

## **AN ANALYSIS OF THE FREEDOM TO OPERATE TOOL SUSTAINABLE IMPLEMENTATION IN THE RESEARCH AND DEVELOPMENT PROCESSES**

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### **Abstract**

A widely accepted definition for the term research and development “R&D” can be found in a publication of the online “Business dictionary” and is described as a systematic activity combining both basic and applied research aimed at discovering solutions to problems or creating new goods and knowledge. R&D may result in ownership of intellectual property such as patents (Businessdictionary, 2018). The mentioned “goods” can be seen as products and services but can also be new production methods or new procedures and the research can be scientific and or in technological fields (Investopedia , 2018). When conducting R&D the involved parties are in most cases specialists in the subject matter of the field of research.

This paper examines thoroughly the emerging importance of freedom to operate processes; as it became important for the entities conducting R&D to ensure themselves that the new discovered developments are actually new and therefore not protected, the freedom to operate search and analysis was born, abbreviated "FTO". FTO is usually used to determine whether a particular action, such as testing or commercializing a product, can be done without infringing valid intellectual property rights of others (Patent Lens, 2018).

### **Keywords**

Risk management, Intellectual Property Rights, Sustainable, FTO, R&D

### **JEL Classification**

A10, A11, D21, M12

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### **Introduction**

The classical FTO is often limited to the geopolitical area where the conductor of the R&D wants to operate with his results and is also limited to the various protection rights such as: patents, trademarks and other intellectual property “IP”. The FTO has the clear purpose of discovering if it is possible to market a product either produced in or imported to a country without infringing any IP. What is seen as “freedom to operate” can also be reached by acquiring licenses, purchasing the IP or coming to cross-license agreements with the owners of IP. In all cases and for all parts: owners of IP, as well as owners of technology, it is clear that patent litigation can be very expensive, uncertain and risky so: prevention is better than cure (WIPO, 2018).

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Within the FTO, every operation should have a policy statement, which should make a commitment to the ideals of sustainability. Without a policy, there is no mandate for employees, management or the public to undertake improvement plans or manage benchmarks in respect of sustainability issues. An FTO provides a mechanism through which the operation can comply with its policy and objectives. The policy should be developed by a working group or problem-solving group.

The policy, like all areas of an FTO, should be documented and communicated to all relevant people including clients, management, employees, suppliers, distributors, advertisers, public relations companies, and retailers of the service or product. Furthermore, the working group should help build commitment, provide support to ensure its implementation, and recognize the efforts of those who support it. There are a number of principles that should underpin any policy statement these include:

- Recognize that FTO is among the highest corporate priorities;
- Establish and maintain communications with internal and external interested stakeholders;
- Determine the legislative requirements and environmental impacts associated with the organization's activities;
- Develop management and employee commitment to sustainability, with clear assignment of accountability and responsibility.
- Establish a disciplined management process for achieving targeted performance levels.
- Provide appropriate and sufficient resources, including training, to achieve targeted performance levels on an ongoing basis.
- Evaluate environmental performance against appropriate policies, objectives, and targets and seek improvement where appropriate.
- Establish a management process to review and audit the FTO and to identify opportunities for improvement of the system and resulting performance.
- Encourage contractors and suppliers to also implement a FTO.

It is proposed to gather as much details as possible concerning the reasons and the purposes of a FTO and develop a comprehensive description of where to implement the FTO and how to improve this implementation to reach a higher sustainability of the investment in the FTO for the enterprise. We are looking also for fields and possibilities to use the FTO in such a way that it is not confined to what is has been used until now for, so that this investment is valued on more than one field.

We are looking at tree fields of improvement for reaching a higher sustainability:

1. Improving the spread of the investment in the FTO so that it brings the best results with the lowest investment at the given moment of the R&D.
2. Implementing the results of the FTO in the processes so that the initial investment is more valuable since it supports more than the classical purpose.
3. Reaching an investment to risk mitigation knowledge curve which allows the project owners to decide on how much is the maximal investment in FTO still sustainable for their project.

**The methodology** used involves the analysis of different literature sources describing different methods and backgrounds of using and implementing FTO's with the view on best practices on the field. Furthermore, we implemented the working experiences of implementing and using FTO's in 2 different global corporations with 20 by the writers implemented FTO's. The results of this research seek to show that the actual investment in the FTO process will not change when implemented in the way this research developed since it still has to bring the results that the traditional FTO also brings.

