



TECHNOLOGY TRANSFER MODEL AND INDICATORS FOR TURBO- SUDOE

August 2017

VERSION 3

INDEX

1. TECHNOLOGY TRANSFER MODEL	4
2. FRAMEWORK.....	6
3. STRENGTHS AND WEAKNESSES IN TURBO-SUDOE	8
3.1 TT Services Provided in each TT and Indicators.....	8
3.2 TT PROFILES AND MECHANISMS	14
4. FOCUS OF THE MODEL	20
5. BUILDING THE MODEL.....	22
5.1 Transference broker	23
5.2 Specific Profile	25
5.3 Information: offer and demand	26
5.4 Network	29
6. INDICATORS	31

1. TECHNOLOGY TRANSFER MODEL

In the present document the Technology Transfer model designed for TURBO-SUDOE is presented. Currently the model in the SUDOE region is still focused on an Open Innovation 1.0 model, based on collaborative innovation between industry and research. The new model will be focused on creating an entire ecosystem of networks working together in order to create innovation beyond industry needs. The model is aimed at ensuring the interaction of the different agents and the development of an operational ecosystem for technology transfer that takes into consideration both the needs and inputs from all the agents of the ecosystem.

The table below reflects the process in which innovation models have evolved in the recent years. The TURBO-SUDOE TT model is aimed at reflecting the last step of the diagram, ensuring an ecosystem centric approach towards TT in which innovation takes place in a cross-organization and multi-stakeholder network.

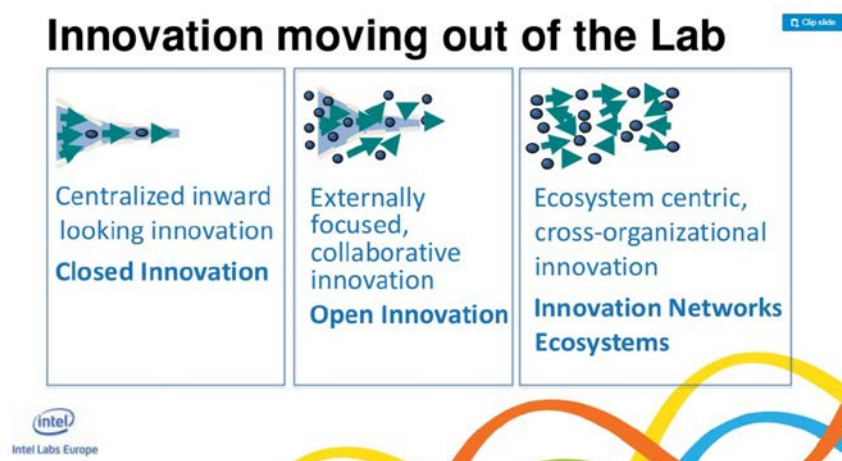
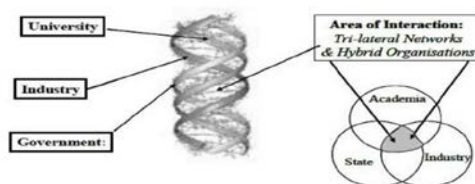


Fig. 1. Evolution of the innovation models. (Martin Curley VP Intel Labs).¹

The Open Innovation framework currently working in the target region of the TURBO-SUDOE project is mainly based on the traditional triple helix model that considers as the main actors of the TT process the academia, government bodies and industry representatives. The Triple Helix model that has been the regular framework during the past recent years can summed up in the following figure.

¹ Open Innovation 2.0: A New Paradigm, Martin Curley and Bror Salmelin

Triple Helix Innovation



Source: Henry Etzkowicz

Fig. 2. Innovation model based on triple helix. (Martin Curley VP Intel Labs).²

The more agile and open approaches needed for open innovation 2.0, based on ecosystem networks, are in conflict with the traditional control that organizations have had in the triple helix- based model. According to specialized theory, the control played by these institutions do inhibit the involvement of external agents and make it difficult to trigger the societal and cultural change, required to unblock the involvement of external agents and the emergence of new ideas and approaches.

The rationale behind the new TT model to be developed within TURBO-SUDOE wants to overcome these issues and implement a model based on a quadruple helix (the framework is shown in the next chapter) that ensure the interaction of all the agents involved and active in the ecosystem, the creation of networks, and the specialization within comprehensive strategies of technology transfer.

As a basis, the different entities participating in the project show different technology transfer processes and approaches and are willing to contribute to the achievement of the above mentioned objectives. However, the innovative character of the model requires from the participant organization to define and adapt to a radical new model. Based on the previous experience reported by the participants, there is still limited experience in the implementation of Open Innovation and Ecosystem centric initiatives. For this reason, this project needs to be seen as a step forward in the definition and implementation of radically new approaches both within the institutions that take part in the project as well as on the ecosystem in within which they operate.

Before describing in detail the model proposed by the TURBO-SUDOE project it is important to highlight the very complex ecosystems in which technology transfer do take place (in order to adapt it to the new model). These ecosystems, are formed by a

² Open Innovation 2.0: A New Paradigm, Martin Curley and Bror Salmelin

wide variety of players including universities, engineering schools, regional centres of innovation and technology transfer agencies, public regional agencies, clusters, competitive poles and many other institutions, all of which do play a key role in the development of technology transfer process.

Effective ecosystems have very particular characteristics of specialization in specific technologies and industry sectors, with critical mass developed over time and with a supportive framework conditions.

Here, the ecosystem is understood as the entrepreneurial and societal conditions beyond the incumbent agents that affect how proactive an institution needs to be secure the exploitation or the absorption of novel technologies and that will also influence institutional policies of an organization.

In this sense, technology transfer process and their management need to be analysed in specific legislative and operational environments conducive to their development. An example of such operational environments can be the Regional Innovation Strategies (under ERDF programming) observed in some of the participant regions of the project and that play a fundamental role in the conceptualization of TT processes. It is important to bear in mind that technology transfer processes sits in the context of wider regional and national policy frameworks on innovation and commercialization, and that it will be important to consider the views and interests of a large range of players including industry representatives, policy makers and investors. Bearing in mind this large picture will be fundamental for the success of any novel TT model.

