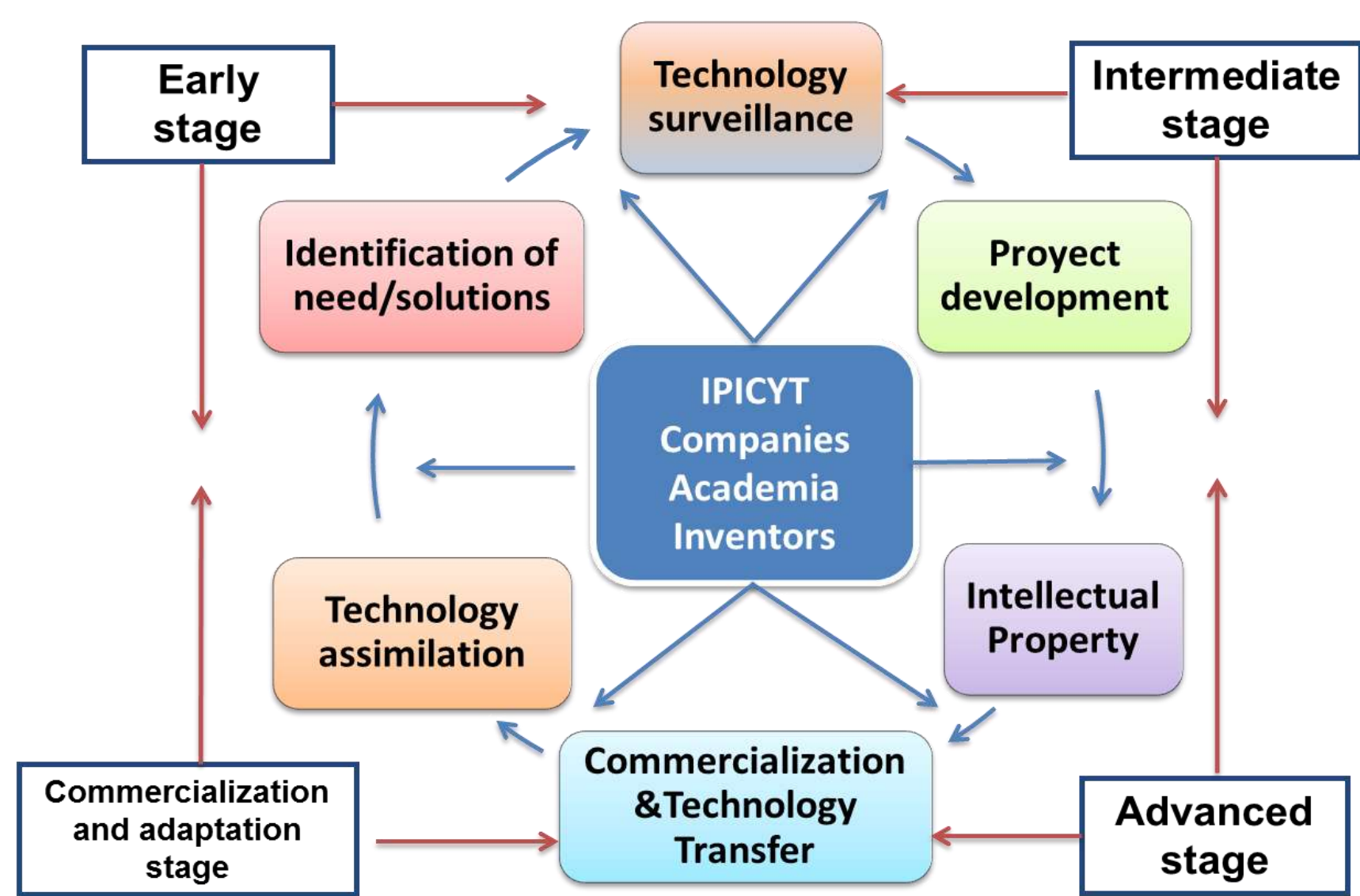


Text Mining in Mining: Tailings Dam Water Treatment and Reutilization

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Technology Management Model



Tech trends for R&D efficiency

Novel Tech Surveillance method is proposed for increasing efficiency in R&D, patent grants and Technology transference from Research centers, companies or inventors. Tech surveillance is a source of vital information for deciding on investing in certain R&D pathways according to business/tech/IP strategy of the user.

