engages in the early and middle phases of R&D	32%
Research-based – the organization is based on full-scale R&D activities	42%

V.2 GENERAL FINDINGS (PART A OF THE SURVEY)

This section focuses on general practices and perceptions of the responding organizations towards licensing, as well as other forms of IP-related activities in the field of ESTs.

The following elements are covered:

- The proportion of ESTs-related patents in the overall patent portfolio of the responding organization. This component will also be used and controlled in order to allow us to provide for some further-drill down analysis of the responses.

- The importance of ESTs licensing activities (both *out-licensing* and *in-licensing* activities) to the responding organizations.

- The possible shift in the organization's business strategy towards licensing of ESTs in the past three years.

- The portion of the organizations' activities that are based on additional collaborative IP mechanisms (patent pools, cross-licensing, joint ventures, strategic alliances, etc);

- The relative importance of different IP-related activities to the overall business strategy of the responding organization.

V.2.1 Estimated proportion of ESTs-related patents in the overall patent portfolio of the responding organizations

As Table 6 demonstrates, 48% of the responding organizations reported that ESTs-related patents constitute either a substantial or significant part of their overall patent portfolio.[10]

37% of the responding organizations reported a low share of ESTs-related patents of their overall patent portfolio.

15% of the responding organizations reported that ESTs-related patents represent a negligible share of their overall patent portfolio.

Table 6 – Estimated proportion of ESTs-related patents in the overall patent portfolio of the responding organizations (Part A, Question 1)

Share of ESTs-related patents	**% of total respondents**
Negligible (<2%)	15%
Low (2-15%)	37%
Significant (15-50%)	27%
Substantial (>50%)	21%

V.2.2 Importance of *licensing* activities to the responding organizations

When looking at the overall importance of licensing activities to the responding organizations (at least as far as the commercialization, exploitation and development of proprietary assets are concerned), a distinction was made between *out-licensing* and *in-licensing activities*.

Generally speaking, the option of *licensing-out* refers to situations in which the owner of the technology seeks to license this technology to others in exchange for a financial return (which again can take place in different forms, such as upfront payments, royalties and fixed sums). The option of *licensing-in*, on the other hand, broadly refers to situations in which one entity seeks to gain access to a proprietary technology that is owned by another entity for the purpose of using this technology for its own activities. Thus, licensing-out refers to the "supply-side" of technology while licensing-in refers to the "demand-side" of technology.[11]

With regard to *out-licensing*, 73% of the responding organizations consider this type of activity as being important to their overall operations, with 40% replying that *out-licensing* is either very important or fundamental to their operations (Table 7).

Table 7 – Importance of *out-licensing* activities to the responding organizations (Part A, Question 2a)

Importance of *out-licensing* activities	**% of total respondents**
Negligible	27%
Moderately important	33%
Very important	31%
Fundamental	9%

10. In this survey the term "substantial" refers to a share of ESTs-related patents that is greater than 50% of the overall patent portfolio and the term "significant" refers to a share of EST-related patents that is between 15% to 50% of the overall patent portfolio.

11. For further discussion on licensing see: Megantz, C. R., *Technology Management: Developing and Implementing an Effective Licensing Program*, John Wiley & Sons, 2002; Teece, J. D., *Managing Intellectual Capital*, Oxford University Press: Oxford, 2000; Smith, G.V. and Parr, R.L., *Valuation of Intellectual Property and Intangible Assets*, John Wiley & Sons, 2000.

With regard to *in-licensing*, here only 53% of the responding organizations attach importance to this type of activity, with 21% replying that *in-licensing* is either very important or fundamental to their operations (Table 8).

Table 8 – Importance of *in-licensing* activities to the responding organizations (Part A, Question 2b)

Importance of *in-licensing* activities	**% of total respondents**
Negligible	47%
Moderately important	32%
Very important	18%
Fundamental	3%

It should be noted that the difference in the importance that the responding organizations attach to *out-licensing* vis-à-vis *in-licensing* may be linked to the fact that this survey is more focused on *out-licensing* activities (especially in part B). Hence, it is possible that there was a kind of a "selection bias" in the survey, insofar that the organizations that answered the survey may focus more on *out-licensing* activities.

V.2.2a Drill-down analysis

Tables 9 to 14 provide a more detailed analysis of the responses to questions 2a and 2b (importance of licensing) based on different groupings.

The first group – *EST-intensive* – refers to responding organizations reporting that ESTs-related patents constitute either a substantial or significant part of their overall patent portfolio (based on *Part A, Question* 1in the survey). As Table 6 (above) demonstrates, the *EST-intensive* sub-group includes 48% of the responding organizations.

The second group – *organization type* – refers to the classification of responding organizations in the following sub-groups: 1. private companies; 2. academic institutions; and 3. public (or semi-public) bodies, such as governmental bodies, research institutes, national laboratories, not-for-profit organizations, etc (based on Part C, Question 1).

The third group – *company size* – refers to the classification of responding organizations as either multinational companies or SMEs (based on Part C, Question 2). Originally, there was also an intention to include large companies in this sub-category. However, the number of responding organizations that are categorized as "large company" was too small to provide for a meaningful analysis. As such, only two groups were considered for this classification.
Moreover, the reason for focusing on private companies in this category is twofold. First, in the previous group a distinction is already made between private companies and other entities (academic and governmental bodies). Secondly, in terms of the sample size, private companies constitute the lion's share of the responding organizations (66%), and therefore provide a more meaningful statistical basis for the drill-down analysis (i.e. the sample size of the other entities is too small to allow for such a drill-down exercise).

It should also be noted that the following drill-down analysis is further limited by the fact that the sub-groupings in each category do not contain equal numbers of respondents. For example, in the group *organization type* there are more private companies than other entities. As discussed is section III, this methodological limitation stems from the fact that the survey was not originally intended to be circulated among an equal number of respondents from different organizations. Rather, it was sent to leading organizations that deal with the patenting of ESTs as a whole. Nevertheless, despite this methodological

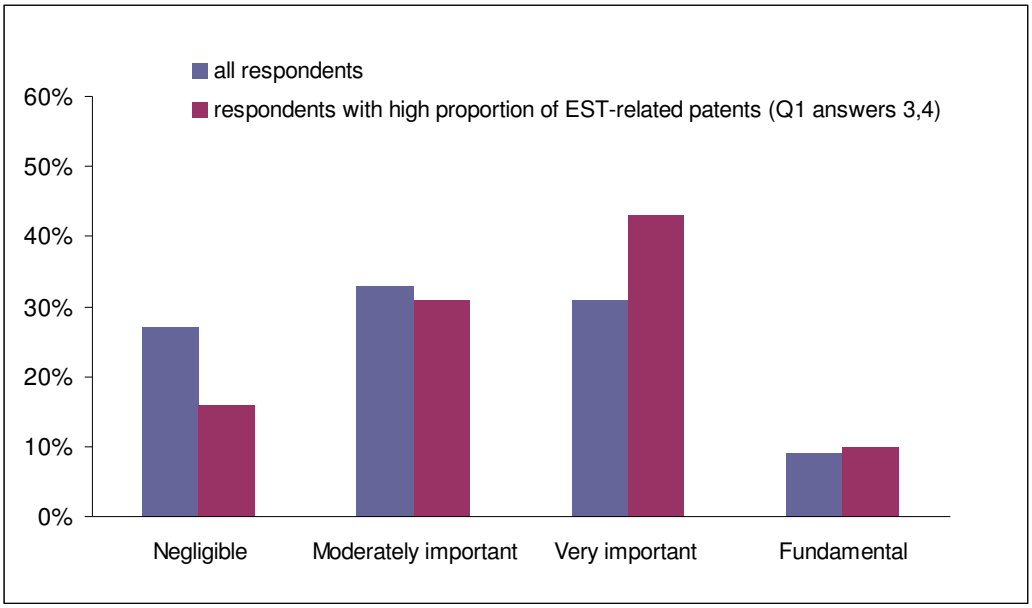
constraint, the ability to obtain additional information by looking at different sub-groups is likely to provide important insights about the key issue relating to this study.

According to Table 9 below, *EST-intensive* organizations address greater importance to *out-licensing* activities (compared with the overall population of the survey) – 84% of the *EST-intensive* organizations attach importance to this type of activity, with 53% replying that *out-licensing* is either very important or fundamental to their operations.