2. FRAMEWORK

The objective of TURBO-SUDOE there is what is called "Open Innovation 2.0", a paradigm that aims to create innovation in many fields by exploiting the so-called "collaborative research." Not only specialized laboratories but universities, industry and government, united together to achieve common goals through a process of ideas that can really take shape in technologies, products and services. TURBO-SUDOE has shaped its technology transfer model according to the Open Innovation 2.0 framework. The figure below from Martin Curley VP Intel Labs shows the essence of the framework.¹

Open Innovation 2.0: A new Milieu

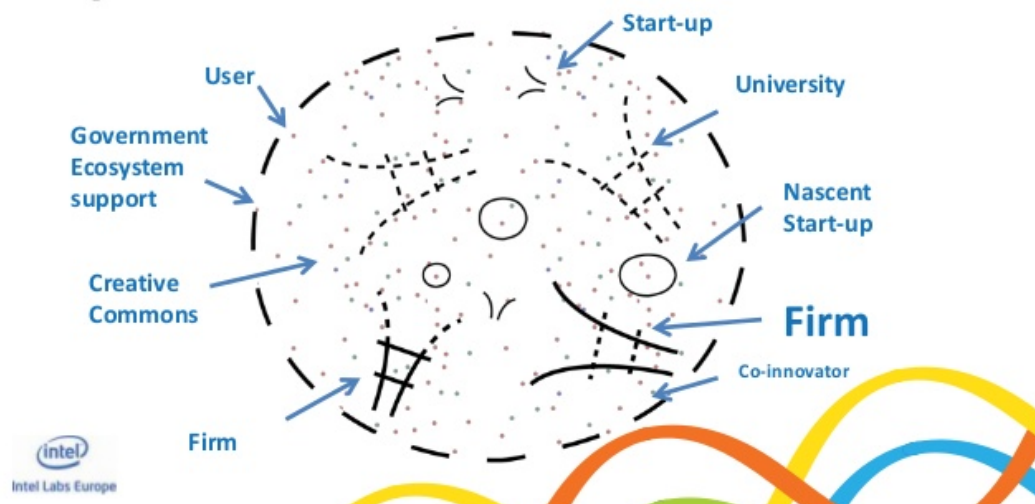


Fig. 3. Open Innovation 2.0 scheme (Martin Curley VP Intel Labs).³

The open innovation 2.0 framework proposes an ecosystem centric innovation based on a quadruple helix:

- Academia
- Industry
- Government + Citizens + Other agents

The effectiveness of the dynamics of Open Innovation 2.0 builds on the success of the collaborative R&D projects between companies incorporated in ecosystems where active participation are not only by producers (companies and technology generators) but also by users and consumers. The transposition of this term in the world of technology management perfectly suits to the definition of a collaborative (and competitive) networking environment that integrates businesses, public research, governments, citizens, users. Central elements for the success of Open Innovation 2.0 ecosystems are the principles of inter-organizational collaboration, co-creation and sharing of value. The aim of TURBO-SUDOE is to effectively implement a Technology Transfer open innovation 2.0 ecosystem in the SUDOE region. In order to reach this objective, the TURBO-SUDOE will focus its activities on a demand-oriented basis in which demand will be shaped based on the inputs gathered from the external environment of the technology transfer process. In this sense, the TURBO-SUDOE model needs to be understood rather as a “pull model” than a “push model”, where a

³ Open Innovation 2.0: A New Paradigm, Martin Curley and Bror Salmelin

wide part of the activities will be dedicated to collect the information and needs from the demand in order to find a match with the offer or in order to shape the offer according to this information. In this way it is expected to boost an effective technology transfer in the region. One of the implications of this model is that TT brokers, will be understood as multi-skilled professionals, with a comprehensive knowledge of the environment and adaptable to the variety of agents involved in the networks. As it will be described later, the technical and inter-personal skills of the TT brokers will need to reflect these features.

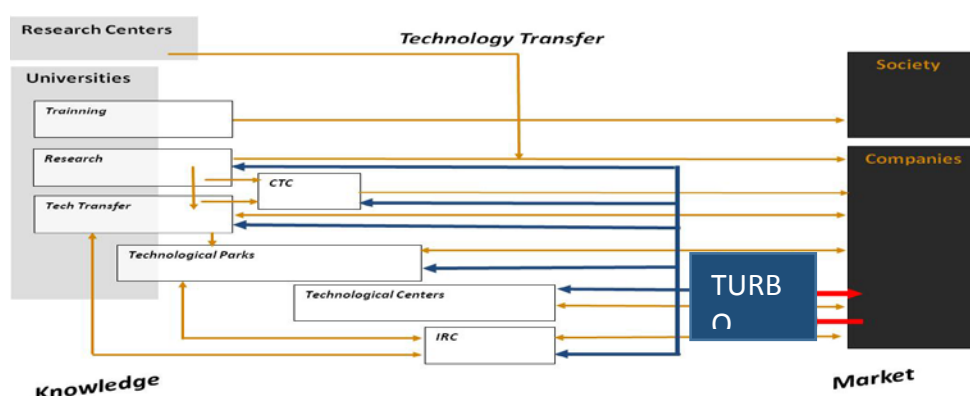


Fig. 2. TURBO-SUDOE model: pull model based.

3. STRENGTHS AND WEAKNESSES IN TURBO-SUDOE

In order to define the model, the consortium has analysed, as a starting point, the particularities of the participant partners and their environment. In this sense the main strengths and weaknesses of the consortium members (faced an Open Innovation Model for TT) have been identified and analysed. The results and the outcomes of this analysis will be reflected in the deliverables E.1.4.1 Technology Transfer Model Guidelines for TURBOSUDOE: internal handbook and E 1.4.2 Technology Transfer Model Guidelines for TURBOSUDOE: guidelines for external users. This analysis includes an appraisal of different aspects of the Technology transfer model of the offer side ("TT MODEL OFFER" collected among universities/tech centre partners of the project) and of the Technology transfer model of the demand side ("TT MODEL DEMAND", collected among industry associations). The findings gathered during this analysis will be the basis upon which to build and define the main features of the TURBSUDOE TT model.

3.1 TT Services Provided in each TT and Indicators

⁴ Knowledge Innovation Market Technology Transfer Pull model
Technology Transfer Model and Indicators for Turbo-Sudoe
 E1.3.1

IPR management

Most of the entities (4 out of 5) that form part of the TT MODEL OFFER report to have clearly defined IPR management procedures. These institutions promote TT and entrepreneurial activities through scouting ideas, filing IP requests, managing IP portfolios, supporting the creation of technology based companies, designing IP strategies, carrying out research on patentability, monitoring application for patents etc. Some emerge to have a specific office dedicated to TT. Furthermore, most universities offer advisement services on IP for researchers. IPR Management is therefore considered as a fundamental feature of the TT Transfer model and the appropriate resources are invested in most of the OFFER institutions.

