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### Main Failure Factors in Technology Consortia

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**Abstract:** The paper presents the main factors of failure of technological consortia, based on a review of international literature and European legislation on intellectual property. It was identified that the elements that may lead to a patent consortium failing correspond to: inclusion of substitute technologies and non-complementarity; Incorporation of non-essential technologies, negotiation failures; Development of anticompetitive behaviors framed in the collaboration scenario; The non-incorporation of conflict resolution mechanisms; External factors associated with the capacity of adoption and diffusion of knowledge of the territory or society.

**Keyword:** Patents, technological consortia, licenses, technology transfer, management of intellectual property, patents.

#### 1. INTRODUCTION

According to the latest figures from WIPO ([1]), the use of industrial property systems has been increasing, with figures reaching 2,88 million patent applications in 2015; 1.15 million utility models; 8.4 million trademark registrations, 1.4 million industrial designs, 15 plant varieties. In this context, technological consortia have also flourished.

It is possible to affirm that the antecedents of the technological consortia are the consortia of patents. The first consortium of patents, which is known, came about in 1856 when:

“Four major manufacturers, [among] [of whom] Singer, together formed the Sewing Machine Combination and decided to jointly exploit their patents. Manufacturers not belonging to the consortium had to obtain a license to use the patents of the fund and pay a fee for each sewing machine they manufactured using the patented technology “([2]).

This strategy allowed to reduce the time and money that the firms spent demanding to the other manufacturers, with respect to the changes in the design of the machines ([3]). It was created by the attorney Orlando B. Potter and tried to solve the patent war that was triggered with the commercialization of the sewing machine Singer (4).

According to the European Free Trade Association ([5]):

“The concept of technology consortium encompasses agreements whereby two or more parties decide to share their technologies and grant global licenses to them. The technology consortium concept also includes agreements whereby two or more companies grant a license to a third party and authorize it to license the technology package “(paragraph 56).

Likewise, it is established that technological consortia may be constituted simply as agreements between a limited number of parties or in more complex structures as an independent entity responsible for granting licenses of the technologies.

However, according to [6], technological consortia can start in three different ways: joint licensing schemes; With a license manager; And as a patent platform. In the first, it is a small group of patent holders that sometimes extend to other holders of essential patents. In the second case, it is an independent body that launches a call for essential patents related to a certain standard or technology. The administrator evaluates the “essentiality” and is responsible for collecting and distributing the royalties. The third case, related mainly to compliance with regulations, its objective is to offer the licensing.

Although there are many benefits of studies on these types of agreements [7], [8], [9], [10], [11] there are also varied possibilities for improvement [12], [13], [14]. Therefore, the document seeks to identify which are factors that affect the failure of technological consortia.

## **2. METHODOLOGY**

In order to identify the factors that may lead to a technological consortium to fail, a review of academic literature and related European legislation was carried out, following the following protocol in accordance with the scheme of systematic reviews: (i) identification of the Field of study, subject and period to be analyzed; (ii) formulating the problem; (iii) definition of search criteria for information; (iv) selection of references and studies; (v) critical reading and risk assessment of bias in included studies; (vi) extraction of relevant information and data; (vii) analysis and synthesis of scientific evidence.

## **3. RESULTS AND DISCUSSION**

Although there are numerous academic [15] and legislative [16], [17] and [18] papers dealing with the advantages of patent and technological consortia, there are others that establish recurring factors when these types of Agreements.

A first element is associated with the fact that technological consortiums depend heavily on the will of those who want to form the consortium or are members. In some cases firms have no incentive to participate in the consortium, as discussed [19]. An example of this is the first behavior is the case of Johnson & Johnson, a company that decided not to participate in a patent consortium and not to offer patents for three retroviral medicines ([17] and [20]).

In other cases, consortia may be converted into unstable agreements by free rider (parasite) agents. Evidence of this was found by [21] regarding the stowaway. In this case different behaviors can be found: (i) the member provides a patent of low value, that is to say, complementary but not essential, and benefits from the third party royalties; (ii) uses participation in the consortium to use third party patents and technology, developing new products; (iii) the selection of patents submitted is selective, so that new developments would not be included in the consortium; (iv) the free rider can promote an agreement so that members do not exercise their intellectual property rights to the detriment of another member, which can be understood as a procompetitive result in the

short term, but in the long term, it can become a Barriers to entry for new firms that do have to cover the costs of access to technology.