Table 9 – Importance of *out-licensing* activities – *EST-intensive* organizations vis-à-vis all respondents

Importance of *out-licensing* activities	**% of all respondents**	**% of *EST-intensive***
Negligible	27%	16%
Moderately important	33%	31%
Very important	31%	43%
Fundamental	9%	10%

Figure 2 – Importance of *out-licensing* – *EST-intensive* organizations vis-à-vis all respondents



With regard to *in-licensing* activities, *EST-intensive* organizations also attach greater importance to such activities compared with the overall population of the survey, though the gap in this case is less visible. 67% of the *EST-intensive* organizations attach importance to this type of activity, with 31% replying that *in-licensing* is either very important or fundamental to their operations (see Table 10).

Table 10 - Importance of *in-licensing* activities - *EST-intensive* organizations vis-à-vis all respondents

Importance of *out-licensing* activities	**% of all respondents**	**% of *EST-intensive***
Negligible	47%	33%
Moderately important	32%	36%
Very important	18%	24%
Fundamental	3%	7%

As Table 11 demonstrates, public bodies and academic institutions attach the greatest importance to *out-licensing* activities. 96% of the responding public bodies and 86% of the responding academic institutions replied that this activity is important to them, with 45% and 50% of public and academic bodies (respectively) reporting that *out-licensing* is either very important or fundamental to their operations.

Private companies also attach importance to *out-licensing* though to a lesser degree. 65% of the responding companies confirmed the importance this type of activity, with 35% replying that *out-licensing* is either very important or fundamental to their operations.

These results may not come as a surprise. Generally speaking, public bodies and academic institutions lack the financial resources and infrastructure needed to undertake the entire process of R&D (especially in its more advanced stages), not to mention the manufacturing, marketing and distribution of these technologies once they have been introduced to the market. As such, *out-licensing* is considered a more viable and practical option with regard to the ability of such organizations to transfer and commercialize their proprietary ESTs to entities (mostly private companies) that have the means to develop these technologies and bring them to the market.

Table 11 – Importance of *out-licensing* activities – according to *type of organization*

Importance of *out-licensing* activities	**% of private companies**	**% of academic institutes**	**% of public bodies**
Negligible	35%	14%	4%
Moderately important	28%	41%	46%
Very important	30%	26%	42%
Fundamental	5%	19%	8%

Conversely, when it comes to *in-licensing*, private companies attach greater importance to this type of activity compared with other organizations. 67% of the *responding* companies noted the importance of this activity, with 26% replying that *in-licensing* is either very important or fundamental to their operations.

On the other hand, only 29% of the responding public bodies and 26% of the responding academic institutions reported that *in-licensing* is important to them (Table 12).

Again, this may not come as a surprise given that private companies would be the most likely candidates to *license-in* ESTs from academic institutions and public bodies.

Table 12 – Importance of *in-licensing* activities – according to *type of organization*

***Importance of out-licensing* activities**	**% of private companies**	**% of academic institutes**	**% of public bodies**
Negligible	33%	74%	71%
Moderately important	41%	11%	21%
Very important	22%	15%	4%
Fundamental	4%	0%	4%

Finally, as Table 13 demonstrates, most of the responding multinational companies and SMEs consider *out-licensing* to be of importance to their operations. 45% of the responding multinational companies and 36% of the responding SMEs reported that *out-licensing* is either very important or fundamental to their operations. At the same time, the majority of the reporting multinational companies and SMEs (55% and 56% respectively) consider *out-licensing* to be of moderate importance to their operations.

Table 13 – Importance of *out-licensing* activities – *multinational companies* and *SMEs*

***Importance of out-licensing* activities**	**% of multinational companies**	**% of SMEs**
Negligible	0%	8%
Moderately important	55%	56%
Very important	40%	25%
Fundamental	5%	11%

With regard to *in-licensing* activities, a similar share of multinational companies and SMEs reported that *in-licensing* is either very important or fundamental to their operations (25% and 30% respectively). At the same time, a larger share of multinational companies (46%) reported that *in-licensing* is of moderate importance to their activities, compared with 31% of SMEs choosing this category (Table 14).

Table 14 – Importance of *in-licensing* activities – *multinational companies* and *SMEs*

***Importance of out-licensing* activities**	**% of multinational companies**	**% of SMEs**
Negligible	29%	39%
Moderately important	46%	31%
Very important	22%	25%
Fundamental	3%	5%

V.2.3 Changes in business strategy towards licensing activities

The survey also sought to understand if there has been a shift in the responding organizations' business strategy towards licensing of ESTs in the past three years (Part A, Question 3).

Overall, there seems to be growing support over time for the use of licensing. As elaborated in Table 15 below, over a third of the responding organizations (39%) reported that their business strategy has become more supportive of licensing, compared with 3% of the organizations reporting the opposite trend (Table 15). Still, 54% of the responding organizations indicated that there has been no change in their business strategy towards licensing.

Table 15 – Changes in business strategy towards licensing over time (Part A, Question 3)

Change in business strategy towards licensing in the past three years	**% of total respondents**
Less supportive of licensing	3%
No change	54%
More supportive of licensing	39%
ESTs licensing is not a part of my business strategy	4%

V.2.3a Drill-down analysis

The trend towards the use of licensing is also visible among *EST-intensive* organizations, although to a slightly lesser extent compared with the sample as a whole. 34% of *EST-intensive* organizations reported that their business strategy has become more supportive of licensing (compared with 4% reporting the opposite trend). Yet the majority of *EST-intensive* organizations (60%) indicated that there has been no change in their business strategy towards licensing (Table 16).

Table 16 – Changes in business strategy towards licensing over time – *EST-intensive* organizations vis-à-vis all respondents

	% of all respondents	**% of *EST-intensive***
Less supportive of licensing	3%	4%
No change	54%	60%
More supportive of licensing	39%	34%
ESTs licensing is not a part of my business strategy	4%	2%

When considering the responses to this question on the basis of the different types of organizations (Table 17), public bodies reported the most visible shift towards licensing (54%), followed by academic institutes (44%) and private companies (33%).

Table 17 – Change in business strategy towards licensing – according to *type of organization*

Change in business strategy towards licensing in the past three years	**% of private companies**	**% of academic institutes**	**% of public bodies**
Less supportive of licensing	3%	4%	0%
No change	57%	52%	46%
More supportive of licensing	33%	44%	54%
ESTs licensing is not a part of my business strategy	7%	0%	0%

Interestingly, 40% of the responding multinational companies reported a positive shift in their business strategy towards licensing, while only 25% of the responding SMEs reported the same shift (Table 18).

It is plausible that the growing use of licensing by multinational companies may be associated with the overall shift in the manner in which these companies conduct their R&D efforts – most notably the current shift from relying mostly on in-house capabilities towards collaborative models that involve external partnerships.

Table 18 – Change in business strategy towards licensing – *multinational companies* and *SMEs*

Change in business strategy towards licensing in the past three years	**% of multinational companies**	**% of SMEs**
Less supportive of licensing	0%	8%
No change	55%	56%
More supportive of licensing	40%	25%
ESTs licensing is not a part of my business strategy	5%	11%

V.2.4 Participation in collaborative IP mechanisms and cooperative R&D efforts

The responding organizations were also asked to identify their level of involvement in collaborative IP-based mechanisms and in cooperative R&D efforts.

For the purpose of this survey a distinction was made between c*ollaborative IP-based mechanisms*, such patent pools and cross-licensing (Part A, Question 4a) and more general *cooperative R&D efforts*, such as strategic partnerships, joint ventures, etc (Part A, Question 4b).

With regard to *collaborative IP-based mechanisms*, overall there is an even distribution between users and non-users of such mechanisms. 52% of the responding organizations reported that they are never or rarely engaged in collaborative IP-based mechanisms, while 48% reported that they are occasionally or frequently using such mechanisms (Table 19).[12]

However, when looking at *cooperative R&D efforts*, here one can see that the vast majority of the responding organizations indicated that they are involved in these types of activities. 83% of the responding organizations reported that they are occasionally or frequently engaged in cooperative R&D efforts (Table 20).