**1. Researching the classical implementation of freedom to operate**

The classical FTO has been summed up by Cecilia Chi-Ham in a presentation at the University of California (Chi-Ham, 2009) we will bring a part of it here as an overview:

*Step 1. Define subject matter*

- Describe the technology and the anticipated field of use
- Identify technologies: core and substitutable
- Geographies
- Time frames

*Step 2. Formulate FTO team*

- Build a multidisciplinary team

*Step 3. Define questions and IP search strategy*

- Interview and laboratory history
- Develop a series of questions congruent with the projects immediate and future goals

*Step 4. The FTO investigation*

- Scope of typical FTO search – Scientific, patent databases and other publications, search engines, geography
- Levels of FTO – these are the actual steps of the research itself which implements not only the patent documents but all the information possibly reachable around them.

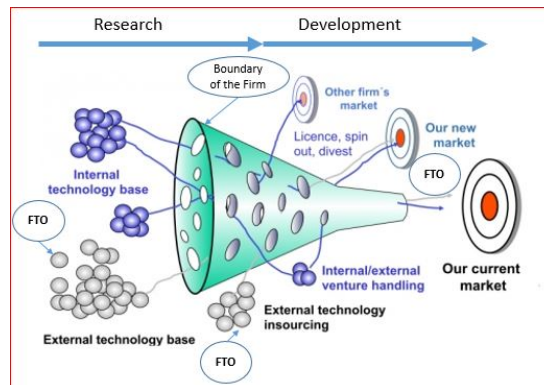
*Step 5. Product of the FTO search*

*Step 6. Strategies to manage the FTO risks*

A comprehensive classical FTO is a process which is typically performed at the end of the R&D process. When analyzing the subject of sustainable FTO there is the need to differentiate between the different factors that enhance sustainability. Each of these factors has a strong influence on the decision of how to proceed and what are the choices that are to be taken when deciding on how to proceed with a FTO in such a way that it is sustainable in the R&D process. As already mentioned the objective of this paper is to identify the right strategy for conducting a FTO so that it is implemented in the R&D in the best possible way and describing a method of improving that implementation so that the spread of the investments in the FTO brings the best results.

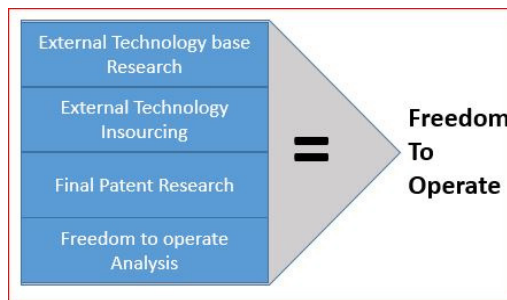
**2. Purpose of the FTO**

It is important to observe at what stage of the R&D does one start working on the FTO and how much resources are invested in every step of it. In his book *Open Innovation*, Henry Chesbrough describes the R&D process as in (figure no.1). We allowed ourselves to add also the locations where FTO can and should be already implemented to reach a higher sustainability for the investment in the FTO derived from our experience in implementing around 20 FTO's (Chesbrough, 2003).

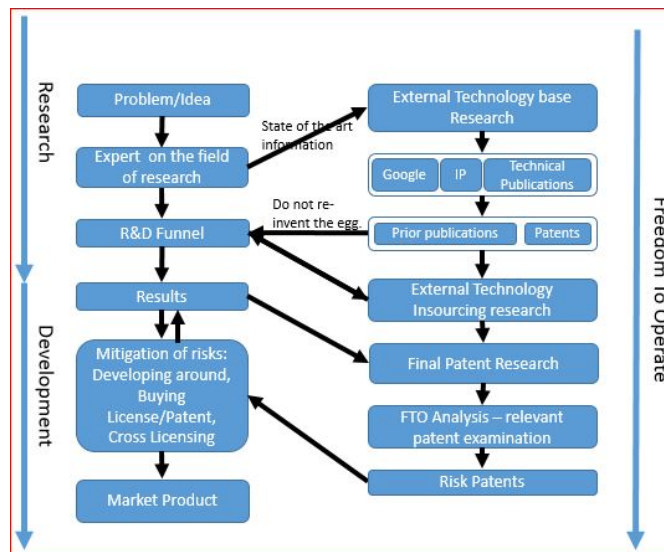


**Figure no. 1 Funnel presentation of the R&D process implementing the FTO analysis**  
*Source: Chesbrough, Open Innovation, HBS Press, 2003 and research conducted by the writers*

When looking at funnel presentation of the R&D (figure no.1) it easy to derive that the FTO can be divided in several modules which should be implemented each at the right place and time during the R&D. These modules could be summed up as the FTO modules in the R&D process (figure no. 2). By structuring the FTO in the different modules that can be implemented separately in the different stages of the R&D process one reaches a gradual investment in the FTO which is monetarized immediately since it delivers usable information to the researchers. When the FTO is classically conducted only at the end of the R&D this information is typically not needed any more and therefore serves only one purpose, thus missing the opportunity to for example save the product development team resources and time.