The above is related to the possibility of developing non-cooperative consortiums, due to failure to negotiate with third parties, as indicated [22]. There may be situations in which members agree that they will only be licensed through technology packages, associated with the pursuit of reduction of transaction costs for third parties; However, if it is a very rigid mechanism and patents can not be licensed separately, technology package licensing would become an obstacle for small companies that do not have all the resources to access the complete package. Another difficulty would be found in cases where the technology provided is substitute and not complementary.

From another perspective, the possibility of the failure of a consortium is found when one of the members has a dominant position in the market. It could resemble a Stackelberg (leader - follower) scenario in which the dominant position of the sector is transferred to a dominant position in the consortium, to the detriment of smaller members.

Another aspect to consider is the difficulty in agreeing the distribution of royalties, in some consortia the solution has been prorated according to the number of essential patents of each member, but this solution can also create distortions. According to [8] this can lead to increase the number of patents associated with an invention. For their part, [19] identified that there are two ways of distributing royalties: proportional to the number of patents included in the consortium or proportional to the value of the patents. This last alternative includes the age of the patent, number of licenses, number of times the patent was infringed, its essential feature.

From another perspective, [9] emphasize that technological consortia can not reduce structural barriers related to technology transfer, therefore, their effectiveness will also be conditioned by external factors and the capacity for adoption and diffusion of knowledge of the territory or society .

From the point of view of [5] the technologies of a consortium often, partially or totally, support the incorporation of an industrial standard. The existence of such a standard and associated technological consortium may lead to: (i) members not having incentives to develop new technologies and have a stagnation process in the long term; (ii) it becomes more difficult than other new and improved technologies, but outside the norm, to enter the market.

Another factor that can lead to failure is the lack of distinction between the ways of comparing technologies: (a) between complementary and substitutive technologies and (b) between essential [23] and non-essential technologies. Complementarity refers to the need for simultaneous and simultaneous use of technologies to develop a good or service, while substitution implies that the product or service can be developed with one or another technology. It is worth mentioning that the difficulties in consortia increase if the patents included in the consortium are of substitute technologies; As there may be litigation for the inclusion of patents in products that can compete with each other.

However, the criterion of essential is associated with the absence of any substitute technology for the elaboration of a product or process, or for compliance with a technical standard [24]. In spite of the above, it should be mentioned that there will be situations in which a technology is complementary or essential for the production of one good or service and for another it is substitute or non-essential. Hence, a judicious valuation study is always required [25].

However, the failure to incorporate conflict resolution mechanisms into consortium creation acts or the non-existence of independent conflict resolution bodies has been another of the difficulties faced by some consortia [25, 26, 27].

Finally, there is the instability of the consortia if the coordination and collaboration of the members are related to anticompetitive behavior. In this case, and given the delinquency programs implemented by several competition authorities, there would be incentives to disclose the anticompetitive behavior promoted within the consortium. This is because the proximity between the members would allow the exchange of sensitive information such as price or production data.

#### **4. CONCLUSION**

This document identified that the elements that may lead to a patent consortium failing correspond to: inclusion of substitute technologies and non-complementarity; Incorporation of non-essential technologies, negotiation failures; Development of anticompetitive behaviors framed in the collaboration scenario; The non-incorporation of conflict resolution mechanisms; External factors associated with the capacity of adoption and diffusion of knowledge of the territory or society.

Also included in the paper are some novel reflections on: (i) situations in which the free rider scenario in the consortiums appears, (ii) the distinction between complementary, substitute, essential and non-essential technologies.

Some of the recommendations of [5] and that may favor the success of this type of consortia correspond to: (i) transparency in the creation process; (ii) the choice and nature of shared technologies, ie using a criterion of complementarity and taking into account their quality and price; (iii) inclusion of independent experts for the design and operation of the consortium; (iv) the existence of clauses on the exchange of information between members and against third parties; (v) independent dispute resolution mechanisms. All these should be explored and taken into account by governments, when it comes to include in the legislation the technological consortia.

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