However, and with regard to TT MODEL DEMANDS, IPR management procedures do not appear to be as clearly defined as for TT MODEL OFFER. Some do however have meetings about IP and about IPR management and they provide activities such as scouting ideas and looking for new technologies and project opportunities for their partners, but they do not represent the majority.

In this sense, the TT Transfer model will need to ensure that IPR issues are deeply integrated within both ends of the spectrum and that a common IPR language is spoken by the agents. To achieve this objective it will be fundamental to ensure that the role of TT broker is endowed both with technical and interpersonal capacities in order to understand the needs and expectations of the environment. Moreover, IPR management needs to operate in an international system based on the compliance with world class standards. The TT model will need to regularly support and guarantee the continuous improvement of IPR standards of practice.

Valorisation

From the responses gathered among the consortium members, it emerged that some of the TT MODEL OFFER entities count on the figure of professional expert to deal with valorisation issues. Protecting and valorising the results of their research can be seen as an important issue for all institutions. This is the case for the some institutions, where a specific team of valorisation experts with direct relationship with the research teams is responsible for facilitating valorisation processes. Although the role of these teams is considered fundamental for research exploitation, it has also been observed that these groups are rather small and that their role and responsibilities is not as duly consolidated as it would be expected.

Another of the issues that has been highlighted by the respondents is the need for these groups to show a more specialized nature, allowing them to have a clear and concise understanding of the sector environment in which they operate. The TT model proposed by the TURBOSUDOE project must ensure that the disperse knowledge available within research units is compiled into a more systematic language that can be easily understood and shared by external stakeholders. This needs to be further reinforced by the development of specific protocols that take into consideration the different phases and actors involved in the process (from protection action to marketing processes).

On the other hand, the DEMAND members of the consortium declare providing information services to their companies about internationalization strategies and commercialization activities. Most of these services, though, take the form of viability studies and investment opportunities assessment (services that could easily evolve towards more concrete valorisation actions following the TURBOSUDOE model implementation). However, most of the time, these services are provided by external agents offering specialized portfolios, including, technology transfer companies, regional agencies, business and competitive clusters.

Moreover, it has been observed that in most of the regions demand is widely scattered into a large number of small companies which really need to be aware of the most recent research developments (and using a common and understandable language) that help them to be more innovative and more competitive both at national and international level.

Marketing

The commonality in the marketing strategy of the various TT MODEL OFFER entities is that almost all of them rely on brokerage events. Counting on an experienced commercial and relying on technological web portals also emerged as a marketing strategy for two of the entities respectively. For two universities, facilitating cooperation between the business-industrial sector and the university itself emerged as an important point. Therefore, no common pattern or strategy has been identified, showing that specific solutions are adopted based on concrete scenarios.

In a similar way no trending patterns could be noticed among TT MODEL DEMAND entities with regard to marketing strategies. One of the entities did not report having any specific marketing strategy and the other two respectively reported relying on brokerage events or integrating the marketing activities within a broader internationalization plan.

The TT model proposed by the TURBOSUDOE project will play special attention to the interaction of the TT broker with the operational environment so as to ensure that the marketing needs of both sides of the process are fully met.

R&D contracts

Regarding R&D contracts most of the TT MODEL OFFER entities signed R&D contracts with companies. Furthermore, some entities also emerged to have participated in collaborative projects with public administrations. The majority of the TT MODEL OFFER entities have dealt with more than 40 contract research agreements in the past five years. Contract research agreements are thus a strength for TT MODEL OFFER and need to be reinforced by the TURBOSUDOE model.

The TT MODEL DEMAND ENTITIES signed R&D contracts with companies, local universities and research centres, even if with significantly lower numbers of contract research agreements compared to TT MODEL OFFER.

The uneven nature of R&D contracts (based on the responses gathered among the participants) shows the need for the TT model to invest larger efforts in promoting R&D contracts from the demand side. This is coherent with the objective of the project to encourage a more proactive attitude towards TT from the DEMAND side. Reinforcing the role of the demand side, the new TT model will gather further evidence from the market and therefore will guarantee more effective and impact-based TT processes.

Collaborative national/ regional projects

All of the TT MODEL OFFER emerged to have collaborative national regional projects. The majority of TT MODEL OFFER entities participated in more than 21 R&D collaborative projects in the past 5 years. R&D collaborative projects are thus a strength for these entities Furthermore, these projects emerged to be mainly brought forward with companies, and to a lesser extent with public administrations.

On the other hand, the information gathered among the demand-side agents, show a far more limited interest to participate in national or regional projects. According to the data gathered only one entity emerged to have taken part in collaborative national/regional projects. Therefore, one of the requirements of the new TT model will be to highlight the need for Demand-side institutions to actively cooperate with agents of the ecosystem in the implementation of collaborative projects and initiatives. A comprehensive knowledge and understanding of all the agents of this environment will be fundamental to channel and respond to this objective.

Collaborative research projects funded by the European Union

All of the TT MODEL OFFER have participated in collaborative research projects funded by the EU. It emerged that half of the TT MODEL OFFER entities had participated in between 3 and 5 EU funded projects in the last five years, and the other half had participated in more than 21 EU funded projects.

Out of the three TT MODEL DEMAND entities, two of them or their partners are working with companies involved with collaborative research projects funded by the EU. Furthermore, one of the entities reported having tried to involve companies in EU funded projects but without success. One of the entities participated in between 3 and 5 EU funded projects in the last 5 years. The other participated in more than 6 projects.

In general, it emerges that almost all of the entities have participated and are participating in collaborative research projects funded by the EU.

Technology transfer: licensing agreements in the past 5 years

This point showed a consistent variation across entities. However, the majority of the entities reported having more than 11 licensing agreements in the past 5 years. Licensing includes here patents, copyrights, know-how, databases or design rights. What it can be observed is that these processes are mainly technology-push processes rather than market pull mechanisms.

Technology transfer: IP assignments in the last 5 years

Most of the entities reported having had between 0 and 2 IP assignments in the last 5 years. This highlights a clear weakness among the entities and a clear demand for leadership in the identification and negotiation IP assignments. The TT model will need to highlight the importance of leadership skills in prioritizing and promoting IP assignments within the institutions. A deep knowledge about the specific demands of both the offer and the demand side will be a key element for technology transfer brokers. The identification of valuable market opportunities for the research activities conducted within the institutions will need to be reflected into concrete IP assignments and to overturn the extremely low figures that have been identified among the participants. In order to achieve this model will need to widen the approach towards IP (usually perceived too narrowly and intangible).

