

Technology Transfer and Libraries: Embedding the Library in the Technology Transfer Process

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Abstract: Technology transfer is becoming increasingly important to universities as a way to supplement their budgets and to attract and retain top researchers. In this paper, the authors argue that libraries are perfectly situated to embed in the technology transfer pipeline. Libraries can do this by providing access to high quality resources and by contributing better informed research to the technology transfer decision-making process. This paper is based on of several years of work by the Business Intelligence Unit at the University of Arizona. The authors would like to thank Cindy Elliott, Sandy Kramer, Jennifer Martin, and Jim Martin for their support and work in building out the current system.

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1. Introduction

As government support for institutions of higher education in the United States has decreased, the need for additional areas of revenue generation has increased. Since 2007-2008, per-student aid has decreased by 20% on average, while in Arizona that decrease has been greater than 45% (Mitchell and Leachman, 2015). Additionally, universities are feeling public pressure to curtail increases in tuition for students. For these and other reasons, universities have looked towards technology transfer as a way to help provide additional revenue.

Like private businesses, technology transfer offices need access to competitive intelligence to inform their decision making. Competitive Intelligence (CI) is defined by the AMA Dictionary of Business and Management as:

Information that has been analyzed and is therefore ready for use in decision making. Information becomes intelligence only when and after it is analyzed and prioritized. It is the link between raw information and business strategies based on information (Kurian, 2013).

Competitive Intelligence began to flourish in the 1980s (Anica-Popa & Cucui, 2009) and studies continue to find that the implementation of CI in businesses

results in sustainable growth (e.g., Stefnikova et al. 2015). The widespread adaptation of CI evidenced in Bulley's (2013) study that found the importance of CI in Ghana. Rothberg & Erickson (2012) studied the importance of CI by industry and found that the pharmaceutical industry devoted significant resources while the engine and turbines industry have a relatively low level of CI activity.

Attempts have been made to create a standard process for CI. Pellissier and Nenzhelele (2013) provide an overview of the existing research into the CI process and then propose a competitive intelligence process model based on their analysis of these studies. Pargaonkar (2016) argues that while plenty has been written about the uses of CI in sales, finance, and market intelligence, patent analysis has been under appreciated as a CI tool. Kislin (2013) argues that CI is best utilized when there is a balanced triangular relationship between the decision maker, researcher, and available information.

CI use in the technology transfer offices has varied. Johns Hopkins University builds a course around CI research that allows students to get hands-on training by working with their university's technology transfer office (Phan, 2014). Bradley et al. (2013) do an in-depth study of Proof of Concept Centers in the US and their role in providing CI to the technology transfer process.

2. Maximizing Internal University Resources - Using Business Intelligence for Informed Decision Making in Technology Commercialization

The Business Intelligence Unit [BIU] of Tech Launch Arizona [TLA] transforms raw data from primary and secondary research into meaningful, actionable information that is then used by the Tech Launch Arizona to support informed decisions by TLA staff. To facilitate the activities of the BI Unit, TLA tapped internal University resources and expertise toward the simple goal of making better informed, iterative decisions along the path commercializing of University intellectual property. This type of activity is often given lip service by institutions, but many fail to act from lack of a clear vision, lack of identified needs or gaps, or a lack of institutional support. TLA is proving how this much needed capability can be readily identified, adequately facilitated, and executed using many of the resources already available within a university.

Identifying the Need - Identifying the Business Intelligence needs of TLA was conducted through an internal analysis of the current commercialization decision making process, evaluation of current methods of assessment, and identification of gaps in the technology evaluation process. Two types of technologies emerged through this effort; those that had a clear path to market and identified licensees, and those that did not. For many of technologies that did not end up having a clear path to market, it turns out that the evaluation methods used were inadequate for the needs of the organization, the investigators, and the technology. A new, more robust method of internal analysis was needed. TLA embarked on a two month process of investigating

technology assessment needs and developed a Business Intelligence Framework for implementing a new process for technology assessment. TLA's Wheelhouse division identified the need for expertise in the areas of market research, domain specific experience, new venture development, and business strategy.

Rallying Resources - To this end, TLA began to refocus cross campus relationships to help bolster the BI Unit and fill in gaps in the technology assessment continuum. TLA enlisted help from the University of Arizona Library and its librarians for additional market research resources and searching expertise to gather secondary research. Secondary research is gathered through this unique partnership with the University of Arizona's libraries, the single largest collection of information resources available to the university, a group of highly-skilled cross disciplinary research librarians, and TLA's Business Intelligence Unit. This research is filtered and aggregated through a rigorous BI process to outline an initial opportunity assessment of the technology and its potential value to applicable industries.

In order to further bolster the resources available to the Business Intelligence Unit, Tech Launch Arizona began to solicit internal and external domain expertise from practicing doctors in our medical centre and from our world renowned scientists in UA laboratories, as well as from alumnus CEO's and Industry experts from local, regional, and national commercial partners. Guided by secondary research, BI Unit staff conduct primary research with the assistance of domain-specific industry experts. Informational interviews with internal and external domain experts, end users, and value chain partners help develop the value proposition and use case for the particular technology. The ability to have an internal and external network of domain experts across campus and in our region, expands the resources available to TLA and our Business Intelligence efforts.

The Effect – The goal of the research is to have full understanding of the problem faced by the industry, potential users, and how the technology can provide a valued solution. These items are illuminated for the licensing manager and the principal investigator through the BI process. Through analysing, challenging, vetting, and validating the information gained, the BI Unit provides actionable information and recommend next steps for the development of the technology. Understanding the value placed on the technology by domain experts, those who will use the product, and those who will facilitate the products path to market, removes guess work, reduces risk, and allows for value added proof of concept activities and directed licensing efforts by the TLA team.