Table 19 – Active participation in collaborative IPR mechanisms, such as patent pools, cross-licensing, etc (Part A, Question 4a)

Participation in collaborative IPR mechanisms	**% of total respondents**
Never	23%
Rarely	39%
Occasionally	25%
Frequently	13%

Table 20 – Active participation in cooperative R&D agreements (Part A, Question 4b)

Participation in cooperative R&D efforts	**% of total respondents**
Never	4%
Rarely	13%
Occasionally	43%
Frequently	40%

Taking all the above factors into account, the survey also asked the responding organizations to rank the intensity of their various IP activities relating to ESTs-patents and technology (Part A, Question 5).

Table 21 provides a detailed breakdown of the respondents' ranking of IP activities based on their intensity (on a scale of 1 to 4, with the value "1" indicating the lowest intensity and the value "4" indicating the highest intensity).

For the purpose of this exercise the different IP activities were ranked by looking at the frequency of "high values" for each corresponding activity (i.e. by counting the number of times in which the responding organizations assigned the values "3" or "4" to represent the intensity of the different IP activities).

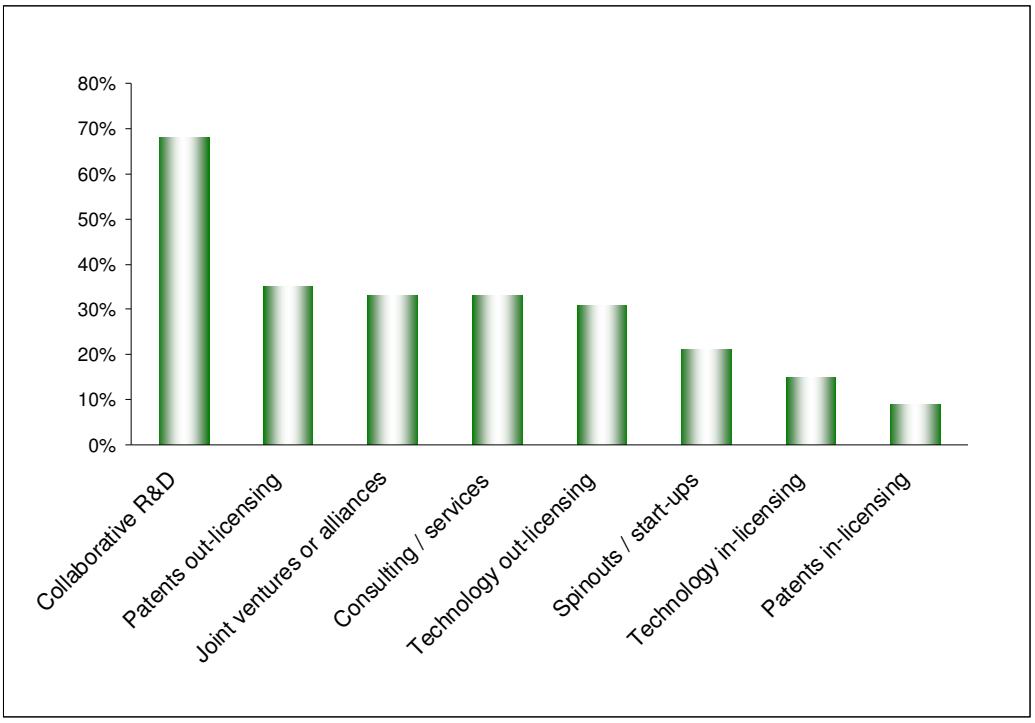
As Table 21 demonstrates, 68% of the responding organizations considered collaborative R&D agreements to be of high intensity (in terms of the use of this mechanism in their overall IP-related activities). Other IP-related activities that were identified as having high intensity include patent out-licensing (35%), joint ventures or alliances (33%), consulting and services (33%) and technology out-licensing (31%). On the other hand, about 20% or less of the responding organizations identified spin-outs and start-ups, technology in-licensing and patent in-licensing as having the highest intensity in terms of the use of these mechanisms.

12. As indicated above, given the methodological constraints of this survey, the differences between these categories cannot be considered as statistically significant.

Table 21 – Share of responding organizations reporting a high intensity in their use of different IP-based activities relating to ESTs-patents and technology (Part A, Question 5)[13]

Type of IP-based activity	% of responding organizations
Collaborative R&D	68%
Patents *out-licensing*	35%
Joint ventures or alliances	33%
Consulting/services	33%
Technology *out-licensing*	31%
Spinouts/start-ups	21%
Technology *in-licensing*	15%
Patent *in-licensing*	9%

Figure 3 – Share of responding organizations reporting a high intensity in their use of different IP-based activities relating to ESTs-patents and technology (Part A, Question 5)



V.2.4a Drill-down analysis

Overall, *EST-intensive* organizations seem to be more engaged in the use of different IP activities compared with the overall population of respondents.

With regard to collaborative IP-based mechanisms, such as patent pools and cross-licensing, *EST-intensive* organizations reported a slightly higher use of such mechanisms compared with the responding organizations as a whole. 41% of *EST-intensive* organizations indicated that they are occasionally or frequently using such mechanisms (Table 22).

The same trend can be seen with regard to cooperative R&D efforts. The vast majority of the responding *EST-intensive* organizations (93%) indicated that they are occasionally or frequently active in cooperative R&D efforts (Table 23).

13. In this table, each entry represents the share of responding organizations that have assigned the values "3" or "4" to the corresponding IP activity.

As such, it is also not surprising that a higher share *of EST-intensive* organizations indicated that they are frequently engaged in the use of different IP-based activities relating to ESTs-patents and technology. As can be seen from Table 24, IP-based activities that were identified as the most significant in terms of their intensity include collaborative R&D agreements (76%), patents out-licensing (48%), joint ventures or alliances (42%), and technology out-licensing (39%).

Table 22 – Active participation in collaborative mechanisms for IPRs, such as patent pools, cross-licensing, etc – *EST-intensive* organizations vis-à-vis all respondents

Participation in collaborative mechanisms for IPRs	**% of total respondents**	**% of *EST-intensive***
Never	23%	21%
Rarely	39%	38%
Occasionally	25%	35%
Frequently	13%	6%

Table 23 – Active participation in cooperative R&D agreements – *EST-intensive* organizations vis-à-vis all respondents

Participation in cooperative R&D efforts	**% of total respondents**	**% of *EST-intensive***
Never	4%	0%
Rarely	13%	7%
Occasionally	43%	39%
Frequently	40%	54%

Table 24 – Share of responding organizations reporting a high intensity in their use of different IP-based activities relating to ESTs-patents and technology – *EST-intensive* organizations vis-à-vis all respondents[14]

Type of IP-based activity	**% of all responding organizations**	**% of responding *EST-Intensive* organizations**
Collaborative R&D	68%	76%
Patent *out-licensing*	35%	48%
Joint ventures or alliances	33%	42%
Technology *out-licensing*	31%	39%
Consulting / services	33%	29%
Spin-outs / start-ups	21%	26%
Technology *in-licensing*	15%	20%
Patent *in-licensing*	9%	10%

Also, it would seem that public bodies and private companies are more actively engaged in collaborative IP-based mechanisms (41% and 38% respectively indicated that they are either occasionally or frequently using such mechanisms). In comparison, only 29% of the responding academic institutions reported a frequent use of these mechanisms (Table 25).

With regard to cooperative R&D efforts, all types of organizations reported an equally high level of involvement in such activities. 83% of the responding private companies and public bodies and 81% of the responding academic institutions indicated that they are occasionally or frequently active in cooperative R&D efforts (Table 26).

14. See footnote 13.

As to the ranking of different IP-based activities relating to ESTs-patents and technology, (again in terms of intensity of use), the category "collaborative R&D efforts" was identified as the most significant type of activity by all organizations. Other IP activities which received high rankings include patent and technology out-licensing, spin-outs/start-ups, and consulting/ services (Table 27).