Technology transfer: Spin-offs creation

Most of the TT MODEL OFFER entities support the creation of spin-offs. In this sense, the majority of the entities reported having adequate or good staff for start-up creation and support and have described the importance that the interlay of different actors plays in the spinning out process. Although the importance given to spin off creation among the participants highlights the active efforts of these institutions, the TT model will need to highlight and stress the different mechanisms and structures conducive to the creation of spin-offs and how do they apply in each of these institutions. Amongst these mechanisms, the TT model will pay special attention to normative, strategic, infrastructure and structural support mechanisms. Knowledge about all these factors will be a key responsibility of the technology transfer brokers. The need to highlight the importance of spin-off creation mechanisms is further reinforced when analyzing the data provided by demand agents, and that reflect that none of them have established mechanism for supporting the creation of spin-offs.

Technology Transfer staff

The entities on the OFFER reported having adequate staff specialized in licensing and negotiation. Although this needs to be seen as a strength among the participant partners, special attention needs to be placed on this issue. One of the main assumptions of the TURBO-SUDOE model is the need to strengthen the role of technology transfer brokers and to ensure that they are endowed with the required tools to ensure fluent technology transfer processes. Here, the model needs to ensure that technology transfer brokers do have a comprehensive understanding of the ecosystem and the sector in which they operate and that they are able to understand the specific needs and expectation of all agents involved. This knowledge about the sector needs to be coupled with a set of interpersonal skills that guarantee that the transfer process is conducted appropriately. Among this skills leadership will stand out as one of the most relevant; as it has been seen there is no one-size-fits-all policy in technology transfer and leadership skills will be fundamental manage the risks and conflicts generated in technology transfer processes, to decide the priority to be placed on technology transfer or selecting the most appropriate route to impact. Moreover, negotiation and communication skills will be unavoidable for the TRUBOSUDOE project model. The availability of these skills will guarantee that all the agents in the technology transfer chain speak the same language and that can effectively exchange information and expectations. Entrepreneurial capacities of technology transfer agents will also need to be reinforced to support and incentivizing successful technology transfer initiatives.

Total number of employees working in Technology Transfer

Technology Transfer Model and Indicators for Turbo-Sudoe

E1.3.1

The total number of employees working in Technology Transfer activities varied across the TT MODEL OFFER ENTITIES. Half reported having between 0-3 employees, and half reported having between 11-20 employees. This diversity needs to be seen as an example of the different strategic approaches towards technology transfer within the institutions. As it has been mentioned above, the TURBOSUDOE model needs to find an even balance between the need for sector specialization and the capacity to generate comprehensive strategies within the institutions. The team's composition need to guarantee an extensive understanding of the sector of activity and the availability of all the skills required for implementing successful technology transfer processes.

3.2 TT PROFILES AND MECHANISMS

Capability of entities to evaluate new technologies opportunities

Half of the TT MODEL OFFER entities assess as weak their capabilities to evaluate new technologies opportunities, and the other half assess their capabilities as adequate. The same proportion emerged for TT MODEL DEMANDS entities. Here again, the TURBOSUDOE model will place special interest in reinforcing leadership capacities among technology transfer brokers. This will respond to the need to correctly identify and prioritize technology portfolios and define the most valuable transfer routes.

Company resources to take ideas through proof of concept, testing and validation

In general, TT MODEL OFFER entities emerged to have weak or inexistent resources to take ideas through PoC, testing and validation. On the other hand, TT MODEL DEMANDS entities also emerged to have weak resources to take ideas through PoC, testing and validation. It is obvious, as it has been stressed during the field work, that technology transfer is expensive and that technology transfer agents cannot be indifferent on the mechanisms available to fund technology transfer processes and to ensure its sustainability. The TURBOSUSOE TT model will need to provide impact and performance oriented tools that generate the necessary evidence to gather organizational resources towards technology transfer initiatives. The TT model will also need to gather evidence on the eco-system development and absorption capacities (that will be reflected in the development of testing and validation initiatives with a market oriented perspective).

A formalized screening procedure to assess invention disclosures

TT MODEL OFFER entities showed an occasional or systematic use of screening procedures to assess invention disclosures, while half of the entities reported having adequate or good access to staff capable of managing invention disclosures, but at the same time it emerged that TT MODEL OFFER entities have weak or no resources to follow up on the disclosures.

TT MODEL DEMAND entities are more variegated in their use of screening procedures to assess invention disclosures. One entity also highlighted making an occasional use of screening procedures for SMEs and a systematic use of these procedures for groups and larger companies.

Staff for scouting of new ideas and inventions

It clearly emerged that for TT MODEL OFFER the TT department does not have sufficient staff for scouting new ideas and inventions. All of the entities reported in fact scoring very weakly on this point. The TURBOSUDOE model will need to explore mechanisms for recognition and scouting of new ideas and inventions, particularly focused on new career research and initiatives.

Stage-gate system

Almost none of the TT MODEL OFFER entities reported using a stage-gate system to drive commercialization decisions. This clearly highlights a weakness. On the other hand, TT MODEL DEMAND entities varied consistently in their usage of stage-gate systems to drive technology acquisitions. This fact highlight the limited impact of strategic decisions in this regards. Stage gate system will need to be reinforced as a way to endow the organization with more a more long-term strategic view in a way that encourages continuous innovative, reflective and evaluative practices. Training technology transfer brokers in more reflective technology transfer practices will generate a paradigm change within the organizations.

A post-deal management system to monitor partner compliance

Overall, most of the entities made an occasional use of post-deal management systems to monitor partner compliance although they were not the common practice among the partner institutions. This fact relates to what has been mentioned above, and stresses again the need to implement new technology transfer models with a more long term and sustainability-oriented perspective.

Dedicated software tool for managing IP

Half of the entities reported not having any software tool for managing IP, and the other half reported an occasional or systematic use. This fact highlights the variety of strategies implemented among the partner institutions.

Rewarding researchers/employees

It emerged that the majority of TT MODEL OFFER has adequate schemes to reward researchers who create and disclose IP with commercial value. This thus constitutes strength for these entities. On the other hand, it emerged that most TT MODEL DEMANDS entities had no schemes to reward employees who detect technology transfer opportunities.