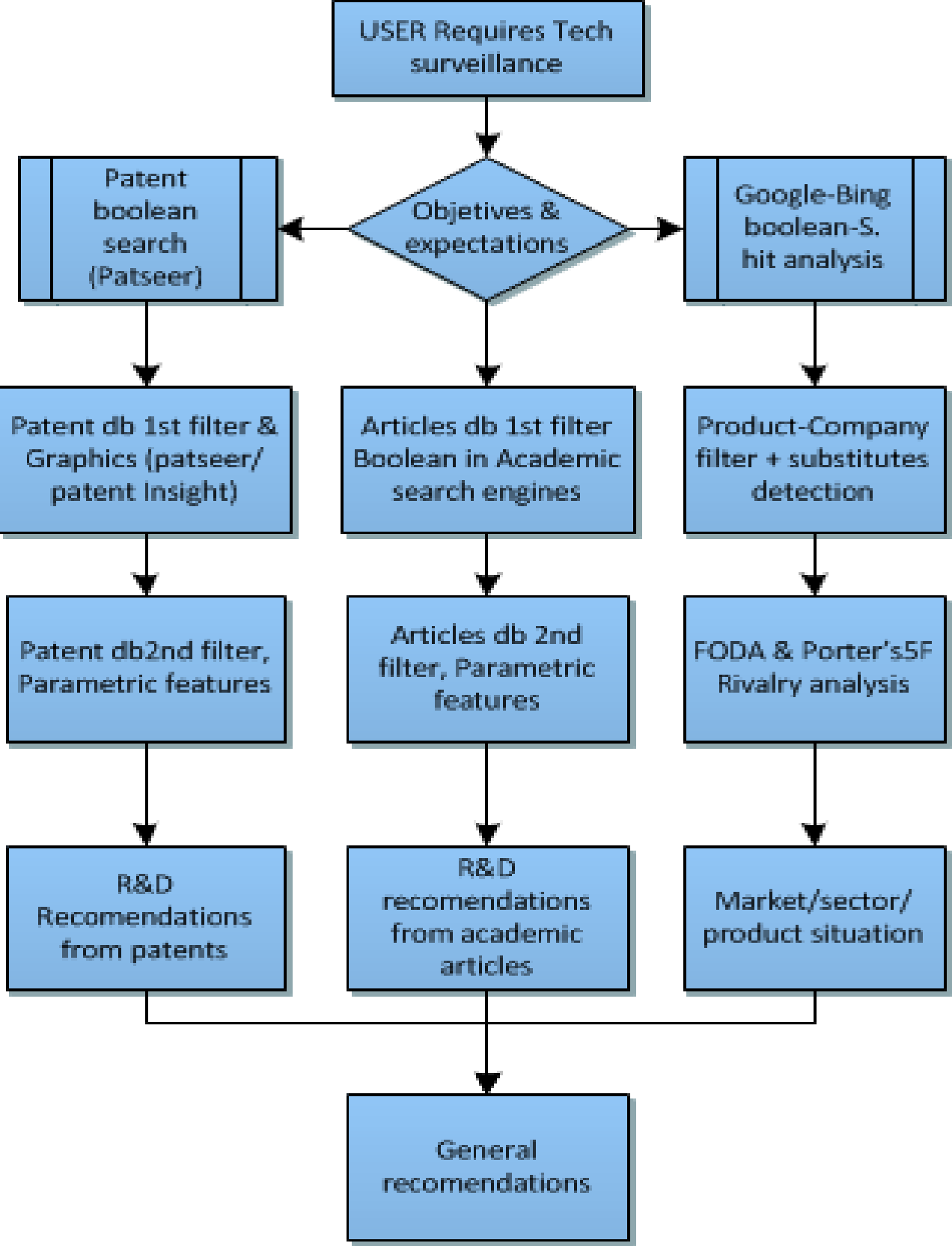
Arising from an adapted Tech management model which requires to receive projects at different stages of development, Tech surveillance has become into a important tool for decision making.

For those early-intermediate stage projects, the R&D team (research/IP/investor) should have information about prior art (patents, articles, web & products) to visualize the past and also could visualize what has not been done. Then, they could evaluate how to set an strategy of R&D with clear goals and risks (technical & IP) related to a market opportunity window or scenarios.

In an advanced stage of R&D and commercialization, Tech surveillance becomes into a tool for securing IP according to sectorial trends, is useful in Tech transference negotiations and could point out which are the tech trends for adapting a product.

R&D efficiency increases when decision makers have the most complete information about the tech, legal and market trends and could evaluate potential scenarios and choose the best R&D route.