Table 25 – Active participation in collaborative IPR mechanisms, such as patent pools, cross-licensing, etc – according to *type of organization*

Participation in collaborative IPR mechanisms	**% of private companies**	**% of academic institutes**	**% of public bodies**
Never	27%	15%	17%
Rarely	35%	56%	42%
Occasionally	25%	22%	29%
Frequently	13%	7%	12%

Table 26 – Active participation in cooperative R&D agreements – according to *type of organization*

Participation in cooperative R&D efforts	**% of private companies**	**% of academic institutes**	**% of public bodies**
Never	6%	0%	0%
Rarely	11%	19%	17%
Occasionally	46%	44%	29%
Frequently	37%	37%	54%

Table 27 – Share of responding organizations reporting a high intensity in their use of different IP-based activities relating to ESTs-patents and technology – according to *type of organization*[15]

Type of IP-based activity	**% of private companies**	**% of academic institutes**	**% of public bodies**
Collaborative R&D	61%	74%	92%
Joint ventures or alliances	31%	30%	42%
Patent *out-licensing*	30%	48%	38%
Technology *out-licensing*	27%	33%	46%
Spin-outs / start-ups	14%	48%	21%
Consulting/services	30%	37%	39%
Technology *in-licensing*	15%	11%	21%
Patent *in-licensing*	11%	4%	4%

Interestingly, multinational companies seem to be much more engaged in the use of collaborative IP-based mechanisms, compared to SMEs. 53% of the responding multinational companies reported that they are occasionally or frequently using such mechanisms, compared with only 19% of the responding SMEs (Table 28).

15. See footnote 13.

In contrast, there is a much greater degree of similarity between these types of companies with regard to cooperative R&D efforts, in which 87% and 78% of the responding multinationals and SMEs (respectively) reported that they are occasionally or frequently engaged in cooperative R&D efforts (Table 29).

Lastly, the same similarity can be seen in relation to the ranking of different IP-based activities relating to ESTs-patents and technology by both multinationals and SMEs. The most frequently used IP-based mechanisms include collaborative R&D efforts, joint ventures or alliances, technology and patent out-licensing. SMEs also attach high importance to consulting and services (Table 30).

Table 28 – Active participation in collaborative IPR mechanisms, such as patent pools, cross-licensing, etc – *multinational companies* and *SMEs*

Participation in collaborative IPR mechanisms	**% of multinational companies**	**% of SMEs**
Never	10%	53%
Rarely	37%	28%
Occasionally	36%	11%
Frequently	17%	8%

Table 29 – Active participation in cooperative R&D agreements – *multinational companies* and *SMEs*

Participation in cooperative R&D efforts	**% of multinational companies**	**% of SMEs**
Never	3%	11%
Rarely	10%	11%
Occasionally	46%	42%
Frequently	41%	36%

Table 30 - Share of responding organizations reporting a high intensity in their use of different IP-based activities relating to ESTs-patents and technology – *multinational companies and SMEs*[16]

Type of IP-based activity	**% of multinational companies**	**% of SMEs**
Collaborative R&D	60%	61%
Joint ventures or alliances	31%	33%
Technology *out-licensing*	31%	25%
Patent *out-licensing*	28%	36%
Consulting/services	23%	46%
Technology *in-licensing*	16%	17%
Patent *in-licensing*	14%	8%
Spin-outs/start-ups	9%	23%

16. See footnote 13.

V.3 LICENSING OF ESTs IN DEVELOPING (NON-OECD) COUNTRIES (PART C OF THE SURVEY)

One of the key objectives of the survey was to obtain some further insights into the transfer, access and deployment of ESTs in developing counties, inter alia also looking at licensing activities (focusing specifically on *out-licensing* activities)

Arguably, the term "developing country" may be subject to different definitions (for example, based on GDP per capita, life expectancy, infant mortality, literacy rate, infrastructure, etc) and the classification of countries into different levels of development is not clear cut. Countries may be grouped into different classifications, such as developed countries, developing countries, least developed countries (LDCs), newly industrialised countries (NICs), emerging markets, low income countries, middle income countries, etc.[17]

As such, in this survey the term *developing country* was used in its broader sense, without referring to any specific definitional framework. Moreover, as noted in the survey (explanatory text of Part B, page 2) the term *developing country* is used in relation to countries that are not members of the Organization of Economic Cooperation and Development (OECD).[18]

It should also be noted that by focusing on developing countries, the study does not aim to imply that innovators that are based in developing countries are not engaged in the management, exploitation and diffusion of ESTs both in developing markets as well as in developed ones. In other words, this study does not intend to imply that the flow of ESTs is unidirectional.

Nevertheless, given the overall objectives of the joint project undertaken by the UNEP, EPO and ICTSD, this survey sought to focus on intellectual property-related activities that involve recipients (or prospective recipients) of licensed ESTs that are based in developing countries.

In this context, Part B focuses on the following elements:

- The extent to which the responding organizations are engaged in licensing activities in developing countries.
- The developing countries in which the licensing of ESTs is taking place on a more frequent basis.
- The factors that affect the decision to enter into licensing agreements (and other collaborative IP-based activities) in developing countries, including:

  Protection of intellectual property rights;

  Scientific capabilities;

  Infrastructure and human capital;

  Market conditions; and

  Investment climate.

17. For a discussion on developing countries see: International Monetary Fund. *World Economic Outlook – Database — WEO Groups and Aggregates Information* (October 2009), http://www.imf.org/external/pubs/ft/weo/2009/02/weodata/groups.htm#oem (Accessed on 28 Dec 2009); World Bank. *Country Classifications* http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20420458~menuPK:64133156~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html (Accessed on 28 Dec 2009); United Nations Development Program. *Human Development Report* 2009, http://hdr.undp.org/en/statistics/, (Accessed on 28 Dec 2009).

18. OECD – List of Members, http://www.oecd.org/countrieslist/0,3351,en_33873108_33844430_1_1_1_1_1,00.htmlת (Accessed on 28 Dec 2009).

- The willingness of ESTs patent owners to provide for more flexible licensing terms (including monetary ones) to entities that are based in developing countries.

V.3.1 Licensing activities in developing, non-OECD countries

The responding organizations were firstly asked to describe the extent to which they have entered into licensing agreements with licensees that are based in developing countries in the last three years (Part B, Question 1).

Here it would seem that the majority of responding organizations have yet to enter into such licensing agreements with entities that are based in developing countries. As Table 31 demonstrates, 58% of the responding organizations indicated that they have never entered into licensing agreements that involve recipients from developing countries. Additionally, 25% indicated that they have rarely entered into such agreements (Table 31).

Thus, while previous findings indicated that licensing (especially *out-licensing*) plays an important part in the overall commercial activities of the responding organizations, it is also apparent that the scope of using this tool in developing countries is still quite limited.

Table 31 – Share of responding organizations that entered into licensing agreements involving recipients based in developing countries in the last three years (Part B, Question 1)

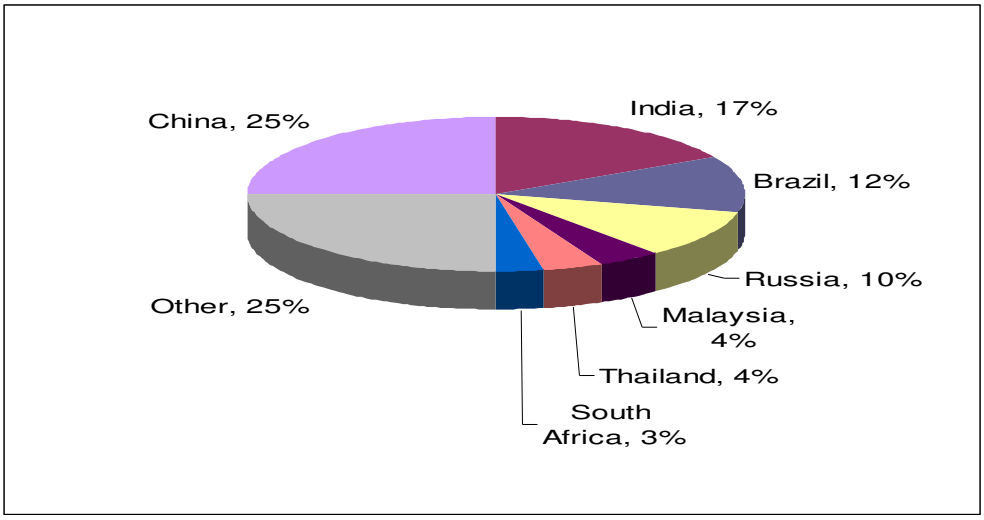
Licensing agreements that involve licensees based in developing countries in the last three years	**% of total respondents**
Never (no deals)	58%
Rarely (< 5% of deals)	25%
Occasionally (5% – 25% of deals)	12%
Frequently (> 25% of deals)	5%

Still, as one can learn from Table 32, China, India, and Brazil were identified as the countries with which the responding organizations have been most involved with regard to licensing agreements or other IP-based activities involving ESTs (Part B, Question 2).