Distributing any proceeds due to the employee/researcher

Among TT MODEL OFFER entities there is weak distribution of proceeds of exploitation due to the Researcher. Among TT MODEL DEMANDS entities there is no distribution of any proceeds due to employees that detect opportunities. In general, we may say that the entities score weakly in distributing any proceeds due to employees/researchers. No specific indicators have been gathered in this regard.

It is important that the TT model developed by the TURBOSUDOE project does include a set of success and performance indicators related to these elements.

The entity has a scheme to incentivize TT management to commercialize IP

None of the TT MODEL OFFER reported having a scheme to incentivize TT management to commercialize IP. This highlights an important weakness that needs to be addressed through a more leadership oriented approach. It is important that institutions commit to incentivize the organization staff towards a more proactive TT approach. Organizations need to set up the necessary structures to support researchers in commercializing their IP and accessing the market for their research. In this sense, organization (and this will be the role of the TT broker) will need to show researchers how can they interact with the industry and other agents of the eco-system to identify cooperation routes. Offer and demand sides should be aligned in highlighting impact as a fundamental requirement for research and market access (here impact is understood as economic, social, environmental, etc.) Working with agents of the surrounding environment helps achieving research impact and it can catalyse the development of further collaborative initiatives. In this sense, the exchange mechanism developed by the TURBOSUDOE model (and implemented in the pilot actions) needs to be seen as a compromise towards this translational approach.

TT department has strategic business partnerships

TT MODEL OFFER entities reported having local, national and international strategic business partnerships. On the other hand, TT MODEL DEMANDS entities emerged to have strategic business partnerships with knowledge generators at the local and national level. Partnerships are fundamental to speed up the pace of innovation and commercialization, help translate discoveries into the market place and deliver actual created deliverables. A good partnership offers goods insights into how business models work and showing the Offer side the way to develop a valuable product for the market. The drop in public funding for innovation activities makes it fundamental to identify private business partnerships as a new way to address this and in this sense, ensuring that the interface to business and researchers seeking opportunities for collaboration is as simple as possible. The role of Technology Transfer must ensure the mutual understanding and common vision among these agents. Technology Transfer brokers need also to work on raising awareness of the benefits that demand agents derive from the collaboration with technology offer agents. The model here proposed suggest to use success metrics based on the capacity of TT brokers to generate transversal and translational activities over the long-term and not based on short-term revenue generation. The TT broker will need to have the capacity to easily navigate throughout the whole negotiation process, aligning the timescales of the agents, and guaranteeing a continuous mutual trust among them.

Access of TT department to resources needed for marketing and communication/ resources to communicate sector needs

Access of TT department to resources needed for marketing and communication resources to communicate sector needs emerged to be a weakness among the entities (both from the demand and offer side). Some of the demand institutions have stated that they rely on external communication agencies to interact with external agents. Although this system might proof to be successful in the short term it does not allow institutions to directly improve the proximity between R&D departments and the companies, and might create some trust barriers between offer and demand agents. One of the reasons that can explain the need for some institutions to rely on external communication agencies is their small size (compared with other international examples) and their limited capacity to invest resources to communication activities. The solution to solve this problem needs to consider the regular interaction (based on formal and informal meetings) between R&D and companies, but also it is fundamental that both typologies of agents do speak the same language. Enlarging these TT groups will be again a fundamental step towards increasing the relation between the agents involved in the whole TT process. Also, ensuring that TT Brokers do have both

Technology Transfer Model and Indicators for Turbo-Sudoe

technical and communication / interpersonal skills will also be a key requirement for the success of the process.

TT department has capability to influence lobby stakeholders and investors/partners

Both TT MODEL OFFER and TT MODEL DEMAND entities have insufficient capabilities to influence lobby stakeholders and investors. Ensuring the effective communication with public and private agents will be fundamental to facilitate the uptake of TT processes and initiatives. Although some agents, due to their institutional nature, are better positioned than others to access public and private agents, some effort still needs to be conducted in this regard. The success of most of the initiatives analysed rely on an individualised and specialized approach towards the action and based on the needs of the specific TT project. Participation in large events, both sector-based and multisector, (such as fairs, bilateral meeting, international fairs, Platforms University – firms, etc.) also play a fundamental role in ensuring the influence of TT brokers over lobby stakeholders and investors / partners as it has been mentioned by some of the respondents. The development of comprehensive strategies to address both public (public authorities, funding national programs agencies, municipalities, etc.) and private agents (venture capital funds, banks, private companies, etc.) that move beyond the individualized approach is another of the recommendations of the partners involved in the definition of the model. Finally, as it has been observed in some partners the collaboration with other regional institutions is a key factor in reaching potential partners.

TT department has a successful track record of accessing funding

Track record of access to funding (none-local-national-international) varied consistently across TT MODEL OFFER entities, but even if the majority of the entities reported having adequate or good access to funding in general they have clear difficulty to access seed funding, business angels and venture capital in the last financial year what can be seen as a weak point for the overall TT process. In general, track record of access to funding takes place mainly at the local and national levels, with a clear difficulty for the offer and limited access to international agents. Again the atomization of the teams and researchers participating in international and collaborative R&D programs needs to be seen as a trammel in the development of TT processes. In terms of international funding, the main channels used by the partner institutions in order to access funding is the participation in public EU programs.

Entity's strategy for growth in TT

Technology Transfer Model and Indicators for Turbo-Sudoe

E1.3.1

Half of the TT MODEL OFFER entities reported having adequate strategies for growth in TT. The other half said it was weak or inexistent. But, even if the strategy is clear they reported not having an operational plan covering at least the next 3 years in their TT department or a very weak one, thus highlighting a considerable weakness on this point. Some of the times the strategy is hampered by their disparity within the organization based on the different projects and departments in charge. Therefore, it is important to define more comprehensive strategic plans to promote TT within the different lines of action of the organization and taking into consideration the various actors involved (TT Office, research management services, innovation units, etc.) This strategic approach needs to be based on a more long-term oriented vision of TT impact, rather than on immediate income gains. It is important to stress the visibility of the unity in charge of implementing the strategy and centralising the tasks in specific professional profiles. The existence of such units will be facilitate the interaction and communication with the internal and external resources throughout technology transfer processes.

TT activity recognized as a contribution to excellence in research/ in business development and positioning

The majority of the TT MODEL OFFER entities reported that their TT activity was adequately recognized as a contribution to excellence in research. This is thus a strength. For TT MODEL DEMANDS entities, most considered their activity as adequate for business development and positioning.