3. BIU's Competitive Intelligence Report

Based on the existing standards cited above, the BIU created a CI report that was specific to the needs of TLA. A high level overview is available in Figure 1 below. Much of this research is available from open sources such as press releases, news articles, industry/trade sites, and social media, but solely relying

on this type of information is time consuming and may result in a lower quality product. Appropriate resources should be licensed in order to increase the speed of the search process and the legitimacy of the sources cited. The University of Arizona Libraries have added six new databases that assist in the research; four have a medical specialization, two cover high tech, and one is a specialty patent searching database.

Even with the addition of these new resources, the researchers must also search the latest academic literature to be able to provide the best possible technology assessment. Most technology emanating from technology transfer is likely to be cutting edge, so reports may not yet exist on the exact technology. In that case, the only place this information may be found is in the academic literature.

One thing critical for librarians to be aware of is that a librarian executed patent search is not exhaustive or authoritative; only a patent agent or attorney is qualified to do that type of work. However, the patent summary is a starting point for more research by the appropriately licensed individual and can also be valuable if it uncovers existing patents that would pre-empt the technology under review.

The final report should be in an executive summary format, usually 2 to 4 pages long, with links to all of the supporting documentation. It is important to summarize the supporting documents and supply page numbers and direct quotes from the reports and articles so the licensing manager can quickly access the information she/he deems most relevant.

Figure 1 – Major Sections of a the BIU’s Competitive Intelligence Report

- Market Overview Documents
 - Total Market Value
 - Growth Estimates
 - Major Companies
 - Major Investors
- Technology Assessment
 - What is currently being used in the market?
 - What are the major segments?
 - What is the likely market size for the technology under review?
 - Value chain analysis
- Industry Overview
 - Total industry trends, focus, and forecasts
 - Competing technologies (both direct and indirect)
 - Current products available
 - Regulations
 - Related articles and documents relative to the new technology

Approaching the Technology Transfer Office

The University of Arizona Libraries benefitted from being present when Tech Launch Arizona was formed, but it is still possible for libraries to insert themselves into an existing technology transfer process. Two analyses should be completed prior to approaching the technology transfer office. First, determine what currently subscribed to databases could be used for CI research, match those databases to what industries and technologies that they are best suited. Second, establish the current activity emanating from the technology transfer office by reviewing recent licenses, patents, and start-up companies formed. This work will aid in determining how relevant existing databases are to the technology that is spun out of the university, see figure 2 below for possible lines of inquiry.

Figure 2 – Analysis of Current CI Environment

- Do the existing resources provide insight into what the university is licensing and patenting?
- What sources are currently being cited by the technology transfer office?
- Is the technology transfer office pulling information from a general open web search, or is the technology transfer office accessing information from not-publicly-available specialized reports?
- Is the tech transfer office using library resources?

The next step is to set up a meeting with the technology transfer officer, if not the director of licensing, then a licensing manger. This meeting will serve as an information gathering interview which will allow the library to gain a better understanding of the role of competitive intelligence in their decision making process, see figure 3 below for some suggestions for possible questions.

Figure 3 – Questions to ask

- What tools they currently use?
- Do they pay for outside reports from market firms?
- How much money do they spend on competitive intelligence reports and resources?
- Have they ever considered partnering with the library to support this work?
- Analyse existing outside CI reports that the technology transfer office purchases. From these reports the library will gain a better understanding of the expectations of CI content and scope as well as insight into the information gaps.

If the technology transfer office is paying for outside marketing firms to create these reports, it is advised to get an estimate of their expenditures and to see the reports so you can get a better understanding of expectations. In the authors' informal analysis, we found that these reports run around \$5,000 each and often lack high quality sources of the information. That is because private firms often lack access to the competitive intelligence resources due to cost. Finally, many of the firms that create these reports only hire marketers who lack the research skills needed to find the hidden gems of information.

One of the benefits of the cooperation between the library and technology transfer office is the access to additional resources for the entire university. Often technology transfer offices will purchase access to a database for only one or two simultaneous users. The price can be significant when compared to the unlimited user option. By leveraging the library's experience in licensing databases access can be acquired often at a much better price per user than the technology transfer office can on its own. It has been the authors' experience that the price for one user is often 25% or more than the price of opening up the resource to IP authentication university wide. In one instance, the technology transfer office was paying more than 50% of the subscription price for university wide access.

Finally, the technology transfer office isn't set up to manage multiple database licenses with differing subscription dates and vastly different terms and conditions. This work is a traditional strength of libraries and by taking on the task of license management, the library can further build goodwill and a foundation for future collaboration.

4. Conclusions

A need for a thorough discussion of existing internal technology transfer practices that focuses on evaluation and decision support of commercialization efforts is apparent. Many technology transfer offices solely focus on the patent landscape, published articles and generalized market research in relation to the technology. This results in an expenditure of a large amount of money on patent

cost, proof of concept funds, and overall operations based on minimal information from their existing CI processes. Often there is little to no insight or decision support for the technology about the competitive advantage, perceived value proposition to the end user, or how the technology may integrate into an established value chain. A solution is needed to efficiently allocate resources to viable technologies while better serving all parties, the researcher, the technology, the licensing manager, and the University.

TLA's Business Intelligence Unit is an example of an effective solution to this well recognized need. It is the authors' contention that the technology transfer process will profit from increased cooperation with libraries. Librarians' knowledge of databases, research methods, and proper documentation standards fill a void that is currently present in technology transfer. Marketing firms and others that currently provide these competitive intelligence reports lack the access to and knowledge of the best resources available.

The result of librarians being involved in the technology transfer process is decreased cost for access to competitive intelligence resources, higher quality research, and savings to the institution as an outcome of this research.

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