Tech Surveillance Procedure



Tailing Dam and Water pollution

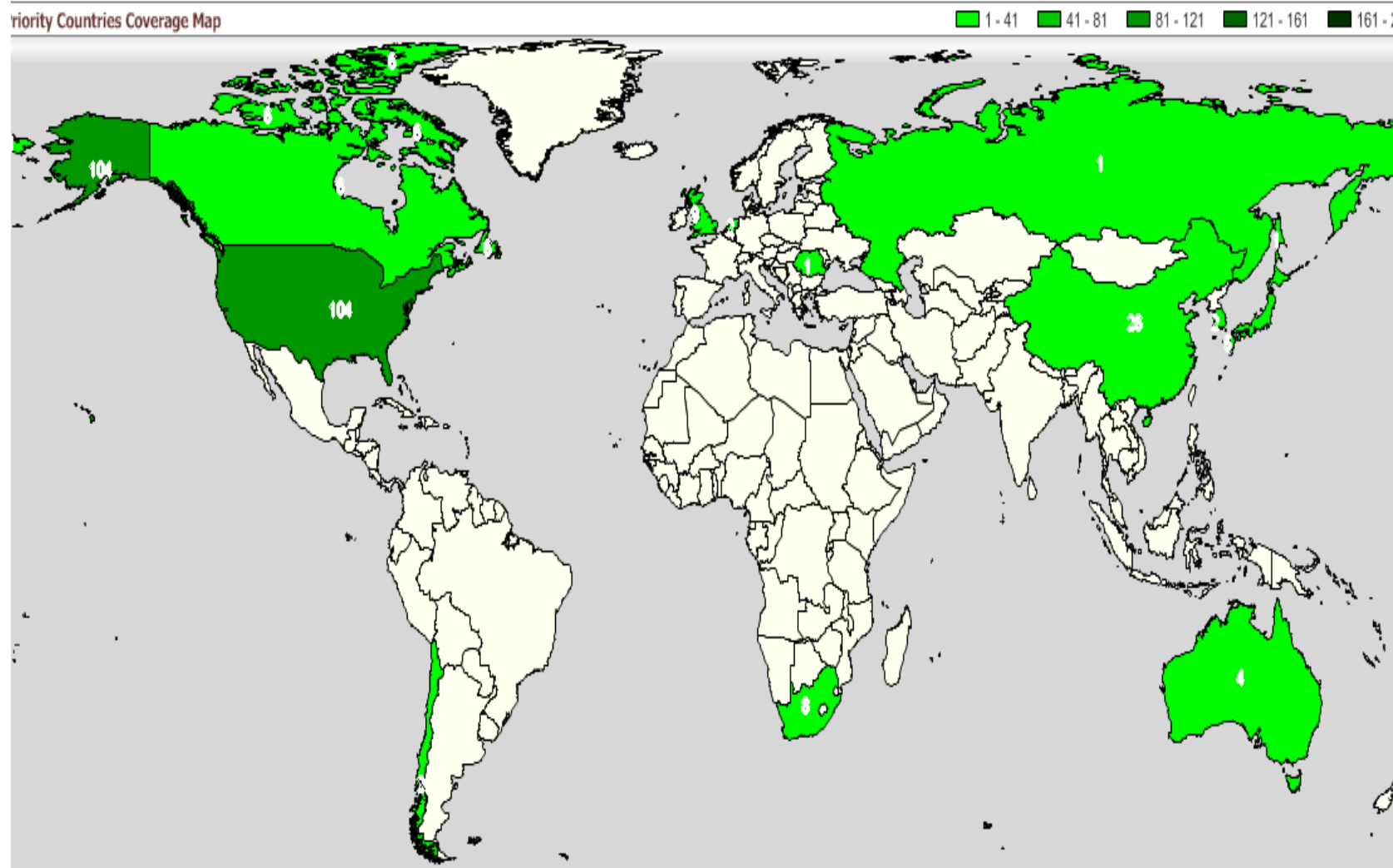
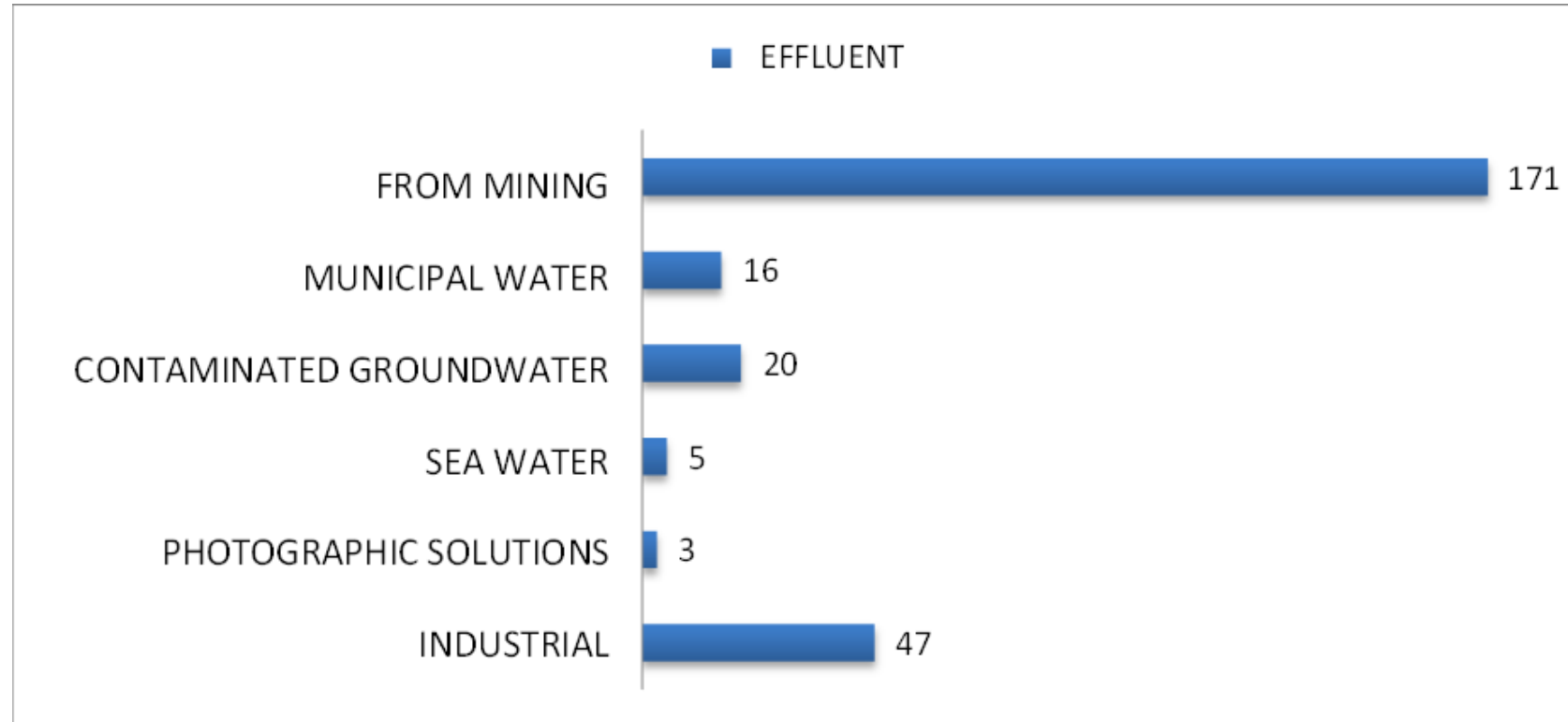
In Mexico, mining has been important ever since prehispanic era, rising during the colonial period, so as it is nowadays an important source of GDP. Nonetheless, this industry has to face a huge problem which is the environmental pollution, caused by the residues coming from mineral processing. This residues, known as tailings, end up confined in great ponds, called "Tailing dams". These tailings contain arsenic or heavy metals, which pollute water and soil, affecting human health. Besides, mining industry require great quantities of water, so it's even more important to find out how to clear this water kept in the tailing dams, in order to reuse it or safely discharge it.

