

Pharma Competitive Intelligence using open source data and visualization tool: towards metrics for drug R&D milestones

Background

Pharma-biotech industry is facing a changing world with many market challenges. It is facing a drying “drug pipeline” (Mullard, 2012), and it is exposed to a patent cliff with increased competition (Harrison, 2013). OECD countries are tightly regulating drug pricing and market access through health technology assessment. This industry is switching its business model from blockbuster to nichebuster, adopting new R&D management strategy based on the OI model (Schumhacher, 2013).

Purpose

In that context, technology scouting based on key opinion leaders, science shopping, speed dating is evolving toward pharma competitive intelligence (PCI) (Carlucci, 2005), for early detection of opportunities and market risk, by gathering, processing and analyzing useful information based on scientific and business information to support decision-making process.

Method

PCI could be build at the crossroad of technology forecasting (TF) and knowledge management (KM) (Canongia, 2007) and yield a wealth of information on competitor activities, R&D trends, emerging fields and strategic collaborations. TF would not rely only on patents as a major source of information (Grandjean, 2005), but would exploit clinical trials and market authorization data transparency, as well further specific sources to forecast market size based on demographic and epidemiological data. KM would take advantage of the information flow during the drug R&D cycle times (Fig.1).

Figure 1: Drug R&D time cycle and information flow.

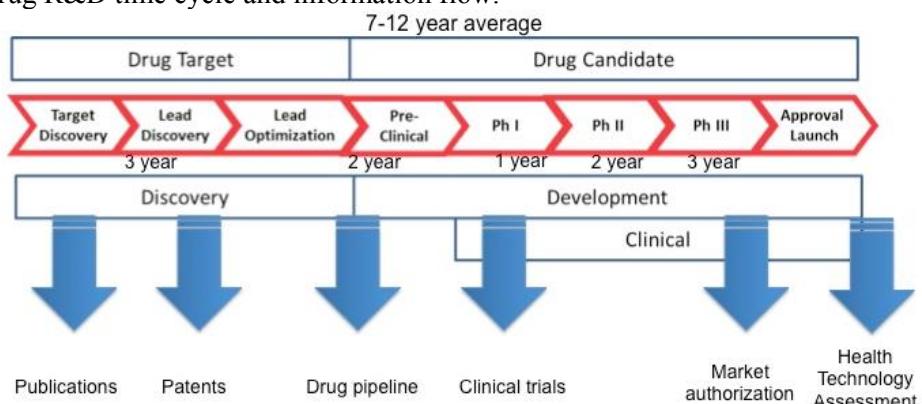
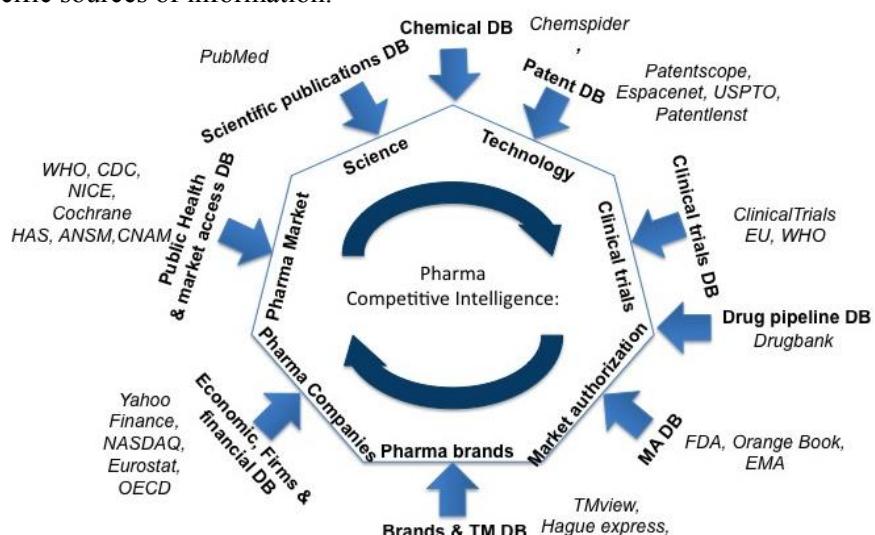