TT department has a comprehensive suite of formal tools and methodologies

The majority of the TT MODEL OFFER entities reported having no formal tools and methodologies or having very weak ones, thus highlighting a considerable weakness on this point. In some of the DEMAND side cases the responsibility for TT activities relies on external agents that act as intermediary between the institutions, in which case no tools or methodologies are available within the organisations. Regarding the services and activities that these methodologies should deal with, the agents of the demand side have highlighted among the most important the following:

- Maintaining the internal technology data bank.
- Analysing and prioritising the technological offer and portfolio.
- Disseminating the research results.
- Detecting the technological demand of companies in the ecosystem and channelling specific actions among the research groups.

- Negotiating and managing R & D contracts.
- Providing market oriented support and advice.
- Informing and advice researchers and their business partners on existing funding sources.
- Assessing and protecting the results of research produced.
- Promoting and commercializing the results of research produced.
- Encouraging business creation.
- Disseminating and inform the ecosystem about the benefits and potentialities of technology transfer processes.

The entity experience of managing TT activities

Whereas TT OFFER institutions do count with the extensive experience in conducting technology transfer activities the situation is rather different on the demand side. Although with some regional variations, demand entities reported having a low level of experience in managing TT activities. In general, more than half of the DEMAND entities reported having weak or inexistent experience in managing TT activities and most of them work with experienced agents in the field. Those ones with specialized teams mainly work in the areas of IP, valorisation, R&D contracts and entrepreneurship support but it was observed a lack of comprehensive expertise on regarding TT activities. Most of the experience was gathered through niche actions rather than based on a comprehensive approach and with limited time dedication (with most of the responsible individuals dedicating part of their time to other activities within the organization). The creation, through the TURBOSUDOE model of a specific agent that do take responsibility for communicating demand side needs and requirements to the offer side in a regular and coordinated way, will allow the system to work more efficiently and less based on case-specific conditions.

4. FOCUS OF THE MODEL

According to the analysis of the offer and demand in TURBO-SUDOE it can be concluded that the model needs to focus on the following different aspects.

In general, some of the entities reported having adequate strategies for growth in TT, but some defined their strategy as weak or inexistent, and both the offer and the demand side do not have a clear operational plans for the next three years. Moreover, they do not have a comprehensive set of formal tools and methodologies for technology transfer units. In general, more than half of the entities reported having weak experience in managing TT activities. This is thus to be highlighted as a

weakness among the entities so [a clear methodology for technology transfer brokers and technology transfer units will be developed in the course of the project](#). The transference broker could leverage his/her actions based on that methodological approach and thus guarantee the quality of the process.

The capabilities to evaluate new technologies opportunities are weak, both for the demand and the offer side, so even if the entities show an occasional or systematic use of screening procedures to assess invention disclosures and have the staff capable of managing invention disclosures, it also emerged that they have weak or no resources to follow up on these disclosures. [Evaluation of technologies and opportunities will be critical as well as the follow-up and regular interaction with inventors and researchers](#).

It emerged that the consortium has weak resources to take ideas through proof of concept, testing and validation processes. [The model will focus its activities on identifying the financial instruments that administration and public bodies do offer to fund such activities](#). Moreover, in order to build an open innovation 2.0 system, activities will be dedicated to work closely with administrations and governments, leveraging on the networks already created in collaborative projects with public administrations.

It clearly emerged that among the offer side there is a lack of staff for scouting new ideas and inventions. In general, all the entities scored very low in this point. For this reason, efforts will be invested in [improving the scouting skills in both sides](#), an activity that will leverage the network already created by all the entities as they all have participated or are participating in collaborative research projects.

Access of TT department to resources needed for marketing and communication and resources to communicate sector needs emerged to be a weakness among the entities. They rely (both demand and offer) on brokerage events and the role of external agents. Most of the TT MODEL OFFER entities emerged to have weak or no access to staff trained in the field of marketing, communication, influencing and lobbying. For this reason [marketing actions should be optimized, as communication and information exchange is crucial in order to implement the model](#). To do so, the model will rely on some of the strengths the consortium already has: TT MODEL OFFER entities reported having local, national and international strategic business partnerships. On the other hand, TT MODEL DEMANDS entities emerged to have strategic business partnerships with knowledge generators at the local and national level. Leveraging on these strategic business partnerships, the model will highlight the importance of carrying out [common campaigns on collaborative research projects](#),

common marketing material on subjects of interests for both parties and common events involving society.

TT MODEL OFFER has adequate schemes to reward researchers who create and disclose IP with commercial value, but lack the schemes to incentivize TT staff to commercialize IP. On the other hand, it emerged that most TT MODEL DEMAND entities had no schemes to reward employees who detect technology transfer opportunities. The TURBOSUDOE model suggests to combine the two aspects, leveraging on the strength of the offer-side and creating joint collaborative programmes: taking into account that most universities offer advisement services on IP for researchers, it will be possible to [make use of this university staff to offer advice and support to agents of the demand-side](#). Another way it will be the [creation of support programmes](#) that allow reducing the work load for researchers participating in projects with a technology transfer focus.

All entities reported having a weak capability to influence external agents, stakeholders and investors/partners. This highlights an important weakness across the entities. Thus, together with guaranteeing that the technology transfer brokers count with the leadership and communication skills required to conduct such activities, the TURBOSUDOE model could participate and generate events [where inventors can present their innovation ideas in front of panels of investors](#) so that the former can provide feedback and consider the possibility of engaging in the development of the product.

In general, track record of access to funding takes place mainly at local and national level, but all entities have clear difficulties in accessing seed funding, business angels and venture capital. The TURBOSUDOE model should [collect information on public financial instruments available using the networks and contacts available within administrations as well as provide information regarding private investors \(through participation into specific events or using the existing international strategic business partnerships in the consortium\)](#).

Regarding spin-offs most of the TT MODEL OFFER entities support the creation of spin-offs. The majority of the entities reported having adequate or good staff for start-up creation and support. We may thus qualify this as a strength. None of the TT MODEL DEMANDS entities support the creation of spin-offs. Considering this, [joint programs](#), involving administrations too, could be a positive actions in order to create an environment that facilitate the creation of new technology based companies.