The target of this analysis is to find out which have been the techniques to clear and reuse water from tailing dams, and how these techniques have evolved through time. The methodology consisted on analyzing patents and literature documents, found by Boolean keyword search on Patseer, related to tailings dam water treatment and reuse. The documents obtained were filtered with and classified into different categories, according to the purposes of the treatment (recover metals, reuse water, discharge water safely, remove pollutants, etc.), identifying which were the unit operations or mechanisms involved in the processes, and whether this methods are applicable to other wastes or not.

After analyzing this documents, the results showed the trends of the different methods involved, and how they have been changed from early mechanical separations (such as filtration and sedimentation), to the newly developed selective adsorbent materials.

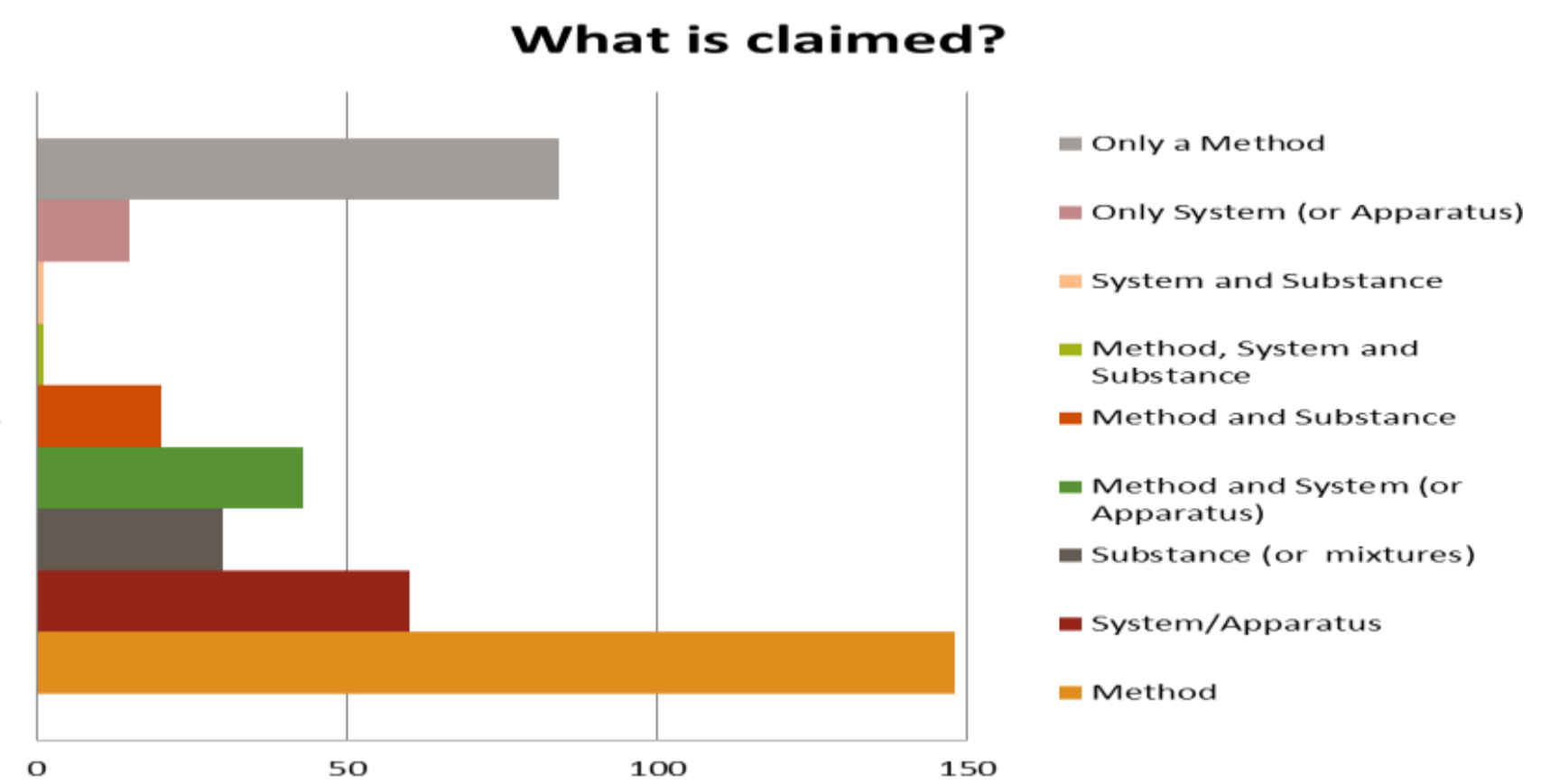
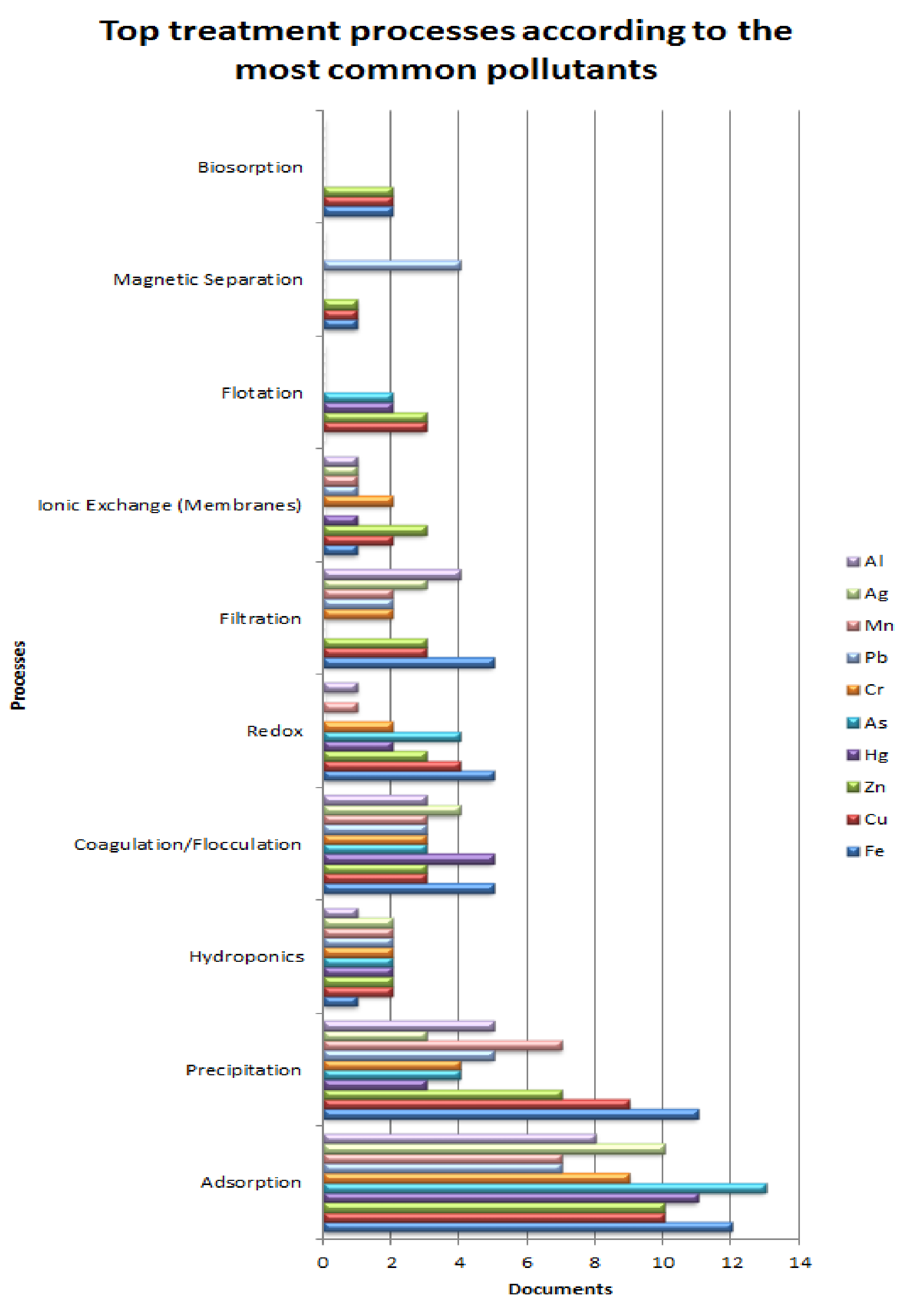
RESULTS