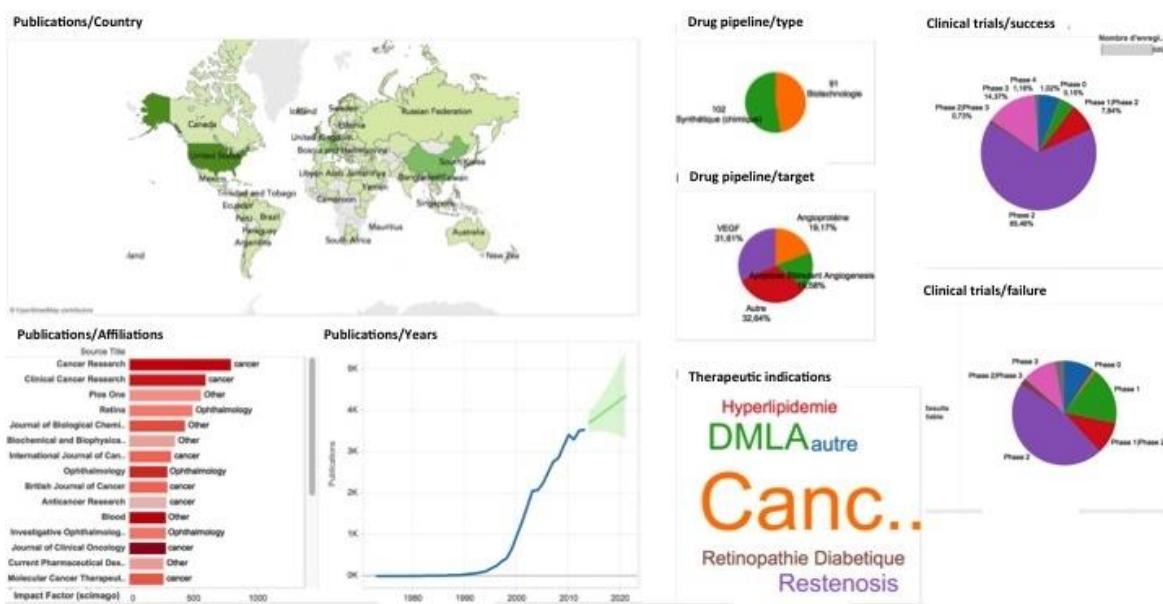
Figure 2: Specific sources of information.



Findings

Open sources databases with structured information were privileged, and we were able to identify specific sources of information for each milestone in drug R&D. To cross-references data extracted from those various sources (publications, patents, chemicals, diseases, and drugs), we took advantage of standardized classifications or thesaurus (respectively, MeSH, IPC, CAS, ICD, and ATC) (Fig.2). Contrary to the traditional statistical methods designed to verify a priori hypotheses, exploratory data analysis techniques were preferred to explore the underlying patterns and identify the systematic relationships between variables.

Figure 3: Angiogenesis inhibitors dashboard



Discussion

The goal of this research was to implement a versatile data visualization tool: we chose Tableau Desktop. This software has a server automation to filter large data sets, the ability to assemble data in dashboards, with customize annotations. Visualizations may be downloaded to local PC, making dashboard available to any collaborators, empowering entire organization, to visualize market trends, real-time clinical data, across geographies and demographics for decision makers. As an example, we will present a landscape of angiogenesis inhibitor drug and discuss metrics for drug R&D milestones.

Conclusion

All biotech startups should gather competitive intelligence information, but the problem is that in most biotech startups no one manages this flow of information nor is it organized in a systematic way. The analytical process that transforms disaggregated market and competitor data into relevant strategic knowledge that can be readily put to use by using opens source databases and data visualization tool. It also can help academic scientists learn about new technologies and trends in the industry R&D that could greatly benefit research laboratories by improving discovery platforms or by identifying public-private partnership opportunities.

References

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