5. BUILDING THE MODEL

Technology Transfer Model and Indicators for Turbo-Sudoe

E1.3.1

In order to build the model the following conditions will need achieved:

- **Creation of a professional model - Transference BROKER (Tbroker).** The transference broker will be the catalyst for the execution of the model and will be in charge to plan, implement and participate in the actions required to build and ensure the success of the model.
- **Gathering information.** It is important to gather the necessary information throughout the entire value chain of the technology transfer process in order to shape the actions and boost the technology transfer results.
 - ✓ What is happening and where?
 - ✓ Who needs what and what is the rationale behind this need?
- **Creation of network.** It is important to create a wide network that will involve all the market players of the value chain in order to finally shape a comprehensive operational environment.
 - ✓ Who can help?
 - ✓ How to involve them?

5.1 Transference broker

Technology brokers are understood as advisors who use their knowledge and experience in a specific area of the industry in order to bring together buyers with specific needs and providers with optimal solutions to solve a specific issue. Technology brokers work with clients to determine which is the optimal solution and the best solution provider for a current need. If the best solution is outside of their network, they will work with the client to carry out an exhaustive scouting and evaluate the options encountered and select the one that best meets the needs of the client.

So, summing up, it can be said that a technology **brokers helps the demand side to find and acquire the best solution or provider for a specific business problem.**

Brokers must understand both what the adopter needs as well as what the provider has so that they can arrange the best matches possible and must ensure that negotiations are conducted in an understandable “language” for both parts. This implies that brokers must have at least enough technical sophistication to understand the technology they’re brokering but also that are equipped with a set of interpersonal skills that allow them appropriately guide the interactions between the actors.

Another figure, upon which the model will need to be based on, and that has appeared in the last years is the knowledge broker. Knowledge brokers move knowledge around and create connections between researchers and their various audiences so that research is duly disseminated. They are also producers of a new kind of knowledge: brokered knowledge⁵. The role played by knowledge brokers is to bridge the existing gap between information flows within a given network. In fact, brokers benefit from the transfer of knowledge by groups of actors that have this knowledge to others who do not. The knowledge brokers are those who manage to find a common thread between very different situations, seemingly unrelated, and they know how to convey the skills necessary for the realization of collective action and for this they are able to organize and create ad hoc common solutions.

The TURBOSUDOE project will create a new role using characteristics of the previous profiles, the **transference broker (TB)** that will incorporate the functions of a technology broker and of a knowledge broker. He/she will be in charge not just of finding a solution for specific business problems but, also, to collect and transfer information and knowledge that can result in appropriate solutions for an entire environment. The role of the transfer broker will be central in generating an open innovation environment where the innovation and the transference of innovations into the market will take into account not just specific business needs, but also the societal and ecosystemic needs that can bring business opportunities to companies. For this reason it is critical that the transference broker can be able to understand and relate with the following agents:

- **Technology providers:** Technology generators such as universities, technology centres and public or private research groups.
- **Business:** companies, business organization, marketing and business development personnel.
- **Society:** governments, administrations and citizens.

According to this, the TB should match this profile

- ✓ People with scientific background and who can understand research results and interact with researchers as «peers».
- ✓ Business developers with market oriented approach and preferably industry experience.
- ✓ Legal advisors/people with legal and IP matters experience.

⁵ Morgan Meyer. The Rise of the Knowledge Broker. Science Communication, SAGE Publications, 2010, 32 (1), pp.118-127.

- ✓ Soft skills needed by TB to negotiate, facilitate, interact with different types of stakeholders (researchers, industry, investors, governments, citizens).

In order to match this profile it will be taken into account that the transference broker will be a person with experience in R&D and innovation projects and with some experience in technology transfer services and protocols related to IP management. Finally, taken into account the framework ("pull model"), experience in the business and administration environment will be desirable.

5.2 Specific Profile

The following features should be part of the Transfer Broker candidate:

Being ACCOUNTABLE towards researchers: The transfer broker will be able to understand the technical issue and the scientific language of the researcher through his/her background and experience in research and innovation projects. At the same time, the transfer broker will have the skills and the experience required to solve any issue presented from the researchers and from the industry.

Being TRANSPARENT and EFFICIENT: the technology broker has to be able to avoid "Black Holes", keep inventors up-to-date and being able to communicate in a constant and effective way with the knowledge generators (researchers). Leadership skills are also important so that she/he is able to prioritise and create a portfolio of technology and innovation opportunities to be transferred using the information collected from the knowledge generators. Moreover it has to be able to be transparent in order to create trust among administrators and citizens.

In order to achieve these results specific characteristics have been defined for the TB by the consortium through an analysis of the skills and soft skills needed (see deliverable E1.1.1 10 TB profiles). Ideally she/he should be a person with:

- Experience in R&D and Innovation
 - ✓ At least 1-2 years of experience in research, development of new products, development of new processes, or being involved in innovation projects along his/her career, preferably with a management/project management role in these areas.
 - ✓ Experience in R&D funding mechanisms.
- Experience in Technology Transference (TT)

- ✓ Some experience in technology transference processes is preferred.
 - ✓ Some expertise in main tools and models related to technology transference activities.
 - ✓ Ideally the transfer broker should have some experience in scouting and technology surveillance to know not only about the present but also the future needs and trends of the sector.
 - ✓ Experience in technology marketing.
- **Industry-business and administrations experience**
 - ✓ Experience/knowledge about business environment in its sector: worked in/with companies of the sector, knowing how the value chain of the sector operates.
 - ✓ Knowledge about the role of administrations in the sector development, incentives offered, etc.
 - ✓ Very valuable: Commercial/Marketing/Sales skills.
 - **Other requirements**
 - ✓ Languages: English
 - ✓ Computer skills at user level.
 - ✓ Oral communication skills for oral expositions and presentations and networking at very different levels.

5.3 Information: offer and demand

In order to properly work, the model has to effectively obtain and process the information coming both from the offer and the demand sides. This information should be collected by transfer broker so that she/he can draw a clear picture of the situation and properly identify the sector needs.

Information from the offer

Engaging the technology offer players is fundamental in order the model can proper work.

In order to achieve the objectives three main procedures are included in the model:

- ✓ Information request format.
- ✓ Interviews with the inventors (researchers working in universities, technology centres or companies).

Technology Transfer Model and Indicators for Turbo-Sudoe

✓ Incentives.

A Technology Information request format in order to collect the information about the technologies and its advantages for the market has to be used (the format will be included in the Guide document).

In order to verify the information collected interviews/communication with inventors will be crucial. Moreover a formalized screening procedure to assess invention disclosures, along with the information obtained by the demand, will be essential in order to prioritize technology transfer opportunities.

Regarding scouting ideas, the transference broker will be fully trained on this area taking into account that, at the moment, this represents a weakness for the consortium.