1634 documents were found related to Tailing dam or ponds, together with water treatment or recovery. After a second filtering 172 documents were found relevant for our research. Contaminant treatment methods, as well as devices, systems or compositions for carrying out said methods, can be applicable to different kind of effluents, not just mining effluents. Thus, a first criteria was classifying effluent origin.



Patent Trends

The variety of contaminant metal or substance was also analyzed, wherein the solution and treatment strategy for water pollution depends absolutely on the kind of substance. Therefore there is a correlation in patent analysis about the pollutant management technique and the contaminant as follows:



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Conclusions

Innovation timeline in water reutilization started on the 70's, however, it was increased on the 90's as a consequence of the environmental concerns.

The main priority countries are US, Japan, China, Great Britain, Australia, South Africa and Chile, which have important mining industries, and also strict environmental regulations.

The preferred metals for recovery from tailing dams are Cu, Fe, Zn, Ag and Al, etc., but not just only for environmental concerns, but because the mining industry is looking for recovering low grade metals with new extraction technologies. Also As, Cr, Hg and Pb recovery from tailing dam water are highly protected.

Adsorption technology is preponderant and used with almost all the pollutants disclosed with 35 documents, followed by redox mechanisms (28), filtering (23), coagulation/flocculation(23) and precipitation (22). However, 22 other technologies are under



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