**Figure no. 2 FTO modules in the R&D process**  
 Source: research conducted by the authors



**Figure no. 3 FTO to R&D time flow implementation diagram**  
 Source: research conducted by the authors

### 3.0 Developing a new strategy for the implementation of the FTO

Product developers rely mostly only on their knowledge of the state of the art of the subject matter of the R&D project and might miss some of the existing information. If the work of the FTO team would in such a case start at the beginning of the product development, with an **External Technology Base Research** and would channel the results to the developers, these will not waste time and resources in developing already existing technologies but would directly implement these in their work when possible. This way we create a situation where it is in the best interest of the developers to supply the FTO team information for the research since they know that they will in return receive for the research relevant

information saving them from reinventing the wheel. After the first research the FTO expert can be used by the development team to supply further external technology know how which is needed to implement in the project in the **External Technology Insourcing** module. The project can get on the fly clearance for some of the technologies they want to implement if these are not protected or the IP is not valid any more. In the final stage of the R&D the team reaches results which will be than in a **Final Patent Research** tested for potential infringement of third party IP, but since the FTO has been ongoing from the beginning of the project the investment in the research will be smaller and very focused on the exact IP which poses a risk for the project, the result of the continuous work of the FTO team will be a lower number of potentially high risk patent documents that need to run through the **Freedom to Operate Analysis**. Many of them already known and mitigated in the early phases of the project thus saving the very high costs of relevant patent risk expert assessment for example by a patent attorney. In the improbable case that a high risk would surface at this stage the loop of mitigation can be followed with options like licensing or buying the third party IP, reaching cross licensing agreements and or redeveloping the products to not use the protected technology e.g. finding substitute technologies which are not protected or inventing around the high risk patents. Last but not least is the identification of patentable inventions that might surface during the R&D process and/or in the final product. Through the continuous support of the FTO in the project, the patent expert is there to spot the inventions soon and reach patent application as soon as possible thus corresponding well with the first to file dogma (Schieber, 2011). In our FTO to R&D time flow implementation diagram (figure no. 3) we visualized the in this research resulting sustainable symbiosis of the R&D process and the FTO modules.

### **Summary of the results**

It is now possible to deduct that the actual investment in the FTO process will not change when implemented in the way this research developed since it still has to bring the results that the traditional FTO also brings and the amount of work has not changed. When breaking down the new implementation into the way it is performed and further into the steps and the kind of resources used one can see improvements on all levels:

*Time factor* – how long should an FTO research take and at what point of the R&D process? The FTO should not be an obstacle in the process but a tool that is continuously supporting it. A part of this question has been answered by implementing the FTO in the R&D process from the beginning. Furthermore, the research will be in very big parts already done by the time that the R&D process comes to an end and needs the clearance.

*Human resource factor* – How many human resources? Does it make sense to maintain an expert for this field or maybe externalize this task to achieve the best results with the best investment? By recommending to embed the FTO process directly in the R&D process the need of a constant IP expert arises, which is contrasting with the wish of increasing the sustainability of the FTO when working with the R&D due to possible higher costs. This can be mitigated by training the R&D personal in basic steps on how to perform the first modules by itself. Furthermore, it is also possible to externally perform some of the researches without using direct high level IP experts.

*Business requirement /decision factor* – the managers needs to give the business requirements to his experts. The FTO team needs to know from the beginning of the project what kind of steps is the management ready to take on the way to the final product. For example: purchasing licenses or patents or dealing with patent infringement after the product is in on the market. A good example for this is the Sony Walkman product (Sueddeutsche, 2008).

*Cost factor* – taking into consideration the vast patent databases existing, the financial resources needed for a comprehensive research can grow very fast. The results of the FTO

research considering only the relevant patents for example, need to be examined and an expert assessment as to the risk factor is needed. Typically, a freedom to operate opinion will cost at least \$10,000, and sometimes substantially more. It is not at all uncommon for a freedom to operate opinion to cost \$20,000 or \$30,000, or more (Quinn, 2010).

### Conclusions and implications

As shown by the authors, the new embedded implementation approach will also shorten the length of the FTO itself from the point of view of the R&D researchers.

On one hand bigger enterprises will normally have an in-house IP expert which will in such a way be better implemented and taken advantage of. Smaller and midsized enterprises can consider using external IP experts on a middle level for example self-employed IP engineers. This will save all enterprises the higher costs of the classical FTO implementation of high level IP attorneys which should be used only for exceptional reports in case of high risk third side patent documents, where it was not possible to mitigate through the methods described above.

On other hand, through the modular approach the FTO expert can directly implement these requirements into the R&D during the process without losing time and at a point where it is still possible and not at a point where the process is finished and changes would require restarting the process.

And finally, by implementing the modular FTO in the R&D we have seen that these costs can be reduced. Especially by reducing the number of high risk documents that need to be assessed. Such an assessment can reach costs of \$5000 to \$7000 per document and need to be avoided as much as possible.

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