Incentives are going to be an effective instrument for researchers to disclose their invention for technology transfer activity. The type of incentives that the model take into account are the followings:

- ✓ Dedicate part of the project Indirect costs to the researchers at the end of the projects.
- ✓ Own dedicated budget to cover patenting costs.
- ✓ Economic support for entrepreneurs.
- ✓ Give advice and provide facilities for entrepreneurs; spin-offs
- ✓ Economic support for proof of concepts.
- ✓ Give researchers support by advice of external consultants for free.
- ✓ Reduce the teaching load for researchers participating in projects with a technology transfer focus.
- ✓ Competitions/contests rewarded with visibility/collaboration with industry
- ✓ Support in the evaluation and/or processing of industrial property.
- ✓ Complete support in the internationalization of utility models and patents.
- ✓ Financing the attendance to technology transfer events/industry events/
- ✓ European initiatives related to R& D programmes.

Regarding incentives for the creation of Spin offs different initiatives have to be taken into account:

- ✓ An office/space inside in order to have meetings/work with the team.
- ✓ Training and advice for the development of the business plan and business management.

- ✓ Technical support and advice on legal, administrative and tax documentation.
- ✓ Invitation to networking events.
- ✓ Providing contacts of potential investors.
- ✓ Finding sources of financial support.

Information from the demand

Regarding the demand side the information gathered will need to take into consideration both the needs from industry representatives as well as the societal needs addressed. For this, it will be necessary to guarantee the involvement of public administrations (including central government and municipalities) and citizens in a strategic way.

Regarding the industry, different actions have been included in the technology transfer model such as:

- ✓ Open inquiry or direct contact with market players (market players are all the entities involved in the sector value chain such as providers, manufacturers, logistics companies, end users) in order to define their specific subject of interests.
- ✓ Offer support programmes that help reducing the workload for researchers participating in projects with a technology transfer focus.
- ✓ Sponsored research opportunities: creating programmes of research partially sponsored by companies/associations or clusters from the different industries in the region on specific subject of interests identified.
- ✓ Access to equipment and facilities for companies to realize test or analysis on research topic related to the industry, sharing knowledge on methods and methodology in exchange to know-how, under confidentiality agreements what are their interests and needs.
- ✓ Know industry needs through regular participation in major industry fairs.
- ✓ Visibility and marketing presence: through the building of specific page in the offer websites (university and technology centers websites) where the market players from the demand can expose their needs, potential collaborations, success stories and the concerns of the industry environment.

As the model is based on an Open Innovation 2.0 framework, it proposes the involvement of the society in order to understand the needs and to transfer to the market solutions that bring societal benefits too.

Different actions can be included in the technology transfer model such as:

- ✓ Citizens inquiry: small enquiry about citizen concerns can be carried out in collaboration with local and regional administrations in order to target the technology transfer on the social environment.
- ✓ Knowing public administrations priorities: contact with local and regional administrations in order to understand their priorities in terms of innovation for the next 5 years.
- ✓ Access to finance: collect information on public financial instruments through administrations contacts and information regarding private investors are investing through participation of TB into specific events.
- ✓ Moreover events where inventors can presents their innovation ideas in front of investors panels can be organized so that the researcher can obtain a feedback form industry

5.4 Network

Creating a network is a central point in order to create an effective Technology Transfer Model. According to this the model, events participation and organization involving different market players of the value chain will be important activities for the TB; this will allow creating the required interrelation between knowledge generators, industry and administration/society.

Different actions can be included in the technology transfer model such as:

- ✓ TB and researchers participation in industry fairs
- ✓ Presentation by researchers of innovative ideas and new technologies in front of investors panels in order the researcher can obtain a feedback from industry and start potential collaborations
- ✓ Open event where citizens can present their idea of innovation in front of researchers, companies and administrations
- ✓ Presentation to administrations of data collected from citizens through industry citizen inquiries and ideas in order to eventually define
- ✓ Resource optimization: personal and / or shared infrastructure, shared services between industry and knowledge generators.

These activities will led to the widening of the technology transfer potential, cost reduction/lowering the risk of the technology transfer and boost the know-how transfer between stakeholders, improve the global knowledge of the ecosystem.

6. INDICATORS

The indicators will be evaluated once the pilot started. The pilot will be carried out during 14 months and the activities of the transference brokers will be implemented. The following indicators has been established

Indicator	Quantitative
1. Disclosure of inventions	✓ Collection of at least 8 disclosure of new technologies per area (5 from Universities/technology centre and 3 from the industry associations consortium partners)
2. Disclosure of market needs	✓ Collection of at least 15 technology needs for each priority area from the industry associations
3. Creation of a strategic technology portfolio	✓ Creation of portfolio of technologies of 5 entities (4 Universities/technology centre and 1 from industry associations consortium partners)
4. Marketing of technologies	✓ Marketing profiles of at least 8 technologies per Priority area (at least 5 from Universities/technology centre and 3 from industry associations consortium partners)
5. Marketing of technologies	✓ Presentation of the Marketing profiles of at least 25 companies per priority area (activity to be carried out with industry associations consortium partners)

Indicator	Quantitative
6. Marketing of inventions	✓ Organization of at least 1 investors panels presentation (panels of 5 investors each) for each transfer broker involving Universities/technology and industry associations (Universities/technology and industry associations joint activity)
7. Collaborations between different market players	✓ At least 3 projects proposals between universities/tech centre, industry and administrations Universities/technology and industry associations joint activity)
8. Collaborations between different market players	✓ Institution of at least 2 programmes of sharing personal and/or infrastructure and/or services between industry and knowledge generators (Universities/technology and industry associations joint activity)

Indicator	Quantitative
9. Building a network	✓ At least organization of 2 networking events for each transference broker. At least one of these 2 events needs the participation of the four main market players of the technology transfer value chain: Universities/tech centres, industries, administrations and citizens. (Universities/technology and industry associations joint activity)
10. Building a network	✓ Collection of 2 innovation priorities (actions lines or funding lines related to improve innovation in the context) for at least 5 administrations/sectorial associations (Universities/technology and industry associations joint activity)
11. Building a network	✓ Obtaining of at least 150 citizens' inquiries (on line or in presence) Definition of at least 3 citizens main concerns. (Universities/technology and industry associations joint activity)
12. Commercialization of inventions	✓ Obtaining at least 3 technology transfer agreements per TB (Ex: licensing, assignment, knowledge transfer, co-development, spin-off, etc.) (Universities/technology and industry associations joint activity)