Table 32 – Developing countries with which responding organizations have been most involved with regard to licensing agreements or other IP-based commercialization activities involving ESTs (Part B, Question 2)

Country	**% of responding organizations indicating they have been involved in licensing and IP-based commercialization activities in that country**
China	25%
India	17%
Brazil	12%
Russia	10%
Malaysia	4%
Thailand	4%
South Africa	3%
Others	25%

Figure 4 – Developing countries with which responding organizations have been most involved with regard to licensing agreements or other IP-based commercialization activities involving ESTs (Part B, Question 2)



V.3.2 Importance of different macroeconomic factors in deciding whether to enter into licensing agreements (and other collaborative IP-based activities) in developing countries

In this question the responding organizations were asked to rank the impact of different macroeconomic factors in their decision to enter into licensing agreements with recipients that are based in developing countries (Part B, Question 3).

Specifically, the responding organizations were asked to assess the importance of the following categories and sub-categories:

Protection of intellectual property rights
1. Existence of an established legal patent framework in that country, membership in international IP treaties, such as Patent Cooperation Treaty (PCT)
2. Ability to enforce the license and relevant patent rights in the country, including effective civil and criminal penalties
3. Ability to gain access to know-how, patents, or other assets owned by the other party in the developing country
Scientific capabilities, infrastructure and human capital
1. Existence of scientific and research capabilities (in universities, national laboratories, private sector, etc)
2. Availability of R&D infrastructure (including well-equipped laboratories, testing facilities, etc)
3. Access to well-trained human capital in that country or region
Favorable market conditions
1. Size of potential national or regional market (providing opportunity for market expansion)
2. Sufficient purchasing power of the national or regional population
3. Existence of established distribution channels in the country or region
Favorable investment climate

1. Existing measures aimed at encouraging foreign direct investment (financial incentives, administrative procedures that are not burdensome for doing business in the country, effective and timely government response)
2. Demonstrated commitment of the national government to address climate change and/or to ESTs deployment
3. Governance (rule of law, transparency, non-discrimination)

The values that were assigned to each of the above categories were based on an ordinal scale of 1 to 4, where the value "1" represented the lowest score (not a factor) and the value "4" represented the highest score (compelling reason toward an agreement).

This report provides an aggregate analysis of the above categories. In order to do so, each category was first analyzed separately by calculating the average results of each sub-category.[19]

For example, Table 33 below provides an outline of how the detailed results of each sub-category relating to the protection of IPRs were calculated and how the aggregated analysis was done. In this category (as well as in all other categories), the aggregated score of each of the values in the Y-*axis* (1=not a factor to 4= compelling reason toward an agreement) represent the average corresponding scores of each of the three IP sub-categories that appear in the X-*axis*.

Table 33 – Importance of intellectual property factors on the decision to enter into licensing agreements (and other collaborative IP-base activities) with recipients that are based in developing countries (Part B, Question 3)

Protection of intellectual property rights				
	Existence of an established legal patent framework in that country, membership in international IP treaties, such as Patent Cooperation Treaty (PCT)	Ability to enforce the license and relevant patent rights in the country, including effective civil and criminal penalties	Ability to gain access to know-how, patents, or other assets owned by the other party in the developing country	**Average**
Not a factor	14% (of total respondants)	12%	29%	**18%**
A basic precondition for doing business, but not a driving factor	30%	25%	31%	**28%**
Significantly attractive condition: would encourage negotiation	29%	32%	24%	**29%**
Compelling reason toward an agreement	27%	31%	16%	**25%**

Accordingly, Table 34 provides an aggregate analysis of the overall importance that the responding organizations attach to the four different categories: *protection of intellectual property rights; scientific capabilities, infrastructure and human capital; favorable market conditions; and favorable investment climate*.

19 . The use of average results is based on the assumption of equal weights for each of the sub-categories.

Table 34 – Importance of different macroeconomic factors in the decision to enter into licensing agreements (and other collaborative IP-based activities) with recipients that are based in developing countries (Part B, Question 3)

	Protection of intellectual property rights	**Scientific capabilities, infrastructure and human capital**	**Favorable market conditions**	**Favorable investment climate**
Not a factor	18% (of total respondents)	13%	16%	15%
A basic precondition for doing business, but not a driving factor	28%	37%	26%	27%
Significantly attractive condition, would encourage negotiation	29%	37%	44%	42%
Compelling reason toward an agreement	25%	13%	14%	16%

Overall, the survey finds that, together with the other categories, the protection of intellectual property rights is an important factor affecting the decision to enter into licensing agreements with recipients that are based in developing countries.

82% of the responding organizations indicated that the protection of IPRs is an important factor in their decision, with 54% arguing that the protection of IPRs is either a "significantly attractive" condition that would encourage negotiation of licensing agreements or a "compelling reason" toward an agreement.

The survey also finds that the other three categories – existence of scientific capabilities, infrastructure and human capital, favorable market conditions, and favorable investment climate – seem to have an even greater weight in the decision to enter into licensing agreements with recipients in developing countries (between 85 to 87% of the responding organizations indicated that these categories are important to their licensing decisions).

Interestingly, when looking more closely at Table 34 one can also identify some further insights.

For example, at one end of the spectrum, and compared to the other factors (market conditions, investment climate, etc), slightly more respondents considered IPRs not to be a relevant factor in their motivation and decision to enter into licensing agreements with recipients based in developing countries (18% in the case of IPRs, compared to an average of 16% in the other areas).[20]

At the other end of the spectrum, a greater number of respondents found IPRs to be pivotal in their motivation and decision to enter into licensing agreements with recipients based in

20. However as explained before, given the size of the sample, the difference between 14% in the category of IPRs and 16% in the other categories may not be statistically significant. In other words, one can also argue that there is no real difference between the categories with regard to this element.

developing countries (25% in the case of IPRs, compared to an average of 15% in the other areas).

The following section (drill-down analysis) provides some additional comparisons that may help establish a possible explanation to this interesting finding.

V.3.2a Drill-down analysis

Previously, the report used three classifications *(EST-intensive, organization type* and *company size)* in order to provide additional drill-down analysis and insights about the responses to Part A of the survey.

In this section, we shall use a new classification – *licensing -intensive* – that refers to the share of responding organizations reporting that during the last three years have occasionally or frequently entered into licensing agreements which involve recipients based in developing countries (Part B, Question 1). As Table 31 demonstrates above, the *licensing-intensive* group consists of 17% of the responding organizations.

Table 35 provides a comparison between the general respondents and *licensing–intensive* respondents with regard to the importance of the above macroeconomic factors in the decision to enter into licensing agreements (and other collaborative IP-base activities) with recipients that are based in developing countries. The values relating to the group of *licensing –intensive* respondents are colored in grey.

Table 35 – Importance of macroeconomic factors in the decision to enter into licensing agreements (and other collaborative IP-base activities) with recipients that are based in developing countries – *licensing-intensive* organizations vis-à-vis all respondents

	Protection of intellectual property rights	**Scientific capabilities, infrastructure and human capital**	**Favorable market conditions**	**Favorable investment climate**
Not a factor	18%	13%	16%	15%
	11%	13%	14%	13%
A basic precondition for doing business, but not a driving factor	28%	37%	26%	27%
	34%	36%	29%	29%
Significantly attractive condition, would encourage negotiation	29%	37%	44%	42%
	31%	38%	42%	40%
Compelling reason toward an agreement	25%	13%	14%	16%
	24%	13%	15%	18%

It would seem that, compared with the general population, *licensing–intensive* respondents attach greater importance to the protection of IPRs with regard to the decision to enter into licensing agreements with recipients that are based in developing countries (89% of the l*icensing–intensive* respondents vis-à-vis 82% of the general respondents).

Also, the protection of IPRs seems to carry a slightly greater weight among *licensing–intensive* respondents (89% confirming its importance) compared with the other macroeconomic

factors (scientific capabilities, infrastructure and human capital - 87%, favorable market conditions - 84%, and favorable investment climate - 87%).

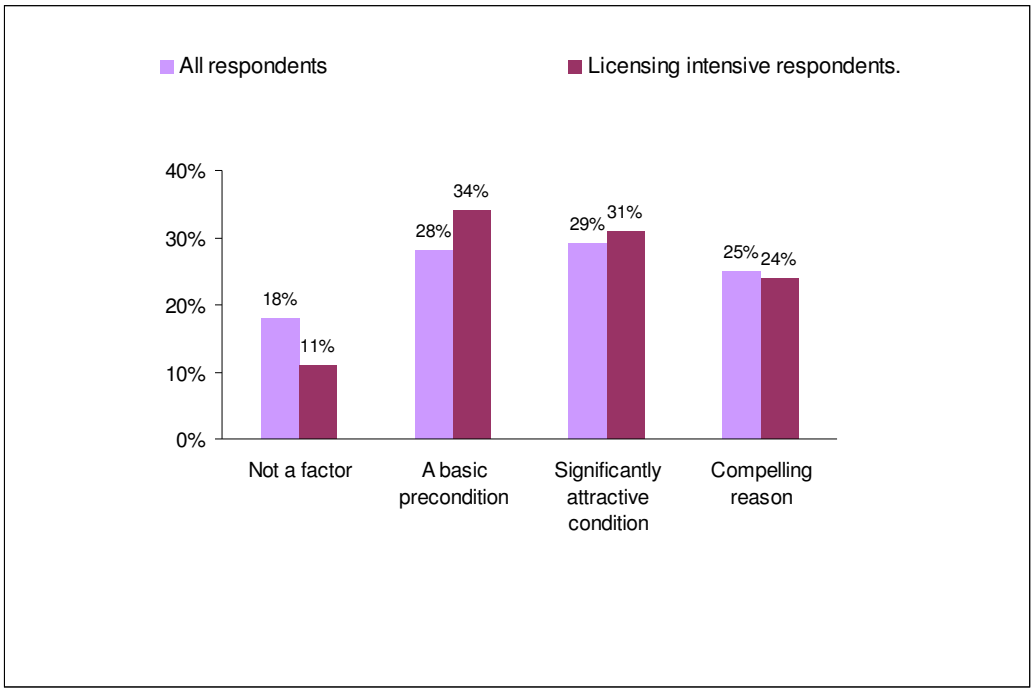
In other words, when controlling for the group *licensing–intensive* respondents, the protection of IPRs seem to take a slight priority over other macroeconomic factors with regard to the decision to enter into licensing agreements with recipients that are based in developing countries.[21]

Therefore, looking at the results of Tables 34 and 35, it is plausible to suggest that, compared with the other macroeconomic factors, the protection of IPRs seems to be more sensitive to the degree to which proprietary ESTs reach a stage in which their commercial horizon is more visible and applicable.

For example, if a specific technology has reached a stage in which its owner is able to commercialize it in a developing country (for example via a licensing agreement), then the significance of intellectual property protection in the decision to enter into such a deal would increase, at least compared to the other macroeconomic factors. This seems to be more visible among those organizations that already engage in licensing deals (and other IP-related activities) in developing countries. Conversely, if the technology did not yet reach a stage of commerciability, then the overall significance of intellectual property protection would be lower than the macroeconomic factors.

Figures 5 to 8 provides additional information about the importance of each of the above macroeconomic factors, both for the general respondents and for *licensing intensive* respondents.

Figure 5 – Importance of intellectual property factors in the decision to enter into licensing agreements (and other collaborative IP-based activities) with recipients that are based in developing countries



21 . However, as explained before, given the size of the sample, the difference between the category of IPRs and the other categories may not be statistically significant.

Figure 6 – Importance of scientific capabilities, infrastructure and human capital in the decision to enter into licensing agreements (and other collaborative IP-based activities) with recipients that are based in developing countries

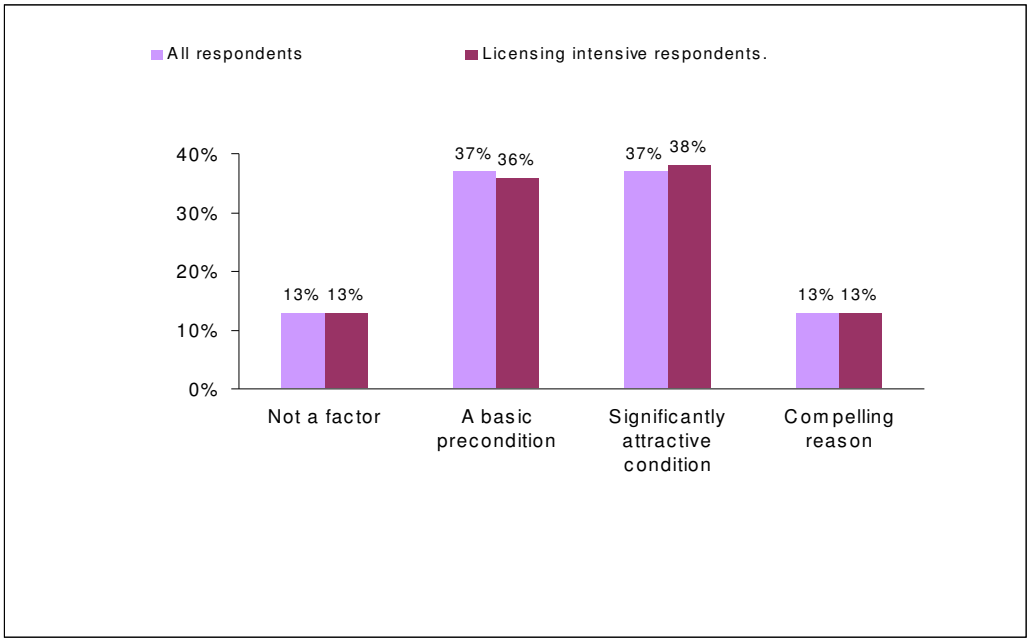


Figure 7 – Importance of favorable market conditions in the decision to enter into licensing agreements (and other collaborative IP-based activities) with recipients that are based in developing countries

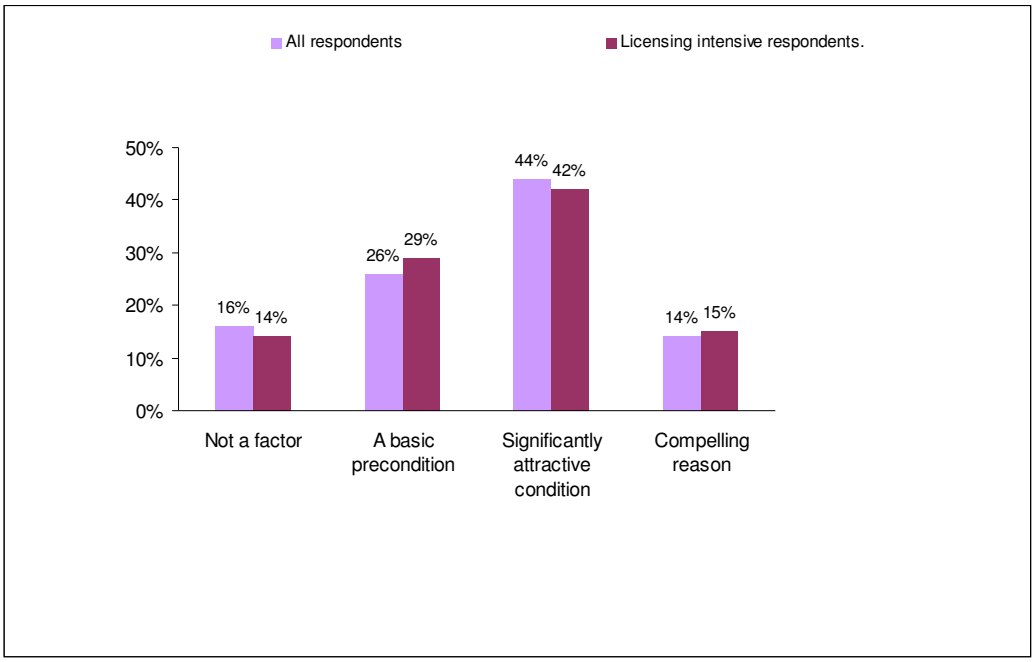
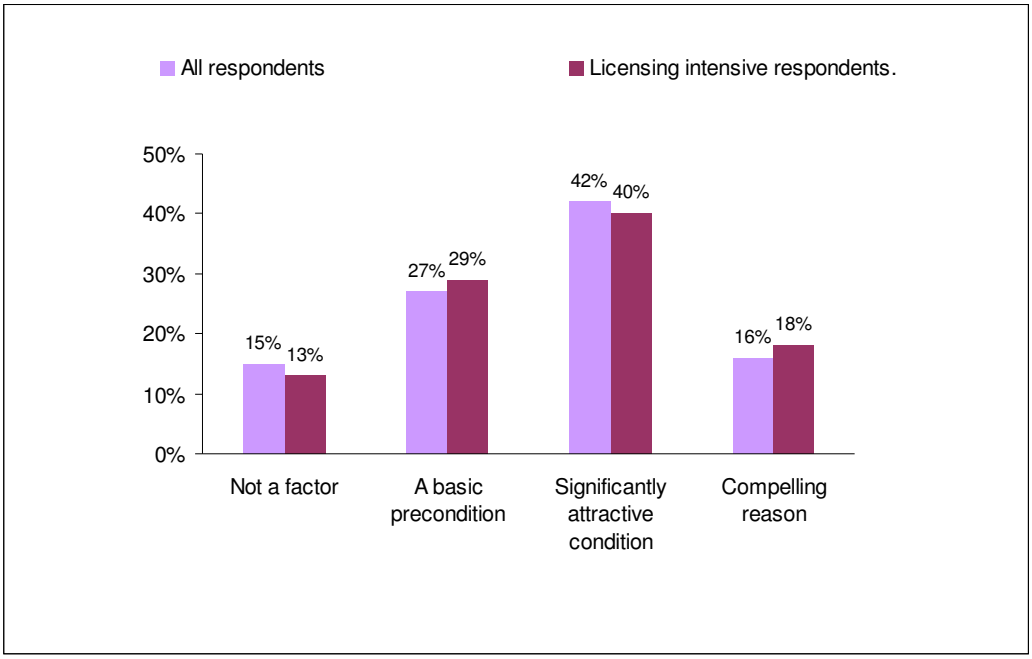


Figure 8 – Importance of a favorable investment climate in the decision to enter into licensing agreements (and other collaborative IP-based activities) with recipients that are based in developing countries



V.3.3 Willingness of ESTs patent owners to provide more flexible licensing terms (including monetary ones) to entities that are based in developing countries

Lastly, the survey sought to obtain some insights about the extent to which ESTs patent owners would be willing to provide more flexible licensing terms to recipients (that are based in developing countries) that may be more financially limited in terms of their ability to meet the original ("standard") terms of the license (Part B, Question 4).[22]

It should be noted that the survey did not make a distinction between the willingness to provide more accommodating licensing terms and the actual grant of such terms. The reason for this is twofold.

First, early in the planning of this survey it became evident that the responding organizations are very sensitive to questions that may be perceived as "probing" into confidential information (for example, about the terms of the license). Thus, the question had to be phrased more generally in order to secure a sufficient rate of response.

Secondly, with the tacit understanding that not all responding organizations have been involved in these kind of activities (i.e. negotiating a license with recipients that are based in a developing country and that do not have the financial resources to meet the "standard" terms of the license), the survey also wanted to capture opinions and views on this issue rather then focusing only on de facto practices.

Nevertheless, it is argued that, despite the above limitations, the ability to obtain some initial empirical data on this issue is very important, inter alia because of contemporary discussions

22. In the survey, the term "purchasing power" was used to imply the extent to which an entity in a developing country may have more limited financial capability in terms of its ability to meet the licensing terms, for example compared with an entity that is based in a developed country

about the manner in which the transfer of proprietary ESTs should take into account the financial capabilities of potential recipients that are based in developing countries.

Moreover, in the drill-down analysis below, further insights are provided with regard to the responses of *licensing-intensive* respondents and the other sub-groupings.

Overall, it would seem that vast majority of responding organizations (70%) indicated that in such cases they would be willing to provide more flexible licensing terms to recipients that are based in developing countries, with 20% indicating that they would be willing to make their licensing terms either "much more" or "substantially more" accommodating (Table 36).

Table 36 – Willingness of ESTs patent owners to provide more flexible licensing terms (including monetary ones) to entities that are based in developing countries (Part B, Question 4)

Willingness to provide for more flexible licensing terms	**% of total respondents**
No difference in licensing terms	30%
Licensing terms are more flexible	50%
Licensing terms are much more accommodating	15%
Licensing terms are *substantially* more accommodating	5%

V.3.3a Drill-down analysis

Tables 37 to 39 provide a more detailed analysis of the responding organizations based on different groupings – *licensing-intensive, organization type* and *company size.*

As Table 37 demonstrates, an even greater share of *licensing-intensive* respondents (78%) indicated their willingness to make their licensing terms more flexible vis-à-vis recipients from developing countries with more limited financial resources.

This is an important finding, not least because the group of *licensing-intensive* respondents represents organizations that indicated that they are already more frequently engaged in licensing activities with entities from developing countries. In other words, it is possible that in cases where licensing deals are already taking place, in practice the terms of such licenses are more accommodating towards recipients with more limited financial resources that are based in such countries.

Table 37 – Willingness of ESTs patent owners to provide more flexible licensing terms (including monetary ones) to entities that are based in developing countries – *licensing-intensive* organizations vis-à-vis all respondents

Willingness to provide for more flexible licensing terms	**% of total respondents**	**% of licensing Intensive respondents**
No difference in licensing terms	30%	22%
Licensing terms are more flexible	50%	58%
Licensing terms are much more accommodating	15%	16%
Licensing terms are *substantially* more accommodating	5%	4%

Academic institutions seem to be the most willing to provide more flexible licensing terms to recipients with limited financial capabilities that are based in developing countries (table

38). 83% of the responding academic institutions indicated their willingness to provide more flexible licensing terms, followed by public bodies (75%) and private companies (64%).

Table 38 – Willingness of ESTs patent owners to provide more flexible licensing terms (including monetary ones) to entities that are based in developing countries – according to *type of organization*

Willingness to provide more flexible licensing terms	**% of private companies**	**% of academic institutes**	**% of public bodies**
No difference in licensing terms	36%	17%	25%
Licensing terms are more flexible	48%	58%	50%
Licensing terms are much more accommodating	13%	13%	21%
Licensing terms are *substantially* more accommodating	3%	12%	4%

Finally, a similar share of multinational companies and SMEs (64% and 69% respectively) indicated their willingness to provide more flexible licensing terms to recipients with limited financial capabilities that are based in developing countries (Table 39).

Table 39 – Willingness of ESTs patent owners to provide more flexible licensing terms (including monetary ones) to entities that are based in developing countries – *multinational companies and SMEs*

Willingness to provide more flexible licensing terms	**% of multinational companies**	**% of SMEs**
No difference in licensing terms	36%	31%
Licensing terms are more flexible	50%	48%
Licensing terms are much more accommodating	12%	14%
Licensing terms are *substantially* more accommodating	2%	7%

ANNEX

Survey of licensing activities in selected fields of Environmentally Sound Technologies (ESTs)

Cover letter issued on July 2009

The United Nations Environment Programme (UNEP), the European Patent Office (EPO), and the International Centre for Trade and Sustainable Development (ICTSD) are collaborating in the production of a study that aims to enhance the understanding of the role that intellectual property plays in relation to the transfer, access and deployment of environmentally sound technologies (ESTs), starting with the energy generation sector.

As part of this study, the project partners are working with [Supporting Organization] to conduct a survey that focuses on licensing practices in ESTs. We believe this analysis will provide useful input into the ongoing technology transfer discussions taking place in the context of the UN Framework Convention on Climate Change (UNFCCC) negotiations.

For the purpose of this survey the term ESTs refers to those technologies that protect the environment; are less polluting; use resources in a more sustainable manner; recycle more of their wastes and products; or handle residual wastes in a more acceptable manner than the technologies they substitute.[23]

While representing only one piece of a wider set of conditions and components that determine the rate, composition and magnitude of technology transfer, intellectual property rights (IPRs) are of fundamental importance. Moreover, we have chosen in part to focus on licensing activities given that they represent a "real-life" manifestation of technology transfer activities.

We would like to emphasize that the results of this survey *are not intended for any type of commercial use.* Moreover, the responses collected in this survey will be kept confidential, and the identity and answers provided by any individual respondent will not be disclosed. Rather, all the results collected and analyzed in this survey will be presented at an aggregated level.

For the purpose of this study we have asked Dr. Meir Perez Pugatch, of the University of Haifa and Research Director of the Stockholm Network think-tank, to coordinate this survey and to analyze its results. Should the need arise, and with your permission, Dr. Pugatch may contact you directly via electronic mail or telephone to discuss survey inputs.

For your convenience the survey is provided in the attached file.

You may choose to fill in the survey using the attached word document (just click in the appropriate boxes and save the document). In this case please send the survey to the following email address: meirp@pugatch.co.il.

Alternatively, you may choose to fill in the survey on a hard copy and fax it to the following number +972-3-6204395.

23. The above definition is based on Chapter 34 of Agenda 21 of the UN Program on Sustainable Development

Should you encounter any problem please feel free to contact Dr. Pugatch at the email address indicated above or at telephone number +972-3-6299294.

As a leader in technology innovation and patenting in this field your response to this survey is invaluable. We are very grateful for your time and willingness to assist us in this important project.

With kind regards,

On behalf of the Project Partners

Hussein Abaza
Chief
Economics and Trade Branch
UNEP

On behalf of the Supporting Organization

Survey of licensing activities in selected fields of Environmentally Sound Technologies (ESTs) – July 2009

Unless stated otherwise, the term licensing refers to both the *in-licensing* and *out-licensing* of patented inventions, and any type of additional trade secrets, know how etc. that is part of the subject matter of the license.

Part A – General questions

Question 1

What is the estimated proportion of ESTs-related patents in your overall patent portfolio?

Negligible (<2%) ☐	Low (2-15%) ☐	Significant (15-50%) ☐	Substantial (>50%) ☐

Question 2

How important are licensing activities to your organization (as far as the commercialization and/or exploitation and/or development of proprietary assets are concerned)?

2(a) Importance of ESTs *Out-Licensing* activities

Negligible ☐	Moderately important ☐	Very important ☐	Fundamental ☐

2(b) Importance of ESTs *In-Licensing* activities

Negligible ☐	Moderately important ☐	Very important ☐	Fundamental ☐

Question 3

Has there been a shift in your organization's business strategy towards licensing of ESTs in the past three years?

Less supportive of licensing ☐	No change ☐	More supportive of licensing ☐	ESTs licensing is not a part of my business strategy ☐

Question 4

4(a) To what extent is your organization active in collaborative mechanisms for intellectual property rights, such as patent pools, cross-licensing, etc?

1. Never ☐	2. Rarely ☐	3. Occasionally ☐	4. Frequently ☐

4(b) To what extent does your organization engage in cooperative research and development agreements or joint venture agreements with other companies or organizations to develop or improve ESTs?

1. Never ☐	2. Rarely ☐	3. Occasionally ☐	4. Frequently ☐

Question 5

Please rank your organization's intellectual property activities related to ESTs-patents and technology (including know-how) in the following areas

(Rank on a scale of 1 to 4 with 1 = low intensity, 4 = high intensity)	1	2	3	4
Patents *out-licensing*	☐	☐	☐	☐
Patents *in-licensing*	☐	☐	☐	☐
Technology *out-licensing*	☐	☐	☐	☐
Technology *in-licensing*	☐	☐	☐	☐
Joint ventures or alliances	☐	☐	☐	☐
Spinouts / start-ups	☐	☐	☐	☐
Collaborative R&D	☐	☐	☐	☐
Consulting / services	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐

Part B – Questions focusing on developing countries

One of the objectives of the study, which is outlined in the introductory letter, is to obtain some further insights into the transfer, access and deployment of ESTs in developing counties, inter alia by also looking at licensing activities (and more specifically *on Out-Licensing* activities).

For the purpose of this survey the term *developing countries* may refer to countries that are not members of the OECD. It is, of course, well understood that the concept is very broad and that developing countries cannot be grouped into a single entity.

Therefore, this survey by no means implies that the flow of ESTs is going in one-direction. In particular, if your company is also based in a developing country, then the following questions refer to actions towards other developing countries.

Question 1

To what extent has your organization entered licensing agreements that involve licensees (which are not majority-controlled subsidiaries) based in developing countries in the last three years?

Never (no deals)	Rarely (< 5% of deals)	Occasionally (5% – 25% of deals)	Frequently (> 25% of deals)
☐	☐	☐	☐

Question 2

With which countries has your organization been most involved in licensing or other commercialization activities of intellectual property in the field of ESTs? Please name up to six countries.

Country A	Country B	Country C
Country D	Country E	Country F

Question 3

When your organization is making a decision whether or not to enter into a licensing or cooperative development agreement with a party in a developing country, to what extent would the following factors positively affect your assessment? (**Please rank from 1-4 based on the categories below).**

1. Not a factor	**2. A basic precondition for doing business, but not a driving factor**	**3. Significantly attractive condition: would encourage negotiation**	**4. Compelling reason toward an agreement**

Extent of Influence:	**1**	**2**	**3**	**4**
Protection of intellectual property rights				
1. Existence of an established legal patent framework in that country, membership in international IP treaties, such as Patent Cooperation Treaty (PCT)	☐	☐	☐	☐
2. Ability to enforce the license and relevant patent rights in the country, including effective civil and criminal penalties	☐	☐	☐	☐
3. Ability to gain access to know-how, patents, or other assets owned by the other party in the developing country	☐	☐	☐	☐
Scientific capabilities, infrastructure and human capital				
1. Existence of scientific and research capabilities (in universities, national laboratories, private sector etc)	☐	☐	☐	☐
2. Availability of R&D infrastructure (including well-equipped laboratories, testing facilities, etc)	☐	☐	☐	☐
3. Access to well-trained human capital in that country or region	☐	☐	☐	☐
Favourable market conditions				
1. Size of potential national or regional market (providing opportunity for market expansion)	☐	☐	☐	☐

2. Sufficient purchasing power of the national or regional population	☐	☐	☐	☐
3. Existence of established distribution channels in the country or region	☐	☐	☐	☐
Favourable investment climate				
1. Existing measures aimed at encouraging foreign direct investment (financial incentives, administrative procedures that are not burdensome for doing business in the country, effective and timely government response)	☐	☐	☐	☐
2. Demonstrated commitment of the national government to address climate change and/or to ESTs deployment	☐	☐	☐	☐
3. Governance (rule of law, transparency, non-discrimination)	☐	☐	☐	☐
Other factors: (please specify)_____	☐	☐	☐	☐

Comment *(optional)*_____

Question 4

When entering into an out-license agreement with parties that are based in developing countries, to what extent do the monetary terms of your license reflect your willingness to introduce greater lenience due to differences in the purchasing power of the parties?

No difference in licensing terms	Licensing terms are more flexible	Licensing terms are much more accommodating	Licensing terms are *substantially* more accommodating
☐	☐	☐	☐

Comment *(optional)*_____

Part C. General questions regarding your organization

1. Is your organization

A private company	☐
Academic institution	☐
Research Institute	☐
Governmental body	☐
National research institute or laboratory	☐
Non-profit organization	☐
Consortium	☐
Other (open text)	☐

2. Size of your organization

Multinational (over 5,000 employees)	☐
Multinational (between 1,000 to 5,000 employees)	☐
Large (more than 250 employees) but mostly focused on domestic markets	☐
SME (up to 250 employees)	☐
Very small (less then 10 employees)	☐

3. In which country is your HQ based?

Please enter name of country:

4. The current study has a particular focus on selected ESTs for the energy generation sector. Please indicate which of the categories below describe the innovation development activities of your organization. Indicate all that apply, and list others as appropriate.

Wind	☐
Solar thermal	☐
Solar PV	☐
Geothermal	☐
Biomass / Biofuels	☐
Ocean / Wave	☐
Hydro	☐
Waste-to-Energy	☐
Other	

5. Please estimate the level of investment in R&D in your organization

		If possible, please provide an estimate of investment in R&D (in $US)
Low – the organization's business model is not based on significant internal R&D	☐	
Limited – the organization primarily engages in R&D activities aimed at improving existing technologies	☐	
Significant – the organization engages in the early and middle phases of R&D	☐	
Research-based - the organization is based on full-scale R&D activities	☐	